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FEBRUARY 1997

MIX

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Project Studio Maintenance

Recording Vocals

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REMASTERING THE CLASSIC

A Cardinal Publication

World Radio History

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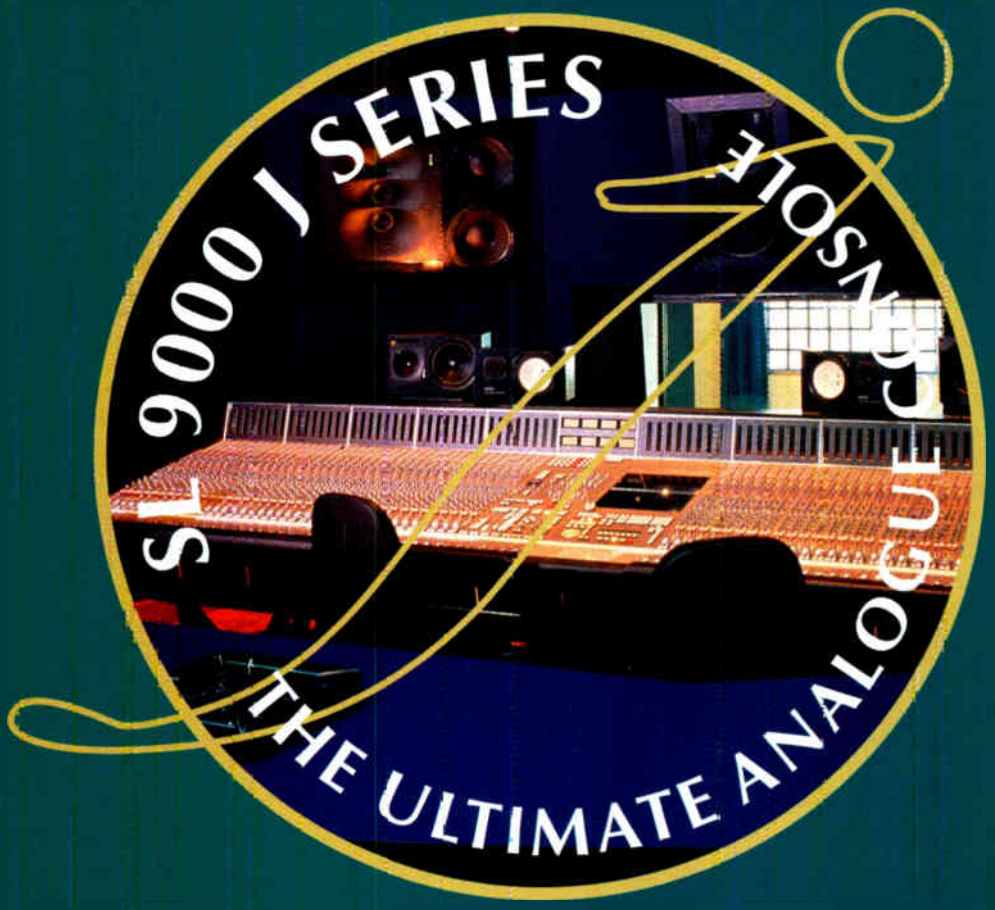

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ACTIVE MONITOR SERIES

Perspective Monitoring

Two Pros And Their Tannoys..

Five centuries ago, Leonardo da Vinci brought art and science together to create beautiful images using his knowledge of engineering, physics, geometry and perspective. • His images were so clearly rendered, so precisely represented, that the mechanisms he drew then could be recreated today. • Da Vinci maintained that the artist had to use the methods of science, and the scientist the tools of art. • Now, five hundred years later, Tannoy once again blends science and art to deliver the world's most advanced monitoring systems.

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"I have relied on Tannoy point source Dual Concentric loudspeakers for several years. Their resolution of time and space put them in a league of their own. Now with the advantage of state of the art filtering and amplification, the overall precision of the image and critical damping factor makes them an unbeatable combination at any price."

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• Beginning with the precise phase coherent drive units, the AMS series builds on Tannoy's unrivaled reputation for accurate imaging perspective. • Active monitors provide unparalleled low frequency accuracy, due to the extremely low impedance coupling of the amplifier and drive units, and the elimination of parasitic passive crossover elements. • Precise tailoring of the active filter elements allow matching of production tolerances to within 0.25dB, guaranteeing superb stereo imaging. • The amplifiers use aero-space tolerance components and design, with the components selected for their sonic qualities as much as their reliability.

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■ These are studio monitors designed to step aside and let you inside the musical perspective.

photo courtesy of Royaltone studios

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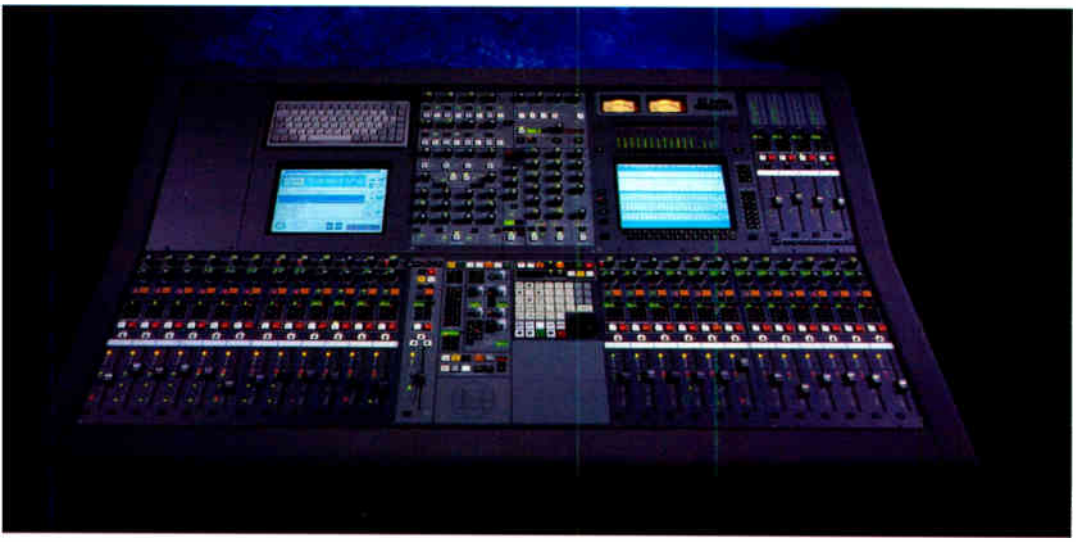

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FEBRUARY 1997, VOLUME 21, NUMBER 2 · PART ONE OF TWO

AUDIO

16 **The Fast Lane:** Flat on My Back *by Stephen St.Croix*

18 **Insider Audio:** Shrinking the Synth *by Paul D. Lehrman*

22 **Insights:** AMS Neve's Mark V. Crabtree *by Mel Lambert*

32 **Recording Vocals:** Thoughts From Both Sides of the Microphone *by Sarah Jones*

58 **Computer-Hosted Audio at AES** *by Philip De Lancie*

84 **International Update**
- "Riverdance: The Show" *by Stephen Webber*
- Olympic Studios *by Mel Lambert*
- A Connecticut Yankee's Guide to Studio English *by Stephen Webber*
- Alan Stivell's "Brian Boru" *by Barbara Schultz*

94 **Producer's Desk:** Patrick Dillett *by Dan Daley*

160 **Recording Notes**
- Counting Crows *by David John Farinella*
- Meat Beat Manifesto's Recombinant Dub *by Alex Artaud*
- Medeski Martin & Wood in The Shack *by Robin Tolleson*
- Classic Tracks: David Bowie's "Heroes" *by Blair Jackson*

PAGE 100

THE PROJECT STUDIO

68 **Project Studio Profile:** Chris Mars *by Adam Beyda*

70 **Project Studio Profile:** The Place *by Barbara Schultz*

72 **Project Studio Profile:** Serenity Records Solar Studios *by Sarah Jones*

74 **Project Studio Profile:** Magic's Studios *by Blair Jackson*

76 **Project Studio Maintenance** *by Dan Daley*

118 **Affordable Digital Effects Processors** *by Loren Alldrin*

PAGE 118

AUDIO POST-PRODUCTION

44 **The Force Lives On:** Remastering the "Star Wars" Trilogy *by Larry Blake*

100 **Post Script**
- Special Venue Audio: San Francisco, the Movie *by Tom Kenny*; Kaatskill Kaleidoscope *by Gary Eskow*
- "Swallowtail Butterfly" at Third Street Sound *by Maureen Droney*
- Restoring "The Umbrellas of Cherbourg" *by Eric Rudolph*

116 **New Products for Film/Video Sound**

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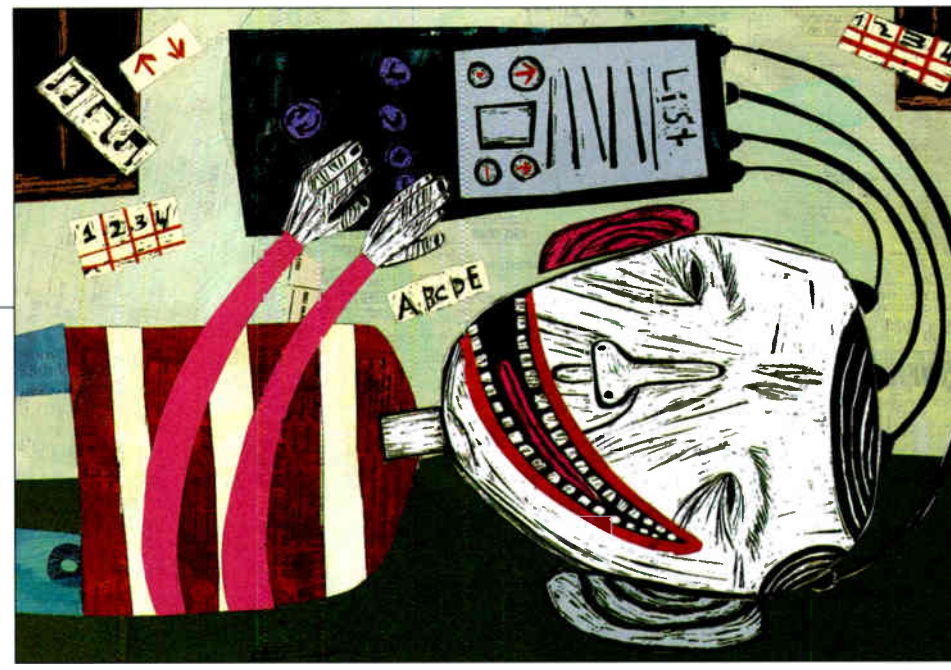

PAGE 15

PRODUCTS

124 **Preview/Hot Off the Shelf**

128 **Field Test:** Intelligent Devices AD-1 V2.0 Pro Audio Analyzer *by George Petersen*

130 **Field Test:** Horizon Music Upgrade I/O Cards for the Alesis ADAT *by George Petersen*

132 **Field Test:** TL Audio EQ2 Dual Parametric Valve Equalizer *by George Petersen*

136 **Field Test:** Event Electronics 20/20bas and 20/20 Direct Field Studio Monitors *by Barry Cleveland*

LIVE SOUND

138 **SoundCheck**
- New Sound Reinforcement Gear at AES *by Mark Frink*
- QuickTips

139 **Tour Profile:** Dave Matthews Band *by Mark Frink*

152 **Virtual Stage:** The Knitting Factory Debuts Interactive Internet Performance *by Evan Ambinder*

158 **New Products for Sound Reinforcement**

PAGE 139

DEPARTMENTS

8 **From the Editor**

10 **Current**

12 **Industry Notes**

182 **Coast to Coast** (Includes NY Metro, L.A. Grapevine, Nashville Skyline, Sessions & Studio News)

200 **Studio Showcase**

208 **Ad Index**

214 **Marketplace**

219 **Classifieds**

232 **Feedback**

PART TWO
1997 MIX
MASTER
DIRECTORY

Check out Mix Online
http://www.mixmag.com

Cover: Former Led Zeppelin bassist John Paul Jones has installed a 72-in, three-section Euphonix CS-2000M console into his JPJ Productions studio on the west side of London. JPJ, which had housed a Euphonix CSII since 1992, also includes Dynaudio main monitors. **Photo:** Christina Jansen. **Inset Photo:** Courtesy Lucasfilm Ltd.

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Now:

Audiowerk8, Emagic's new PCI based digital audio recording card, makes hard disk recording as easy as tape. With 8 discrete outputs, stereo analog ins and digital I/O, solutions are solutions without exceptions. Shipping with VMR, the "Virtual Multitrack Recorder", software so transparent, the manual is included in this ad. And for your growing studio needs, Audiowerk8 is fully compatible with the Logic Audio production system. The choice is simple, with a list price of $ 799.– creative expression with professional results is now affordable to all.

Home studio technology takes **a leap in quality** and **a drop in price.**

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MacOS and Windows '95 compatible.

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recording two additional tracks. You can name each track and access a virtually unlimited number of alternative takes.

2. High Definition Level Meters

Allows you to accurately monitor the levels of your recordings on each track.

3. Left and Right Locator Displays

Shows you the currently selected in/out points. Values can be easily edited with click/drag mouse operation. Values can be readily selected and dragged into any of the 20 positions in the Position Memory bank and vice versa.

4. Cycle Button

Enables cycle playback and record between the left and right locators.

5. Track Switches

Besides the standard switches such as Solo, Mute and Record, the Stereo Buttons allow you to group 2 tracks together as one track for easy handling.

6. Wave Display

The positive waveforms of your recorded tracks smoothly scroll from right to left during playback and recording. This allows you to easily navigate through your recordings.

7. Set-Locator Button

These buttons allow you to write the current "tape" position into the locator displays on the fly. Controllable either with the mouse or with a keystroke, these buttons allow you to quickly generate new left and right locators.

"tape length" you have left for your recording. It also indicates your current position within the recording.

9. Auto Drop Button

With this button enabled, the VMR will automatically switch to record mode using the currently displayed left locator as record IN and the right locator as record OUT.

10. Tape Button

You'll need to choose a "tape" before making your first recording. Pressing this button gives you a variety of tape length options depending on the size of your hard drive.

move or mixdown the data of "soloed" source tracks between the left and right locators to the tape position on a record enabled destination track.

12. Input Selector

Press "A" to choose the Analog Input, or "D" to choose the Digital Input on your Audiowerk8 Card.

13. Pitch Variation

Clicking on this button opens a display where you can simply enter the desired pitch value by clicking and dragging. Pitch ranges are from -9.99% to +9.99% in steps of 0.01%.

with each tape. 6 can be displayed simultaneously. To view others, simply click on the slider and drag left or right. Clicking on the "pair" button between 2 position memories gives you a "pair selection" which can be dragged into both locator displays simultaneously. Position memories can also be set and recalled via keystrokes.

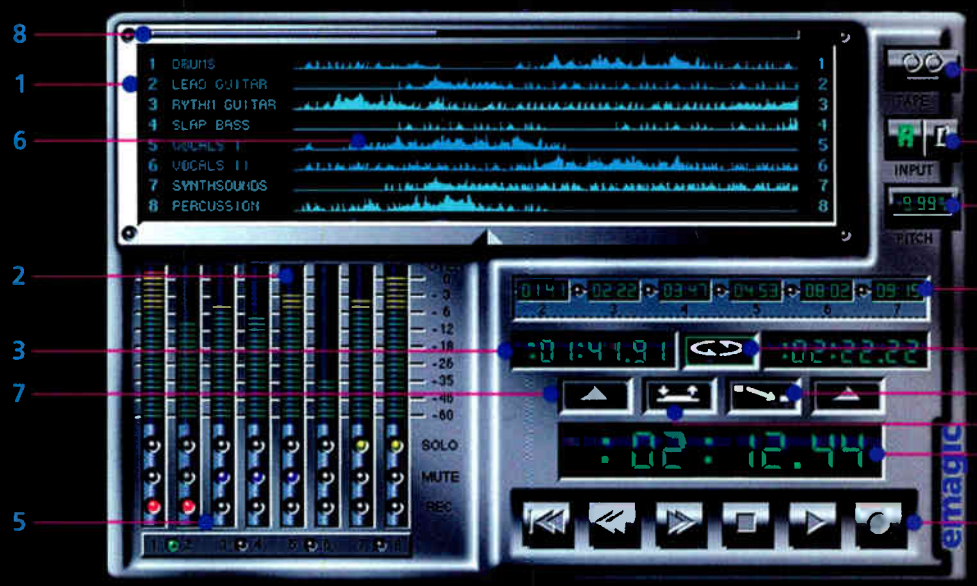
15. Position Display

Optimized for legibility, the position display shows you the current tape position. A maximum tape length of 1 hour, 59 minutes and 59.59 seconds can be displayed.

16. Tape Controls

As simple to use as the controls of any conventional multitrack tape recorder.

VMR "Virtual Multitrack Recorder" Software, included with Audiowerk8, Emagic's new 8 Channel Digital Audio Recording PCI Card.



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This turnkey solution is your easy introduction to Digital Multitrack Audio Recording.

AW8 plus Logic Audio Discovery

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AW8 plus Logic Audio

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The Audiowerk8 will be available in early March at leading music retailers. The suggested retail price is **$799.–** including the Virtual Multitrack Recorder Software. For more information about Audiowerk8, system requirements and all available upgrade options please visit our webpage or give us a call.

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FROM THE EDITOR

THE INFOGAP

Once upon a time, a not so very long time ago, the engineers who worked in studios were also the people who built much of the audio gear. If the console broke down during a session, help was right there in the control booth. As the studio industry evolved, engineers began diversifying, usually with a full-time maintenance tech caring for a multiroom facility and staff engineers handling recording duties.

In the project studio, today's engineer/owners are on their own when it comes to troubleshooting. There's no staff tech to call or engineer down the hall in studio 3B to give advice. Whether we're using semi-pro or pro gear, it all needs service eventually, and without regular maintenance, little quirks often develop into catastrophic failures.

For example, no pro studio would consider going even a week without maintaining or checking an analog 24-track. Yet, project studio owners run modular digital multitrack systems for months at a time without cleaning the guides or heads. A typical scenario: Don't think about upkeep until the MDM ejects a mangled master tape. At that point, it's easier to blame the manufacturer than the months of neglected maintenance. The same is true with workstations and computers: Once a disk crashes, it's too late to start thinking about backups or defragmentation software.

There are several factors at work here: It's easy to postpone maintenance costs when dealing with a tight project studio budget. Digital gear of any type (computers, recorders, mixers, etc.) rarely shows any outward symptoms before failure, as opposed to analog equipment, where a gradual loss of HF response and increased noise are early signs that something's wrong. Many project studios are owned by individuals who are musicians rather than technicians and may not be maintenance-oriented. And solid, useful information regarding maintenance is hard to come by.

So what does one do? The Internet offers new hope in audio forums where various audio pros converse, and many companies provide troubleshooting assistance on their Web sites. In this issue, Dan Daley presents tips from the pros on the topic of project studio maintenance. In keeping with our issue focus on the project environment, we also profile four successful facilities, look at vocal-recording techniques and offer a guide to affordable digital effects devices.

Also this month, our associate editor Tom Kenny steps up as managing editor of *Mix*. Tom started in 1988 and, since then, has moved us light years ahead in terms of editorial style and journalistic professionalism. In 1991, he expanded our coverage of sound for television and feature film production, which is unparalleled in the industry. For a taste, check out film sound columnist Larry Blake's report on the new audio track for the *Star Wars* reissue. The original was groundbreaking not only in its visual and audio excellence, but also because its success encouraged the acceptance of the Dolby Stereo film sound format. I look forward to hearing the new version.

Save me the sweet spot seat,

George Petersen

BPA INTERNATIONAL SPARS ABP American Business Press

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by David Schwartz and Penny Riker Jacob

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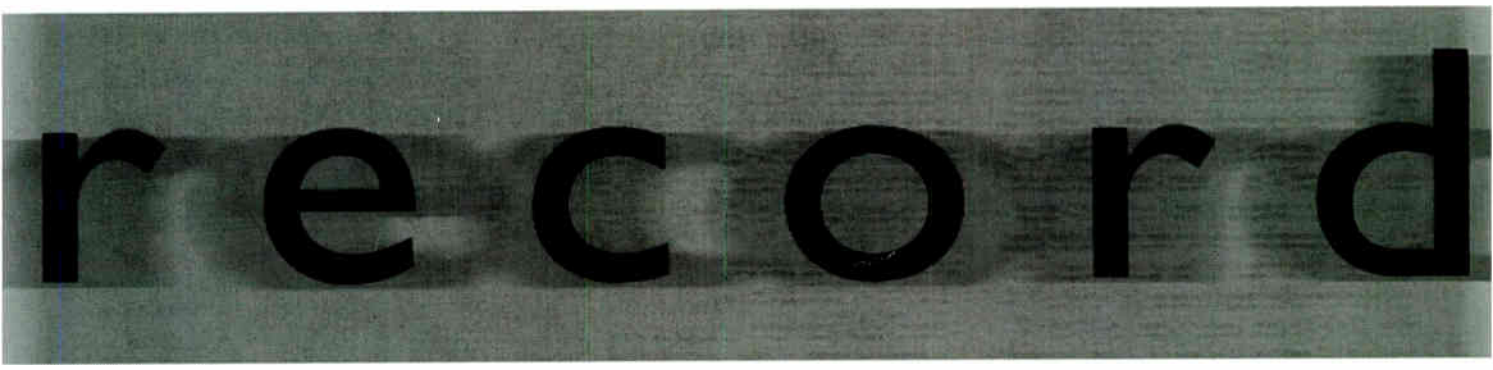

QUANTEGY

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CURRENT

MARK IV SELLS PRO AUDIO DIVISION

Mark IV Industries Inc. (Buchanan, Mich.) has entered into an agreement to sell Mark IV Audio, its ten-company professional audio group, which includes the Altec Lansing, DDA, Dynacord, Electro-Sound, Electro-Voice, Gauss, Klark-Teknik, Midas, University Sound and Vega brands. Mark IV Audio is one of several non-core divisions being sold as Mark IV Industries focuses on its automotive and industrial sectors.

The new parent company is an affiliate of Greenwich Street Capital Partners, a New York-based private equity fund. "We expect that having Greenwich as a parent company will produce very positive results for customers, and for our employees around the world," says Bob Pabst, president of Mark IV Audio. "Greenwich has a keen interest in the audio business, and it is clear that the interest is in dynamic growth and expansion." Pabst stressed that Greenwich is retaining current management personnel. "Our customers will be dealing with familiar faces, and personal relationships developed over the years will not be disrupted."

Under the new agreement, development plans include major investment in improved manufacturing capability, increased expenditures for new product development and the introduction of new marketing programs.

DOD REORGANIZES, CHANGES NAME

The DOD Electronics Corporation, based in Sandy, Utah, went through corporate restructuring and is now known as the Harman Music Group. The Harman Music Group is made up of three individual companies, DOD, DigiTech and dbx. John Johnson serves as president of the Harman Music Group, Wayne Morris is executive vice president, Elpitha Votsis is vice president of HMG's financial department, and Gerald Biesinger is vice president of human resources. In addition, the three divisions are headed up by individual management teams: Larry Banks is president of DOD, Rob Urry is president of dbx, and John Johnson is continuing to serve as acting president of DigiTech. "This new organization and separation of our three companies allows each brand to increase its focus and effort in the marketplace," says Johnson. "The move also allows us to better manage and maintain our growth."

In a related announcement, DigiTech introduced a new senior management team. Brian Scott is director of manufacturing, Jim Pennock is director of engineering, Randy Thorderson is director of marketing and product management, and Eric Shea is U.S. national sales manager. International sales are being headed up by Greg Héritier.

NARAS ANNOUNCES AWARD WINNERS

Recording Academy president Michael Greene recently announced the 24th annual Hall of Fame winners, and the 1996-97 Lifetime Achievement and Trustees Awards. The new recipients of the Lifetime Achievement Awards, which honor lifelong artistic contributions to the recording medium, are soul singer Bobby Blue Bland, pop duo the Everly Brothers, singer Judy Garland, violinist Stephane Grappelli, rock 'n' roll legend Buddy Holly, bandleader/composer/bassist Charles Mingus, pianist/composer Oscar Peterson and rock pioneer Frank Zappa. The 1996-97 Trustees Awards, which recognize outstanding contributions in a non-performing capacity, go to Herb Alpert and Jerry Moss, who together founded A&M and Almo Records, and the legendary songwriting team of Burt Bacharach and Hal David. The Lifetime Achievement and Trustees Awards, which are decided by vote of the Recording Academy's National Trustees, will be officially acknowledged during Grammy Week, later this month.

The Recording Academy also announced recipients of its 24th annual Hall of Fame Awards. Recordings inducted include Miles Davis' *Sketches of Spain* album (Columbia, 1959), Ray Charles' *The Genius of Ray Charles* (Atlantic, 1960), Louis Armstrong & The All-Stars' *Mack the Knife* (Columbia, 1960) and *An American in Paris* (Victor, 1929), featuring George Gershwin, conductor Nat Shilkret and the Victor Symphony Orchestra.

NASHVILLE SPARS CHAPTER FORMED

The Society of Professional Audio Recording Services recently formed a Nashville chapter, announced SPARS executive director Shirley Kaye and association president Tom Kobayashi. "We have SPARS chapters in Los Angeles, New York, Tampa and Miami," says Kaye. "SPARS local chapter meetings provide a forum for communication among our members and the professional community," adds Kobayashi. For information about Nashville SPARS, contact Glenn Meadows at Masterfonics (615/244-8866) or Lisa Roy at Studio A Referral (615/320-9394).

SHOW UPDATE

Next month brings AES Europe to Munich. The 102nd Audio Engineering Society convention will be held March 22-25, at the MOC Center. For details, visit www.aes.org or call 212/661-8528.

The National Association of Broadcasters announced that it has expanded the technical sessions and events planned for the upcoming NAB '97 and NAB Multimedia World in Las Vegas,

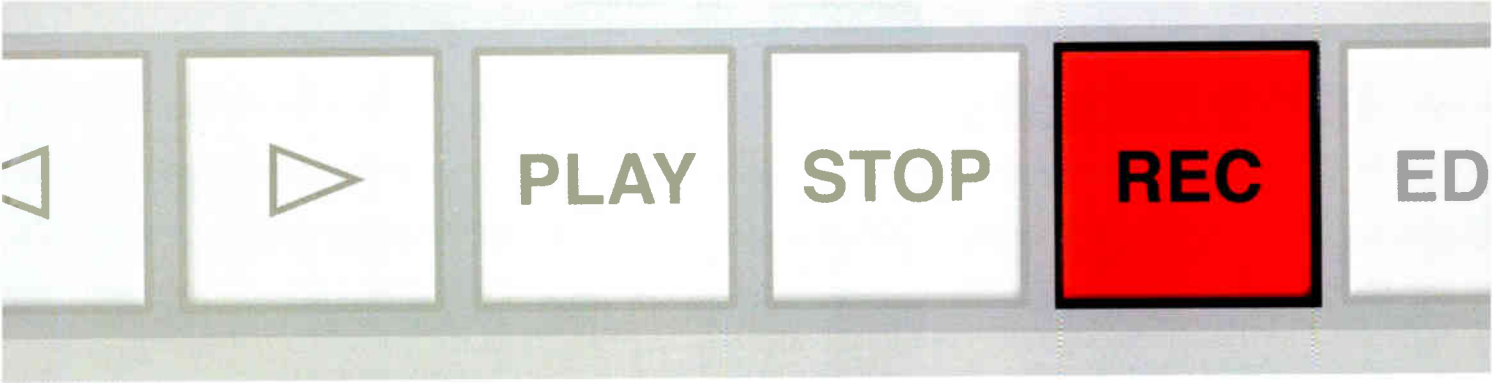
—CONTINUED ON PAGE 12

TEC AWARDS RETURN TO NEW YORK, DONATION ANNOUNCED

The 1997 Technical Excellence & Creativity Awards are returning to the New York Marriott Marquis on Saturday, September 27, 1997. Sponsorship and ticket information is now available. Call Karen Dunn at 510/939-6149 or e-mail KarenTEC@aol.com.

The Mix Foundation would like to acknowledge a donation of $500 to the TEC Awards in honor of the late Jason Perlman.

World Radio History



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INDUSTRY NOTES

Soundcraft, based in Nashville, appointed **Allan Nichols** to the position of vice president of sales and marketing. Nichols comes to Soundcraft from Mark IV Audio...**Michael MacDonald** was named vice president of installed sound at **JBL Professional** (Northridge, CA)...**Sennheiser** (Old Lyme, CT) was appointed exclusive distributor for **DAS Audio**, effective January 1; call 810/434-9190 for information. In other DAS news, **Nat Hecht** was brought onboard as U.S. director of sales and marketing... **Amy Huson** was promoted to vice president of marketing and customer service at **Orban** in San Leandro, CA...Designer/audio engineer **Bob Skye** joined San Francisco-based **Charles M. Salter Associates**, where he will specialize in the design of critical listening and performance rooms, theater and cinema audio systems, and sound systems for music performance spaces... **John Devins** was promoted to regional sales manager at **Alesis Corporation**, headquartered in Los Angeles...**John Monforte** was named director of audio at the **University of Michigan** in Ann Arbor... **Dr. John E. Koehler**, president of the Koehler and Co. telecommunications consulting firm, joined the board of directors at **Pinnacle Micro** (Irvine, CA)...**Horizon Music Inc.**, of Cape Girardeau, MO, was granted a United States Patent for its M.A.P.S. (Microphone Amplification System) technology...Chester, PA-based **Community Professional Loudspeakers** appointed **Noel Darby** as eastern regional sales manager for its U.S. market...**Robin Caine**, head of digital audio at **Pro-Bel Limited** (Berkshire, UK), was elected a Fellow of the Audio Engineering Society at the recent AES show in Los Angeles, CA...**Clear-Com Intercom Systems** brought onboard **Gary Keener** as central regional sales manager and **Pat Hamp** as eastern regional sales manager...**JRF Magnetic Sciences**, in Greendell, NJ, announced that it has changed the name of its 2-inch 8-track recording format from Ultra-Analog to Ultimate Analog to prevent confusion with California company UltraAnalog...**On the Road Marketing** and **Wilson Audio Sales** are the newest sales firms representing **Sabine** (Alachua, FL)...**Q Up Arts**, headquartered in Salt Lake City, was named exclusive distributor of **Greytsound** CD-ROM and CD-Audio sample library products... **AKG Acoustics** (Nashville) presented **Michael Chafee Enterprises** with a Rep of the Year Award at the recent Audio Engineering Society convention in Los Angeles...**Microtech Conversion Systems** moved into new, expanded headquarters, located at 2 Davis Drive, Belmont, CA 94002-3002; phone 800/233-3693 or 415/596-1900; fax 415/596-1915; or visit www.microtech.com... **RS Marketing** was named Rep of the Year by **Fostex** (Norwalk, CA)... **Daniel Abrams** was hired as engineering consultant and **Andrew McNutt** was promoted to marketing and media relations at **Thorburn Associates** in San Francisco... Audio electronics distributor **QMI** (Holliston, MA) appointed **Mac Pacific Marketing** to represent Drawmer and Chevin Research in Southern California, Southern Nevada, Arizona and Hawaii; and **Black Hawk Marketing** to sell Chevin Research in the Pacific Northwest...**dbx Professional Products**, based in Sandy, UT, celebrated its 25th anniversary at the fall AES show in Los Angeles, CA...**Furman Sound Inc.** moved to new offices on the first of this month. The address is 1997 S. McDowell Blvd., Petaluma, CA 94954-6919; phone 707/763-1010; fax 707/763-1310... Culver City, CA-based **Fairlight USA** hired **Griffin Public Relations and Marketing** (New York City) to serve as its U.S. public relations agency... **Brigham Hardy** joined **Samick Music Corporation** (City of Industry, CA) as credit manager. ■

—FROM PAGE 10, CURRENT

April 5-10. For registration information, call NAB's fax-on-demand service at 301/216-1847, or visit www.nab.org.

This year's NSCA show will take place at the New Charlotte Convention Center, in Charlotte, N.C., from April 18-20, with Pre-Expo Education taking place April 16 and 17. For more information, call NSCA at 708/598-7070, or browse www.nsca.org.

TAX DEDUCTION FOR MUSIC OVERSTOCKS

Under Section 170 (e) (3) of the U.S. Internal Revenue Code, excess, overstock inventory of recorded music, musical instruments, sheet music and related products can be turned into a federal income tax deduction, when donated to a qualified charity. Certain restrictions apply; for a free guide, and step by step instructions, phone the nonprofit National Association for the Exchange of Industrial Resources at 800/562-0955.

WEB DEBUTS

Melbourne, Australia's ARX Systems launched a home page, at www.arx.com. Features include product details, reviews, a factory tour and general audio information.

Intelix's new Web site, at www.intelix.com, contains a variety of resources and linked information including "Six Solutions for Contractor Satisfaction," "News & Views" and a company personnel contact page.

The Global Showcase is an Internet business aimed at helping musicians and audio professionals showcase their abilities and make contacts. At www.globalshowcase.com.

Klipsch Professional now has a home page, featuring product info and more. Visit www.klipschpro.com.

MasterDigital Corporation debuted a Web page at www.masterdigital.com, which includes information on the CD mastering and audio restoration services it provides.

The Music Power Network's home page, at www.musicpowernetwork.com, is an online musician's guild/support site created by and for music industry professionals.

ProMusic introduced a Web site at www.promusic-inc.com. There, find the latest information on new releases and more. ■

CHECK OUT THIS MONTH'S MIX ONLINE!
http://www.mixmag.com

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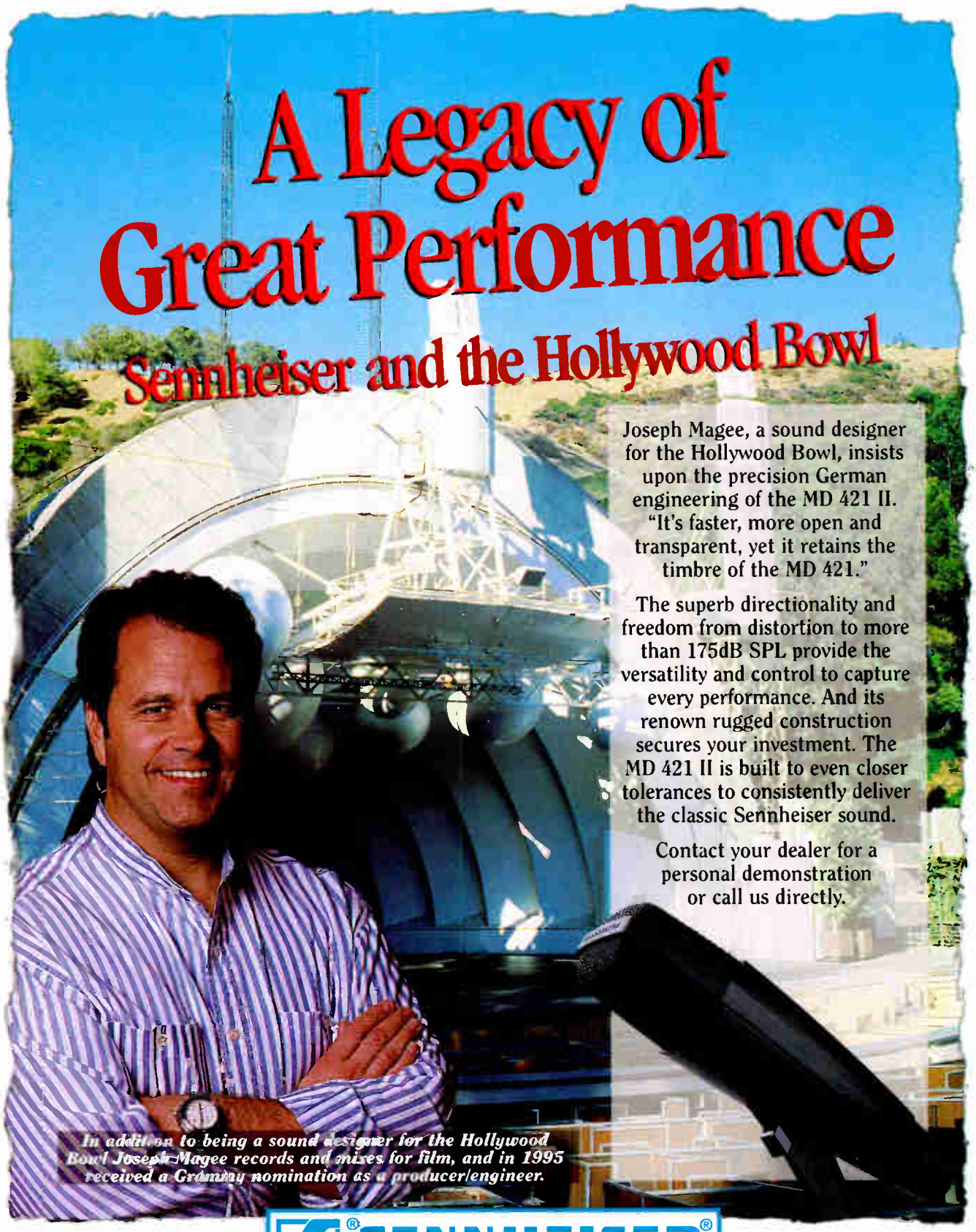
A Legacy of Great Performance

Sennheiser and the Hollywood Bowl



Joseph Magee, a sound designer for the Hollywood Bowl, insists upon the precision German engineering of the MD 421 II. "It's faster, more open and transparent, yet it retains the timbre of the MD 421."

The superb directionality and freedom from distortion to more than 175dB SPL provide the versatility and control to capture every performance. And its renown rugged construction secures your investment. The MD 421 II is built to even closer tolerances to consistently deliver the classic Sennheiser sound.

Contact your dealer for a personal demonstration or call us directly.

In addition to being a sound designer for the Hollywood Bowl Joseph Magee records and mixes for film, and in 1995 received a Grammy nomination as a producer/engineer.

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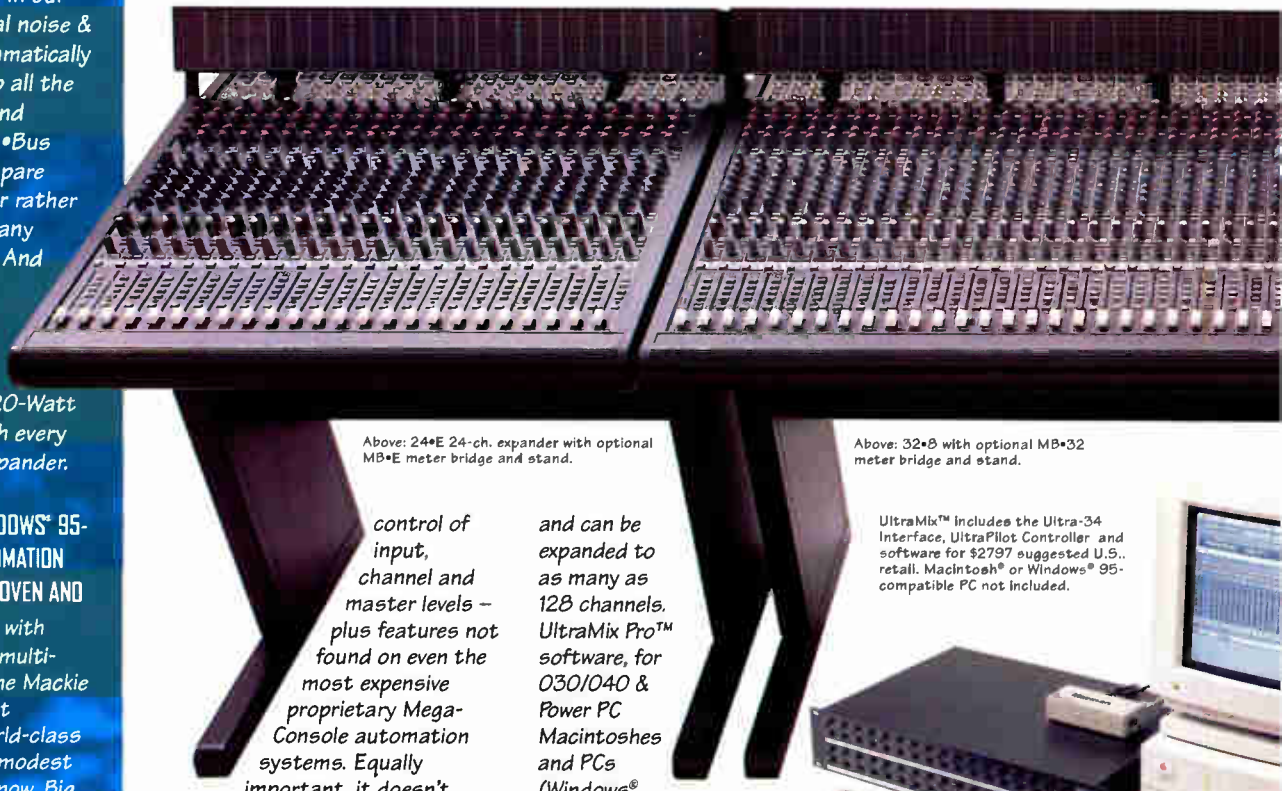
7 REASONS TO BUY OUR TO MIX MORE CREATIVELY,

1 VLZ CIRCUITRY FOR ULTRA-LOW NOISE AND CROSSTALK. *A fancy new name for the same old circuitry? Nope. VLZ (Very Low Impedance) is a Mackie innovation based on solid scientific principles. Through the careful deployment of high operating current and low resistor values at critical points in our consoles, thermal noise & crosstalk are dramatically reduced. Open up all the channels, subs and masters on an 8•Bus console and compare what you hear (or rather don't hear) with any Brand X console. And because VLZ circuitry needs loads of high current, we ship a humongous, 220-Watt power supply with every 8•Bus & 24•E expander.*

2 IT EXPANDS ALONG WITH YOUR NEEDS AND BUDGET. *You'd be surprised just how many 8•Bus console setups like the one below are currently in use. But you don't have to start out this way. Start out with a 24•8 or 32•8 and then grow your 8•Bus console 24 channels at a time with our 24•E add-on modules. 1, 2 or even 3 of 'em connect in minutes. They come with their own 220-watt power supply; optional meter bridges are available.*

3 IMPECCABLE MIC PREAMPS. *A console can have motorized dooflammers and an optional MIDI espresso attachment, but if the mic preamps aren't good, you don't have a fully-useful production board. Our discrete preamps with large-emitter-geometry transistors have won a critical acclaim for their exceptional headroom, low noise (–129.5dBm E.I.N.) & freedom from coloration. VLZ circuitry in the preamp section also reduces crosstalk.*

4 THIS CONSOLE JUST PLAIN SOUNDS GOOD. *Sure, you may be able to buy a Brand X console for less. But you end up with a console that sounds like…well…a Brand X console. Granted, we're getting into a pretty subjective area here…but we have tall mounds of 8•Bus warranty cards that rave about our consoles' "clarity," "sonic purity," "sweet sound," "transparency," "lack of coloration" and a lot of other superlatives we wish we'd thought of first.*



Above: 24•E 24-ch. expander with optional MB•E meter bridge and stand.

Above: 32•8 with optional MB•32 meter bridge and stand.

7 MAC® & WINDOWS® 95-BASED AUTOMATION THAT'S RELIABLE, PROVEN AND AFFORDABLE. *Along with affordable digital multi-track recorders, the Mackie 8•Bus has made it possible to do world-class productions on a modest budget. But until now, Big Studios have still had one remaining and unattainable creative "secret weapon"… computerized level automation. That's why we developed the UltraMix™ Universal Automation System. It gives you fully editable and recallable control of input, channel and master levels – plus features not found on even the most expensive proprietary Mega-Console automation systems. Equally important, it doesn't degrade sound quality, introduce zipper noise or cause audible "stepping." UltraMix is currently being used to mix network television music themes and on several major album projects – by seasoned engineers who grew up on Big Automation Systems. Their verdict is that UltraMix is a serious automation solution – stable, reliable and frankly easier to use than more expensive systems. The basic system controls 34 channels and can be expanded to as many as 128 channels. UltraMix Pro™ software, for 030/040 & Power PC Macintoshes and PCs (Windows® 95 required), includes a wealth of features like editable fader curves, built-in level display, up to eight subgroups, SMPTE time code display, event editor with pop-up faders, optional control of outboard effects devices, and the ability to play Standard MIDI files from within the program.*

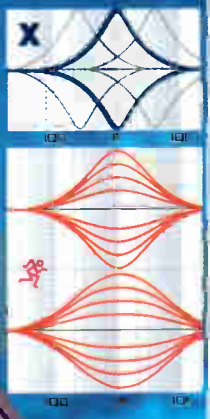
UltraMix™ includes the Ultra-34 Interface, UltraPilot Controller and software for $2797 suggested U.S.. retail. Macintosh® or Windows® 95-compatible PC not included.

World Radio History

8-BUS CONSOLE... AND 2 TIPS ON HOW EFFICIENTLY AND, WELL, MORE FUNLY.*

5 PROFESSIONALS REALLY USE THEM. *The members of Boyz II Men could have afforded any console they wanted for their studio's second room. They chose an 80-input 8•Bus setup with 102 channels of UltraMix™ automation. In the studios of artists as diverse as k.d. lang[1], Yes, Queensryche, Aerosmith, Lee Roy Parnell, Bryan Adams, Carlos Santana, Whitney Houston, Eric Clapton & U2, our consoles really are used to make great music.*

6 WIDE MID RANGE EQ. *Whether you're tracking or mixing, equalization is one of your most important creative tools. Mackie's 8•Bus consoles feature extremely-wide-bandwidth peaking EQ that can be used to achieve effects that simply aren't possible with narrower EQ. Most Brand X midrange EQs have a fixed bandwidth of about 2 octaves (blue graph at right). You can sweep it up & down the frequency spectrum, but the "sharpness" of the EQ curve is always the same. This kind of EQ is good for some purposes... but if you've worked with it before, you know it's too drastic and localized for gentle changes in overall tonal coloration.*



The 8•Bus' true parametric H Mid lets yo spread th band- width out to as muc as 3 octaves (red curves above). That extra octav of "width" gives you a whole new creative palet

Above: 24•E 24-ch. expander with optional MB•E meter bridge and stand.

Above: The SideCar, matching 8•Bus equipment rack.

8 WHAT ULTRAMIX AUTOMATION CAN DO FOR YOU:

- *Hone a complicated mix one track at a time with every fader move recorded*
- *Clone your best fader moves and use them in other places in the mix*
- *Automute unused sections of your tape tracks or noisy MIDI sound modules*
- *Via automated mute or fader cuts, make a composite mix ("comp track") from the best moments of several tracks of the same vocal or instrument*
- *Save mixes for recall and editing at any time (great for mixes with music beds or "donuts")*
- *Make six voice-over versions of a jingle mix – and then easily make the inevitable nitpicky client changes three days later*
- *Step up to big-league automation without breaking the bank!*

9 LEGENDARY RELIABILITY. *One of those factors you probably don't think much about – until your console goes down in the middle of a critical late-night session. Built with pride in Woodinville, WA USA, Mackie 8•Bus consoles have an enviable three-year track record for enduring continuous, round-the-clock use and abuse.*

* Poetic license applied for.

1 Mention in this ad denotes use only, as reported to Mackie Desi and is in no way intended to constitute official endorsement the artists or groups listed.

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FLAT ON MY BACK

A HORIZONTAL LOOK AT TECH-TOYS

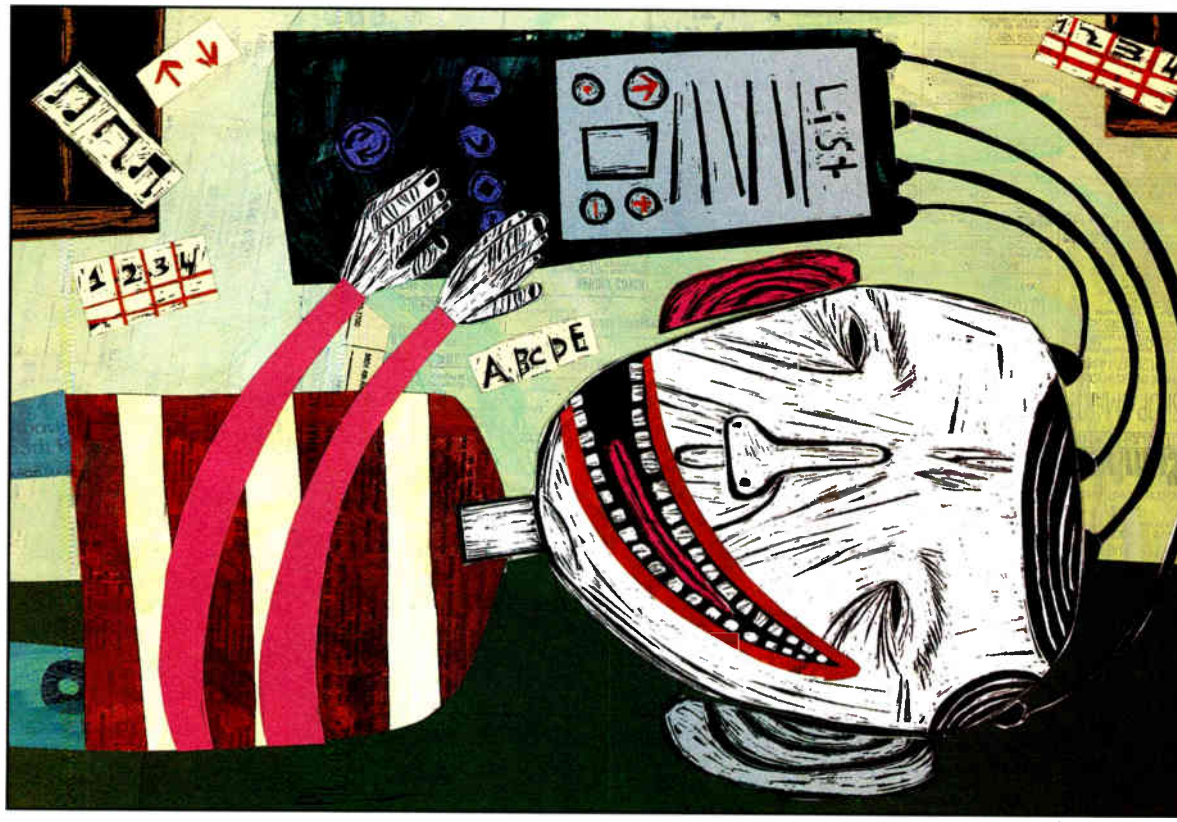

ILLUSTRATION MELINDA BECK

So I'm sitting on 35 k of custom HD when this flaming jerk comes along and slams into me from behind. There were eight of us in a group, with three of us sitting dead-stopped on U.S. Highway 1 waiting to turn left into a year-end Harley rally, and the other five slowing to a stop behind us. But this moron for some reason decided that he would suddenly see how fast his giant full-dress cruiser could go, and to the dismay of his passenger, opened it up full on. The state trooper who saw the entire thing turned to his friend and said, "Watch. That guy is going to have an accident." Jerk locks up the rear brake, never even touches the front brake, and slides 80 feet, hammering me (and only me) dead center rear. When they come to get his bike, they find it is in *fifth* gear! Questioning several of the 150 or so witnesses—all bikers—it seems this guy was doing about 75 miles per hour. He got both me and my bike into the air, and then I landed and slid for some infinite period, and the bike then landed on me and we slid some more. Needless to say, I am in bed, in pain, and will be for some time.

The moral of this intro? Nothing new, just a new twist on that old standard: Watch your back.

How does this relate to you? Well, it relates about as well as I usually do—sorta. What do *you* do when you are confined to bed because of a particularly violent and insane attack by a brain-dead motorcycle aimer? Probably exactly what I do: buy toys. I mean, I can't work because I can't sit in a chair—too much damage to my lower spine. I saw everything on TV worth watching in the first quarter of the first day, and that was probably only fun because of the painkillers. So I began a www search for small tech-toys that might be useful in or around our industry. I came up with two very cool tiny monsters. One will be covered now, but the other proved *totally impossible* to get my hands on in any way, pulling every string I own, including that old sophisticated standby that all of us columnists use: rolling in the dust and crying in the street directly in front of the offices of the manufacturer of the item in question. And I assure you that was a painful exercise for me, given my previous rolling-in-the-dust-and-crying-in-the-street incident detailed above. So here is the one I did get:

What fits in the palm of your hand and is cool enough to get you a little free sushi? This one is easy—the Pilot from USRobtics. This piece o' tech is definitely as close to the dream of "digital paper" as I have found. I have seen Pilots around for a while but couldn't really think of any actual reason to use one, so I

BY STEPHEN ST.CROIX

—CONTINUED ON PAGE 209

World Radio History

Bag End Time-Align® Gems

The Bag End Quartz, Crystal and Sapphire combine the fidelity and efficiency of the ELF™ and Time-Align technologies to bring studio quality sound to the concert venue. The low frequency extension and unprecedented sound quality offered by the ELF™ technology is even more incredible when the small size of the Quartz 4 x 18" enclosure is revealed. The Crystal and Sapphire offer highly directive Time-Align mid/hi systems designed for smooth arrayable coverage, bringing point source clusters to their physical limits. Call us for the details.

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SHRINKING THE SYNTH

PROS AND CONS OF THE NEW SOFTWARE TECHNOLOGIES

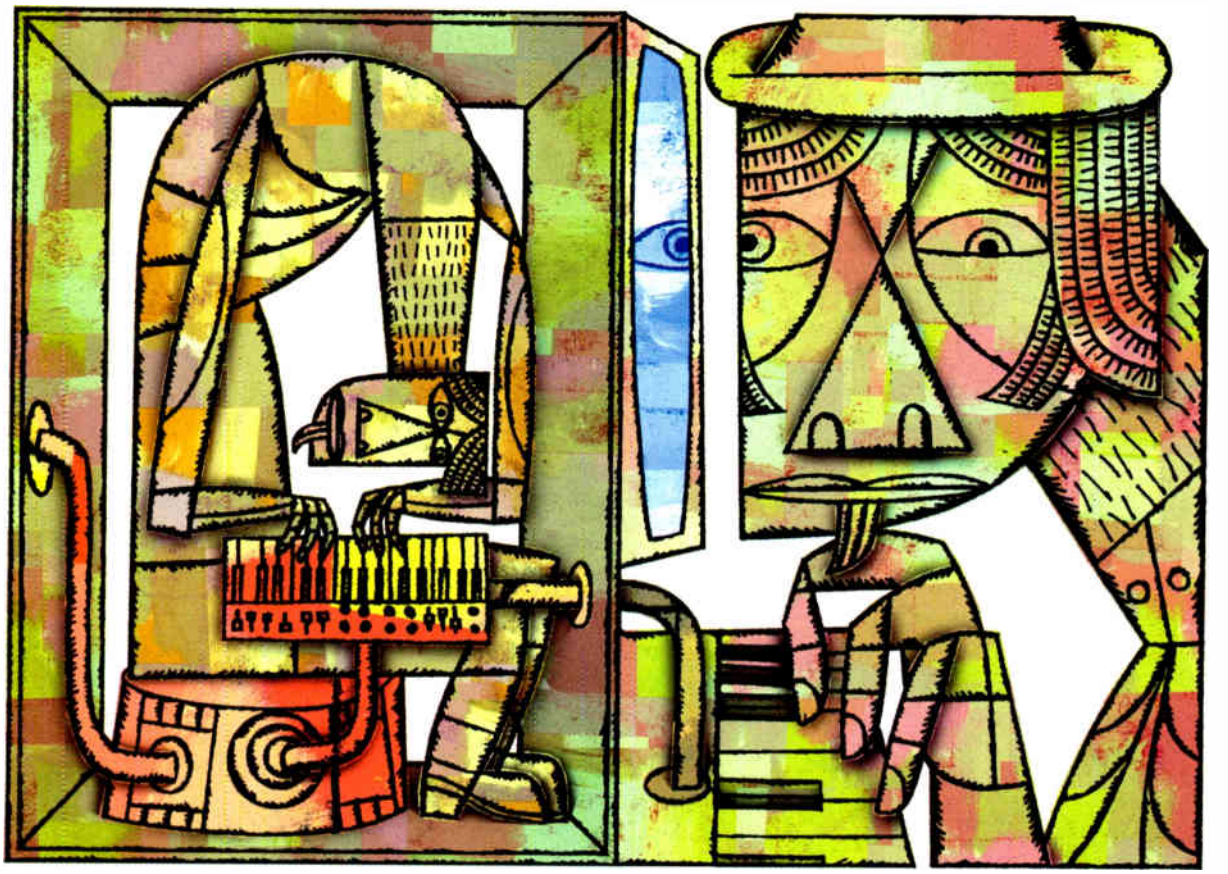


ILLUSTRATION: RICHARD DOWNS

BY PAUL D. LEHRMAN

Last month I talked about the new level of complexities that synthesis is heading toward. I extolled the virtues of physical-modeling technology, whose real-time-oriented control capabilities are demanding a higher level of involvement on the part of the synthesist.

You got a problem with that? Too dry, too expensive, too involved, too *much work*? Okay, this month, how about we go in the opposite direction: cheap, and hands-off? Or even better, *free* and *totally* hands-off? We can do that. And the scary part is, this direction may turn out to be our best hope for a decent soundtrack as we hurtle on down the information superhighway.

Let's back up a little. We all know about computer sound cards, those horrid things with two-operator FM chips that produce nasty noises in the background while you play games, and that have made MIDI a dirty word in multimedia circles. Well, sound cards have gotten a lot better of late, using chips with sophisticated sound engines and decent sample sets from manufacturers of high-end synth gear, but their era may be drawing to a close. Computer manufacturers are putting more audio DSP hardware on their motherboards, for things like digital recording, voice mail and speech synthesis, and a lot of that hardware can handle music synthesis just as well. With all of that stuff already on there, adding a synth chip, maybe a reverb processor, and a couple of megabytes of sample ROM right onto the motherboard is child's play. Communicate with the chip over an internal bus using MIDI for the control language (just like a sound card), run its output through the computer's onboard digital-to-analog converter, throw in some MIDI file playback software, and *voilà!*—a synth studio in a box.

Does this cost very much? I've heard reports that the per-unit price to computer manufacturers of some OEM synth chips is about to drop down to about the level of a Zip cartridge, and maybe lower. And not only is the cost invisible to the user, so is the technology: no more trying to figure out if the card on the store shelf fits into the type of slot in your computer, no more IRQ conflicts or hardware jumpers. No more driver software issues ei-

World Radio History

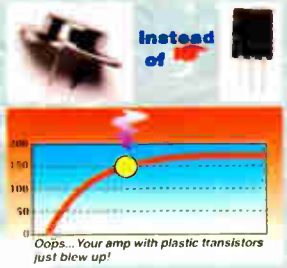
How do you improve the world's best selling power amp?

Popular wisdom says "don't change the recipe when you're making good biscuits." The reason the CS 800 has remained dominant for over twenty years is that we've only changed it a few times and when we did, we knew what to throw out and what to keep.

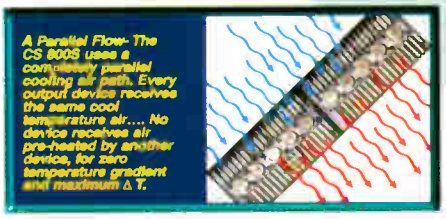
Very carefully!

What to Keep

The new CS 800S uses metal (TO-3) power transistors, because plastic devices just don't deliver equivalent thermal performance. While metal devices can be used right up to silicon junction failure, plastic devices degrade 50°C (90°F) sooner. This margin of "thermal headroom" can be the difference between a really loud finale and something more final.



Oops... Your amp with plastic transistors just blew up!



Books have been written about thermal management, but it all boils down to three things: air flow, heat sink area, and Δ T (the difference between the heat radiator and ambient air). The CS 800S uses a unique "parallel flow" heat sink alignment so every transistor receives the same cool temperature air for optimum Δ T.

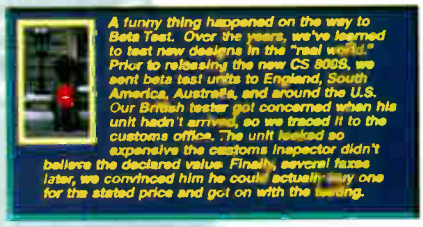
With two variable-speed 32 CFM fans cooling hundreds of square inches of heat sink area, and metal (TO-3) power devices (in the air stream), the CS 800S will play very loud for very long (years - not minutes or seconds).

The audio amplifier section uses proven Class A/B ultra-linear complementary topology with several improvements that further reduce the distortion/noise floor even lower than the already "audiophile quality" CS 800X (40 v/μsec, <0.03 % thd, etc.)

Our exclusive output circuit design (patents pending) completely compensates for amplifier output impedance. We conservatively spec damping factor at 1000 but it is only limited by component tolerance.

Modular inputs and outputs provide flexibility in configuring the CS 800S for your application. Binding post, or Speakon® outputs, it's your call. A clever input circuit accepts anything from XLR balanced line level signals to single-ended speaker level signals. Caution: don't try this with a non-CS amplifier; speaker level input signals will fry most amps on the market today!

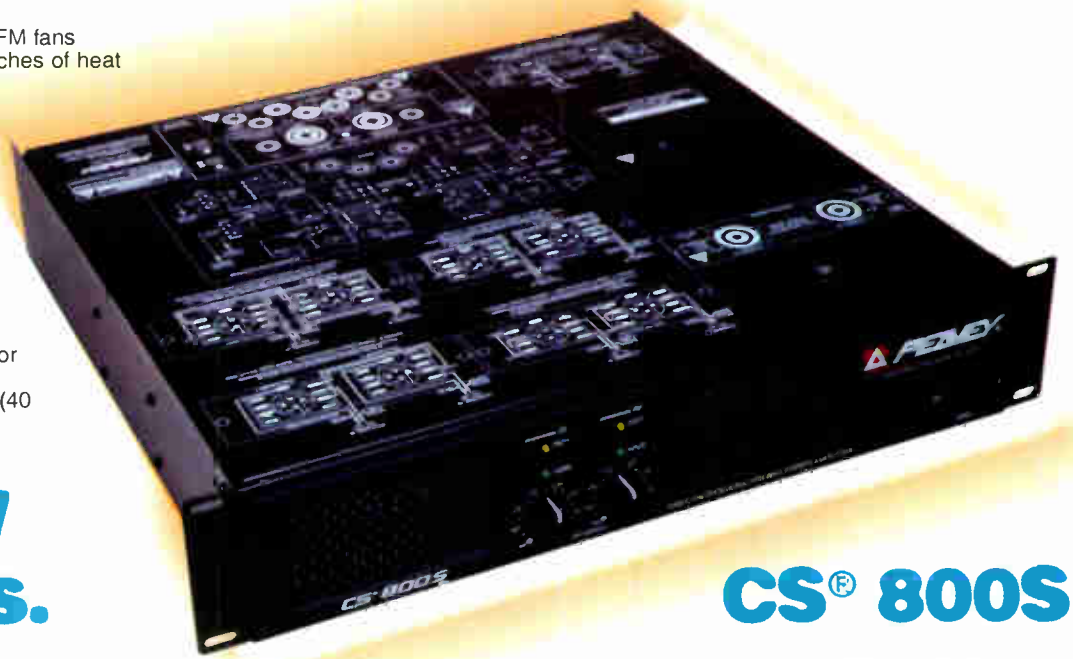
DDT™ - A fast-acting limiter, triggered by clipping or current limiting, which prevents speaker/equipment damage, is probably our most copied feature. Only Peavey Electronics offers "true" DDT. (U.S. Patent #4,318,053)



What to Change

The new CS 800S is two rack spaces high and weighs only 23.5 lbs! The CS800S wasn't lightened by using a smaller power transformer and fewer output devices on a "trick" heat sink. We used our years of digital and "switchmode" experience to develop an advanced high frequency power supply. More than just a replacement for the old heavy iron transformer, intelligent load and thermal sensing dynamically interact to provide more power, longer, and more reliably than previous approaches.

This, combined with our more than 30 years of experience building the most reliable solid-state amplifiers in the world, allowed us to redesign the whole amplifier from input to output, merging the best of the old with the best of the new to deliver 1,200 watts of superior performance without breaking your back **or** your pocketbook. The CS800 just keeps getting better!



1200 W
23.5 lbs.

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MARK V. CRABTREE

MANAGING DIRECTOR OF AMS NEVE

BY MEL LAMBERT

Few professional audio companies can lay claim to two decades of continuous operation under the same capable direction. Exactly 20 years ago, Mark Crabtree set up Advanced Music Systems to combine an interest in electronics and microprocessor technologies with his love of music.

The rest, as they say, is history—and what a roller-coaster ride it has been. Through several changes of ownership and concomitant alterations in corporate direction, Crabtree has retained his faith in the fact that good design, vigorous product support and attention to customers' requirements will win out over flash and glitter. The name AMS Neve has come to represent state-of-the-art analog and digital technologies.

Crabtree on the Libra with RMX-16 reverb and S-DMX delay

Twelve months ago, Crabtree bought back his company from Siemens Austria—which had purchased Neve in '86 and AMS in '90—and began to reshape the AMS Neve management team to move forward with exciting developments in both analog and digital consoles and editing systems. We caught up with this soft-spoken captain of industry in the middle of a busy morning of meetings at his Burnley, North England, headquarters.

What were the first products from Advanced Music Systems?

We started off making a tape-phase simulator, which involved a pair of analog bucket-brigade devices working in parallel to replicate the use of two tape machines. My interests have always been music and electronics. I originally designed the tape-phase simulator to be a [delay-loop] effects unit like the [Watkins] Copycat. I had one and was extremely impressed with it. I used serial analog delay chips for the prototype, but the delay wasn't long enough, and it was noisy. So I [rethought the design] and made it into a tape-phase simulator, instead. Then we followed that up with a DDL to give us the length of delay, which ended up as the very popular DMX 1580. I made it as a modular design so that you could add different cards for different effects. But when we started working on the reverb, a complex set of front-panel controls were needed, which would be hard to add [via a plug-in card]. So in 1981, we produced a separate unit, the RMX-16 digital reverb. There were three of us originally in AMS: myself, Stuart Nevison and Pete Unsworth.

The AudioFile hard disk editor/recorder came later, as a subsequent development?

Yes. These first products were mainly used in the music-recording market, but we always tried to have the technology as advanced as possible. Even the early systems would have a full second of full-bandwidth delay, which, at the time, was enormous. But people in the post market wanted to use it as a layoff recorder—to slip tracks instead of doing it laboriously with ¼-inch tape. To use this long delay effectively as a RAM recorder, they needed some software [to control start and end points], which led to all sorts of other possibilities—the use of RAM-based recording as the original sampler.

The post community that used [the DDL loop editor] as a lay-on/lay-off device found that it saved a lot of time. But, they said, it would be really nice if we didn't lose the contents of memory. So, in the early '80s, I started looking for an acceptable disk drive and came across a 380MB Maxtor drive, which was astonishing, because the other drives we'd been playing with had capacities of only 10 to 20 MB; the larger drive would give us a good hour of recording!

To cut a long story short, that became the 8-track AudioFile system, with software-defined buttons around the display screen. We added scrub editing and increased the track capacity to 16 and then 24 tracks, with timecode lock and other features.

How did the Logic Series of digital consoles come about?

A lot of people were pairing up AudioFiles with analog mixers—this was a little frustrating because of the additional A-to-D and D-to-A stages involved, rather than using a digital port. We made a few designs for a simple mixer that could be added to AudioFile. About this

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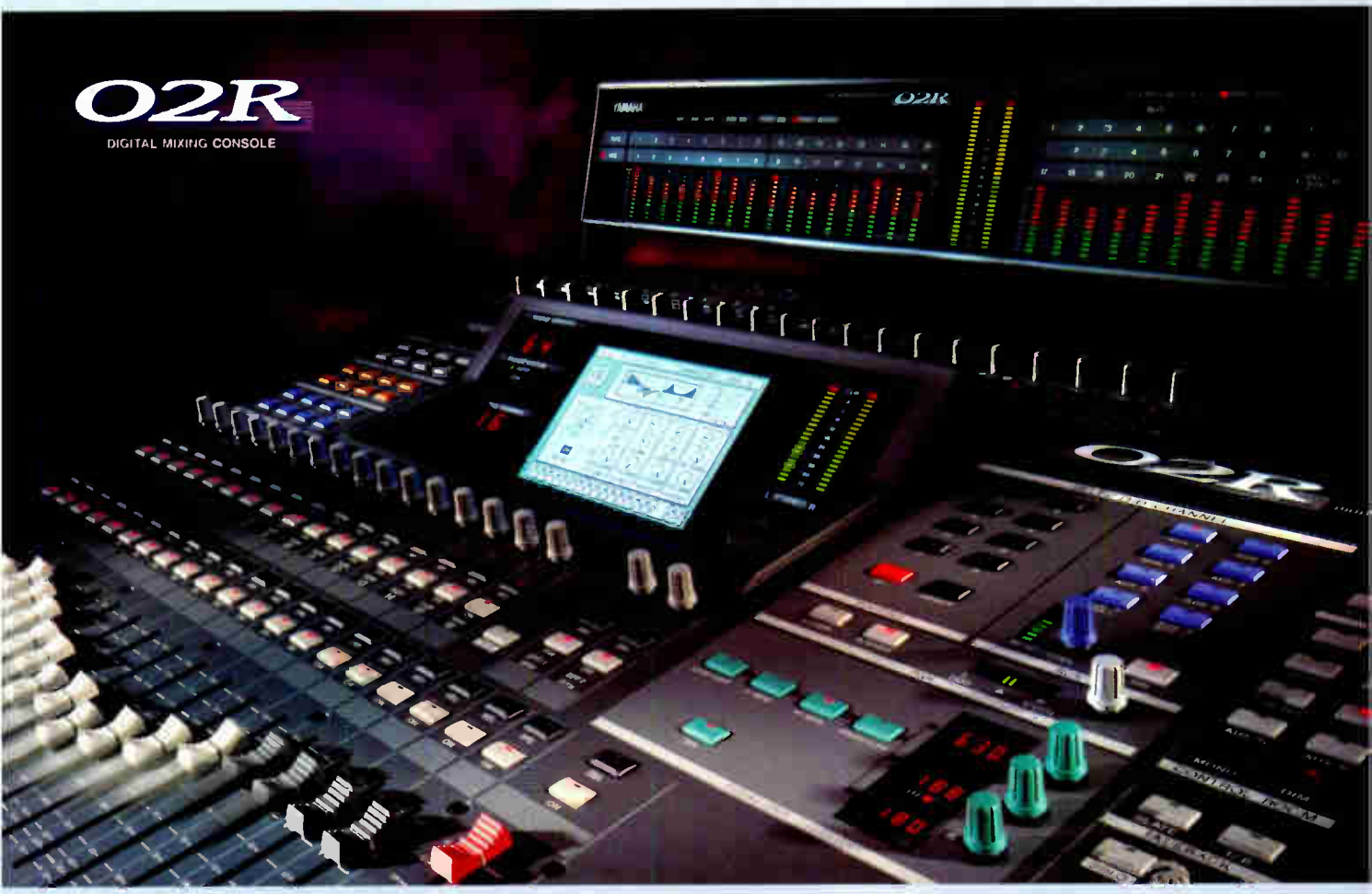

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time, several people suggested that it might be a good idea if, instead of spending all this money on R&D, that we acquire an existing company. There were some benefits to this, since we could acquire some great economic experience and design expertise. And that led to the purchase of Calrec [in 1986], who had been working on an assignable analog board.

Calrec's expertise with an assignable user interface was married with AMS's expertise in digital to produce the Logic Series?

That's right. And from the very beginning, we built an AudioFile editor into the mixer. I always look at what people can get out of new systems; there's no sense in buying advanced technology for technology's sake alone—it's got to earn you money. AudioFile was clearly very powerful for the post market. To record eight tracks on a hard disk wasn't too exciting for the music business because you couldn't back it up easily and take it away after a session. And the recording time was limited. Which is why it was designed from the beginning as a post-production tool. Similarly, the Logic console's primary application—where it was going to give you the most payback—was in post-production. If you had everything automated, that's a market where you can exploit the power much more than, let's say, in music. So that was the direction we took with the original Logic console.

In the late '70s you made a concerted effort to tap into the North American market by setting up a distribution company. What was your thinking?

We learned early on how international our business was. One of the first of the tape-phase simulators was sold to Argentina, and news traveled fast. The States was clearly a big market. When we came to our first trade show in America in 1979, we had a small demonstration room. Most people said they liked the equipment. Audio Rents was very soon on the scene, and that was followed up by Ian Southern [founder of Audio Kinetics, maker of Q.Lock timecode synchronizers] visiting us and saying that he was thinking of setting up a company in the States and would need distributors. We had a long chat with Ian and, at the end of the meeting, came to the conclusion that we should have a joint company, which we called Quintek. The firm was pretty successful for us, but eventually we decided to handle AMS distribution separately, particularly when we introduced AudioFile.

Are you still a hands-on kind of guy? Do you still write code and become involved in system design?

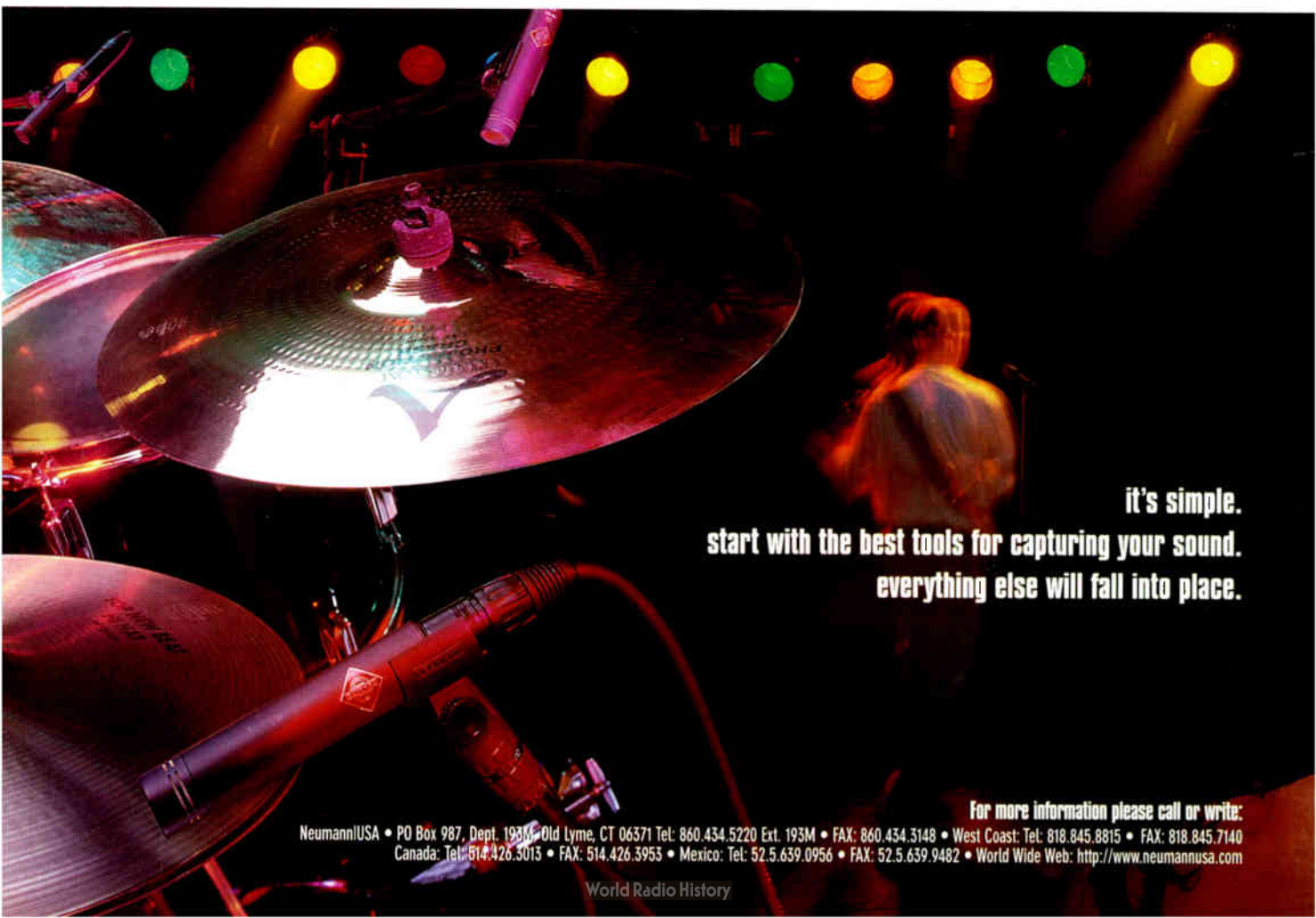
I do bits of all sorts of things, but it tends to be more block diagrams, overview technology, and how the building blocks fit together, rather than coding and design.

AMS has also made a significant investment in high-power, RISC-based designs.

Yes, we've got a stable full of systems [for use] as basic building blocks. It means that you can put the elements together very easily once you've done the basic R&D for a block of processing functions. We modularize everything so that a block of hardware can identify itself to the master software—all of which means that we can put together a complex system very quickly.

Moving forward, Siemens purchased Neve International in 1986, and then in 1990 bought AMS. What made you sell your company?

There were two reasons. One of them



was that America was a necessary market for us. While we had been quite happy selling AudioFiles and reverbs through independent offices and dealers—we had third-party companies in L.A., New York and Chicago—we were convinced that if a facility wanted to buy a big console, they'd want to see something more solid on the ground; we really needed the infrastructure.

Secondly, we were spending a lot of money on development of digital consoles. We had a couple of years of heavy investment coming up and looked around to see if there was a partner that would take a longer view. We considered various options, and Siemens seemed like a good partner; it was an engineering company that had a European philosophy. We got involved in discussions with them and eventually struck a deal.

And you looked at what they'd done with Neve, I assume?

We didn't want to be a subsidiary of Neve, so we were a separately owned company. At that time, Neve was predominantly an analog company with some digital experience. We had no idea that the Capricorn development was going on.

The purchase gave you some much-needed financial resources and the ability to take advantage of Siemens' American distribution infrastructure.

By that time, we'd gone back to having our own wholly owned but small distribution company in America, but clearly Siemens Inc. already had one in existence to distribute our new Logic consoles. So we just became part of that. We were operating well within our financial resources and were profitable, but there was an outside demand for steadily rising profits each year. When you're developing major technology and implementing marketing changes, there will be years when the profits go down, and there are huge outside pressures to sacrifice the future for profits today. Siemens offered an environment that could take the longer view.

I've not yet seen an analog-technology company make a first-class job of moving into the digital arena.

Was there any cross-fertilization of technical ideas between AMS and Neve?

There were discussions early on, and Siemens could have saved a lot of money if they'd taken advantage of what they had. I kept recommending that we [share ideas between the two companies], but decisions within companies like Siemens are often as much political as anything else; once these decisions had been made, people didn't like to alter them.

So you ran parallel manufacturing set-ups; Neve in Royston and Scotland, while AMS stayed in Burnley. How did the joint AMS Neve company develop?

Our acquisition was in September 1990. It became very clear that AMS and Neve were moving in a similar direction; we were both designing, and AMS was manufacturing digital consoles. Siemens made the decision in March of '92 to merge the two firms—unfortunately, they didn't take the trouble to tell anybody how they were going to merge them. It finally took place in October of that year.

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As managing director of the new company, how did you pull together your staff? How did you inspire them to think as one entity and forget that they were formerly a "Neve person" or an "AMS person?"

It's always hard with any kind of merger; there's no easy way to do it. At the time of the first acquisition, I tried to dole out the jobs evenly on either side of the line. And that was a mistake. What I set my mind to do this particular time around, effectively, was not to take one company and add the other to it. Instead, I started with a blank sheet of paper and said: "This is what the company should look like," and tried to fit people from both companies into that shape.

If we were going to be a company making analog and digital products, we needed a fully integrated structure. We needed to be faster to market; we needed to be integrated so that the marketing people don't disagree with R&D. And the manufacturing team doesn't live 250 miles from everybody else. We lost very few people we needed to keep from either company during the merger.

Do you now treat the AMS and Neve lines—AudioFile and Logic Series, vs. VR, Series 55 and Capricorn—differently?

No. From the start of the joint company in 1992 everything was an "AMS Neve" product. We've tried to remove all the [partisan] feelings in the company and integrate the American operation closely with the UK.

In terms of future directions, you have emphasized file transfer via OMFI, additional track capacity, and the integration of recording, signal processing and mixing. Do you see those as major trends in future technology?

Music, broadcast, film and post-production are all substantial segments of our business, and the technologies we've developed apply equally to all of these areas, both in terms of analog and digital solutions.

By the same token, you need to keep one step ahead of what these market segments are going to need, so that you're ready with a solution. It takes time to innovate these technologies. Innovating is quite a hard road to tread. When we introduced AudioFile, we spent the first two years explaining to people what it was all about: Nobody had given much consideration to recording on hard disks. It took a couple of years for people to [appreciate] what we were doing. We don't set out to be dramatic and invent new ways of working; instead, if we come across a practical problem, we find a solution around it with the technology we've got at our fingertips. And that can lead to new ways of working.

Working for first principles is very important in my philosophy. Take the tape-phase simulator, for example. I didn't know that other people were doing this with an original signal and a delayed signal. I set about doing it the same way as tape machines, which is that one deck tracked ahead of the other one, and vice versa. When eventually I got ahold of somebody else's piece of equipment, I was very disappointed because the phasing wasn't as deep and never reached over the null, which is what I wanted it to do. It was very hard making these two delay lines work together, because the clocks kept interfering with one another.

Let's move forward to your re-purchase of AMS Neve from Siemens last February. I recall that originally you were reluctant to go ahead with a buyout, but that the longer Siemens continued to look for a buyer, the more you came around to reversing your initial decision. What was the sequence of events?

I was informed in October 1994 that

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Siemens had been approached by a number of companies with a view to buying AMS Neve. At the time, everything was stable again after the merger, and I felt I was getting to the end of that particular task. But I wasn't sure if I was going to stay with the company, having done what I said I'd do for Siemens.

If you had gone off at that time, I recall you saying, you would have formed a new company to continue doing pretty much the same thing as you'd been doing.

That's not quite right. If I had left at that time, with no sale of the company in sight, I would have done something entirely different for a few years. I was informed that Siemens would decide one way or the other by January of '95. They would either give the company their full backing, or would sell it. It dragged on and on until September or October. People were starting to leave the company because they didn't know what the future was. Or we feared that customers would stop buying the product. And because the decision was taking so long, I could see that I wouldn't be able to make the decisions I needed to move the company further forward.

Back in October '94, when I first heard about Siemens' plans, I made a list of what I would do if I were to take over the company. By the following September, I found that I'd done most of them. It became clear to me that if certain people bought the company, I would set myself up in business again. Once you actually come face to face with what your options are in life, if you're an audio person, all you really want to do is start again.

What made you buy back the firm?

Basically, I wanted to have the freedom to go after opportunities. With a company like Siemens, there's always a question of whether this is a market they want to be in as a corporation. When you're an independent organization, you can go where the opportunities are, even if it's outside your primary historical area.

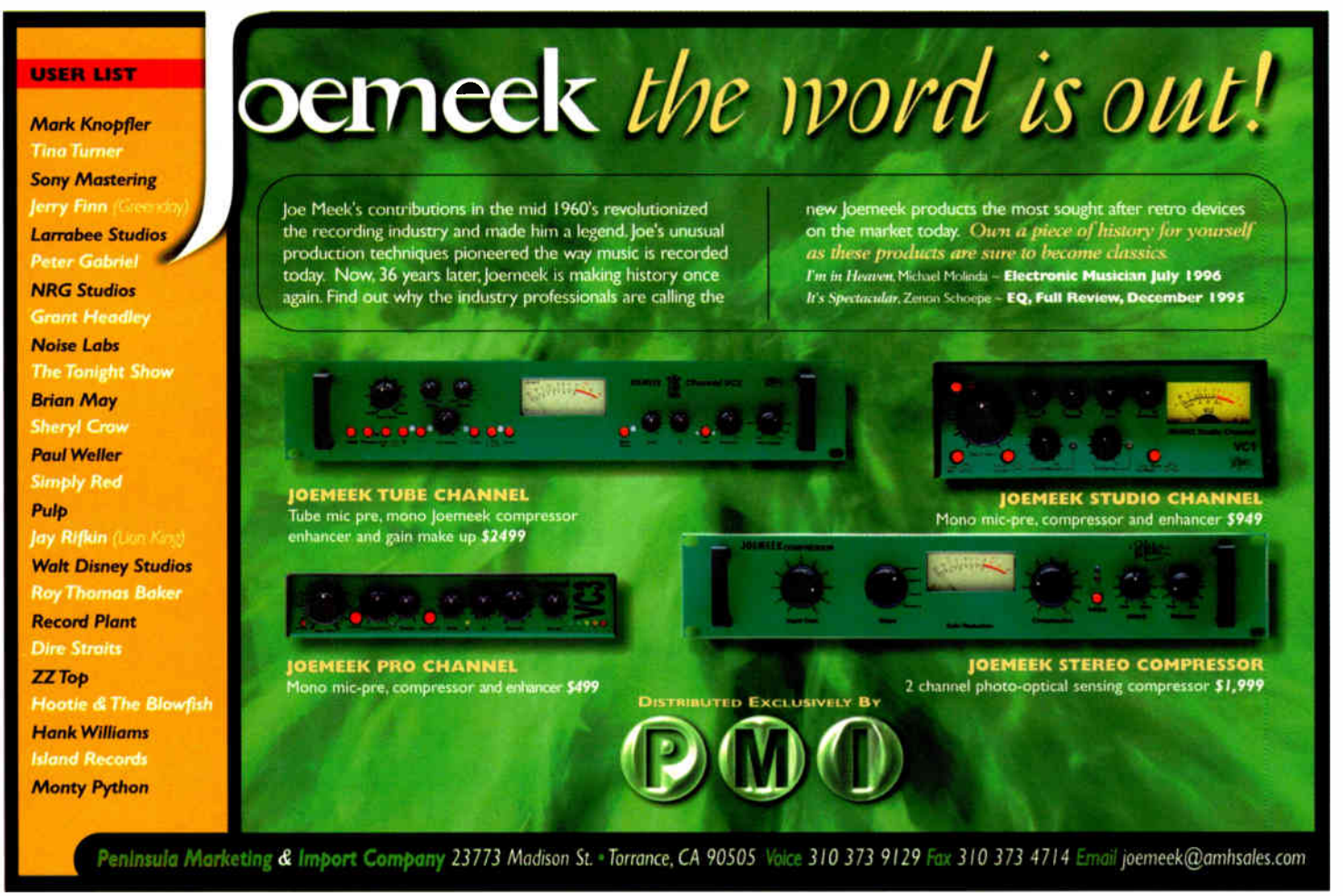
I asked Siemens if they'd listen to an approach from me. They weren't sure about it but told me to make them an offer. At that time, Siemens was in deep negotiations with other people. One party had an offer on the table, but they wanted six months to perform due diligence, and that would mean accountants and lawyers crawling all over the company. At that point, you had to be careful that the company didn't disintegrate.

They agreed pretty quickly to your offer?

They had two offers on the table of similar size. I told them that I could do the deal rather quickly, so I got my financing together. And I had to put in a lot of my own money. If people are looking to put money into a company, they are always interested in how much you are prepared to risk yourself. I was hoping to get it all wrapped up before Christmas of 1995, but it dragged on a bit; we didn't actually sign until February of 1996.

What have you been doing since that time?

The company model I constructed at the time of the buyout is working very well. What we've done is to find reporting and authorization systems that are no longer needed—since we are no longer part of a multinational—and kick them out of the model. This speeds up our operation enormously. Colin Pringle joined us as director of marketing [after several years in the same role



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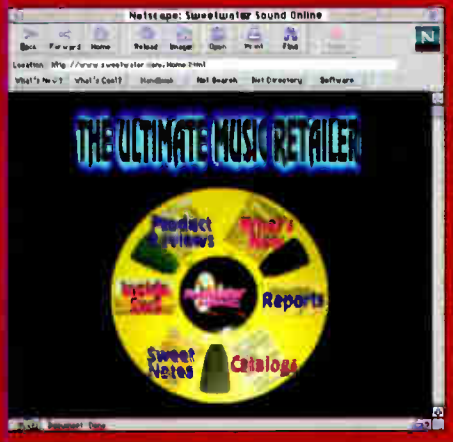

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at SSL], and we work much closer with all of the U.S. offices.

We have also further strengthened our R&D and completed our first financial year-end. I'm pleased to say that we will be reporting a strong balance sheet and showing a modest but healthy profit.

I'm fascinated by the new Libra music-recording console, which seems to be taking advantage of a lot of Logic Series technology at a price around $220k, which will put it up against some of the digitally controlled analog boards.

If you draw a graph at three different performance levels—high, medium and moderate performance—on one axis and market segments—music, post, broadcast and film—on the other, one of the gaps we discovered was that we didn't have a medium-priced music console. For some considerable time, Neve felt that there was a market in America for a $220k analog console and had tried to create such a console. But it always tended to grow in specs and get more expensive. We saw that the Logic technology was more applicable to music, making it easier to approach that gap in the product range. Hence, the Libra was born. Although you can work with the new multitrack AudioFile MT, it's primarily a stand-alone music or broadcast console.

Let's not forget the analog side. At the recent AES convention in Los Angeles, AMS Neve unveiled the new VX Music and VXS Multi-Format consoles.

Clearly, there are people making a decision between Capricorn and Logic; now they're making a decision between analog and digital. We've been developing the new Encore [moving-fader] automation system that is now available across our products, [enabling] people to migrate from one console to another. We've pulled together circuit designs, features and other changes to the V Series. The VX/S is the latest configuration of the VR, with a TFT screen built into the meter bridge; you don't need an external monitor, which helps improve sight-lines into the studio. Its appearance and circuitry have also been upgraded—but it's a pure analog board, not a digitally controlled analog board.

What's the main difference between a VR and a VX?

The VX features the brand-new Encore cross-platform automation system, which is compatible with our other consoles—enabling mix data to be transferred between Libra, Capricorn, Logic 2 and VX/S mixers—plus a long list of additional features. Basically, the V Series was a fine-sounding console by anybody's standards, but we enhanced the sound even further. One of the things we felt it needed was an upgraded automation system, which we've done. For the VX, Encore provides automation of faders and mutes; automation to switch in classic Neve modules and the new, fully integrated Recall are available. We also use a Pentium processor, Windows NT and new hardware to improve Recall accuracy.

The VX/S Multi-Format Console adds features for surround-sound mixing and music scoring, including support for three additional audio tape machines or dubbers, or a second multitrack, plus an independent mono/stereo dialog input. Also provided on the VX/S are eight final mix buses that can be set up as discrete channels or four stereo pairs, PEC/Direct switches for monitor select and record arming, plus optional music

—CONTINUED ON PAGE 211

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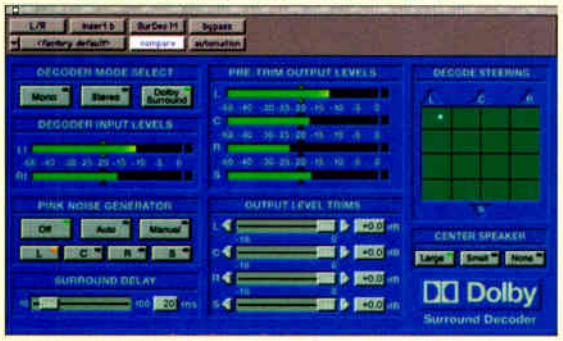

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RECORDING VOCALS

Thoughts From Both Sides Of the Microphone

RECORDING VOCALS IS TRICKY BUSINESS. In addition to having the requisite recording chops, engineers must walk that fine line between achieving their ideal sonic environment and providing a comfortable atmosphere for the singer. In this personal situation, communication must go both ways: Performers must be able to express concerns as well as clearly define the sound they hope to achieve.

For both the engineer and the performer, these skills come with experience, and with an understanding of goals the other person is trying to achieve in the studio. To gain some insight into this complicated issue, *Mix* talked to seasoned engineers and vocalists, to find out the methods they have developed over time to get that optimal vocal recording.

by Sarah Jones

ILLUSTRATION: DMITRY PANICH

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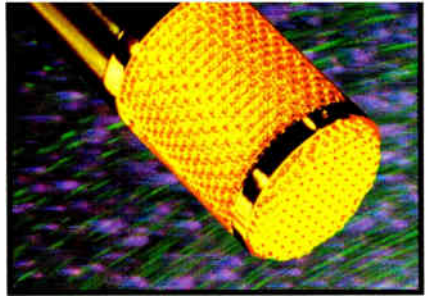

STEVE COUNTER

Like many engineers, Steve Counter started out as a musician. Eighteen years ago, he began mixing in his hometown of Denver before migrating to Phoenix—where he recorded everything from country music to traditional Navajo music to polkas to heavy metal—and then settling in the San Francisco Bay Area, where for the past ten years he's mostly focused on R&B and hip hop. He recorded En Vogue's first two albums there; other credits include albums by Digital Underground, Michael Cooper and the late Tupac Shakur. Currently, he's in the studio with En Vogue, working on their third album.

"Over the years, I've found a lot of mics that I prefer," Counter says, "and if I'm not sure, I have a lot of microphones available to me. I'll just set them up side by side, in a big 'press conference' array, and have the singer sing into them for comparison. I don't run this comparison to tape. You're usually dealing with a limited amount of time, and one thing I learned many years ago is you really can't wear somebody out experimenting on them. They're in there to sing and get their job done, and the less you put in the way of that, the better."

Counter says that with the exception of rock 'n' roll cuts, he tends to prefer tube mics to solid-state models. "Right now, I'm very fond of the AKG C-12VR re-issued C-12," he says. "I like the original C-12; it's a very warm mic, nice and bright, clear top end, and a little bit scooped in the middle. I'm using a re-issued U67 tube mic a lot; it has a real warm, full midrange. I like the Neumann U47; it has a little older sound, it's great for country western."

With Digital Underground, Counter used a Neumann M250 almost exclusively. "It has a little bit of the same character as an M49 Neumann, but it's a much brighter, edgier microphone," he says. "It worked well for the style that rap has: pretty aggressive, not a particularly laid-back vocal style. And then of course there's always the old standby, the [AKG] 414. If I want an edgier kind of vocal sound, it's got nice air to it; it's a little too edgy compared to a tube mic for me, but sometimes you want that; you need that bite. The other thing I'll do is, sometimes for rock 'n' roll, I'll use an SM57 or a 58 Shure dynamic microphone, set it up in the control room, turn the monitors up and just go for the raw guts sound.

You really can't wear somebody out experimenting on them. They're in there to sing and get their job done, and the less you put in the way of that, the better.
—Steve Counter

"When I was over at Fantasy Studios for the second En Vogue record," says Counter, "we used exclusively the Telefunken 251 vintage tube mic, and it was wonderful. Great, lovely top end, and a lovely, warm middle; pretty much everything you want. Fantasy has an old Neve mic/line mixer, and a pair of old Neve compressors. And that basically was my signal path. I bypassed the console entirely. I might use a little Pultec program EQ with a little 10 or 12k on top, a couple dB, but that was about it. That was a great signal path."

Counter mostly used a single mic to record En Vogue's background vocals, one or two singers at a time. "I set up a booth out in the studio with a couple of gobos around the microphone, sort of a half-shell around the back of the singers, with the microphones in front, and the singers usually facing the control room. I try to get at least ten or so feet away from the glass. I don't want to hear the glass, and I've even on occasion turned the singers sideways because of having a real problem with reflections off of the glass. If it's a good-sounding room, I don't mind a little touch of ambience, a little after-ring. Particularly in background vocals, it adds a little extra coloration if it's a good-sounding room. For lead vocals though, I don't like much ambience, because when you go to mix, you might be processing them in such a way that ambience could cause problems."

When dealing with pitch issues, Counter says getting the headphone mix correct is a priority, "which might mean maybe not as much reverb in the headsets, and certainly level is a factor," he says. "I have this problem surprisingly a lot with singers—they'll crank the headphones, particularly if they've been on the road, and they're used to hearing the band behind them. Then they'll start singing real sharp while they're trying to out-shout the headset. The opposite is also true: If the headsets are way down, they start singing timidly to fit into the mix in the headphones, and their pitch starts sliding all over the place, 'cause they're not really grabbing the notes and pushing air. They're just sort of holding way back, and you can hear it. It's very obvious.

"From a philosophical standpoint," Counter says, "whether it's vocalists or musicians or any kind of session, the big thing is not to get in the way of the music. You don't want to put people through a lot of technical stress in what is basically an artistic event."

CHRIS ISAAK

Since the 1990 breakthrough of "Wicked Game," featured in David Lynch's hit film *Wild at Heart*, Chris Isaak has been internationally successful as a singer-songwriter, often compared vocally to the likes of Roy Orbison and Elvis Presley. In addition to recording six hit albums, he's landed roles in films such as *Twin Peaks: Fire Walk With Me* and *Little Buddha*. Isaak doesn't like to talk technical much; when asked what mics he prefers, he replies, "You know, I find that I like to use a ribbon microphone, and of course, I make my own ribbons at home. And I use catgut." His decade-long career has provided him the chance to work with industry veterans, including producer/manager Erik Jacobsen, and to learn the studio ropes.

Isaak says that in the studio, it's important to provide examples of the sounds he's looking for. "When I make a video or a film, and I want it to look a certain way, I'll cut pictures out of magazines," says Isaak. "I'll make a tape of

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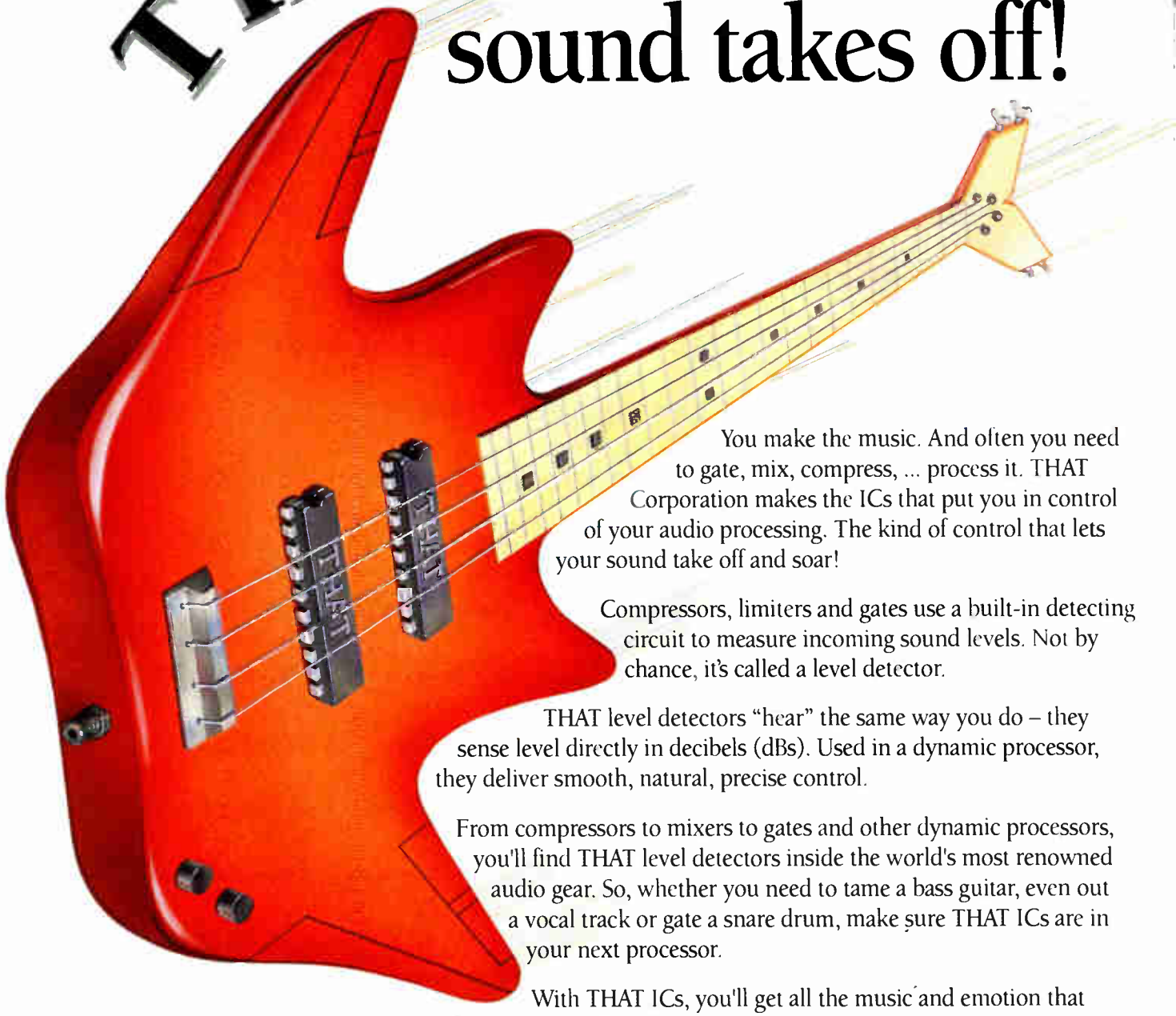

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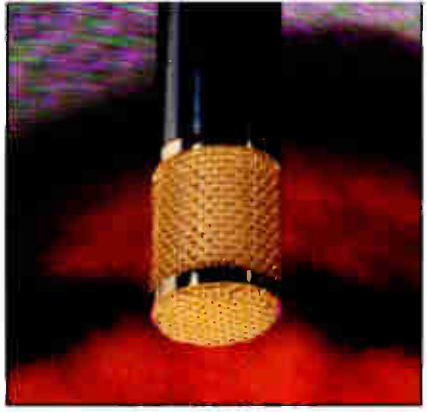

Give somebody an example of the sound. If I was an engineer, I'd slap you if you came in and said, "I don't know, more warm. More yellow, yeah, more yellow."
—Chris Isaak

little pieces of film, and I'll say, 'See this lighting? This is the lighting I want. See the shadows on this? I want this.' And bring that to the cinematographer. I do the same thing in the studio. You come in, and you say, 'I want you to listen to this voice and the way that it's treated; here's what I'm shooting for.' Giving somebody an example of the sound. To me, if I was an engineer, I'd slap you if you came in and said, 'I don't know, more *warm*. More yellow, yeah, more *yellow*.' You hear artists say, 'I want more echo.' Is it echo you want, or reverb? And is it a slap? What is it? The good thing is, if you take time to actually stay in the studio with people, you learn something.

"When I started off, I was in love with slap echo," says Isaak. "'cause if you never heard it on things, and you're a vocalist, you go, 'Man, you could put a big slap echo on everything!' It's like eating cereal: 'How much sugar do you want on there?' 'How much you got?' And one day you write a song, and it's not appropriate. You say, 'Wow, this should be real dry': all of a sudden I want it to be, 'Dig me, I'm Lou Reed.' It changes as the music changes.

"I remember coming into the studio, thinking, 'I'm nervous about this.' So you wear dark glasses, you're kind of hiding your face, and you go out to sing, and you sing in the other room, and say 'Turn down the lights,' you know? Or sometimes you can just put a screen in front of yourself, so they can't look at you when you're singing. But the reality of it is, to me, I like to sing as close to them as I can be—if they're in the same room with me, that's fine, and I want the lights up bright, and I'm not worried about them seeing me sing. Maybe if I have a tough time—so what? I think the reality of it is, besides being comfortable, it helps everybody just to kind of go, look, it's a tough thing to sing, and everybody's going to have tough days."

Isaak says he tries to approach a track as if it's a one-take. "If you can go back and fix something, great, but the reality of it is, I try not to," he says. "I

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Usually the first or second take is it. It's usually the one when you're not thinking, you just do it.
—Dianne Reeves

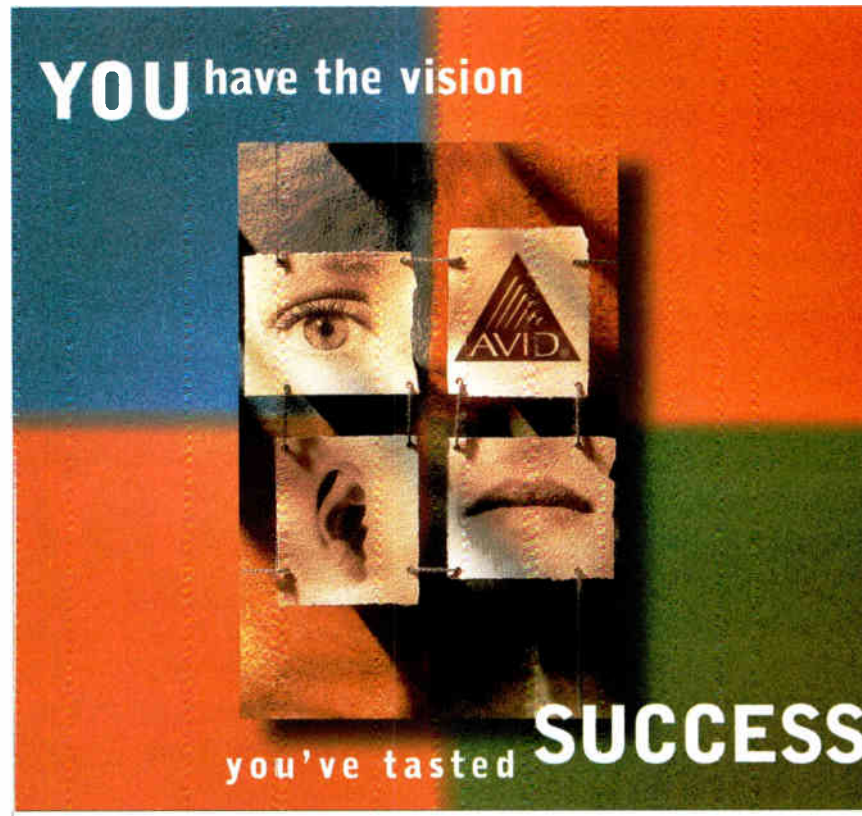
instance, and you want a distorted feel; then you're coming back out into a verse, but you want that clean—I put up two mics or more, depending on how many different sections we require. I'll put up two or three mics, and one might be a very clean mic, with very little compression—say, an M49—for the verses, and then for the chorus, there might be a 57 with massive compression and distortion. They'll sing the verse and move their head to the left or right, depending on what makes them comfortable, and have the other microphones set up a different way, so the voice sounds totally different.

"I own a bunch of outboard preamps, and I love them to death," says Wright. "Add a tube mic, a compressor, and we're off to the races. I typically will not EQ a vocal to tape, because if I do, then I think that I have not chosen the right microphone. Typically I'll use an 1176, because they're fast, and they're not real hard; they don't sound like they're squashing. I love a lot of dynamics—if a singer is overcompressed, it takes away from the dynamics. You build up an intensity, and you don't want a compressor holding you back."

DIANNE REEVES

Dianne Reeves has a diverse history. Since her discovery nearly 20 years ago at a high school jazz band competition, the vocalist has ventured into R&B, jazz and world music, earning two Grammy nominations along the way. In the early '80s, she sang on Harry Belafonte and Sergio Mendes tours; she's also worked with the Latin Ensemble and Caldera. Her ninth album, *The Grand Encounter* (Blue Note), is a return to her jazz roots and features such legendary performers as Toots Thielemans, Joe Williams and Germaine Bazzle.

"I usually work with Eric Zobler, and I really trust the vocal sound that he gets," says Reeves, of her longtime engineer. "We're always trying different mics in different places because I record live, and I like to feel like when I'm in the studio with the musicians, everything is as if I were onstage, only I'm isolated, but I can see all of them. So he uses lots of different mics, sometimes really old, warm mics, tube mics, but more than anything, I just like a lot of presence in my voice. I want everybody to hear everything, from high to



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low, to breath, so it sounds like I'm right there with them."

Reeves says that working with Zobler for so long has made sessions more streamlined. "Basically we just find a nice range of closeness to the mic, because if I sing something that's really soft and I really want to lean in, I use the mic a little bit, because onstage I use the mic a lot," she says. "And it's different things for different kinds of projects. If we're doing more of a pop-oriented project, then usually I have to stay at a certain place because my voice is big. But if we're doing a jazz thing, I can lean up, and I can whisper, and I can do all kinds of things, and he makes it so that it'll come out right."

Reeves prefers to record as many one-takes as possible. "We try to do the song no more than three times, live with the musicians, because then after that for me, it's redundant and I try to do what I did on some other take. And usually the first or second take is it. It's usually the one when you're not thinking, you just do it. And so [Eric is] always ready for that. The one thing I like about working with Eric is, he knows me so well, that he just always has the tape rolling. And I might be messing around and it might just be totally right. As I remember one night, the lyrics of the song had just been written, and I said, 'Well, let me run through it and see how this is going to work.' And it was the take."

Reeves usually works with longtime friend and producer George Duke. "George and Eric are like a wonderful team," she says. "George is very well-rounded, a deep background in all kinds of music. Usually he just wants you to be in there and to be totally comfortable, and they both kind of supply that comfort. They don't tell me how to sing, they just make sure that they hear what it is that I'm doing, and make sure that what I'm doing gets across. And Eric does that with sound, and George does that in terms of going through the lyrics to make sure that I said the word the right way, or the pitch was on, or whatever.

"Also, Eric has some musical background, which makes a difference," Reeves says. "I know that he approaches his instrument, the board, like it's part of the music. And the thing that I love about working with him is the fact that he knows the lyrics of the songs. And that's really important, so that he can enhance what it is that I'm saying, how the music is, the colors. Everything sparkles, and it's just right."

DAVID REITZAS

Last year, David Reitzas mixed *Evita* for Madonna, *The Preacher's Wife* for Whitney Houston and *Destiny* for Gloria Estefan. Engineering credits for '96 also include the likes of Michael Bolton, Barbra Streisand and Natalie Cole's follow-up to her multiple Grammy Award-winning *Unforgettable*. Some of Reitzas' previous recording highlights include a Grammy for Best Engineered Album for *Unforgettable* and for Houston's *The Bodyguard*. Reitzas' ten-year relationship with producer David Foster has given him the experience of

—CONTINUED ON PAGE 211

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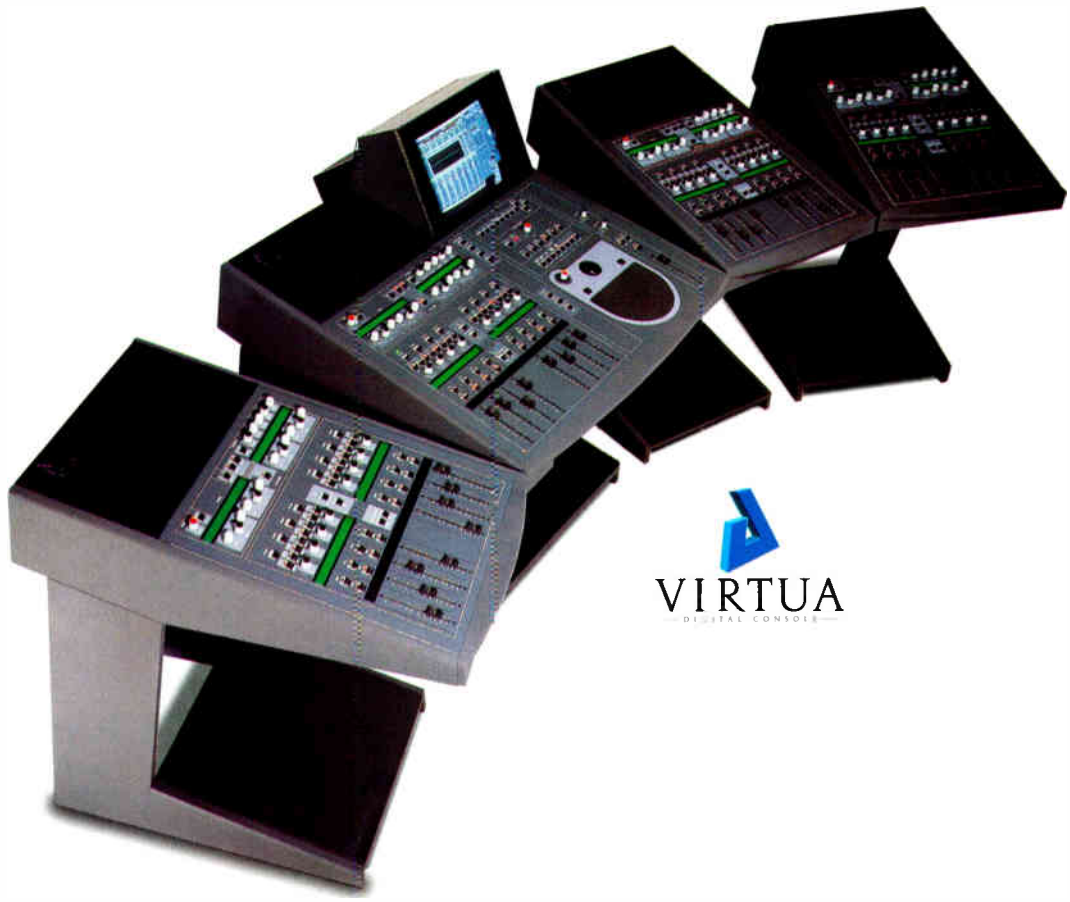

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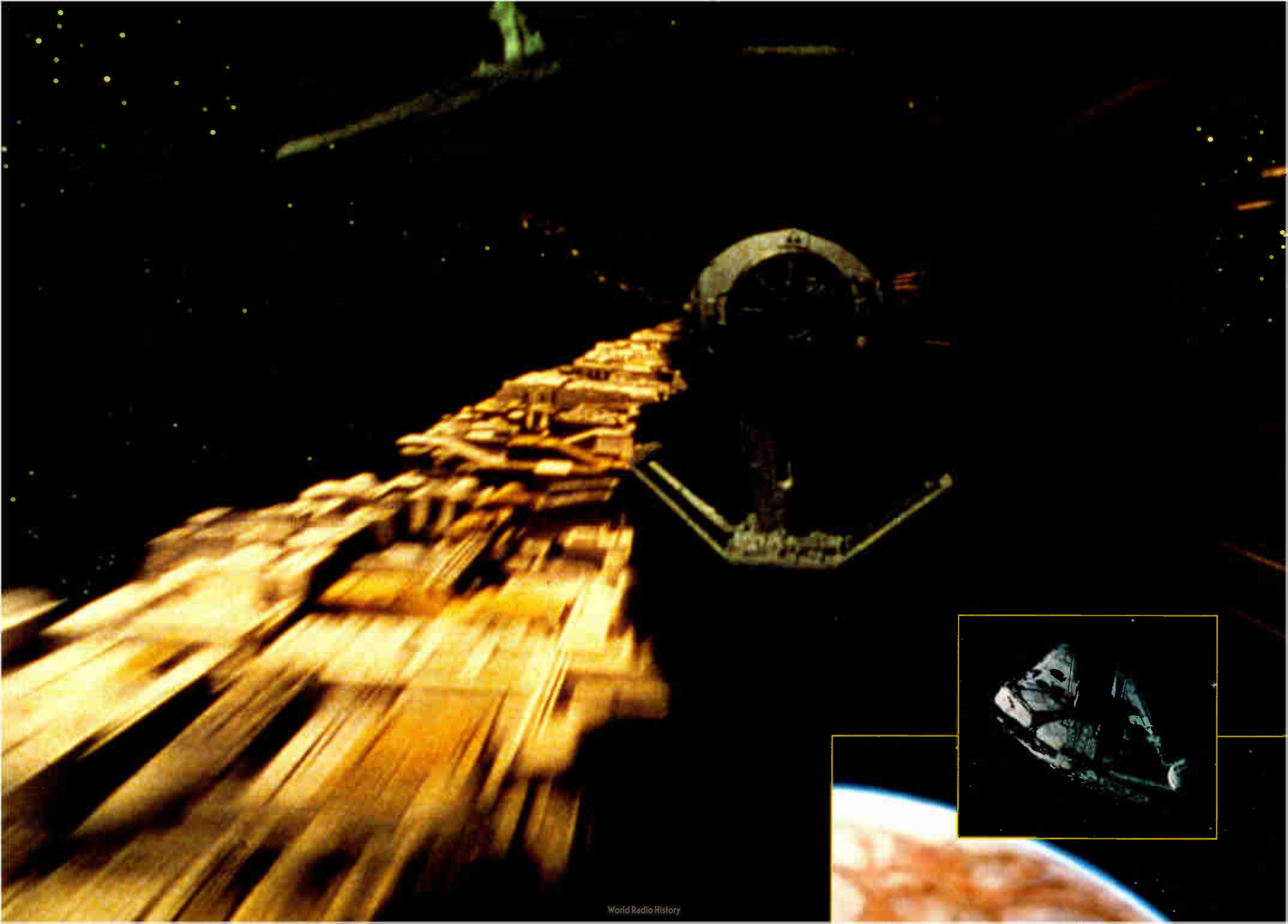

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THE FORCE RETURNS

Remastering The *Star Wars* Trilogy

by Larry Blake

It's hard to believe that it's almost 20 years since the *Star Wars* saga came into our cinematic life. While few people can foresee the success of any blockbuster film, *no one* could have predicted that one film could not only establish the filmmaker and his company (George Lucas and Lucasfilm), but could also change the art and craft of filmmaking. The general public is perhaps more aware of Industrial Light & Magic, Lucasfilm's visual effects wing, but it's also safe to say that the genius behind the sound effects and creature voices, Ben Burtt, is the most recognizable sound person in film history.

In anticipation of the release of a new *Star Wars* trilogy beginning in 1999, Lucas has gone back and spiffed up both picture and track of the original three films for a theatrical reissue titled the *Star Wars Trilogy Special Edition*.

PHOTOS: COURTESY LUCASFILM LTD.

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Remastering The *Star Wars* Trilogy

The large number of sound effects that will be heard in the digital re-release of *Star Wars* that weren't in the original 70mm prints have nothing to do with new technology or revisionist sound editing, but instead harken back to the crazy last month of mixing *Star Wars* in May 1977. Because visual effects were being created and tweaked right up to the release date, different versions of the film had varying levels of completeness and finesse.

PHOTO COURTESY LUCASFILM LTD

Ben Burtt and film editor Tom Christopher with some of the many reels that make up the Star Wars trilogy

IT WAS 20 YEARS AGO TODAY...ALMOST

The mix began in early 1977 at The Burbank Studios (now known by its original name of Warner Bros.), eventually moving to The Samuel Goldwyn Studios (now known as Warner Hollywood Studios) Stage D for the remaining predubs and all final mixing. Working primarily at night because of previous bookings on Stage D, the crew predubbed extensively to fit the final mix into the 33 inputs of the 4-bus Quad Eight board. During these finals, which Burtt remembers as taking about three weeks, there was only one recorder running, with a Dolby A-encoded 4-track LCRS composite mix.

In addition to opticals not being complete, there was another reason that the 4-track master was missing certain sound effects: In 1977, they were not completely confident punching into a stereo mix, and many reels in *Star Wars* were final mixed as a single take. "[The mixers] got more bold as the dub went on," Burtt notes. "If you go into the archives, you'll see three or four different takes of reel 1. Sometimes I would cut masters together; I remember this was done for reel 6. It's hard for us to see, with the flexibility that we have nowadays, the limitations that we had then and why we hesitated to do certain things."

The audio post crew for the remastering of Star Wars, around the SSL 5000 console at Skywalker Sound. Seated, l to r: Terry Eckton, Ben Burtt and Gary Summers. Behind the console, l to r: Marni Hammett, Sean England, David Turner, Ron Ronmas, Gary Rizzo, Lisa Storer, Tony Sereno, Jonathan Greber.

PHOTO STEVE JENNINGS

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Remastering The *Star Wars* Trilogy

As a result, balance changes were made to the 4-track masters, along with the addition of sweetener tracks, while generating the first printmaster, the Dolby A stereo 2-track. Even then, "there was a lot of stuff that wasn't in the stereo optical, including lines of dialog and sound effects, because opticals were being cut in after the mix," Burtt says. "It was the first mix finished and was also the least complete creatively, because at that time the stereo optical [format] was an unknown quantity and Dolby wanted to test it and find out how it was going to work. That mix was rushed out of the door, and we didn't think it was that important because it was only going to be heard in a few theaters."

So, even more sweeteners were added to the original 4-track mix, to go with fixes in loop lines, when the 6-track printmaster was made at Todd-AO Stage A mere days before the film opened. (Goldwyn didn't have a 6-track recorder on its dubbing stages at the time, although there had been two on its fabled scoring stage before it was converted to a shooting stage in the late '70s). It was possible to cut it this close because the 70mm prints

NEW SCENES

Work began at ILM in early 1994 on storyboards and animatics (rough guide animation) for sequences that would need new photography, either live action or special visual effects. (The shooting of much of this new footage can be seen in the IMAX film *Special Effects* that Burtt directed.) The other work for ILM was to re-do opticals, removing matte lines and generally sprucing up the negative.

Many new shots added to the trilogy are to establish certain locations. For example, "Ben Kenobi's house used to be a little hut silhouetted against the sky. Now you see it on a cliff in a big canyon with birds flying around it and rugged canyons in the background. It's a little bit richer in the geographic sense. We're doing that with all three films."

There were three primary new scenes in the film. One, a larger Mos Eisley Spaceport which makes it merit the classification "spaceport" more easily than the very bare outback town portrayed in the original film, which was shot very quickly and cheaply. The new scene features some new CG creatures whose designs were based on work that ILM had done for *Jurassic Park*. Scurriers (based on the Velociraptor) and the Ronto (shamelessly derived from the Brontosaurus, although any self-respecting dinosaur lover or child would have called it Rachio, short for Brachiosaurus). Burtt had to create new vocalizations for all these creatures.

The second was in the Tatooine desert sequence, with the Imperial Stormtroopers scouting the area. It features fully animated CG Dewbacks, with new voices created from recordings of hippos and rhinos.

The general public is not aware that the character of Jabba the Hutt was supposed to make his debut in *Star Wars*, not *Return of the Jedi*. Budget and time constraints prevented Lucas from matting in a good enough Jabba to replace the guy in a rug suit who was photographed talking with Harrison Ford in 1976. The restored film will have a CGI Jabba the Hutt as he appeared in *Jedi*, complete with slimy tail. Terry Eckton was able to cut around the original human Jabba, with Burtt adding in new dialog in "Huttese." Unlike another high-profile restoration, *Lawrence of Arabia*, there has been no additional human ADR necessary in preparation of the Special Edition of the trilogy. ■

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could be printed, striped with magnetic oxide, and then set aside to wait for the 6-track printmaster. At that point, the print was "sounded" by copying from the printmaster to the print. *Star Wars* opened initially in about 35 70mm engagements.

Even after the film was in theaters and on its way to becoming the most popular movie ever made, the mix was continuing at Goldwyn, in order to create what Burtt says was considered by Lucas to be the genuine article...in mono! "He [Lucas] felt that the stereo mixes were just for a few isolated venues, and he put his real effort into the monaural because that was what was going to play in most theaters."

However, since the mono mix was done in the standard 3-track fashion, with separate dialog, music and sound effects, the original 4-track mix, being a composite of all three elements, was

THE THX FACTOR

In the 13 years since Lucasfilm's THX Sound System was introduced for selected engagements of *Return of the Jedi*, its trademark has become, along with Dolby Stereo, the most recognizable moniker in film sound. In addition to the presence of THX systems in more than 1,400 theaters and professional dubbing installations, Lucasfilm (initially led by THX founder and namesake, Tomlinson Holman) has moved the system into the home with licensed home theater products and numerous titles in its laserdisc program. The *Star Wars Trilogy Special Edition* was remixed in a THX environment at Skywalker Sound. ■

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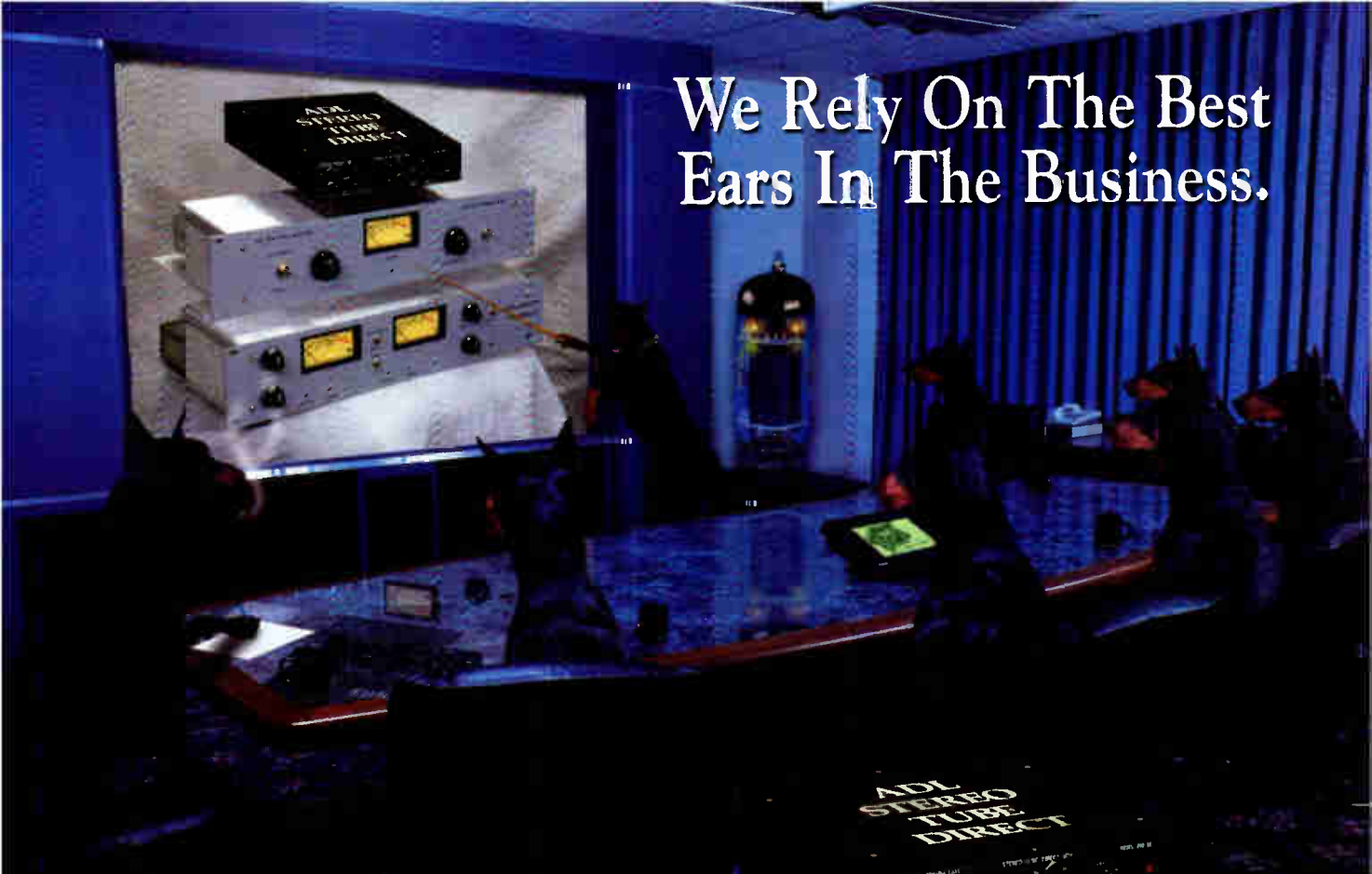

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unusable. This turned out to be no real handicap, and in fact doing that mix from scratch had its own benefits. Burtt remembers that "by the time we got to the monaural there were even further developments: more changes in dialog, more changes in sound effects, different processing," many of which would have been tough to implement with everything married together.

That mix was primarily heard by the public in the initial 1977 wide release of *Star Wars*, since later re-releases were either in 35mm or 70mm Dolby Stereo. However good or complete, this mono mix, being mono, was usable to Burtt in 1996 only as a guide to determine differences between it and the original 4-track mix that would remain the cornerstone of the remastering.

To help facilitate the foreign-language dubbing that he would travel around the world supervising, the last thing Burtt and the mixers did at Goldwyn was to create two 3-track stereo "crashdowns," with creatures on one and all other effects and Foley on the other. While still not an effects stem in today's sense, it simplified foreign mixes and proved to be a help during the remastering.

THE IN-BETWEEN YEARS

In 1995, a little more than a year before Lucasfilm finished work on this special edition, there was a much-touted final home video re-release of the "original" versions of the films in the trilogy. *[Editor's Note: See Larry Blake's column in the November 1995* Mix *.]* Where the first video release of *Star Wars* in the early '80s simply used the original stereo optical mix, the 1995 "THX" mix was made from the 6-track master, plus the sweetener elements that were originally cut from the mono version. Over the years, people have seen so many different versions and mixes that there would be arguments among the fans as to what was in what version. Burtt says that he would get calls "from people in phone booths in Manhattan telling me that they heard secret messages backwards. I have heard everything imaginable.

"But very often people were paying more attention than I was. Sometimes they would point out discrepancies that I wasn't even aware of that I had go back and figure out. There was an off-screen line of Threepio's, where he says, 'That's the main power station tractor beam switch, and you've got to go there and turn it off.' And that was *not* in the 6-track version of the movie; it was only in the stereo optical. It wasn't even in the mono, and I don't know how it happened, but we found that line and now it's back in.

"As far as I know, all of the dialog that was ever in the film is in this version, and all the sound effects that ever appeared are in, plus more. Plus new music and new scenes, so this should represent our best statement as to what the complete movie is and supersede all other versions.

"I got very excited working on it. I had gotten pretty tired of the films and hadn't looked at them for a decade—except for the occasional video mix—and I was excited to watch them again in a theater. I guess it was 'early career nostalgia.' "

Fortunately, all of the necessary original sound elements were still in existence and in good shape: the ¼-inch production recordings, 2-inch 16-track music recordings, 35mm mag cut units, premixes, and all of the various mixes and print masters. The only elements MIA were the Foley units. The original 4-track mix, once located, was

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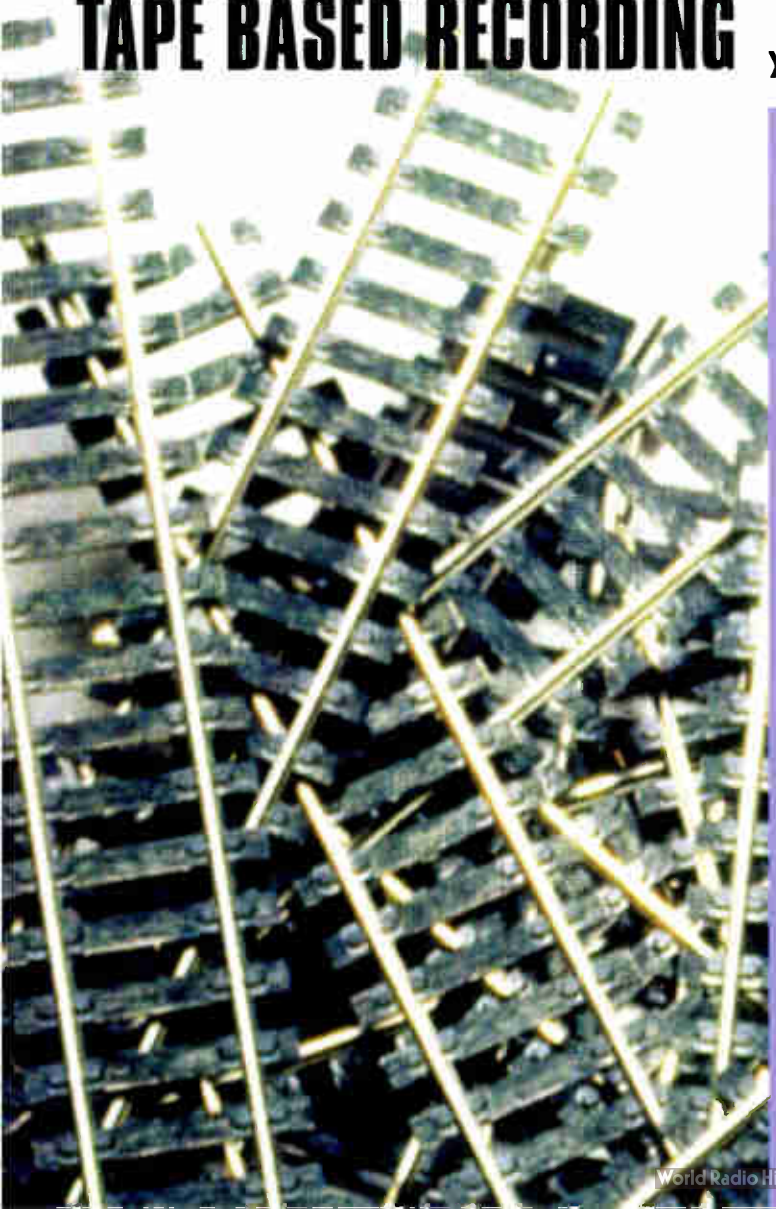

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very carefully X-copied to 35mm 4-track Dolby SR and Tascam DA-88, then put aside until it was needed for the creation of the new 6-track print master.

It was clear that the original 4-track mix would be the backbone of the restoration, although they would have to use dialog and effects premixes, plus original cut music elements, to enable them to match when going to or getting out of new material, be it an inserted shot (such as the revised version of Han Solo's shootout with Greedo), or any of the new scenes.

In preparation for the restoration, Burtt and re-recording mixer Gary Summers, who has worked at Lucasfilm since 1981 and was one of the mixers on *Return of the Jedi*, listened to the original 4- and 6-track print master at Skywalker Sound's Stag Theater at Skywalker Ranch, north of San Francisco.

Using his notes from 1977, Burtt either found the original 35mm cut tracks or had new tracks cut from his ¼-inch work tapes. In addition, he attended to Lucas' 20-year-old "could-have-been-better" wish list.

Sound editor Terry Eckton worked with Burtt in getting the tracks ready for re-recording. Eckton was a logical choice, having cut creatures on both *Empire* and *Jedi*. She spent approximately two months on *Star Wars*, both conforming premixes on mag and cutting new tracks on Pro Tools.

JUMP-CUT: 1996

Gary Summers' first task at the mix was to predub all of the new material in the 5.1 format. This included not only sweetener elements used during the original 1977 print masters, but material for new scenes and surround/subwoofer sweeteners that were cut to take advantage of the 5.1 format. The final print mastering then involved these premixes added to the 4-track mix, original cut music elements, original dialog and effects premixes, plus the two effects combines made for foreign dubbing use.

The original mono surround track was transformed into stereo surrounds in two ways. First, when the original surround was fine but needed to be expanded, it was put through a Meridian 565 home THX processor to utilize the home-THX stereo decorrelation feature. Also, they cut new specific elements for ship motion, a good example of which was the battle in the trenches of the Death Star. They tried to "bring the action off of the screen and into the room," Burtt notes. "We were very conservative in the original film because surrounds were not likely to be played consistently from theater to theater."

Even more mysterious to mixers at the time of the original mix was the subwoofer channel, which was then called "bass extension" by Dolby Laboratories because it was used to help the overall bass response of the system, and not just for low-frequency effects below 100 Hz. By bleeding low-frequency material from the left and center tracks to the left-center speaker, and the center and right tracks into the right-center speaker, the low-frequency handling capabilities of the then-standard Altec Lansing Voice of Theater

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speakers were enhanced. (Some theaters also had separate subwoofers.)

Because they were working from a composite master in 1977, *all* material—dialog, music, and sound effects—was put into the "baby boom" channel, sometimes to the effect of muddying the image. As the Dolby 70mm process evolved in the mid-'80s, mixers would only add selective information to the boom channels (or sometimes nothing at all). Today, this is not an issue because the digital release formats all have a separate, discretely assigned subwoofer track. "The film never had the real low, low frequencies, but now we can extend the low end to what we're hearing today," says Summers.

Thus, Burtt and Summers created a new subwoofer track, with specific effects cut for low-end sweeteners for explosions and such, although Burtt says that they tried to keep it stylistically close to the original in tone. "I went back to my original work tapes and drew only from that material," he explains. "I figured the best way to make it sound like I would have done back then was to keep to the same pool of effects and rework them."

The overall low-frequency response was also extended in terms of the three main screen channels, due in no small part to the increased low-end capabilities of modern theaters (including, of course, those with Lucasfilm's THX Sound System).

Once the new premixes were made, Burtt and Summers went through the film writing automation for all the elements, with the conformed X-copy of the 4-track mix in the monitor at unity gain. Overall level of the 4-track was not touched, although Summers did use two 2-track Cedar DH-1 20-bit dehissers to help combat some of the noise buildup that had accumulated in 1977 with such heavy premixing and only Dolby A-Type noise reduction at their disposal. Summers says that the hiss was really bothersome in quiet scenes such as with the Jawas in the desert, where the only sound is R2-D2's motor and light ambience. "We would never accept that amount of noise today; we would shut down and figure it out!" Summers exclaims. Because the Cedar unit has a two-frame processing delay, the 4-track element was retarded by that amount when threading up.

Next in the processing chain across each channel was a GML 8200 EQ for overall shaping. Summers found that he could boost highs as needed without increasing hiss, as would have happened by putting the EQ ahead of the DH-1; the DH-1 would have had to work harder to do its job with an altered signal. He also did an overall boost of the low end and took a little "bite" out of the midrange, finding one setting that was consistent from reel to reel.

The final step in the chain for the 4-track master was an Aphex Dominator II limiter to take the edge off of some sharp transients; in many instances, the chief offender was R2-D2! Burtt says that their "main problem with the original mix were technical matters: You can't really undo distortion in dialog. Gary did his best to re-EQ the dialog and make it sound as natural as possible."

—CONTINUED ON PAGE 212

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Computer-Hosted Audio at AES

Above: Pro Tools Family PCI; background: SADiE CD-Text Creation System

By Philip De Lancie

Prior to November's 101st AES convention, the recording industry's flagship trade show had not been held in Los Angeles since 1990. A lot changed in the intervening years, a period in which the personal computer went from sideshow to the main event in the audio domain. On the Macintosh side, where the market for computer-based audio tools first took off, Digidesign dominates all but the very high end (Sonic Solutions territory), a testament to the company's strategy of positioning its offerings not merely as hardware and software products but as platforms with a wide range of capabilities provided by third-party developers. Whatever competition remains wasn't much in evidence at the show, especially as Macromedia (which now markets both Sound Edit 16 and DECK) did not exhibit.

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Digidesign, however, is in no position to rest on its laurels. Systems such as SADiE (from Studio Audio and Video, U.S. offices in Nashville) have proven once and for all that the Mac is not the only viable host platform for serious production tools, and the advent of Windows 95 seems to have provided a boost to the "Wintel" side of the market (IBM PC/compatibles running Windows software on Intel chips). Digidesign is aware of all this, of course, and continues to expand its Windows line, including a newly announced Windows NT driver for the AudioMedia III PCI card.

Judging from both the strong showing of Windows-based systems and continued developments in the plug-in market for Digidesign's Mac-based offerings, computer-based digital audio tools are flourishing. Here's a taste of what caught my eye as I made my way around the show floor.

WINTEL SOFTWARE AND SOUND CARDS

Now distributed in the U.S. by Panasonic, Merging Technologies (San Diego) debuted the Pyramix Virtual Studio system, shown in prototype form at last year's AES show in New York. The system is designed to integrate digital mixing, effects processing, disk recording, multichannel editing, and CD-R mastering capabilities for popular CD-R devices. It also allows users to make custom routing and effects configurations. A core effects group included with the system consists of parametric 4-band EQ, 10-band graphic EQ, 3-band tone control, dynamics (noise gate, expander, limiter, compressor, de-esser) and multiple digital delay effects. The company says additional DSP effects including reverb, time compression and expansion and pitch shift will be made available by Merging or third parties.

Pyramix uses Merging's new Kefren DSP audio processor board, a specialized audio processor for personal computers and workstations. The board sports four AT&T 32-bit floating-point DSPs for processing up to 24-bit, 48kHz audio. Both 4- and 8-channel Pyramix configurations are available, either as board and software kits or as turnkey systems. The company also showed a prototype two-rackspace Audio Interface Unit (AIU), which accommodates up to eight channels of simultaneous user-specified inputs and outputs. Available for either Windows 95 or Windows NT, Pyramix uses Open Media Framework Interchange (OMFI) to ensure compatibility with other leading audio and video workstations.

The SSHDR1 from Soundscape (Ventura, Calif.) is also a multitrack Wintel-based recording/editing system with hardware expandability of up to 128 recording/playback tracks (see "Field Test" in *Mix*, November '96). The system has been enhanced with reverb, pitch shift and time stretch effects that will be available as real-time DSP processes in the first quarter of 1997. Soundscape also showed a prototype of a new 8-channel I/O box due out at around the same time.

Digital Audio Labs (Plymouth, Minn.), whose CardD line has been a popular I/O option for Wintel machines, announced the V8 product line, a PC-hosted hardware platform for hard disk recording and DSP. The system's main board (full-length ISA) supports mixing of up to 16 channels. Available I/O cards include CardDPlus, the new Deuce Coupe (stereo analog and digital inputs/outputs), and the new Big Block, with eight channels of analog I/Os and stereo digital I/O. Multiple Big Blocks may be used in a single system. An interface card for Alesis ADAT-format machines (the MDM Custom), supporting both 8-channel digital I/O and machine control, is also available. For signal processing, the DSP Supercharger card comes with one pair of Motorola 56002 DSP chips installed and slots for up to three additional pairs of chips. System pricing starts at around $2,500.

Another hardware/software combination for Windows 95 is available from Metalithic Systems (Sausalito, Calif.). The Digital Wings for Audio system includes a PC card (two stereo inputs, one stereo output) with optional breakout box (named BOB) and DWA software for recording/playback and editing of up to 128 tracks. The software is organized around a hierarchical fader grouping model, with waveform editing in a separate window using Way Cool Edit. Available effects include reverb, delay, flange, distort and envelope functions. MIDI I/O is integrated for sequencing and synchronization applications.

Designed for broadcast applications is CUTmaster from CreamWare (Sumas, Wash.), a Pentium-based recording/editing system featuring MPEG II editing and file transfer, full real-time DSP suite, synchronization, audio preview, format conversion, networking capability and the CARTmaster playback/retrieval system. Prices begin at $2,395.

Sonic Foundry (Madison, Wis.) showed the Version 4.0 update to its popular Sound Forge program for Windows. The company is shifting away from a proprietary plug-in strategy and moving to embrace a new plug-in format based on Microsoft's ActiveX standard, which offers improved support for real-time previewing. Sound Forge 4.0 also includes a new nondestructive cut list, new noise reduction and spectrum analysis plug-ins, a preset manager and support for Progressive Networks' Real Audio 3.0 audio streaming format for the Internet. Additional plug-ins will be available from Waves (Knoxville, Tenn.), which announced the compatibility of its Native Processing Power Pack with the program. The Power Pack includes Waves' L1 limiter, Q10 paragraphic EQ, C1 compressor/gate, S1 stereo imager, TrueVerb and WaveConvert batch processor.

Innovative Quality Software (Las Vegas) was showing its revamped Software Audio Workshop product line for hard disk editing and multitrack mixing. Version 6.0 of SAW, which has been rebuilt around the architecture of Innovative's top-line SAW Plus, now supports simultaneous playback of up to four mono or stereo tracks and can address up to two stereo sound cards for four channels of I/O. Version 6.0 also now supports third-party plug-ins. The previous version of SAW is still available at a lower price as SAW Classic.

Wave Computing of West Milford, N.J., showed StudioPC, a custom-configured, rackmount, IBM-compatible PC with 100 to 200 MHz Intel CPUs and recording software pre-installed and ready to run "right out of the box." Most popular MIDI and hard disk packages are available, including Cubase, Cakewalk, Logic, Spectral, Sound Forge, Pyramix, SoundScape, etc. Prices start at $1,489; software packages are priced separately.

HARDWARE-BASED SYSTEMS

Although not entirely computer-based, it's getting more and more difficult to separate the stand-alone, hardware-based recording/editing systems from those that require a host PC.

Akai Digital (Fort Worth, Texas) debuted enhancements for its DR8 and DR16 digital hard disk recorders. The SuperView SVGA interface card connects the DR8/DR16 to a standard computer monitor and keyboard, allowing for comprehensive display and keyboard-driven editing functions. Version 2.0 of the DR8/DR16 operating system

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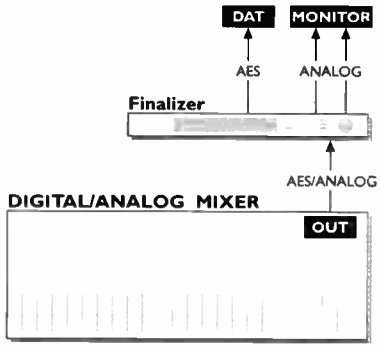

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offers many new features, including manual punch-in/out, backup to SCSI DAT and Exabyte tape drives, support for drives larger than 4 GB and a mode allowing users to save defined settings as templates.

Fairlight (Culver City, Calif.) unveiled MFX-3plus, a major update to its flagship system with an upgraded CPU, PCI bus support, an enhanced controller and a modular approach to new software releases. All major software components will now be available as individual, function-specific modules, which can be custom-tailored to suit individual needs or applications. Due early this year, the first release will be record/play-only modules, designed to provide an economical alternative to tape-based digital multitracks.

MASTERING SOLUTIONS

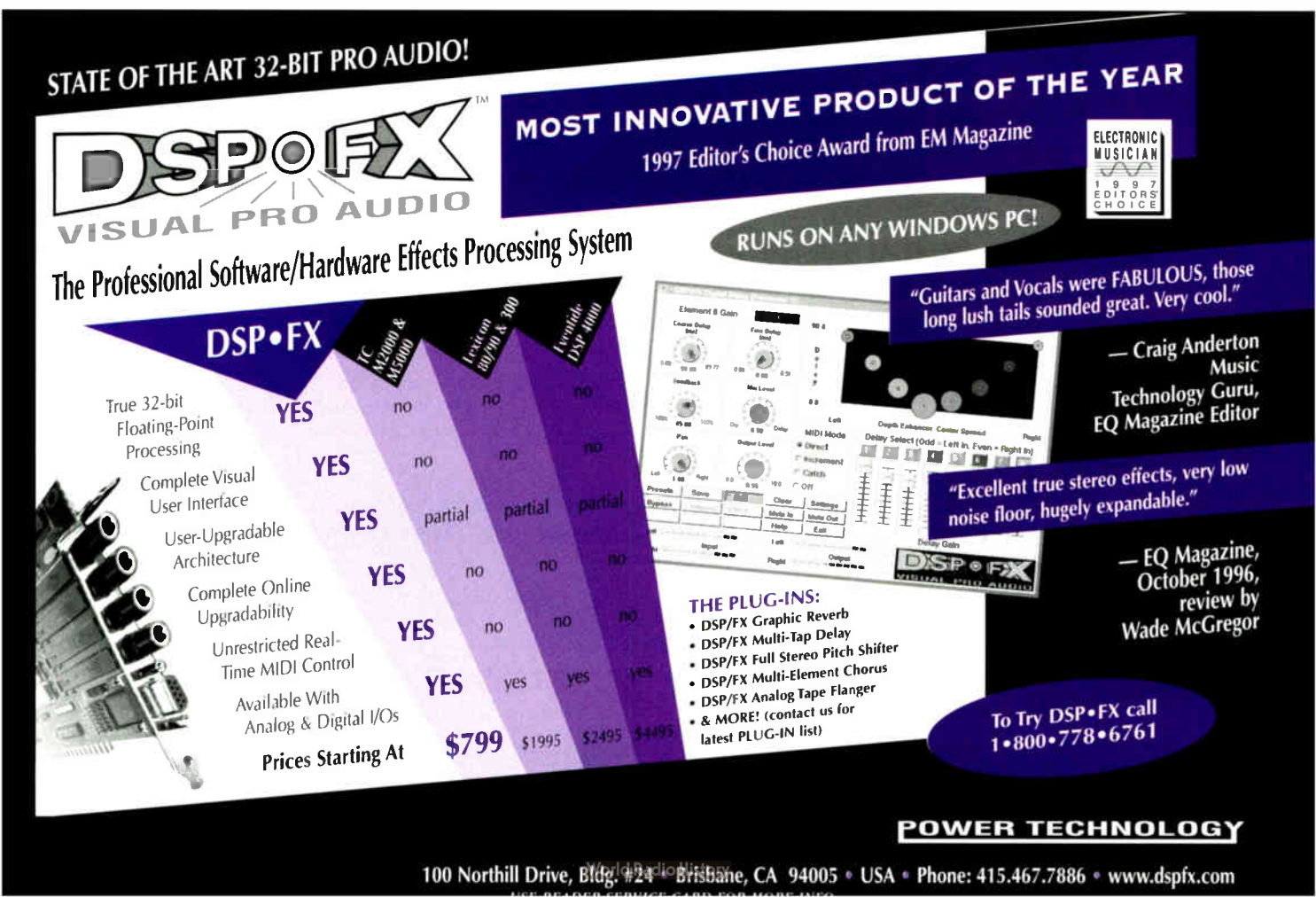
For mastering applications, Mac-based systems from Sonic Solutions (Novato, Calif.) have long maintained a leading role at the high end, with the SADiE system offering the most highly evolved alternative on the Wintel side. Just three weeks before the show, Sonic had announced the release of Version 5.1 of the SonicStudio software package, with enhanced premastering functionality, including a "CD Play Panel," allowing direct audition of any audio track written to Exabyte tape in the DDP format, as well as the ability to re-record PQ data and ISRC codes on previously written DDP tapes.

At AES, Sonic previewed Version 5.2, which was scheduled for release as a free upgrade in December 1996. Optional 96kHz sampling rate capability (available at an additional charge) will ready the system for the 24-bit/96kHz high-density audio format that may end up as part of DVD-Audio. Sonic has also added support for Sony's PCM-9000 magneto-optical recorder, as well as OMS (Open Music System) support to ease integration of external control surfaces into the Sonic work environment. Version 5.2 will also add support for Mezzo Media Archiver Version 2.2.2 to allow backup of an entire project in one step. Sonic also announced its intention to develop technology for creating Liquid Audio-compatible files for real-time audio distribution on the Internet. [*For more on Liquid Audio, see last month's AES report—Ed.*]

SADiE, meanwhile, has implemented a major upgrade, with SADiE3 debuting at the show. The new software is designed to run on existing SADiE hardware, as well as the company's Octavia modular digital workstation. Among the new features are dynamic reallocation of DSP power and read/write support for a variety of major audio file formats, including such Mac formats as AIF and SD II. Particularly notable in terms of efficiency is the ability to load tracks on or off the system in the background while working. SADiE3's mixing module now allows full user configuration with automatable dynamics, EQ and level, and allows internal subgrouping and effects sends. And a new Project Manager keeps audio and edit data together in a project, which may be backed up in a single operation. A broadband de-noise module designed by CEDAR Audio is available as an optional plug-in.

THE DIGIDESIGN PLATFORM

The big push at the big Digidesign booth was on touting the benefits of the just-released Pro Tools Version 4.0. The program now runs native on PowerPC machines. Among the new features demonstrated were send and mute automation, as well as dynamic automa-



Will a wet woolen blanket placed over my PA system enhance or degrade sound quality?

The answer is: The blanket will degrade sound quality. The so called ***BOSS*** effect (Blanket Over Sound System) can also be achieved without the blanket, but is nevertheless an *undesirable* effect. Often times, when the blanket isn't present and the PA still sounds bad the culprit is none other than the system's graphic EQ!

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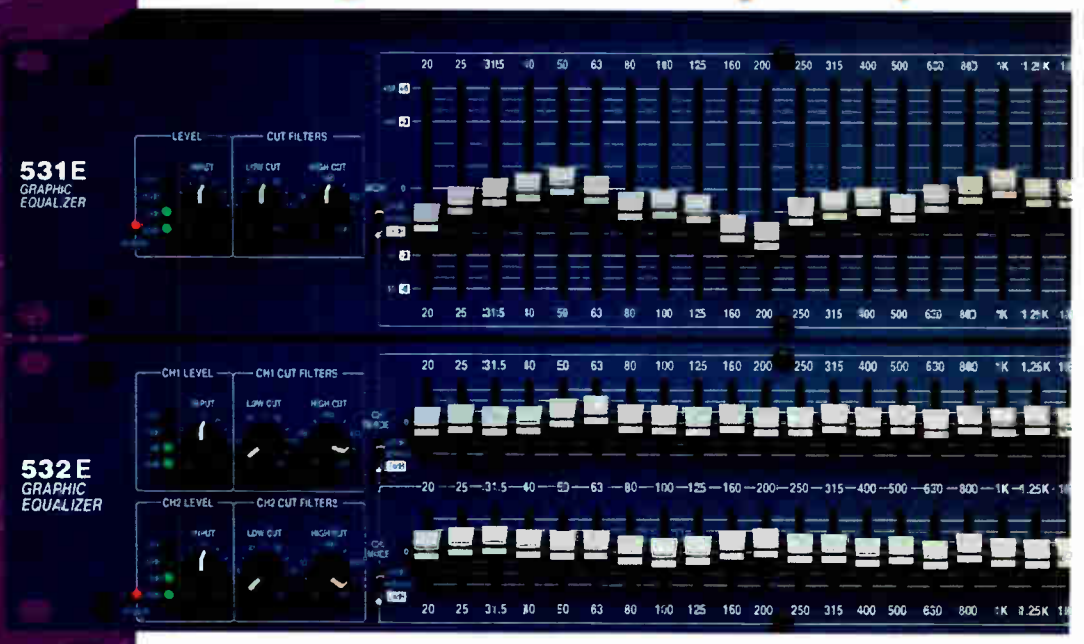

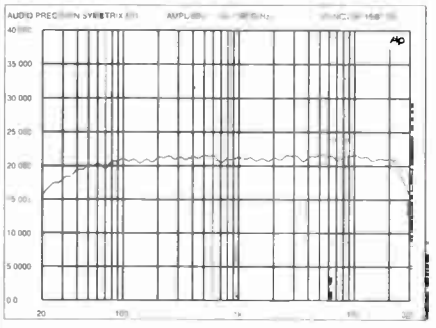

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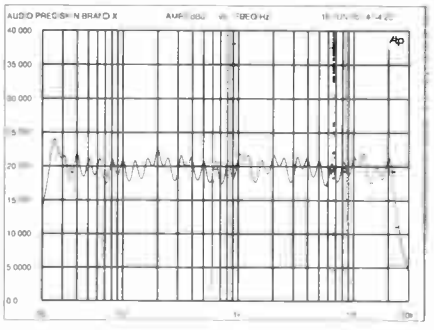

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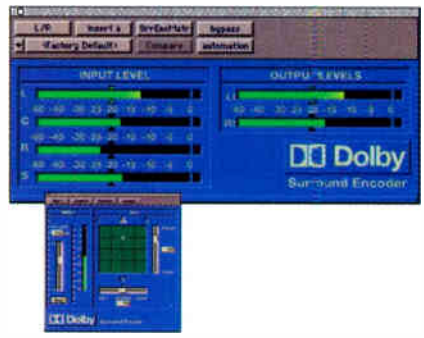
tion of nearly all TDM plug-in parameters. Version 4.0 will also include loop recording, batch export to multiple targets, new fader grouping features and built-in support for synchronized display of QuickTime movies. An optional MachineControl add-on allows transport and scrub-to-picture control over VTRs using 9-pin and VLAN protocols.

Pro Tools 4.0 features built-in support for hardware control surfaces from third-party manufacturers, including JL Cooper, Penny & Giles and Peavey, as well as for a new controller under development by Mackie—a prototype of Mackie's Human User Interface (HUI) was on display at the show. The automatable HUI features eight 100mm updatable motorized faders and bidirectional MIDI or RS-422 control.

One of the smartest strategies Digidesign has pursued over the years is to aggressively support the extension of their products' capabilities by third-party developers through plug-in architectures, first for Sound Designer and later via TDM. At AES, the company announced AudioSuite, a new plug-in specification for Pro Tools 4.0. Core DSP plug-ins bundled with Pro Tools will include reverse, normalize, pitch shift, time compression/expansion, invert, DC offset removal, dither and duplicate.

Dolby Surround Sound Tools

Dolby Surround Decoder TDM Plug-In



Dolby Surround Encoder TDM Plug-In

Many existing plug-in developers at the show announced plug-ins in the AudioSuite format. Waves, for instance, announced AudioSuite versions of L1, Q10, C1, S1, TrueVerb and WaveConvert. Other AudioSuite plug-ins announced include the Pure DSP pitch processor from Mark of the Unicorn, the VocAlign voice pattern synchronization tool from Synchro Arts, the Steinberg Loudness Maximizer, and Spatializer's PT-3D.

The list of TDM plug-ins, meanwhile, continues to grow, making the Digidesign third-party developer booth a busy and often crowded spot on the show floor. Some of these plug-ins integrate into the digital workstation environment processing capabilities previously available only in stand-alone devices; others perform new and unusual operations inconceivable before the digital age. (Contact information on third-party tool developers is available from Digidesign in Palo Alto, Calif.).

Included in the former category are dynamics processors from Drawmer and dbx. The latter demonstrated the DC66 compressor/limiter/gate, which emulates the company's Overeasy circuitry found in the 1066. Drawmer's Dynamics plug-in is also a compressor/limiter/gate, this one based on the company's DS 201.

Dolby Laboratories was showing Surround Sound Tools for TDM, two plug-ins that combine to allow Dolby Surround encoding and Dolby Pro Logic decoding for monitoring of surround-encoded program. The pair are

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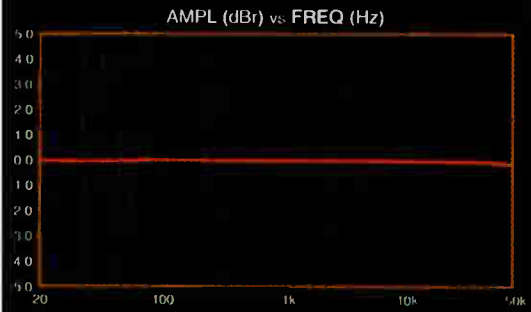

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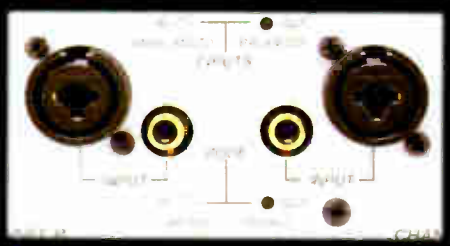
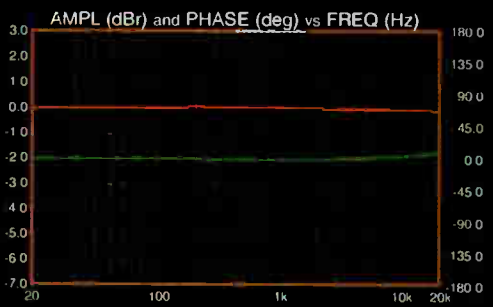


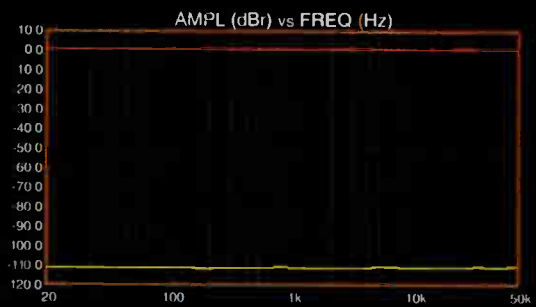
Frequency response, phase and signal-to-noise are technical terms that may make your brain hurt to think about, but they mean everything to the accuracy of your mix. Many amplifier companies strive for excellence in one area, being excellent in all of these is what makes the RP 500 the perfect studio amplifier.



Frequency Response

Phase

Noise Floor



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The RP 500 has an exceptionally smooth phase response which enhances the stereo image. Phase shift can cause phase cancellations in the mix position, which leads to a "smeared" or reduced stereo image found in other amplifiers.

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CHRIS MARS

RECORDING HOME ALONE

Shortly before alternative progenitors and all-around icons The Replacements broke up in the early '90s, founding drummer Chris Mars left the band and embarked on a solo career. The Minneapolis resident landed a deal with the Smash label, and over the next two years he produced two well-received albums of his own songs at nearby Paisley Park Studios. Only a few guest musicians were featured on those records—Mars played virtually every instrument himself.

It may seem strange that Mars would choose this approach after playing with a band for many years, but he says it comes naturally. "I do a lot of visual art, too," he says, "drawing and painting. I've been creative in a solitary way all my life." Unfortunately, studio time is a lot more expensive than oil paints, and playing most of an album's parts oneself can be a particularly time-intensive way to record. Mars often found his creativity curtailed by the clock.

By 1994, when he signed a contract with New Jersey independent label Bar None, Mars had come up with a solution to his time and money problems: "I suggested buying a studio because of all the gear on the market that allows you to get some pretty good recordings at home." It made sense to the label, so with funding in hand, Mars called music stores in Minneapolis and New York City. He decided on a package offered by a local store consisting of 16 tracks of Tascam DA-88; a Samson MPL 2242 mixer; Yamaha NS-10M monitors; mics including six SM57s, two Audio-Technica AT4033s and one AT Pro 25; two dbx 166 compressors; a Roland Super JV-1080 synth module; a bunch of BOSS pedal effects; and a Yamaha DTR2 DAT machine.

After setting up the gear in his living room, Mars was ready to make his third record, with complete creative freedom. But what about engineering chops? "I had no idea," he says. "God, it was a headache. That record was many, many calls to the store and just taking a lot of notes. I didn't know how a board actually worked or anything." Mars had, however, learned skills like mic placement during his studio work with The Replacements, so with this knowledge and a lot of diligence, he got by.

Mars in his studio, illustrating the benefits of working at home. Background: A Mars painting adorns the cover of his new release, Anonymous Botch.

To record his new album, the recently released *Anonymous Botch*, Mars built-out a studio space in his basement (named Pine Box Studio in honor of the building materials and the design). He had a much easier time engineering on this go-round and recorded the album over a period of two-and-a-half months. Asked if he misses working with professional engineers, Mars replies, "Sometimes, yeah, because I'd like to be able to concentrate on the purely creative end. But if you're in a studio, you have to hurry anyway. When you're at home, you can take your time and dabble, so I think it balances out. And at the same time, it's pretty fun, because if there's a sound you have in your head, you can go for it and it's very educational. I've learned a lot."

It may seem a haphazard approach or a simple setup, but the studio is a comfortable place that enables Mars to work alone and unfettered. It's a serviceable, creative tool for him that he uses as such. "I think of music in general as just a vehicle to express yourself," he says, "and I treat the gear as more of just a way to get things out rather than getting all into the technical nuts and bolts. All that stuff is helpful, too—bit by bit you learn a little more, maybe pick up a piece here and there, then you just hit yourself in the head and say, 'Shit, I should have done this three years ago.' You do things the hard way, but it's all about getting the idea across." ■

BY ADAM BEYDA

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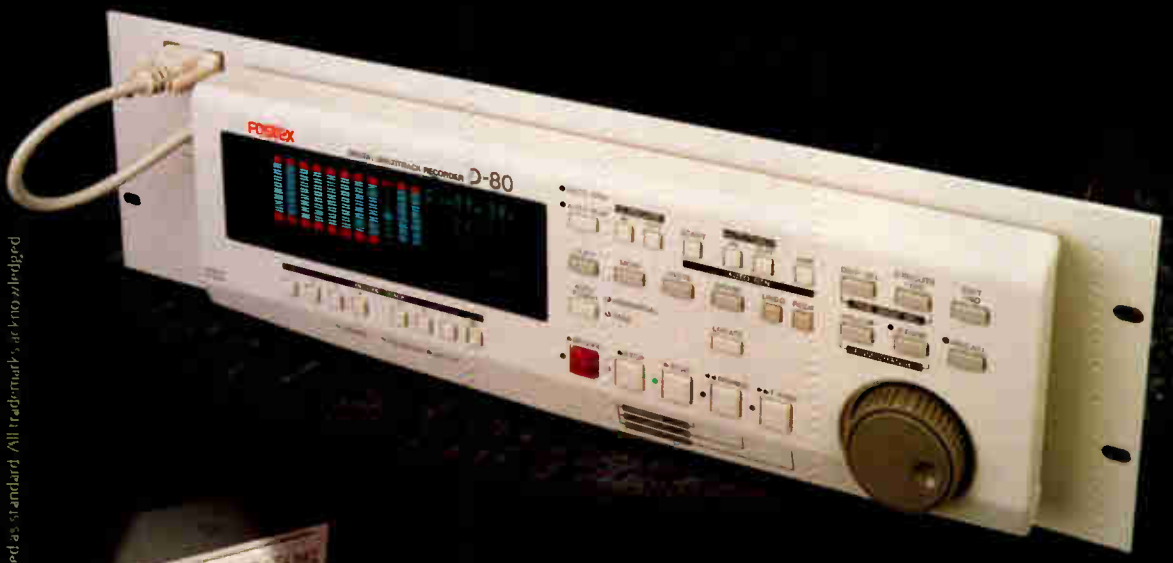

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THE PLACE

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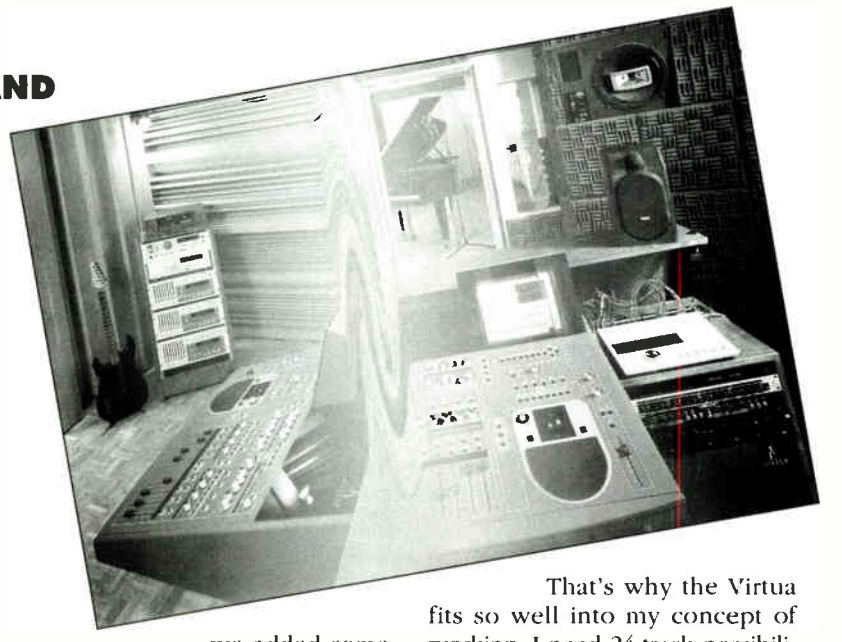

The Place is the personal domain of Heinz Affolter, a Swiss guitarist/composer/engineer, in that order. It's Affolter's third studio, the latest generation of a work space/business that has supported itself and its owner since the late '70s. "It's something between a commercial studio and a private facility," Affolter explains. "I started back in '78 with a 4-track machine, then a 16-track and now—since 1984—I'm at 24, which is perfect for what I'm doing."

Affolter is currently dividing his time between his own artistic pursuits—he has four albums to his credit and another forthcoming—and recording other Swiss acts. His facility, which was designed in 1984 by Helmut Kolbe of Zurich, is situated in a former shop that shares walls with residential apartments, which poses some limitations: "We can mix all night long," he says, "but we have to stop recording drums at 10:00 p.m."

The studio measures 33 by 17 feet and features a live-end, dead-end-style arrangement, with a glass-walled piano booth. The control room (15 by 20 feet) is also acoustically graduated from reflective to absorptive, and downstairs, directly below, is a machine room that doubles as an iso booth. "I have some special things down there for the guitar players," says Affolter, "you know, the rock side. I made some big isolation boxes and put two Marshall cabinets in each of them, so I can pull up speaker wire and the players can just plug in their amps or preamps and have great isolation."

In 1993, all of The Place's rooms were retuned by British studio designer Nick Whittaker. "We made minor corrections," says Affolter. "The main monitors had to be tightened because they are flush-mounted in the wall, hanging down from rubber strips, and they had become loose over the years. Nick also changed the horns, and we added some equalizers—some White EQs—in the bass and made some adjustments to the mid-range." UREI 811As provide the monitoring. Other equipment includes three Tascam DA-88s, two Panasonic SV3700 DATs and B&W CDM1 near-field monitors. Affolter also has outboard gear from TC Electronic, Roland, Lexicon, Yamaha, Ensoniq, Alesis and Valley People, and microphones from Beyer, Crown, Shure, Audio-Technica and RØDE.

The Place's console is a recent addition—a brand-new Soundtracs Virtua, which Affolter says he's been working on nonstop since it arrived, getting the hang of the new digital technology. "Initially, I really had to start rethinking [the way I work]. I just finished mixing a session of 18 songs, and I learned a lot using the automation. I've had automation before, but this is Total Recall. And Total is really total: EQs, compressors, gates, gains, inputs, tape returns...For example, I have a client here, and he has no time to be here, so I tell him, 'Why don't you just do your thing, and I'll keep going. I will not put it on tape until you've heard it.' And in between, I can do another session, and I can just go back to the song. It gives me so many possibilities. That's why the Virtua fits so well into my concept of working. I need 24-track possibilities here, and it's the first time I've seen a desk that does what I want it to do in this price range.

"I do have some complaints," Affolter continues, "but they are mostly software-based, which I think will be worked out. The console cannot send out MIDI program changes, although it has MIDI. I think that's something Soundtracs will probably implement in a later version. It's just so brand-new. I'm definitely the first studio in Switzerland that has one."

When we spoke, Affolter had just finished a gospel project and was about to begin recording a local rock band. "But mostly, I try to have time for my music," he says. He describes his own style as a mixture of Latin, flamenco and jazz-influenced classical guitar. The outside projects he records are various. "Lucerne is a very small town," he says. "There are some local groups here, and I get bands in from Zurich, projects from all over Switzerland now. We record country music, classical music. We have had full orchestras for movie soundtracks here; I think the maximum we could fit was about 20 musicians. But the studio is not booked every day, and I'm happy that it is not booked. I want to use it for my private purposes. I'm a musician. That's what I want to be." ■

BY BARBARA SCHULTZ

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SOLAR RECORDING

The summer of 1996 brought a rash of violent storms to the American Southwest, causing a massive power outage that stretched from California, Arizona and Utah to the Canadian border. Although virtually the entire state of Arizona was without power, Carol Hills-Hitney was still rolling tape at Serenity Records, her recording studio in Prescott. "I didn't even know there was a power failure," she says. Hills-Hitney and her husband, Gene, a solar engineer, live in a solar-powered ranch home, built completely out of recycled and nontoxic materials. Incorporated into the structure is the solar-powered recording studio, where Hills-Hitney composes and records children's music for her own Serenity Records label. The recordings are released through her own publishing company, Harmony With Nature Publishing.

"A solar-powered system basically is very simple," explains Hills-Hitney. "It's modular. You can start with one or two panels, do a few lights in a home, a radio, TV. Then you add more panels later, and more batteries." A 5,000-watt solar electric panel array sits on the roof of the house, gathering energy to power both the home and the studio. A 1,050-watt array provides the maximum studio power level of 2,500 watts, allowing Hills-Hitney to run the studio, at an average power in the 700-watt range, for about ten hours per day. The energy is first stored in batteries; it is then sent through a sine wave inverter, which changes direct current to AC electricity.

"The nice thing about having a solar-powered studio," says Hills-Hitney, "is that you do not have to worry about electrical surges. Another great thing is, it's quiet. You don't have any hum. We have the studio on a separate circuit so that it's not common to the rest of the home circuit."

Hills-Hitney says her vision is to teach peaceful coexistence between people and nature by reaching out to children. She has been developing teaching tools, including music books and tapes with children singing on one side and karaoke-style music on the other side. Ten percent of album proceeds go to nonprofit organizations of the purchaser's choice.

Hills-Hitney's projects are designed to be used in schools or at home, and they have a strong emphasis on ear training. "It's good for children to hear different types of music, and so I mix different meters, time signatures, so they get a feel of different rhythmic structures. And I bring a strong melodic [element] into it," says Hills-Hitney.

The Serenity Records studio was designed and equipped with the help of Dave Bellanca from the Communication Task Group West Ltd., of Las Vegas. Hills-Hitney mixes on a Mackie 3208 with Ultramix automation. Recording equipment includes three Panasonic MDA-1 MDMs with Alesis BRC, Tascam DA30 and DAP1 DAT machines, and two Sony TCK cassette recorders. Monitors are Alesis Monitor Ones, and effects processors include an Alesis MidiVerb 4, TL Audio dual-valve preamp/compressor, Lexicon Alex and Behringer MDX2000. Hills-Hitney is partial, however, to her SPL Vitalizer when recording children. "I find it's really good—it sort of separates them a little bit, gives them a little depth," she says. Mics include Beyers, Shure 57 Betas, AKG 391 and C3000, ATM 25, and Audio-Technica 4050 and 8410s. Hills-Hitney composes with Finale software and an Ensoniq MR76 keyboard, with various other synths and sound modules.

BY SARAH JONES

"It's not easy to record children," Hills-Hitney says. She stresses the importance of making sure they are thoroughly familiar with material and are comfortable with the studio situation, particularly with headsets. Also, she's found that children respond well to hearing other children singing, as opposed to adults. And then there's the attention-span factor. "You can't keep children in a real long session, and besides, I have a fun place that they can come to. They can play with some chickens, and they can be out in my garden and there's no traffic going by."

This is turning out to be an exciting year for Hills-Hitney. She has plans to move into hard disk recording and is expanding her Web site, which features information about her albums, solar energy facts and downloadable audio files. She also hopes to record more all-adult albums. All of these projects are helping her fulfill her commitment to educate children while encouraging practices that will help preserve the environment. "You have to sort of find your little niche," says Hills-Hitney, "and I think I found a niche where I can be helpful and where my time is spent wisely."

For more information about Serenity Records/Harmony With Nature Publishing, call 520/776-9670, visit www.northlink.com/solar/or write to Box 365, Chino Valley, AZ 86323. ■

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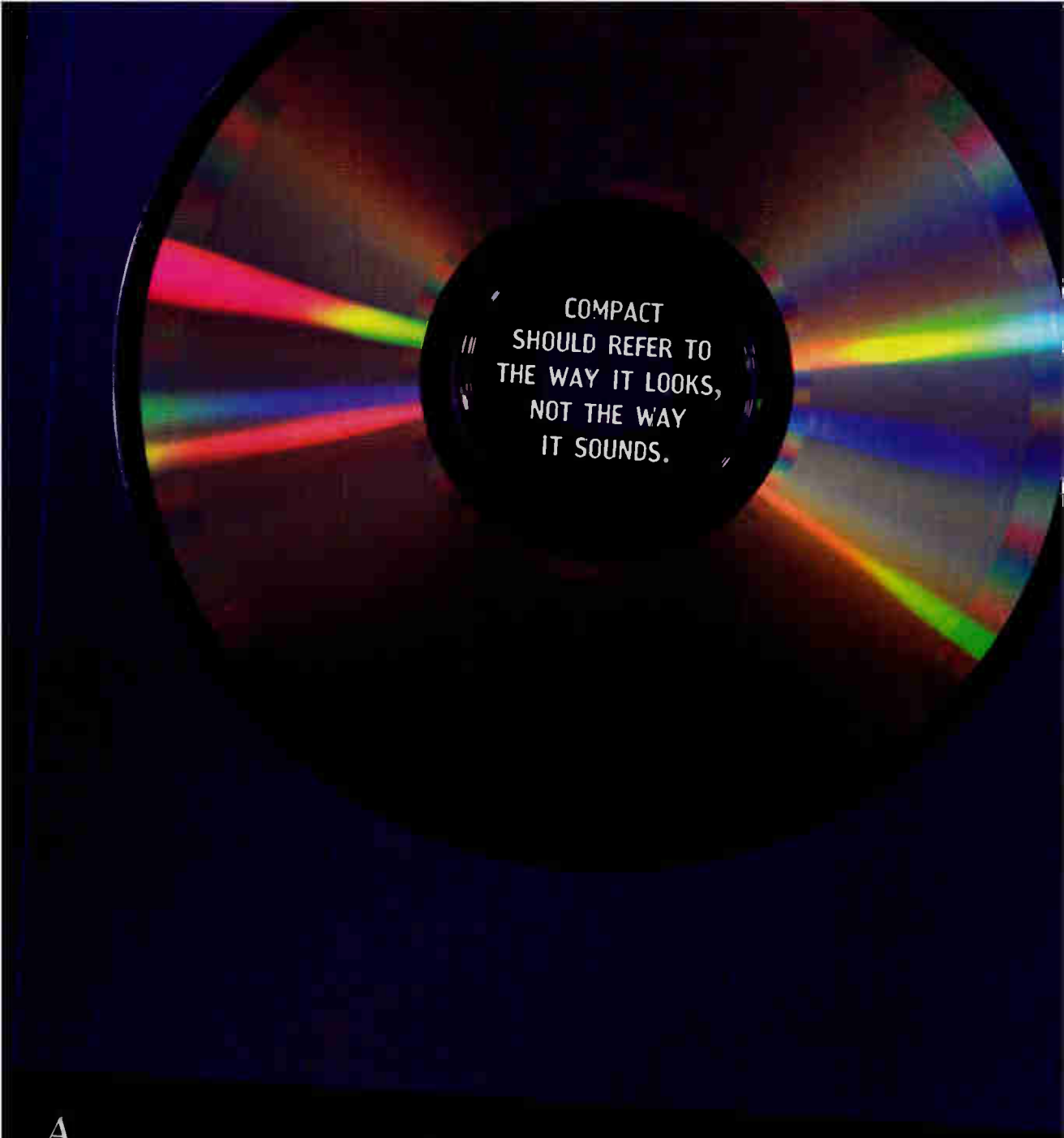

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A STUDIO GROWS LIKE MAGIC

When the singer/songwriter/musician/producer/engineer known as Magic arrived in Los Angeles from the tough streets of Jamaica, New York, in the early '80s, he had $300 to his name and a head full of dreams about making it in the music business. He idolized Earth Wind & Fire leader/producer Maurice White and spent days on end unsuccessfully trying to meet him. "I literally walked to the studio where he was working every day for two months, but the guy at the door wouldn't let me in," Magic says. "A few years later, I did it right: I drove up to the studio in a limousine and this same guy told me just where I could find Maurice!" That led to a friendship, and White eventually even signed Magic's group, called Magic Eye, to his Kalimba Productions company. Since then, Magic's career has been on an upward track, and he's become a producer himself, working out of his home studio with such "name" artists as The Whispers, The Rippingtons, George Duke, Nia Peeples and Gerald Albright. Not bad for a guy who claims he learned much of what he knows about audio from the pages of *Mix*.

Magic's studio (which dominates his house in the lovely town of Moor Park, in Ventura County, just north of L.A.), started out humbly. "I had a Tascam 688, and I made a record on that called 'I'm Coming Home' during the Gulf War—it was like a letter from a soldier—and I sold 67,000 copies of that, off a Tascam cassette deck," he says. "I never wanted to be an engineer; in fact I'm not really sure I want to be one now, but out of necessity I had to learn how to do it to make my music. Then I bought a Fostex console and a Fostex G-16 recorder, and I cut these tunes that The Whispers got a hold of. They met with me and they said they loved the songs and eventually, about eight or nine months later, it came out that what they wanted was for me to produce them doing those songs. By this time, I had a Peavey AMR1600 console and I was using that with the G-16s. The Whispers said they wanted me to record them, so I was going to book a studio, but they said, 'No, we want to do it at your house.' Well, this was my first time engineering, so I said, 'Wait a minute, I'm not an engineer!' And I was really scared; they almost had to force me to do it. They said, 'Look, you've been talkin' to us for eight months about equipment and this and that and you obviously know what you're doing, so just do on us what you did on your own tape.' I was still scared, so I figured I better go get some new equipment, so I got a Soundcraft DC 2000 and eight [Akai] DR-4s, so I had 32 tracks direct-to-disk digital and all this other gear." So far, most of the recording has occurred in the spacious control room, with Magic monitoring on headphones.

In addition to the DR-4s, Magic has recently invested in four E-mu Darwin hard disk systems, giving him a total of 64 tracks to work with. Monitors at the studio are models by Alesis, Tannoy, JBL and Auratone. The extensive collection of outboard gear includes the Yamaha REV7 reverb, Alesis MicroVerb III, four Alesis 3630 compressor/limiters, Audio Control EQ, Ensoniq DP4 effects unit, BOSS Pro SE-50 stereo effects processor and much more. Among his mics are an AKG 414, an Audio-Technica 4033 and an Oktava MK219. Magic is a multi-instrumentalist as well, proficient on guitars, drums and keyboards; his keyboard/sampling rig features a large assortment of Akai, Roland, E-mu, Ensoniq, Yamaha, Oberheim, Alesis, Moog, Kurzweil, Korg and Kawai gear.

These days Magic spends his days and nights juggling production chores for groups like The Whispers and a country group called Shades with his own projects, which run the gamut from jazz to R&B. "I really feel like this is a dream, because so many wonderful things are happening to me—things I fantasized about when I was a kid, and now that I'm an adult I get to do them. And I still feel like a kid." ■

BY BLAIR JACKSON

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PROJECT STUDIO MAINTENANCE

Tips, Tricks And a Little "What's-the-Point?" Repartee

by Dan Daley

Here's one of those stories that crops up anually as a reminder of the days when studio maintenance meant something completely different than it does today. As music production moves ever closer to a complete computer-based domain, many of the old rules of maintenance get replaced by those more relevant to IBM and Macintosh environments.

"The digital world has given the idea of studio maintenance an entirely new meaning," says Shane Faber, owner of Jeep Jazz Music, which operates out of the back of Sound On Sound in Manhattan. Sound on Sound is one of those studios that still has to play by the old maintenance rules, much to the satisfaction, one suspects, of its owner, Dave Amlen, an old-line studio guy who still believes that you can make a facility work successfully with consoles, tape decks and True Grit. But it's people like Faber who are facing the new realities of maintenance in the 1990s.

"The thing about equipment at the project studio level is that, in general, it either works or it doesn't work, and there's not a whole hell of a lot you can do about it," he says, not without some positive spin. "On one hand, it's a pain in the neck knowing that you can't fix most of what you buy because it's a closed box—no user-serviceable parts inside. On the other hand, because everything is so cheap and modular, you can have more than one of a lot of critical systems, like modular digital multitrack decks. Now, instead of a system going down and having to stop the session, you can simply replace the malfunctioning system with another one. That's what I mean when I say that maintenance has a whole new meaning these days.

"Becoming your own technician was fine a few years ago, but in a way it's become kind of dangerous now," adds Faber, who syncs an ADAT deck with an open-reel Tascam ½-inch, 16-track, straddling the line between the old and new rules. "You still have to

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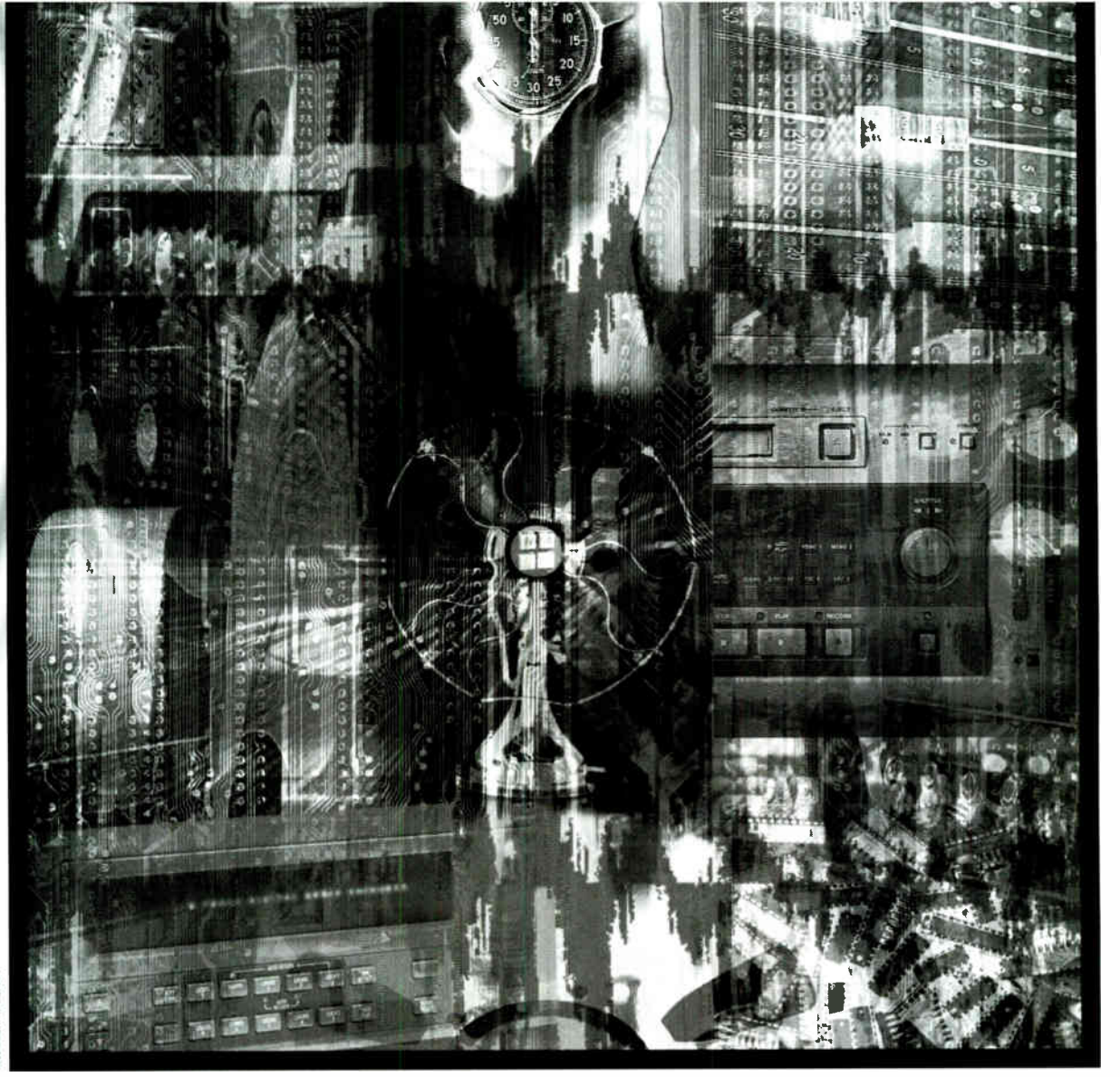

know how to use a soldering iron and a jeweler's screwdriver. But just as important now, you have to know when to call someone else in."

One interesting development from the front lines is that duplicate equipment has become a function of maintenance. ADATs, in particular, were the butt of disparaging remarks in the beginning, mostly about the need to have an extra one always on hand. However, it's become a fairly standard practice throughout project land to keep one redundant MDM unit of any brand nearby, making the old math of "four-8-tracks-equals-24-tracks" an accurate equation.

The same goes for inexpensive signal processors and other outboard equipment. The low cost of the gear has actually made this an advantage in keeping sessions running; in a modular, affordable world, it's easier to pull out an offending rack squirrel and replace it than stop the session to try to fix it, which probably can't be done anyway. This extends to some of the more sophisticated technology, as well. For instance, one facility owner noted that he had purchased his TimeLine MicroLynx synchronizer with an internal black burst generator, but had the foresight to also acquire both an external word clock and black burst generator. "The MicroLynx will crash now and then, and it takes awhile to get them back up," he says. "Having those functions externally is the same as having other parts of the studio modular. It really saves a session when something goes down. I really encourage people to have as many items and functions independent of other systems as possible, from black burst generators to hard drives. All my writeable disk systems are modular, like using my Jaz drive instead of the internal computer hard drive. Instead of having to take the whole Mac in for a repair, I just switch out drives. Be as modular as you can."

Much of what works in computer maintenance environments also applies nicely to project studios. Frank Piazza, a project studio owner in New York, recommends keeping to a computer maintenance schedule for music equipment. "You have to remember to rebuild the Mac desktop—hold down the Option and Command keys when starting up the computer. I find that the frequency at which I do this depends upon the amount of work

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I'm doing. You can either wait for the hard disk to get slow, or you can do it on a regular schedule, like once or twice a week." Defragmenting the hard drive is just as important; use the appropriate software, such as Norton Utilities, to accomplish that. And for goodness sake, don't forget your surge protector!

Air conditioning for project studios is an often overlooked maintenance point, and it goes hand in hand with dust control in the studio environment. It's recommended to have any air-conditioning system that feeds the studio checked and serviced at least annually, and if your system is part of the house system, have it serviced bi-annually, with a particular emphasis on the ducts feeding the studio. Chimney-sweep companies offer duct-cleaning services (as does Sears); have that done at least once a year. And make sure the equip-

CONSOLES, CABLES AND CONNECTORS

It's a good idea to check all your mic cables regularly—cleaning the jackets, checking for missing screws on the XLRs, etc. Also, check for shorts and open connections, and verify that the cables are wired properly, so pin 1 goes to pin 1 on the other end, ditto for pins 2 and 3. Nothing is more aggravating than an out-of-phase mic cable!

Spend some time checking often-overlooked connections, such as those for your monitor amps and speakers. Check the binding posts to make sure the metal surfaces are bright and shiny. Retighten the connections, perhaps using a touch of cleaner/deoxidizer/conductivity enhancement treatment such as Deox-IT from CAIG Laboratories (San Diego). And make sure the lock-down screws on the multipin blocks—such as EDACs and Elcos—on the console and tape machines are secure.

Patchbays can be a particularly troublesome area, particularly in-console versions where the holes face up. They should be cleaned at least once a year, preferably more. Some consoles include a TT patchbay cleaning attachment—a nozzle attached to a can of cleaning solvent—so you can clean without disassembling. Vertigo Recording Services (North Hollywood, Calif.) carries a line of injectors and burnishing tools for professional TRS ¼-inch and TT patchbays, retailing for a mere $34.95.

And on the subject of patchbays, I prefer nickel-plated patch cables. If you're using cables with brass connectors, make sure they're always as shiny as gold—even the slightest amount of oxidation on the metal surface can cause bad or intermittent connections.

—George Petersen

COMPUTER CHECKLIST

[Submitted by Charles Maynes, former software test engineer at Digidesign, now a sound designer/effects editor at Creative Cafe, Glendale, Calif.]

1) Have and use a backup device regularly. Removable drives (Jaz, optical, CD-R) are okay, but usually their limited capacity and high cost-per-MB make them awkward to use. DLT/Exabyte and DDS2 DAT are better solutions. DLT is best if you are using a high volume of material, or if you must change from project to project in a limited amount of time. It is quite fast (transfer rates better than 90 MB per minute) but somewhat costly. If the device is shared by more than three users, it is really a good value.

2) Periodically reformat your hard drives. This takes time—especially with large drives—but is a great bit of insurance for the DAW user. (Be sure to read item #1 before doing this, though!) Also, between projects, occasionally run a disk optimization or defragmentation program.

3) Mac users: Suppress the urge to use operating system extensions—the fewer extra extensions and control panels, the faster your computer. If your computer is dual-purpose, use the extension manager to set up a trim startup environment for your digital audio work, and an enhanced environment for your "off the clock" work.

4) Be sure to read your manuals and "read me" files carefully—most manufacturers will document any bugs or incompatibilities with their products.

5) Use a battery-backup power supply. This is very important, especially if you have older wiring in your studio. It should also help keep your other appliances from disrupting the computer. The battery isolates the computer/peripherals from the wall current.

6) If possible, leave your hard disks on at all times. This will actually allow them safer performance because they will stay at a constant temperature. (Mixing consoles benefit from this, as well.)

7) Avoid installing software revisions in the middle of a project. Unless you have received a critical bug fix in a new version, or like living dangerously, changing software can sometimes lead to new crashes and instability at a time when you can least afford it.

8) As a scheduled maintenance issue, use compressed air to remove the dust from the inside of the CPU. This procedure will increase its lifespan and make it happy.

9) Add more RAM and use faster drives whenever you can.

10) Always use high-quality cables, especially for critical SCSI connections.

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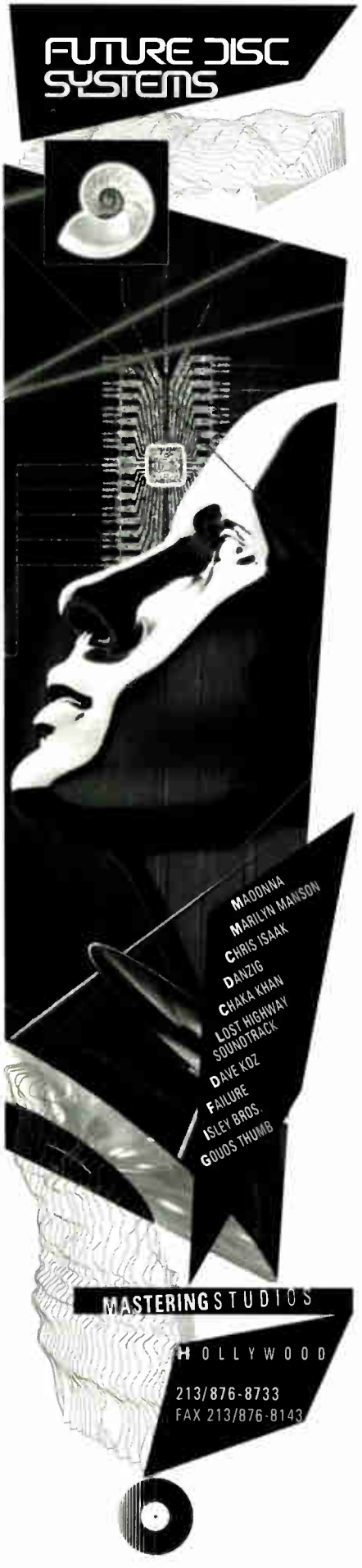

um cleaner hose directly over the top of gear, especially the console, and lift it from section to section so you don't knock dirt into crevices as you move. Small air filtration devices placed near equipment, especially down near the bottoms of racks, also help keep dust under control.

When it comes to maintaining MDMs, E.D. Menasche, co-owner of PM Productions, suggests exercising cassette tapes in the machine by completely fast-forwarding and rewinding them once or twice *before* formatting them. "I've found that that really helps prevent dropouts," he says. "And once you find a brand of tape that works with your type of machine, stick with it. These machines seem to be very picky about what they want in them."

And finally, adds Faber, do everything you can to keep the one most indispensable piece of technology happy: "When you do find a great technician, someone who really knows what he's doing and who can get everything running right, do everything you can to keep him—and don't give anyone else his phone number." ■

Dan Daley is the East Coast editor of Mix.

MDM MAINTENANCE: HEAD GAMES

An ounce of prevention is worth a pound of cure, and this old adage applies equally to caring for your modular digital multitracks. The rotating heads used in videotape-based MDMs usually need replacing after 2,000 to 3,000 hours of use (typically, less than one year at a busy studio). But tape head life may be extended beyond that figure by avoiding dusty conditions and cleaning on a regular basis.

Also, when it comes to tape guides, cleanliness *is* godliness. I've troubleshooted dozens of MDM problems, and dirt particles trapped in the corners of the guide rollers cause tape misalignment and sticking, leading to all kinds of unexplained maladies, even when the heads were clean.

MDM tape heads are extremely fragile. So unless you are thoroughly trained in the ways of cleaning rotary-head assemblies, you'd better forget about popping the top on an MDM to do head cleanings. Both Alesis and Tascam recommend using "dry" tape head cleaning cassettes. Do NOT use the "wet"-style cleaners, which typically involve putting a few drops of some cleaning liquid into a videotape-sized cleaning mechanism. These may permanently damage MDM heads and should not be used. Alesis recommends the 3M VHS-HC Black Watch video cleaning cassette. Tascam suggests the dry cleaning tapes designed for Hi-8mm video.

When to clean heads is subject to a variety of criteria, such as the conditions of operation (dust/humidity/temperature levels) and the type of work you do, such as constant shuttling over short sections of tape. Also, certain formulations of tape shed particles less than others, so once you find a tape you like, stay with it. My rule of thumb is to clean heads on an as-needed basis, such as when the MDM's error light flashes frequently or stays on for long periods.

Keep a maintenance log and note how often your heads require cleaning. Check the number of hours on an ADAT by pressing the Set Locate and Stop buttons simultaneously. On a DA-88/DA-38, hold the Play and Stop buttons while powering up. This will display the total number of elapsed hours of head-drum operation on the time counter display. This hour display is useful not only for scheduling routine service, but also for checking the "odometer" when you're looking at a used machine.

—George Petersen

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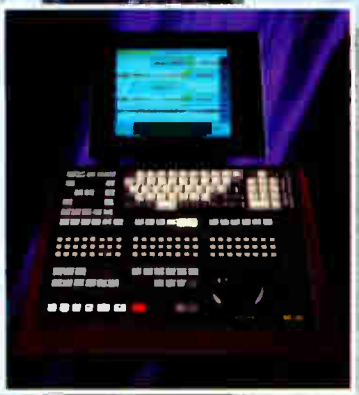

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World Radio History

"RIVERDANCE: THE SHOW"

FOLK MUSIC WITH BROADWAY POLISH

For an island approximately the size of Maine (with a population smaller than that of Missouri), Ireland has an impressive music scene—one that continues to leave a big footprint on world culture. Acts such U2, Van Morrison, The Chieftains, Sineád O'Connor, Sinéad Lohan, Enya and The Cranberries make up a healthy portion of Ireland's exports, and they are a rich source of pride, as well.

It should come as no surprise, then, that *Riverdance* is taking the world by storm. A high-energy, high-tech show combining traditional Irish music and dance with world music sensibilities and a rock 'n' roll pace, *Riverdance* is one of the London theater's most successful offerings. In the UK, *Riverdance: The Video* is the second- best-selling video ever (next to Disney's *The Lion King*). At the show's U.S. debut at Radio City Music Hall, the sale of *Riverdance* merchandise broke the previous sales record, held by the Teenage Mutant Ninja Turtles.

EUROVISION

The show has unlikely origins. The broadcast of the Eurovision Song Contest is a longtime tradition across the Atlantic. You may remember that in the '70s, the contest exposed an unexpecting world to a previously anonymous group of Swedes known as ABBA. The contest works like this: Each country enters a song and a singer (or group) into the competition, sort of like a cross between *Star Search* and the Olympics.

Each year the honor of hosting the event is given to the country that won the previous year. This host country gets to present a musical interlude or short film while the judges are tallying the votes—usually an opportunity for the audience to grab a pint from the icebox. But in 1994, an estimated 300 million European jaws dropped when the combination of Bill Whelan's score and Michael Flatley's choreography put Irish folk music and dance on steroids and into overdrive. *Riverdance* was an overnight sensation.

Despite the overwhelming response, expanding a seven-minute

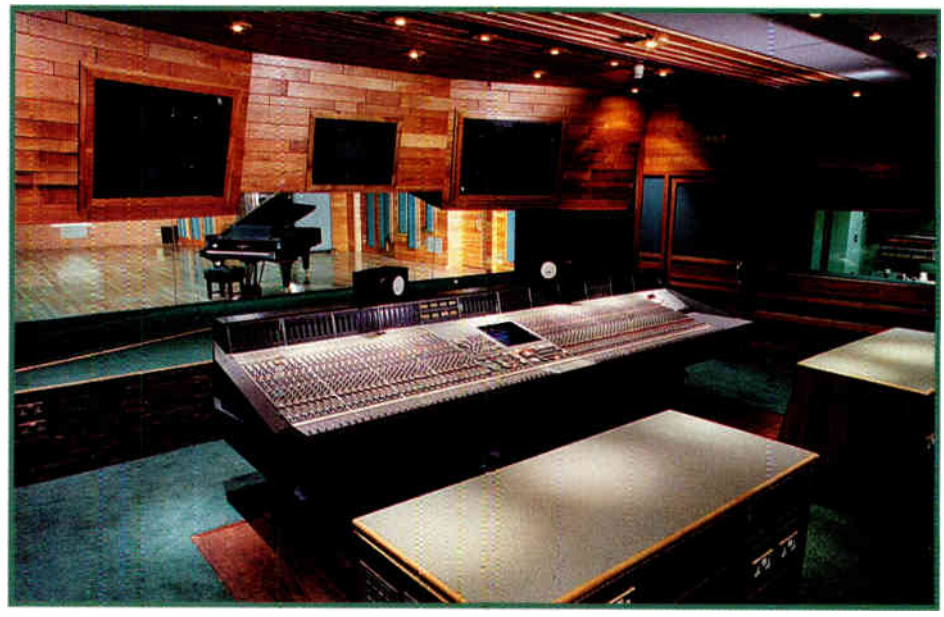
—CONTINUED ON PAGE 88

BY STEPHEN WEBBER

World Radio History

OLYMPIC STUDIOS, LONDON

Still Making History



Studio 1

Olympic Studios has a long and impressive history. Built in 1906 in the fashionable West London suburb of Barnes as an Edwardian music hall, it became a movie house in the '30s, before being purchased in the mid-'60s by Cliff Adams (famous in Blighty as founder of the Cliff Adams Singers, a popular vocal ensemble). Under the capable direction of technical manager Keith Grant, during the late '60s and mid-'70s, Olympic became perhaps the quintessential rock studio, hosting sessions with the Rolling Stones, Jimi Hendrix, Small Faces, Led Zeppelin, The Eagles, The Beatles...the list goes on forever. The studio's outstanding success is often attributed to Grant's love of large orchestral sessions. He made the main room at Olympic one of the best-sounding, live-feel areas in the world, and it is perhaps small wonder that the studio became popular for rock recordings. Hardware came and went, but during the late-'70s, the main room featured a custom-built, wrap-around Helios console.

Studio 2

That was then; this is now. In 1988, Richard Branson's Virgin Studios Group, owners of The Manor Studios in Oxfordshire, Manor Mobile, The Townhouse in West London and related facilities, purchased Olympic from Adams. Then in early 1993, the entire operation was bought by Thorn/EMI. At that time, Studios 1 and 2 featured identical 56-channel/32-bus SSL 4000 G Series boards with Total Recall, while mix/overdub Studio 3 offered a 64-channel/32-bus 4000 G Series with Total Recall. Also available is a smaller pre-production, editing and MIDI programming room in the facility's basement.

Recently, a new console was chosen for Studio 1. Olympic's director of operations, Ian Davidson, says he thought long and hard about the frame size. "These days, 56 channels are just not enough," he says. "Having looked at one or two other consoles, the more we thought about it, the more obvious it became that an [SSL] 9000 was the one to go for. We like the compatibility we now enjoy between our three main tracking and remix rooms; engineers are very familiar with the SSL user interface and automation functions. And the best-sounding SSL is this new 72-channel, 48-bus SL-9000 J-Series. For us, sonic integrity is of paramount importance; we can now throw away all of our outboard preamps and EQs! This is a very quiet console."

"Studio 1 is one of the largest studios in London," adds studio manager Siob-

BY MEL LAMBERT

World Radio History

han Paine. "With space for a full orchestra, we handle a wide range of projects, from album recording and mixing, to film scores. Artists who choose to record here do so because of [the studio's] capabilities.

"For instance, Eric Clapton records all his [English sessions] in Studio 1; Charlie Watts recently finished his latest album; Eternal recently recorded the music for a new Disney animated feature." Other artists have included Shirley Bassey, Steve Hillage, Michael Ball recording *Phantom of the Opera*, Mike Scott (ex-the Water Boys) recording a new solo album with producer Nico Bolas, Chris Kimsey mixing tracks, and the Lightning Seeds. At press time, Clapton was in Studio 1 overdubbing and remixing a series of new album tracks recorded in Los Angeles, with producer Simon Climie and engineer Alan Douglas.

Studio 1's recording area and control room were designed by Sam Toyashima just over seven years ago, and received a full cosmetic refurbishment before the new console was installed. "The room needed a bit of smartening up and modernizing," Davidson says, "but the acoustics were perfect, so we left that as it was." The control room measures 30x22 feet, with a separate machine room to the right, while the recording area is 52x39 feet. Four isolation booths are also available. Studio instruments include a Steinway concert grand with MIDI interface. Acoustics within the recording area can be varied by lowering and raising sections of the ceiling via a series of motor-driven hoists, to create angled panels that reflect sound out into the room.

Studio 2's control room measures 30x24 feet, and the recording area is 36x32 feet, with two iso booths. A Bosendorfer grand with MIDI interface is also available. Studio 3, which handles remix and overdub sessions, features a 26x17-foot control room connected to a small (18x12 feet) live room.

In terms of production hardware, Olympic boasts an impressive collection of analog and digital transports, which can be installed in any of the control rooms. Available decks include a pair of Mitsubishi X-850/880 PD-format digital 32-tracks; two Sony PCM-3324s and two PCM-3348 DASH-format multitracks; and Studer A820 analog multitracks with Dolby A and SR noise reduction. Timecode synchronization is provided by a series of TimeLine Lynx II systems. Mastering decks in each control room include Ampex ATR-100 ¼- and ½-inch machines, plus Sony PCM-2500 and Otari DTR-90 DAT decks. Monitoring in each room is provided by Genelec 1035A systems mounted in soffits.

"Studio rates are competitive with London rates," Paine says. "Studios 2 and 3 go for between £1,000 and £1,100 per day [approximately $1,600 to $1,760], while Studio 1 rents for £1,250 to £1,300 [$2,000]." All rates include an analog multitrack and an assistant engineer. The smaller programming room, which features Amek/TAC Magnum and Mackie 32•8 consoles, Otari MTR-90 24-track, Sony DTC-1000 DAT machine, Digidesign 4-track Pro Tools system and an impressive array of MIDI keyboards, expanders, sound modules and Mac-based sequencers, is available

HELP FOR AMERICANS WORKING IN THE UK

A CONNECTICUT YANKEE'S GUIDE TO STUDIO ENGLISH

There are no mixing boards in England. I first realized this in an elevator in downtown Detroit several years ago. My assistant and I were schlepping an entire 16-track live recording rig up to our hotel room, when a tall man with a very British accent got on at the 11th floor.

He looked at my SECK 1882 mixing board and said, "That's quite a desk, isn't it?" to which I articulately replied something like, "...Uh." My point is, he gave himself away as being an Englishman, and not an American, because 1) he called the "board" a "desk," and, 2) he actually spoke out loud to another human being in an elevator in downtown Detroit.

Last summer, I spent a great deal of time in the UK recording studios, where I realized that the British have entirely different terms for many important tools of our trade; mastering these terms is essential for effective communication during recording sessions; and the English design and build the most incredible recording "desks" money can buy, yet are mysteriously incapable of making coffee that doesn't taste like chewing tobacco.

The language barrier was apparent from the first session. You should have seen the blank stares go back and forth when I said that I wanted to "stack" the female singer's vocal. And when I called into the control room for someone to "bring up the guitar lead," an assistant actually ran to the amp room and, this is the truth, brought me a ¼-inch cable! I decided then and there to start making a list of terms that have different meanings on opposite sides of the Atlantic. So here goes: Lead means cable. Desk means board.

Pokey means fast (so a Power PC running at about a trillion megahertz would be a "pokey computer"). Valve means tube, as in "I say, chaps, where could I find a 'valve' of toothpaste?" Okay, maybe not quite, but: Tube means subway.

Here's another good one: In London you don't start out as an "assistant engineer," but as a "tape op/tea boy." I know this seems like a long title, but they say it in such a "pokey" manner that they could get out three "tapeopteaboys" for every one "assistant engineer" I could say.

Remember the word "kit," as in "drum kit"? As the sandal-and-black-sock-wearing set finally either died off or got hip enough to quit using the term in the States, the word showed up in the United Kingdom and totally took over (much like the Atari computer). Today it means not only drums, but any kind of equipment whatsoever. "That studio has great kit" is correct usage. Here's some more: Kit means gear. Earth means ground. Mains means electrical power, so "give it mains" basically means "turn it on."

There are also many nontechnical colloquial phrases that must have, by now, caused international incidents. The same female singer I mentioned earlier went to take a nap in another room during keyboard overdubs. "Come knock me up when it's my turn," she requested, to which I articulately replied something like, "...Uh." Needless to say, the keyboard overdubs were finished in record time.

—Stephen Webber

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involved in this [show] are traditional musicians who are aware of and happy in that enviornment. We do have [in Ireland] traditionalists who wouldn't want to be involved, but they're not here."

UNUSUAL INSTRUMENTS

In addition to acoustic guitars, fiddles, whistles and the like, the score also features the uilleann (elbow) pipes, gadulka, kaval and bodhrán (a handheld goat-skin drum played with the hand or a double-ended stick). Despite the presence of everything from a full drum kit to timpani, the bodhrán plays a central role in the soundscape.

"The idea is the regular traps kit is not particularly pushing the low end," O'Gorman explains. "We're deriving the lower sound from the [other] percussion and the Irish drum. A lot of Irish music is quite complicated rhythmically. Often, the rhythm is held by the front instruments, and the percussion instruments

ALAN STIVELL'S "BRIAN BORU"

The arcane and the current meet in Alan Stivell's latest release, *Brian Boru*, on Dreyfus Records. Stivell is a Brittany native and champion of the Breton harp, a Celtic instrument that was all but eliminated from memory hundreds of years ago when Brittany became part of France. Stivell inherited his interest in this instrument from his father, who actually built harps and taught his son to play. So, since age nine, Stivell has been playing music and helping revive interest in a lost tradition.

But Stivell also has a keen interest in world music and hip hop. What results is a collection of traditional Celtic songs and ballads that at times sounds very '90s and at times just vaguely ethnic, depending on the type of percussion used—a completely different way to dance to "Mairi's Wedding." "These are songs that are linked with my childhood because I knew them when I was just beginning to play music," says Stivell. "So there was this feeling that I wanted to show, but at the same time I wanted to arrange it in a feeling of the '90s."

Brian Boru was produced by Martin Meissonnier, who also plays some guitar and is credited with "sound design" on the record. Meissonnier, whose credits include world music artists Papa Wemba and King Sunny Ade, met Stivell a few years ago when they were both guests on a French TV series about world music called *Mega Mix*. "We are very different, but we have much in common," says Stivell. "It was interesting to see how things would happen together. Martin's help is to be aware of sounds. He always knows when it's too much of a certain kind of percussion."

Pre-production on *Brian Boru* was done in Stivell's home studio, which contains the electric and acoustic harps Stivell has designed, a Mac running Pro Tools, Tannoy reference monitors and an assortment of synthesizers and MIDI gear. Meissonnier brought in a Tascam DA-88, outboard gear from Roland, Yamaha and Korg, and an assortment of EV mics. There they worked on determining some of the sounds and arrangements they would use. Most of the tracks were recorded at Studio Acousti in Paris

—CONTINUED ON PAGE 92

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PATRICK DILLETT

A LITTLE BIT OF EVERYTHING

PHOTO: HOWARD SHERMAN

Patrick Dillett is searching for the morning's first cup of coffee. The sun outside is shining brilliantly on the autumnal Vermont countryside that surrounds Time Machine, the residential recording facility where he is engineering a private project for the studio's owner. At 31, Dillett, with his broad forehead and round-rimmed glasses, looks more like the Government Studies/Lit major he was at Georgetown University than the burgeoning prince of offbeat alternative productions that he is rapidly becoming.

Exposure to a wide range of literature, however, may have helped with the variety of projects he has engineered in the last ten years, from mixing and cutting for R&B/dance acts like Mary J. Blige, Mariah Carey, Queen Latifah and Diana Ross to pop acts like Original Sins, Aztec Camera and Corey Hart; jazz/pop players like Stanley Jordan; and artists that defy easy categorization, like David Byrne, the B-52's, Yellow Magic Orchestra and the Lounge Lizards. And the poli-sci background probably didn't hurt with his increasingly international clientele, including Milton Nascimento, Gipsy Kings, Marisa Monte and Arto Lindsay. Throw in a session with opera diva Kathleen Battle and you have a pretty well-rounded engineering resume.

Dillett's *oeuvre* as a producer is becoming just as eclectic—not the usual alternative suspects, but the ones with the kind of wacky senses of humor to match his: They Might Be Giants, for whom he engineered and produced their *Back to Skull* and *Spiraling Shape* LPs; Mono Puff ("I Hit My Head"); Valentine Smith's "Peacetime Hours," co-produced with Paul Angelli; the Meat Puppets' "White Sportcoat" track; and the Lounge Lizards' "Queen of All Ears," co-produced with the Lizards' driving force, John Lurie. Dillett even took a side trip as a live sound mixer for the Lizards in 1996, when they did a pass at some off-the-beaten-path European capitals, like Istanbul and Athens.

I caught up with Dillett on an October morning at Time Machine. He had been deep into a project on the studio's SSL when the Yankees won the World Series. And as a native Philadelphian, with the National League baggage that brings, Dillett seemed to be taking it well, even without the coffee.

How 'bout them Yankees?

They were actually the first American League team that I liked, so I don't mind what happened last night at all.

You live in New York now and base yourself there. What brought you to Manhattan in the first place?

Studio work. I started at Skyline Studios ten years ago this month, actually, emptying ashtrays and cleaning the toilets and answering the phones. I was one of the last waves of people who didn't go to school to learn engineering but instead started out learning it as an apprenticeship. There were only a couple of schools worth going to in the '80s anyway. And I'm much happier that I learned it the way I did. I had to clean toilets, but there was plenty of time to read the manuals, then play with the gear to see how it really worked, then go back and read the manuals again.

What got you into engineering, and to Skyline?

I have a friend, Bud Tunnick, who worked for Nile Rodgers when Nile was basing himself out of Skyline. He got me an internship there when I was around 21 years old. It was in between my junior and senior years at Georgetown. After that first summer, I left Skyline and finished college, then went back to Skyline after three years and several millions of dollars worth of Georgetown. But I'm glad I did it that way. I couldn't have timed it better if I knew what I was doing. They were just building the sixth-floor studio and the MIDI room, and the time it took them to complete it was the time it took me to learn the gear that was in there, especially the MIDI room. None of the old-school assistants wanted to deal with the MIDI stuff, and me and another assistant quickly became the MIDI guys. From there, we moved on into the other studios [at Skyline]. As a result, I went from GA [general assistant] to assistant engineer a lot quicker than most do, in a little less than a year.

As you did this, were you formulating what you wanted to become—an engineer, a producer...?

I wanted to do both: engineering as a base skill but a producer, as well. The people I was learning that from, people like Neil Dorfsman, were teaching me about being the kind of producer I felt most comfortable being. Not some-

BY DAN DALEY

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one who controls a project, but someone who helps the artist through the recording process. Neil came up through the engineering ranks, too, and he taught me how to relate to artists by being someone who is sympathetic to the song as the basis of the project, not someone whose back they see all day long at the board. I was always more into focusing on songs than on parts and arrangements. Nile taught me to trust my instincts, not to be afraid of the obvious. "Use the delay in the obvious spot—people will sing along with that stuff!" He also understands that the enthusiasm level surrounding a session is as important as who is playing or whether the equipment works. Keeping the artist, engineer and players happy about what they are doing really shows up on tape in tangible fashion. I'm not so much a technical engineer, not so worried about the great snare sound as much as the song. I wanted to produce but had no pretensions about being the writer or the artist myself. I just wanted to make the songs work.

What was the transitional project from assistant to engineer?

The MIDI room connection, really. Mariah Carey's first record came in, and it was a record with a lot of programming and an unknown producer at the time [Rhett Lawrence], and none of the assistants wanted to work on it. I did four or five tracks on that record, and it ballooned from a week of pre-production into weeks of tracking. And they kept moving me up and along with the record.

What do you remember about those sessions? That record went on to sell nearly 10 million copies...

We all knew she was tremendously talented. I knew it was going to be a good record but not that it would do what it did. I was given a lot of latitude in recording her; Rhett was the programmer on that, as well, so he was the one who dealt with the sounds. My biggest contribution was doing her vocals, and it was my first chance to work on a person-to-person level with an artist as the engineer. One of the things I did there also was act as a bridge between a very programmed environment and a live musician one. I called some of the musicians who played on that record, like Marcus Miller on bass and Omar Akim on drum triggering, and Nile Rodgers, who played guitar on some of it. Since I was from New York, I knew the players.

World Radio History

How did you handle her vocal range?
We definitely went through a few mics with her. She had the ability to blow mics out, and she did—we blew up a couple of older tube mics that couldn't take the pressure. So I wound up using the AKG The Tube, using distance to avoid blowout, and I'd put two of them together on her, next to each other, each with a different level setting. I'd also ride level to tape when we recorded analog. When we switched to digital, that was no longer a real issue. It was a similar situation with Queen Latifah. I used a U67 on her and ran the vocal through a chain of Neve mic pre's and an API 550 EQ.

Is there a line between working as an engineer and as a producer?
I like both. As an engineer, I like the fact that I have more of a choice as to what I work on, and I can sometimes get more excited about a project, as opposed to working on one project all the way through. A lot of records I do I'm in on the ground floor, from pre-production through mixing, so you can get kind of close to it. Engineering takes some of the stress off that. But I do love producing, as well. I've been doing more co-productions, too. Arto and Giants have been that way, and both of them have plenty of studio experience. So productions in that sense are less stressful. And in many cases, like with Mariah Carey, I get called in for a day and it turns into weeks, during which I'm given a lot of latitude by the producer and artist as to my input on the record. With the Lounge Lizards, John Lurie brought me in to mix, and I ended up contributing enough that John thought I should co-produce. So the line can get blurry. Sometimes it's a thin line—the only difference is how you deal with the business part of it. I like to deal with clients, production and engineering, as partners.

Looking over the discography, you have a very eclectic group of artists that you've engineered for. Is that a part of coming of age in New York as an engineer?
Yes, very much. In the late '80s and early '90s, if you didn't do everything, you did nothing. There wasn't a lot of rock going on here then, though it's better now. But that's what you learned to get some range from. I mean, Kathleen Battle? Opera? MIDI was my foot in the door—a utilitarian way, but you had to learn real engineering fast in that environment.

How did you come to work with Battle?
It was through one of the Brazilian artists I worked with. That's another great thing about New York, is how you have so much ethnic diversity and how exposure to that can broaden your range, too. Arto Lindsay was the first Brazilian I worked with. He was one of those "no-wave" guys here, but in doing Brazilian music he has an unbelievable pop sense. It's a pretty amazing dual personality. He and I found that we both like to listen to music the same way, from the perspective of the song.

You've worked a lot in Brazil. What are Brazilian studios like?
A few times a year, for a while now. In Rio, I used Nas Nuvens, which I think means "The Clouds" in Portuguese. They don't have what you'd call top-notch equipment, but they do know how to make records. It's a very homey studio, and it was Arto's choice. It has an old Harrison console, a Ten, I think, which we only used as a playback monitor, recording vocals and acoustical instruments through a whole rack of API mic pre's and EQs, which they had, supplemented by ones we brought down with us. The studios themselves tend to be very '70s, with low ceilings and carpeted walls. There's not a lot of design worship down there yet. I've also worked in a studio in Bahia up in the north of Brazil, where they had significantly less to work with in terms of equipment. We had to bring entire racks of Neves and APIs with us. Arto makes very programmed records here. But in Brazil, he works with traditional instrumentalization and uses it in unusual ways. And to get those players, that's where you have to go. If you need 40 guys playing urdo drums, you won't find that in New York or anywhere else.

There's a certain, I guess the term is sensibility of humor, that runs through the acts you've produced. How does that meld with the actual productions?
On They Might Be Giants, we had John Flansburgh go out into the hall at River Sound to try and make his vocal on a song called "Token Back to Brooklyn" sound more cavernous. John began the song with full-voiced bravado but began trailing off quickly till he was almost inaudible. I was just about to ask him what was wrong when I heard a woman's voice say, "That was very nice." It was someone from the furniture company across the hall going to lunch. On Mono Puff, on the song "The Devil Went to Newport," we set up Mike Viola to sing some background vocals. He had never really heard the lyrics to the song and was only going to sing along in the chorus. The song features some really funny lines, so I left his mic open the whole time to catch his reaction to the lyrics as he heard them for the first time. If you listen closely you can hear him giggling throughout in response to several of the pithier lyrics. With Arto Lindsay, we were working on a score for a modern ballet. For one section, Arto wanted to create a cacophony of noise and percussion. Everyone went into the studio and began banging on things and tossing stuff around. It sounded like so much fun that I couldn't resist joining in. I left the machine running and grabbed what I thought was a plastic pencil cup. In the final score, you can hear the door squeak and slam shut, followed immediately by the sound of a ceramic pencil cup smashing to bits on the floor. We muted out the ensuing laughter.

What New York studios do you like to work in?
I like to think that I've been in just about every studio in New York at some point. Certainly more than most engineers. I like to work in places that are small, with single rooms, where you can really focus in on the client and the project. Where it's more personal. New York has a lot of those. Kampo and River Sound are two of my favorites for that reason. We did a lot of the Giants records at River Sound. It's also what I liked about Skyline: They had two major rooms but on different floors, so it seemed very isolated when you wanted it to be. And New York is always right outside the door.

Do you base studio choices on equipment?
Sometimes. Vibe and equipment, I'd say mostly. River Sound has a [Neve] 8078, and I like that for tracking. Kampo has a new SSL and a good Neve outboard rack. Giants we tracked at Hit Factory and Clinton for the size of the rooms. I'll use different studios for different stages of a project, depending upon what I think I'll need acoustically and in terms of equipment. For tracking, I like to have multiple isolated spaces to record the band ensemble. Hit Factory has a studio with four iso spaces, and Clinton has a lot in their 8078 room. But when it comes time for vocals and overdubs, I don't need a huge place.

You don't seem too obsessed by technology.
I look at that the same way I look at studios: What do you need for the project? I love a lot about both old Neves and SSLs. I prefer older Neves to track on,

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but I'm very into SSLs. SSLs are more like instruments than Neves are. I can play an SSL more than any other console, and I learned from Neil Dorfsman that the console has to be more than a passive recording device. The SSLs let me layer more easily. You can be very meticulous on vocal passes. The automation on an SSL gives you the ability to switch between motorized faders and VCA control, which lets me drop in and out between the two, which is very useful for doing spot vocals. Going through the VCAs, you don't have to be grabbing the fader when it's moving, and it's easier to do overrides in mixing.

How about outboard gear?

I don't carry a lot of stuff around. I like the Lexicon stuff, and Fairchild limiters and Neve and Summit mic pre's. But usually all I carry to a session are some old MXR flangers.

What was your role on the Gipsy Kings' "Love and Liberte"?

I got a tape from them with just acoustic guitars on it, and I worked with the percussion player Nana Vascencelos, whom I had worked with before with Arto, to build a track around that. Nana can really build a symphony of percussion; he walks in, listens to the tracks and then says, "I need 16 tracks." And he'll use them. They're unusual instruments, like udus, which are like a jar with a hole at one end that sounds both boomy and ceramic. But I've become used to them working with Brazilian artists. I put a 421 on the sound hole end of the udu and then EQ it.

Do you tend to use EQ a lot?

I tend to use it to roll off more than add. On the udu, instead of trying to counterbalance the boominess with more top end, I'll roll off the low-mids. I prefer to approach EQ that way.

You prefer simple. Interesting, considering the MIDI that got you in the door.

Yeah. When I work with a client, it's like there is no clear delineation of duties. Input comes both ways—they comment on sounds, I can change song structure and make lyrical suggestions. I like it when it's a real collaboration. It's more fun and it actually goes faster—I don't think I've spent more than two months on one project. I don't want the technology to get in the way of the song and the production. I don't want to minimize the importance of technology in making records, but it's the music and the song that I think it's all about. ■

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BY TOM KENNY

POST SCRIPT

For your monthly dose of film sound columnist Larry Blake, turn to page 44 for his look at the re-release of Star Wars.

SAN FRANCISCO, THE MOVIE

CREATING THE SOUNDTRACK FOR AN IWERKS FILM

by Tom Kenny

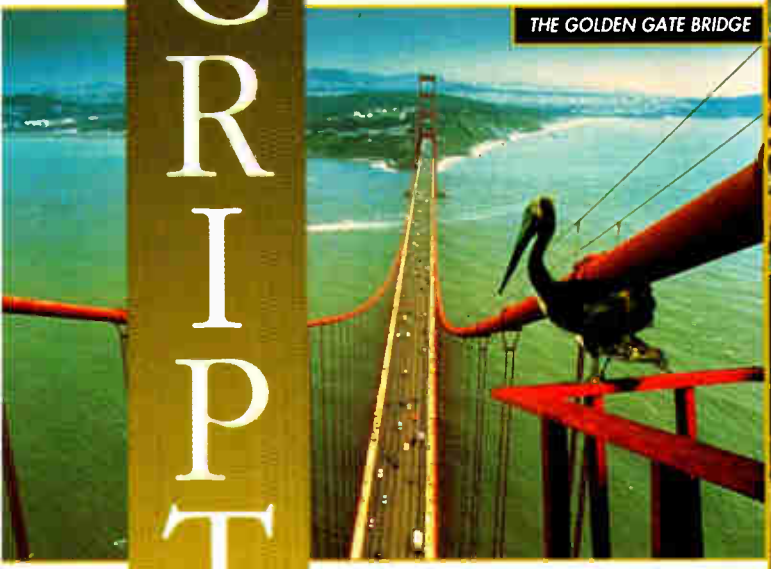
A lot of special-venue audio work is being done outside of the traditional theme park, roller-coaster, theatrical-ride environment. The range of budgets for special-venue projects can run the gamut, from the $60 million for *T2 3-D* to the $50,000 for a special showcase at the local auditorium. But, whatever the budget, today's technology allows any producer to create stellar discrete multichannel mixes.

San Francisco—The Movie would fall somewhere in the middle of the budget line. It's a 30-minute Iwerks film, produced by World Cinemax Corp. to promote the rich history, and stunning visuals, of San Francisco through some of its more colorful characters. The film was shot in "Super 35" and blown up to 70mm, then projected on a 19x42-foot curved screen to an audience of 275, in a theater built specifically for the film at Fisherman's Wharf, San Francisco's ever-popular tourist area.

Andy Wiskes served as production sound mixer on the film. Wiskes has worked

—CONTINUED ON PAGE 111

SPECIAL


THE GOLDEN GATE BRIDGE

THE CAPTAIN

THE MERMAID

Right: Sound designer Luther Greene, foreground, with production sound mixer Andy Wiskers on site at the theater with their Pro Tools station

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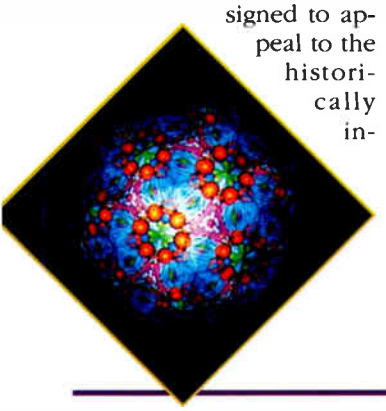
KAATSKILL KALEIDOSCOPE

SOUND IN A SILO

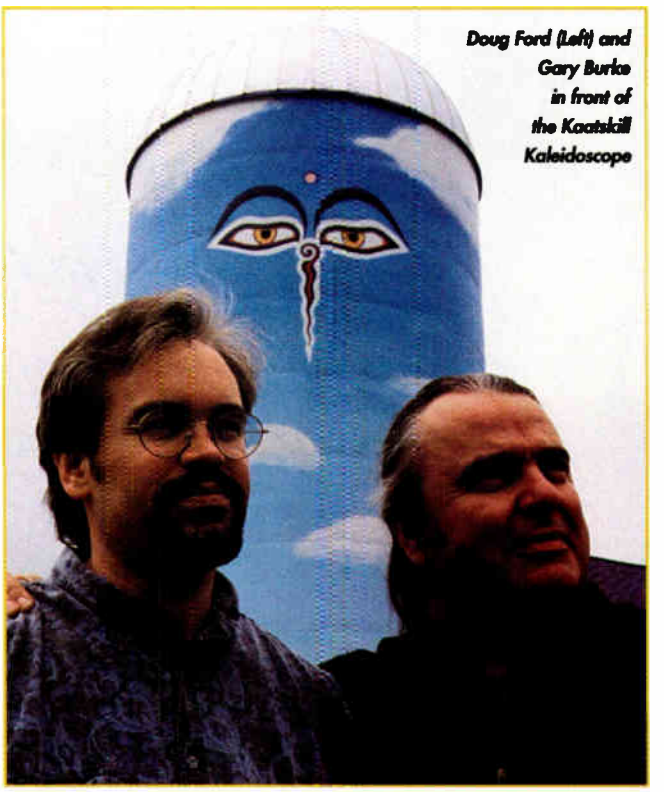
by Gary Eskow

When developer Dean Gitter planned Catskill Corners, he included several attractions designed to appeal to the historically inclined: a restored barn from the mid-19th century; The Spotted Dog Firehouse Eatery, a reproduction of a firehouse from days gone by; and the spruced-up home of railroad magnate Isaac Longyear. But the centerpiece at Catskill Corners is not so much a historical display, but more of a sensory trigger, a giant toy that takes visitors out of this upstate New York farm community and back to their childhoods—or their magic mushroom days. The Kaatskill Kaleidoscope is the world's largest kaleidoscope, standing 60 feet tall in its own silo in Mt. Tremper, N.Y.



Charles Karadimos, who has been designing kaleidoscopes for 19 years, was contracted, along with the father-and-son artist team of Isaac and Raphael Abrams, to make the images

—CONTINUED ON PAGE 105



Doug Ford (Left) and Gary Burke in front of the Kaatskill Kaleidoscope

PHOTO: ALAN SHAPIRO

RESTORING "THE UMBRELLAS OF CHERBOURG"

by Eric Rudolph

The Umbrellas of Cherbourg, Jacques Demy's 1964 all-musical cinematic soufflé, which has not been seen or heard in its original form in the United States since the era of Beatlemania, was lovingly restored last year. Starring the impossibly schoolgirlish 20-year-old Catherine Deneuve and featuring the triple Academy Award-nominated score of Michel Legrand, the film was a popular draw this past spring and summer at art houses across the United States.

Strictly speaking, until its re-release, *Umbrellas*—which contains no spoken dialog; every word is sung—had *never* been seen in its proper form in America, according to a spokesman for Zeitgeist Films (which released the restored *Umbrellas* in the States, in conjunction with Fox Lorber). The prints shown in America at the original theatrical release were compromised in image quality because they were made from a dupe negative, as were most American prints of foreign films in those days. By the mid-'70s, all of the existing U.S. prints were faded and battered. A 1986 U.S. video release was made from a very poor-quality print, and a version of the film (often shown on television), in which the delicately recorded French vocals were re-dubbed into English, further sullied the one-of-a-kind film's reputation here.

Nina Castelnuovo and Catherine Deneuve

However, Demy had a feeling that this unusual work (which he wrote as well as directed, and which he often referred to as *en chante*, literally meaning "enchanting," or "all singing") would live beyond its initial release. Therefore, the director took highly unusual steps to preserve his unique creation. His widow, Agnes Varda, oversaw the creation of a new soundtrack from archived 35mm mag-

—CONTINUED ON PAGE 113

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"SWALLOWTAIL BUTTERFLY" AT THIRD STREET SOUND

by Maureen Droney

Third Street Sound recently played host to the first Japanese live-action film to be posted in the United States. Not a big deal, you may think, until you consider the challenges involved. Mixing in a foreign language can be difficult enough, but this film, titled *Swallowtail Butterfly* —directed by Shunjui Iwai, Japan's hottest, most cutting-edge director—takes place in three main languages, in addition to a plethora of Asian dialects and multilingual slang. This intersecting dialog is a major part of the film, as one of the main themes is miscommunication between cultures. Don't be surprised if you hear of *Swallowtail Butterfly* becoming an international cult classic—it has English subtitles and universal appeal.

Third Street Sound, unfortunately, closed its doors in December. The facility had boasted two mix rooms, a large ADR/Foley stage with Avid Audio Vision, six in-ground pits and a spa for water effects, two digital sound design suites equipped with Pro Tools III workstations and a voice-over bay. Oh, yes, and an effects library that dates back over two decades—highlights include vintage autos and airplanes and sounds of Jane Goodall's chimps.

Mix Stage 1 featured a 72-input Otari Concept automated mixing console, while Stage 2 was equipped with a Concept Elite. The Elite, a digitally controlled analog console released last year, has 96 inputs, Otari Image Recall (which allows immediate storage of all mono input module settings—EQs, panning, faders and switches), Otari Eagle moving fader automation and PicMix, the Otari surround sound module. Both rooms had surround capabilities for Dolby Digital and dedicated voice-over booths to facilitate recording those last-minute inspirations.

Third Street's studios were actually created specifically around their speak-

Above: Scene from Swallowtail Butterfly*; below, front to back: Third Street Sound's Paul Schremp, co-owner, chief engineer and lead mixer (seated); Steve Ogden, co-owner; and Darren Barnett, mixer.*

At Hollywood's Director's Guild Theatre (L to R): Kazutoshi Wadakura, line producer; Shunjui Iwai, director; Steve Ogden, Third Street Sound co-owner; David Baldwin, sound supervisor.

World Radio History

er systems, designed by Audio Intervisual Design's Ken Gourris. "Sometimes when you're cutting sound effects and doing prelay work, you go back on the stage and it sounds different," says co-owner Steve Ogden, a board member of the International Documentary Association (Paul Schremp, a re-recording mixer who has won four Emmys and been nominated for 12, was the other owner). "We've had the monitoring system in all the rooms designed by the same person, so that you hear exactly the same thing in each room..."

The former owners of Third Street have logged more than 25 years in the business and have a reputation for being specialists in audio post for TV reality shows. Experience gained on series such as *Cops*, where cleaning up tracks and removing obscenities has to be done from a 2-track master, has made them expert in dealing with the vicissitudes of live recordings—these guys have to know all the tricks. "On *Cops*, the crew is running around with Beta SP cameras actually chasing criminals," explains Ogden. "One of the cops wears a wireless microphone, and there is a boom mic operator, so we have two audio tracks to work with." Those two tracks are loaded into a Pro Tools system for dubbing to picture, during which, besides striving for clarity of dialog, the dubbing team must deal with removing, via bleeps or some kind of camouflage, 20 to 30 obscenities in each half-hour show.

Third Street also handled post for *Rescue 911*, much of which may be reinacted during four to six hours of Foley performance for each episode. Emergency phone calls used in the show, however, are often real and require cleanup work because they are recorded at very slow speed for cataloging purposes.

Reality-post skills were also required on the five or so National Geographic specials that Third Street worked on each year. "The shows and the contents are demanding," says Ogden. "They are filmed in tropical locations and other unusual places, where sometimes they are shooting with a long lens and can't record sounds. So some of the show comes in without any sound and has to be totally re-created." That involves working with the National Geographic team to decide on the precise sounds that would be representative of animals in that location at that time of year, then finding those sounds in the National Geographic library.

All of this experience made Third Street a logical choice for the *Swallowtail Butterfly* project. The drama, which depicts the plight of Chinese illegal immigrants trying to strike it rich in the Tokyo ghettos known as Yentown, reflects the diversity of the Asian cultural melting pot. The dialog incorporates Japanese, Mandarin and Cantonese Chinese, along with several derivative slangs and English. Subtitles were, of course, not available during dubbing, although, fortunately, reels were mixed in sequential order, enabling the crew to follow the plot line.

Sources at the final came from four 24-track machines of effects and Foley recorded at Third Street, two DA-88 machines with the musical score, Pro Tools and Sample Cell with more sound effects and backgrounds, and ten effects CDs that Rockwell Eyes, the Japanese production company had made on location in Japan. Dubbing was to 24-track analog, which was print-mastered to 35mm in Los Angeles.

"It was a pretty awesome experience because of the cultural differences," comments Schremp. "As to usual mixing stage protocol, we had to dispense with any pecking order and really deal one on one. In any dubbing room, communication is the biggest drawback, and here, well, it's the first time I've done anything quite this elaborate. Sometimes

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we did have a translator, but only for the Japanese. No one understood all the Cantonese, or the dialects!

Dialog editor Harry Harris worked on an AMS AudioFile, bringing it to the stage for output and using a Yamaha 02R to digitally dump to other media when necessary. "Dialog came in on timecode DAT," he says. "They seemed to have been pre-striped with code, which worked really well. Continuous code made finding material a lot easier, and we could do some auto-assembly. The other thing was, almost every scene was shot with two microphones, either a body mic and boom or two boom mics—they used different miking techniques to get more coverage of the actors. Most shows have a portion done that way, but for this one they did it in almost every scene. The problem with that kind of stereo coverage is that when you combine them in mono, you often get phase shifting. So what we did was load everything into the system in dual-mono, and we went through and selected each side, so that when the other character spoke and was stronger on the other side, we selected that one, made an edit and got rid of the other channel. So there was never any time that both channels were running. That worked well, but of course takes a lot more time.

"There are certain things you listen for as a dialog editor that really don't matter if you understand the language or not," Harris continues. "For example, if the background is too heavy for the dialog. So from that point of view fixing problems wasn't any different than in English. But the problems occurred where there were several people talking and overlapping where they make (picture) cuts—there might be four or five edits across there, and some dialog doesn't overlap right. Those were difficult, because in English I'd be able to tell easily, but for this I had to listen over and over to tell who was speaking...and I didn't even have a script."

Schremp elaborates: "Our main difficulty came because we had no idea where the sentences ended. For example, in overlapping dialog, in English you know to fix it, but if it's in Cantonese, and you hear a sound repeat, it may just be typical of the language. Or, you may hear a word, then hear it again offstage and it doesn't register to you as the same word. Also, for mixing emotionally, it becomes, 'How do you play the scene if you don't know what they are talking about? Tender, angry, what are they saying?' The inflections of conversation are difficult; you don't want to just make it flat. Mr. Iwai, the director, would explain the scene to us, but even he had trouble with the Chinese and the dialects. So it was very difficult. Mr. Iwai was wonderful, though. We devised a system, where if he wanted to make a change, he would draw a picture—he would draw the frames of film. And he was so good at it, with little stick figures, that he was very clear and it worked beautifully. When I didn't know what to do, I'd get up and he knew he had to draw a picture.

"I must say, it was quite a process and very rewarding," concludes Schremp. "There were a lot of oohs and aahs once we finished the project and people could screen the whole film. It really moves you." ■

—FROM PAGE 101, KAATSKILL KALEIDOSCOPE

flow. The score was placed in the lap of Gary Burke, a local musician with an international resume. Burke, who scored the Kaatskill Kaleidoscope, and engineer Doug Ford, say this is a one-of-a-kind project.

A drummer who has worked with Bob Dylan, Joe Jackson, Shania Twain and a host of other major artists, Burke

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has also composed ballets, written music for a Reebok commercial and played along with the London Symphony Orchestra on the soundtrack to Francis Coppola's *Tucker*. With all of this experience, Burke was still left scratching his head when he was brought on the 'scope project.

"The first thing I did was lay out thematic ideas while watching a video representation of what the kaleidoscopic images were going to be," says Burke. "But you have to realize that a two-dimensional video hardly gives a true picture of what the experience of sitting in the silo, looking up at a huge kaleidoscope is like.

"Still, I sat in my house, with my primitive setup, which includes an ADAT, an Emulator 2, an Akai S1100 and a [Korg] M1, fed into a small Mackie console. The cubbyhole I was working out of—laying things down live to picture without synching to picture—combined with the 'by the seat of your pants' way Doug [Ford, engineer] was learning how to take surround sound mixing theories and apply them to this unique situation, is really the heart of our story."

Ford concurs. A freelance engineer who has logged extensive hours at Sweetfish Recording Studios, located in the foothills of the Adirondack and Green Mountain ranges, Ford knew he wanted to mix at Sweetfish but had to acknowledge that he was stumped when it came to achieving a mix that would expand as deeply as possible up and into a 60-foot ceiling.

"Imagine a virtual sphere, kind of like a globe floating over the viewer's head. That's the effect that the 'scope gives, and we had to fill up that same space with a surround sound mix. The first thing I did, while Gary was composing, was get on the phone to Dolby, Pioneer and various recording studios. When we started, we didn't even know what the playback format would be! My background is as a rock 'n' roll player and engineer, so the stereo field was all I knew. I didn't have a clue about surround sound, but I found everyone I spoke with to be completely open and helpful."

Ford quickly realized that Dolby AC-3 encoding, as used for film mixes, was not a tailor-made fit for this project. "No traditional system would work," he says. "We had to make Dolby AC-3 fit into our requirements. We had no use for the kind of surround sound imaging that lets the viewer track a jet as it flies from left to right across the screen, for example. That kind of effect can easily be handled with a joystick. In our case, we had to use a surround channel to give the surrealistic sense of a voice coming from within the viewer's head. We also knew we were going to lean heavily on a subwoofer to get a bottom end that resonated throughout the entire area."

Since Burke laid down his initial tracks to an Alesis ADAT machine, the project stayed ADAT throughout, albeit with reservations from Ford. "I much prefer working on analog 2-inch, and in fact we eventually took material from the three ADATs we used and bumped it over to the studio's Otari MTR-90, because the ADAT format does not lock to picture quickly enough," Ford explains. "Studio A has a Neve 8068 Mk II console that works beautifully with the MTR-90. All of the digital recorders sound harsh to my ears."

Once all of Burke's synth and sampler parts were on tape, it was time for overdubs. Multiple brass parts were laid down by trumpet player Peter Ecklund, with Mindy Jostyn handling string lines, doubling or replacing the synth lines that Burke had tracked. Burke says that when he realized the sonic field would be broken into three sides, his compositional technique was altered dramatically. "Remember, we knew that the sound system would be set up as an inverted triangle, with the listener at the bottom, and then a subwoofer and a surround channel. I went back to the early Baroque antiphonal way of writing, where brass choirs were placed in different parts of a church and made to answer one another over wide spaces."

Burke also says that learning about the surround sound mixing process caused him to simplify his writing. "Everyone cautioned us against going nuts with surround," he says. "In fact, when you begin to realize the part that spatial relationships play in the total effect you're generating, you understand that less can really be more. Balance issues become compositional elements. Then, of course, there's the simple joy of playing with effects over such an expansive space. For example, in our final sweetening stages, we took a War of 1812-type section and let the rockets whistle around from speaker to speaker."

Ford laid out three Yamaha NS-10s in a triangle and placed a fourth NS-10 in the center, along with a subwoofer. "The speakers were at console height, with the rear speaker placed about a foot-and-a-half behind my head, facing

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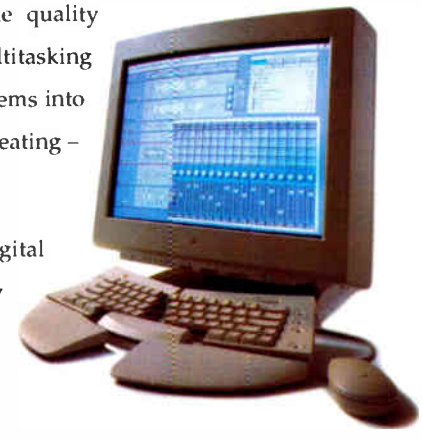

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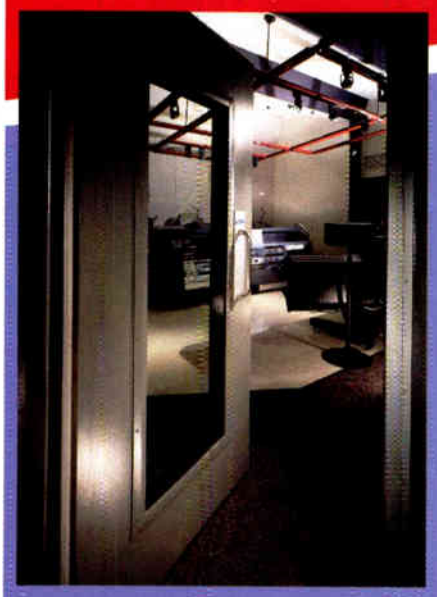

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me," he says. "It's certainly true that control rooms, including Studio A at Sweetfish, which was designed by John Storyk, have not to this point been laid out with surround mixing in mind, but we were able to create a multi-speaker field that felt very spacious. We didn't have the luxury of taking temp mixes and auditioning them in the venue, because the silo was being built while we were working, but I have to say that when it all came together, we were extremely pleased with the way our mixes translated into the larger space.

"Gary's right when he says that people cautioned us against going crazy with the surround sound aspect of our mix," Ford continues. "But there's no dialog in this piece, so we could go a little bit crazy. I think it's important to note that Gary's track is not a support for the visuals; it's much more of a 50/50 thing, with both elements working with each other to create the final effect."

Ford estimates that the ten-minute score, which Burke labels "Americana Soundscape," was divided into about 120 mixing events, and required extensive separate busing and panning. "We leaned heavily on automation. I bused parts out separately to the five speakers we were using while we mixed each section to a single Tascam DA-88. Dolby AC-3 is based on a 5.1 ratio, where you have five full-bandwidth speakers and one sub, but in this case we used a 4.1 ratio."

Ford was quick to point out the generosity of manufacturers in making the track happen. "Yamaha donated a DDP1 Dolby AC-3 decoding unit, and Pioneer has donated two laserdisc players to the site," he says. "Dolby donated the AC-3 encoder as well."

Once the decision to master to laserdisc was made, it didn't take long for Ford to track down Pacific Ocean Post in Santa Monica, which handled the AC-3 encoding. "We kept hearing that Pacific Ocean Post was the place to go, and they were extremely helpful. Frank Hall walked me through the process, so that we were sure that we provided them with exactly what they needed. I also have to thank Steve Thompson of Dolby, and the staff at Pioneer Long Beach who handled our laserdisc mastering."

At the end of the day, Ford and Burke are gratified, mostly by the expressions on the faces of the visitors who seem to be flocking to the site. Ford says, "We're not talking about Skywalker Sound here, but two rock 'n' roll guys who tried to create something

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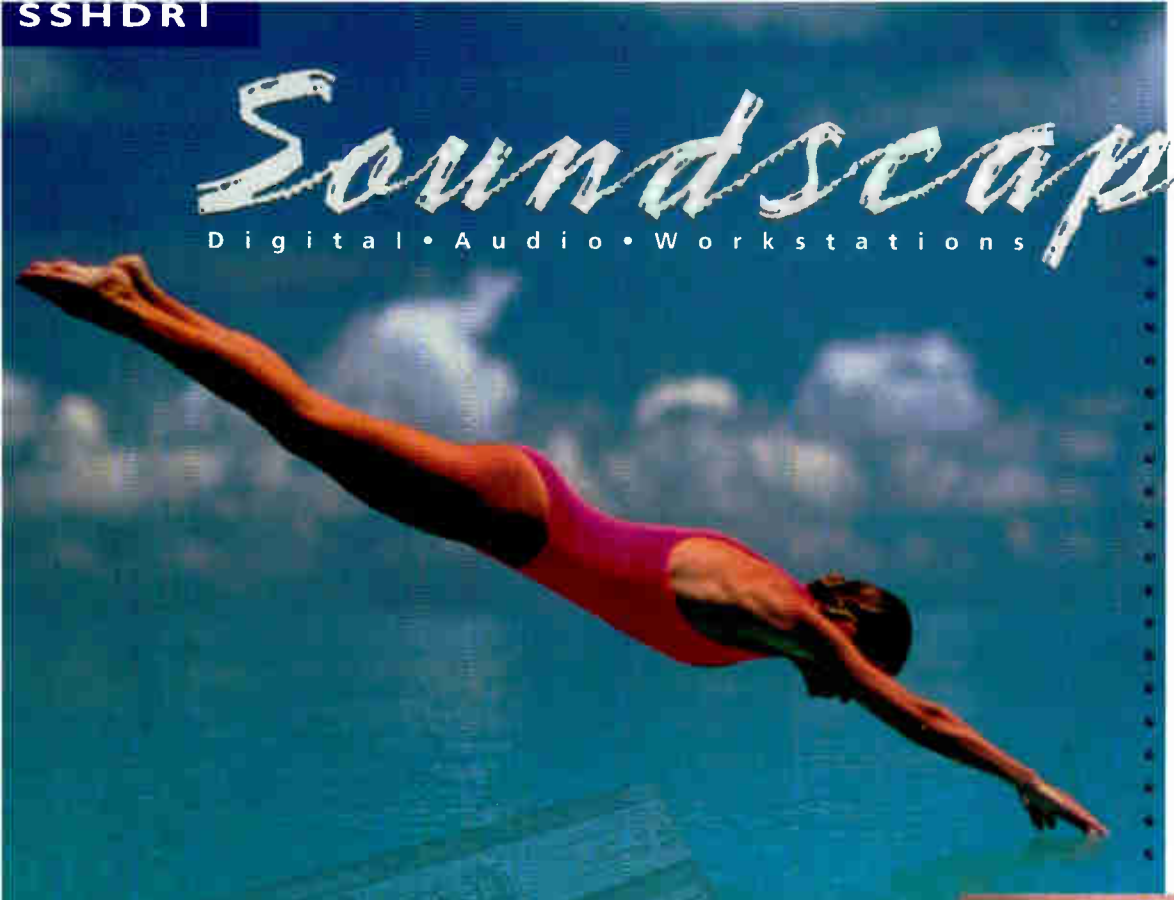

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Gary Eskow is a freelance writer, composer and musician based in New Jersey.

—FROM PAGE 100, SAN FRANCISCO, THE MOVIE

on previous special-venue projects with director Keith Merrill (an Academy Award-winner) and has a Pro Tools studio in nearby Novato. Wiskes' choice of sound designer Luther Greene as his teammate for the project was not unpredictable: Wiskes and Greene had previously worked together on more than 2,000 soundtracks and had collaborated on four features (including *The Adventures of Mark Twain & Partners*), several TV specials (*Will Vinton's Christmas Claymation Special* and *Meet the California Raisins*) and The American Experience's *The Great San Francisco Earthquake*.

Editing was done at Wiskes' Sound Studio on a 16-channel Pro Tools III system. To keep things running smoothly, CD mastering engineer Bob Olhsson was brought in as Mac Wrangler and special sound effects editor, which freed Wiskes and Greene to explore the outside edges of Pro Tools and spend their time assembling a creative track. The work was split so that Greene handled sound effects and musical cues, while Wiskes concentrated on dialog, meta-effects and more musical cues. The score, by Sam Cardon, was recorded at Pinnacle Studios in Salt Lake City and delivered on DA-88.

The first step, as it seems to be in all special-venue projects, was to figure out the acoustics of the theater itself and replicate it in the editing environment. It was ascertained that the L-C-R speakers and the subwoofer were healthy, but that the left and right surrounds left a lot to be desired, which led to a general examination of how much of what sound cues could be successfully put into the side channels. The outcome was the creation of a whole new channel—center rear—which could carry as much information as any of the front speakers. With this setup in the editing studio, the tracks were dedicated to the correct locations and automated within Pro Tools, giving the editors a full "temp" mix as they went along and halving the time of the final mix.

"Being able to build the soundtrack—position effects, create sweeteners, make pans, determine echo return locations, adjust levels—all within the unpressured sanctity of the 'edit studio' environment adds a new level of sophistication to the process," Greene says. "Now, when you arrive at the mix stage, the basic mix is already built, leaving more time for finessing the overall sound. Rather than subjecting your mixer to 'dialog wrestling,' you can now free them to vocalize the pelican, fill up the stagecoach and get them much more creatively involved in the project."

Most of the sound effects were created fresh for the show, and were recorded with a Sanken stereo mic and a Sony DAT recorder. The earthquakes (after all, this is a movie about San Francisco) were composed from a combination of elements, with the main low-frequency rumble consisting of a drastically slowed down sail flap. Effects were introduced at the mix to create sympathetic vibrations from the theater itself for the earthquake scenes. Foley was done by both Greene and Wiskes at the Novato studio, and was recorded directly to Pro Tools.

A total of 44 sound effects tracks were created for the original mix. With the addition of 40 dialog tracks, 16 special, 16 Foley tracks and 16 music tracks, there were 132 tracks at the final, delivered on three hard drives and two DA-88s.

Skywalker Sound was chosen for the "first" final mix for a variety of reasons. Skywalker had IMAX and Iwerks experience, plenty of outboard gear, a

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Pro Tools station next to the console and seemed to be the best facility to handle the 29.97- to 30-frames-per-second pull-up that would have to be made to get the show from the video-referenced post-production to the 70mm, 30 fps DTS release format. So, four months after post-production was started in Novato, Wiskes, Greene and Olhsson drove their Ford Econoline van over the hill to Skywalker Ranch with the project materials: three hard drives, several DA-88 tapes and a passel of cue sheets.

With mixer Chris Boyes at the console, the original final was completed in five days, despite the nearby Inverness Ridge forest fire, which made the screen hard to see at times. Credit here must be given to Boyes for some great work and for sticking by the console, even while his own home was at risk. But then again, such heroism now seems commonplace when working in California.

The final show mix came out of Skywalker Ranch on DA-88 in a LS-L-C-R-RS-Subwoofer-Center Rear format and headed toward the theater for a final tweak. San Francisco audio engineer Bill Ruck was brought in at this point to set up the temporary mix stage in the Citibank-Cinemax theater at Pier 39. Ruck provided all support for the final onsite adjustments, which included construction of a platform in the "acoustic center" of the auditorium and getting in and out of the system amps at the correct levels. John Pond (the owner of Sacramento's SoundBytes Studio) was also brought in with his Yamaha DMC-1000 digital console, to add another level of automation to the process. This also kept the mix in the digital domain.

Two days later, a 30 fps DA-88 tape was winging its way from San Francisco to DTS in Hollywood, where a CD-ROM was burned to create the permanent system playback medium.

After a month of test screenings at Pier 39, the director and producer felt that they could greatly improve the film by major story changes to the soundtrack alone. So, Greene and Wiskes reopened the file labeled *San Francisco—The Movie.*

The script had been completely altered, so more than 100 sound effects were added, several musical cues were completely replaced, the entire center-rear channel was changed from voice-over to effects, and a new "walk-out" musical finale was recorded by Wiskes (onto DA-88), featuring the cast of

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Steve Silver's *Beach Blanket Babylon*—all in few weeks' time. Given the scope of the revisions, this re-edit would have been almost impossible to do outside of the digital domain.

Working on hard disk certainly changes the nature of "post-production," as a producer can now test the audience at a special-venue presentation before committing to a final product. Sound pressure levels can also be decided by the response of the audience (if too many people run out of the theater in the middle of the show, yes, the earthquake is a bit too loud; if one or two run out, it's about right).

With the soundtrack now re-edited and remixed within Pro Tools, it was taken back to the reconstructed stage at the theater, rather than to a mix facility. Ruck and John Pond re-created the previous onsite setup, and final tweaking was done in a matter of days, with direct client and test audience participation.

The moral of the story is that it doesn't take a 30-person sound crew and a dedicated surround mix facility to work in special-venue audio. Because the tracks are only going to be heard in that one location, it only makes sense to do the final-final mix onsite. Where the edit and original final mix take place depends on the experience and needs of the post team. *San Francisco—The Movie* is currently showing at the Citibank-Cinemax Theater at Pier 39 in San Francisco, probably for a very long run. Given emerging technologies, the soundtrack might change several times over the course of the next few years, but hey, why not? ■

—FROM PAGE 101, "UMBRELLAS OF CHERBOURG"

netic tracks, and a new negative was produced from three special interpositive prints made 32 years ago as a far-sighted preservation measure by the director.

"Jacques believed, and he was right, that *Umbrellas* would remain interesting to audiences for many years to come, and he knew that the Eastmancolor film it was shot on was sure to fade with time," Varda explains. "He loved the vibrancy, saturation and image stability of the [then-current] three-color Technicolor process, but that was too costly to use to shoot *Umbrellas*."

Demy did the next best thing to shooting the film with the fade-resistant three-strip Technicolor process: He had Eclair Laboratories make three separate color-selected archival black-and-white positive prints from the original "virgin" camera negative, before a single print was ever struck, Varda explains. (Each of the three black-and-white positives was made to correspond to one of the primary colors, so that they could be recombined to form a new color internegative, from which new prints could be struck.) These three "color selected" positives were stored, along with a great deal of 35mm magnetic film soundtrack material, at the French Bois D' Arcy national archives.

"When the rights to *Umbrellas* reverted to Jacques in the '80s, we found that the original negative and the internegative were both so faded and damaged as to be useless," Varda says. "Jacques then began the restoration process using the three color-selected positives, which is immensely expensive. But he was tired, and then he became sick. He died in 1990, and a year later I decided it was time to complete the restoration. The French Ministry of Culture lent my company, Cinema Tamaris, the needed money, which we will pay back according to a contract. It is delightful to know that almost 35 years later, people are still coming to see *Umbrellas*; it was Jacques' fervent desire that this could be so."

Sound engineer Francois Musy, who has worked extensively with French New Wave pioneer Jean Luc Godard and who just completed mixing Godard's upcoming film, *Forever Mozart*, supervised the sound restoration of *Umbrellas* at S.I.S. Labs in Paris. He received input from Varda and Legrand, and he was assisted by engineer Claude Lerouge.

"Our main goal was to be as faithful as possible to the original—to allow people to see and hear *Umbrellas* as they would have in 1964," Musy said from his home in Geneva. "*Umbrellas* is not actually a musical, but the music is very important. A lot of time was spent trying to find the right balance between the vocals and the music; it was crucial that one not drown out the other."

Most of the original vocals for the film were dubbed by professionals for the nonsinging actors. The music and vocals were then given to the actors on records, so they could familiarize themselves with the material prior to lip-synching during filming, according to *Umbrellas*' producer Mag Bodard.

The 35mm magnetic tracks Musy used, which were the best audio material available, came from an intermediate mix. As the mag stock had been properly archived, the tracks themselves

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required no significant restoration work. The tracks consisted of left and right stereo music, a mono voice track, Foley and two ambient tracks that included minimal sound effects. "It was many fewer tracks than we work with in movies today," Musy notes.

Though not damaged by age, the mag tracks did require some processing to correct imperfections caused by their original re-recording on early '60s-era machines. First, the mono vocal track was run through a Dolby SR processor to eliminate some high-frequency distortion and sibilance. "The machines that made these 35mm mag tracks apparently produced this high-end distortion, but it was not audible at the time," Musy says. "The machines we have today are so much more sophisticated; the distortion in these old tracks became quite prominent when played back on modern equipment."

An SSL 5000 console was used to remix the 35mm tracks, with re-recording to a Sony 3324 digital recorder. Very little processing was done—some reverb was added to the music, but in keeping with the desire to be consistent with the sound of the original soundtrack, Musy did as little as possible to alter the material.

"I used the SSL board quite flat, using almost no EQ," he explains. "No attempt was made to reconfigure any of the individual tracks we had to work with, not even the music tracks. It was a 'take-it-as-it-was' approach; the mix may not have been the way it would be done today, but we decided it was best to respect the mix, to let people experience the film in as close to its original state as possible. We just wanted to improve it sonically as much as possible without changing anything."

At one point, the possibility of using unmixed music and vocal tracks was explored, then abandoned. The original multitrack tapes from Legrand's orchestral and vocal studio sessions were available (these tapes were being prepared for a 1996 re-release of the original soundtrack recording in France) and were reviewed by Varda and company, but using them for the restoration of the film's soundtrack proved impractical. "Of course, they were not in sync with the film, and so we couldn't use them," Varda explains.

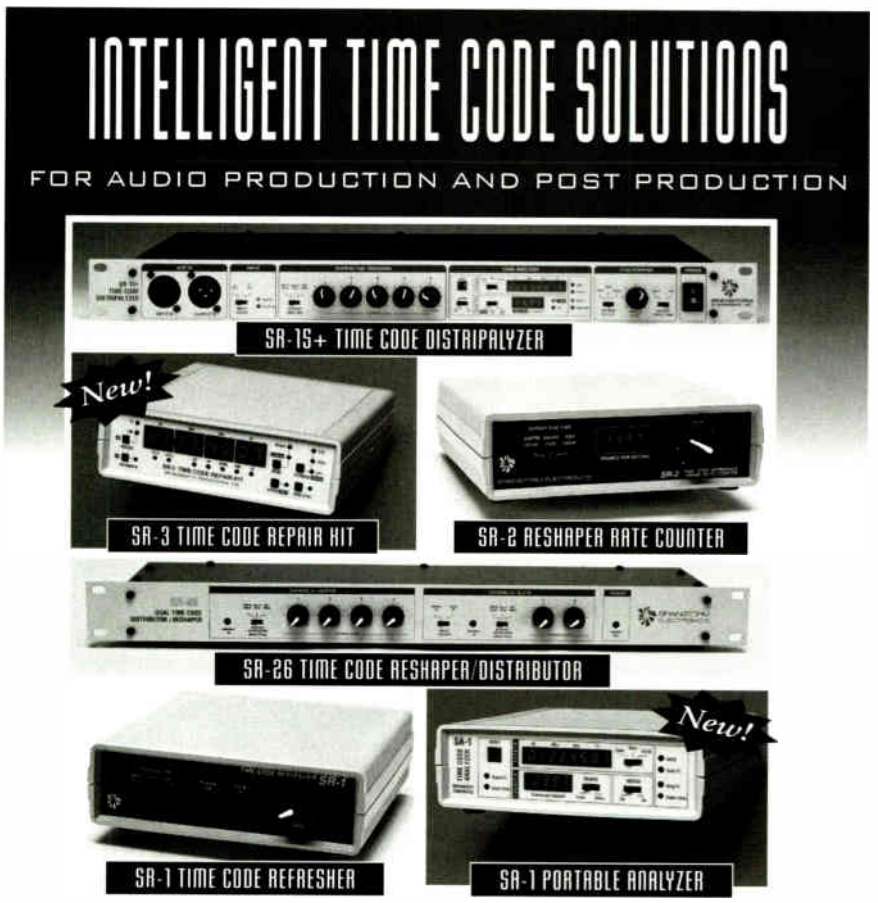
The film, essentially a 3-channel mix, was re-released theatrically in Dolby Stereo. "We tried to put more space in between the music, which is from the left and right, and the vocals, which we centered. The sound is more open, full and round, and the separation is much improved," Varda notes. (Voyager had not yet reviewed the audio material available, and so had not determined the audio format for the laserdisc release. However, a spokesman doubted the limited number of tracks used in the original film would warrant a 6-channel Dolby AC-3 laserdisc release.)

Varda was an important link to the original production; her memory helped to re-create the original sound and look of the film. "The restoration took four months, just an editor and myself. I was the only one who could precisely remember the original robust sound and the vivid colors that Jacques intended for *Umbrellas*," she said.

"The restored version of *The Umbrellas of Cherbourg* sounds and looks better than the American original!" Varda concludes. "My best reward for all of the work is seeing and hearing the film the way Jacques intended it, and seeing other people once again share and enjoy the wonderful sounds and images that are *The Umbrellas of Cherbourg*."

A home videotape release is planned for this spring; a laserdisc version will be subsequently released by Voyager.■

Eric Rudolph is a writer based in New York City.



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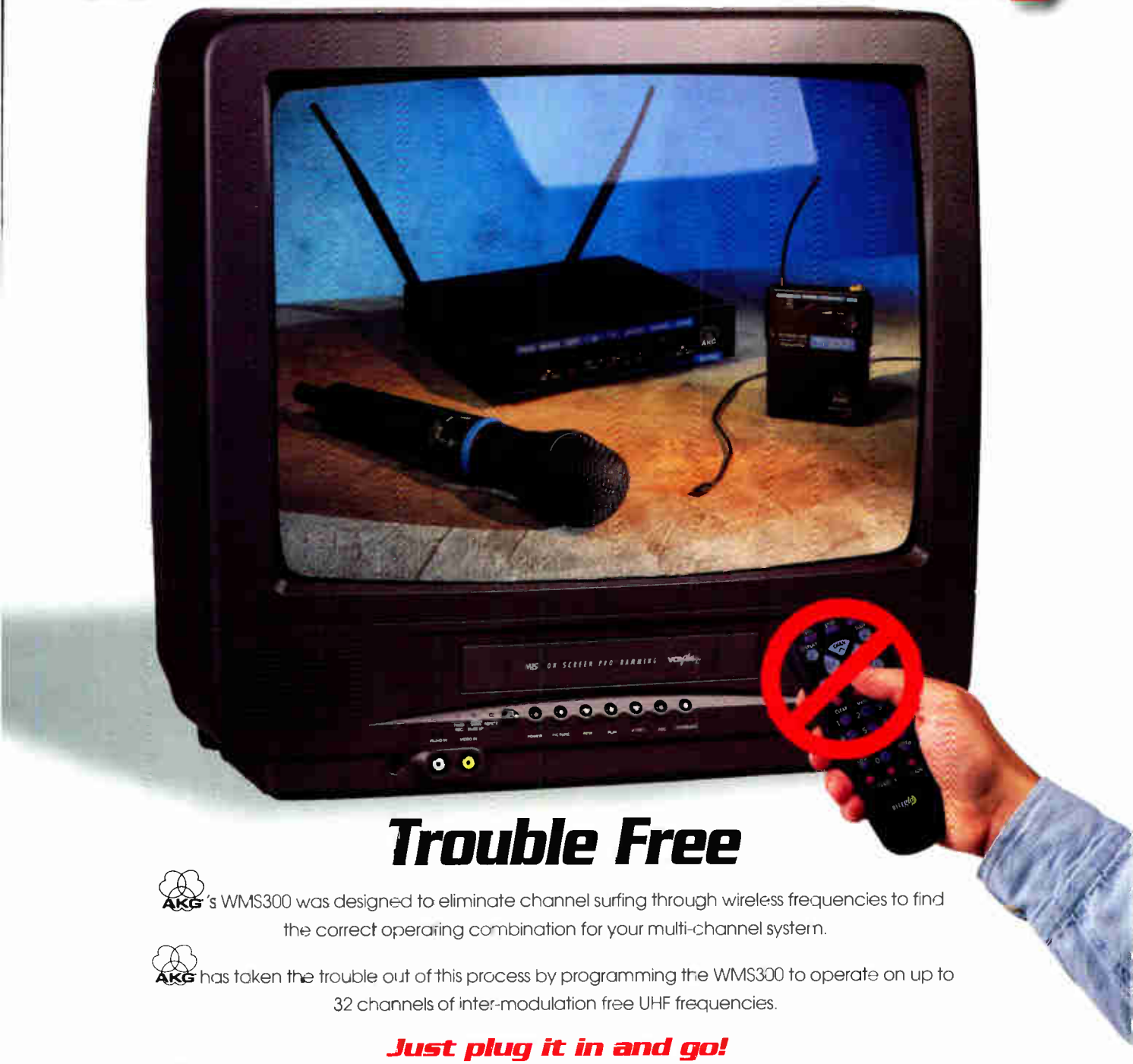

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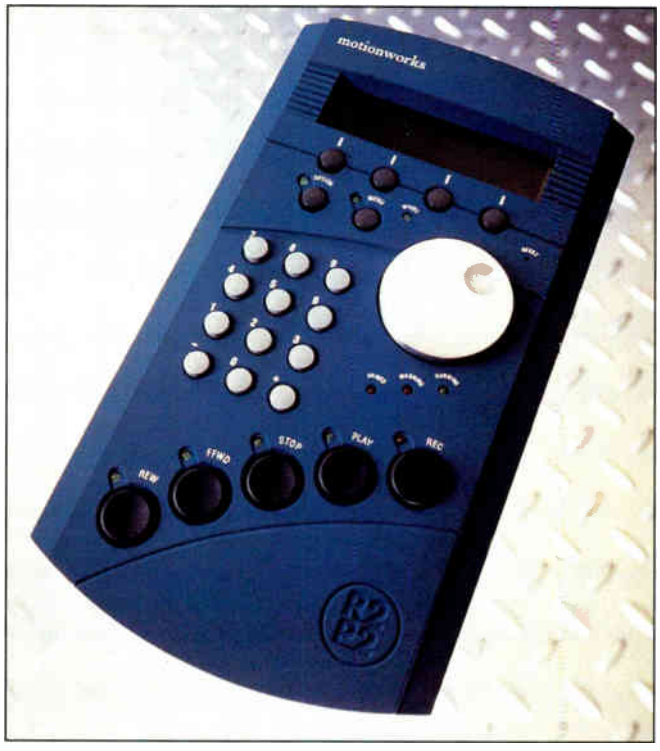
New Products For Film/Video Sound



MOTIONWORKS REMOTE

The Motionworks R2P2 remote control (distributed by HHB of Portland, ME) is a hand-held or desktop-mounted controller for all serial tape machines or DAWs that support the Sony P2 protocol. The R2P2 connects via a single 9-pin D connector and includes a jog/shuttle wheel and standard transport buttons. The unit's onboard library identifies any machine and displays its name in a 20x2 Supertwist LCD. Function keys and internal menus are automatically configured to match the connected device. The unit may also be used as a diagnostic tool for identifying machines connected to patchbays in large installations.

Circle 190 on Reader Service Card

D&R CINEMIX CONSOLE

D&R North America (Brashear, TX) is now shipping the Cinemix film sound recording console. Featuring a dual input path design, Cinemix offers complete recall of routing and switching functions, 6-channel LCRS panning, and automated master control and output assignment capability. PowerFade moving fader automation and PowerDynamics are among the many options that make the Cinemix suitable for a wide range of film sound, video post-production and recording applications.

Circle 191 on Reader Service Card

STAGE ACCOMPANY SCREEN SERIES

Stage Accompany (Cincinnati, OH) announces its new Screen Series loudspeaker system for cinema playback applications. The main system is based around an SA8535 ribbon HF driver, two SA1203 12-inch mid drivers and two SA1513 15-inch long-excursion LF drivers. Recommended surround components include the F1, F7 and E24 units; power for all units is supplied by the SA 1600 amplifier.

Circle 192 on Reader Service Card

MOTU MIDI SYNCHRONIZER

Mark of the Unicorn (Cambridge, MA) is shipping its MIDI Timepiece™ AV multiport MIDI interface and synchronizer for Macintosh and Windows. Offering eight MIDI inputs, eight MIDI outputs, 128 MIDI channels (networking up to 512 MIDI channels), SMPTE (LTC) input/output and front panel LCD programming, the MIDI Timepiece AV is designed to serve as a "synchronization hub" for any computer-based MIDI and digital audio studio. Features include video sync in connection, providing genlock to video or blackburst; ADAT sync out connection to synchronize one or more ADATs without a BRC; word sync out connection for word clock- and Superclock-driven devices, including Pro Tools; MMC; and 0.1% pull-up/pull-down. The MIDI Timepiece AV also converts and stripes SMPTE in all frame formats (24, 25, 29.97 drop and nondrop, 30).

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AARDVARK AARDSYNC II

Aardvark's (Ann Arbor, MI) AardSync II master sync generator was designed to improve the clarity and fidelity of digital audio transfers by providing an extremely low jitter clock for 16- and 20-bit digital audio converters. The unit can generate any digital audio sample rate, including 44.1 and 48 kHz, and accommodates pull-ups and pull-downs. The Video Lock function quickly recognizes and locks to any video house sync, including NTSC and PAL, and the unit generates three word clocks, two AES/EBU and Digidesign's 256 Superclock®. The unit is also compatible with Sonic Solutions, Pro Tools and Yamaha 02R. Price is $1,575.

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BY LOREN ALLDRIN

Affordable DIGITAL EFFECTS PROCESSORS

Yamaha REV500

Sony HR-MP5

Yamaha REV100

World Radio History

ART's FX-1

Do you remember your first digital multi-effects unit? I remember mine very clearly—it set me back nearly $500, was impossible to program and sounded awful. The processor, purchased about ten years ago from a company that will remain nameless, was state-of-the-art technology for the time.

In the realm of the low-buck digital effects processor, a lot has changed. Capabilities and sound quality not available at any price a few years ago can now be had for just a few hundred dollars—20-bit converters, 24-bit (or better) processing, easy-to-use interfaces, large LCD screens, true-stereo parallel or serial processing... Who would have dreamed we'd be able to buy this kind of processing power on a stomp box budget?

Zoom Studio 1204

In the next few pages, we'll check out the latest effects processor offerings from eight manufacturers, listed alphabetically. These products cover a full range of prices and capabilities, from ART's palm-sized unit to Yamaha's latest 32-bit dedicated reverb. All have an appeal to just about everyone in audio, whether used as that first reverb in a bedroom project studio, or as auxiliary device #34, handling left-rear surround channel tambourine ambience in a 96-channel mix. Whatever the application, these processors have one thing in common: They'll all set you back around $500—or less.

Alesis NanoVerb

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Alesis (Los Angeles) offers three effects units in the under-half-a-grand price point. The tiny NanoVerb ($179) is a one-third-rackspace device reminiscent of the company's first reverb, the MicroVerb. The NanoVerb boasts 24-bit processing, 18-bit converters and a full 20kHz bandwidth. It also offers 16 presets, including hall, plate and room reverbs, flange, chorus, delay, rotary speaker simulator and a two-series multi-effects. A single adjust knob controls one parameter per program; the NanoVerb does not store edited presets. Connections include stereo input and output on unbalanced ¼-inch connectors, and a bypass footswitch. A dual-color LED indicates input signal present and input peak.

The MicroVerb 4 ($299) is a single-rackspace processor that offers reverb, delay, chorus, flange, rotating speaker simulator, auto-pan and others. Multi-effect programs in certain configurations offer up to three effects at once. Front-panel adjust knobs allow users to control two effects parameters per program; once adjusted, users can store programs into the 100 user memory locations. MIDI control allows for program change or parameter adjustment. A two-way footswitch controls effect on/off, tap-tempo delay or rotary speaker simulator speed. Inputs and outputs are on ¼-inch unbalanced connectors, with input level, output level and mix controls on the front panel.

At $499, the MidiVerb 4 offers 24-bit processing, 48kHz sampling rate, 20kHz bandwidth and 18-bit A/D and D/A converters. The MidiVerb 4 functions as a dedicated single effects processor, a dual-mono processor and a series multi-effects processor. Effects programs include reverb, chorus, flange, tap-tempo delay, rotating speaker simulator, pitch shift, panning and more. Numerous parameters can be altered for each program, with the edited patches saved back into one of the MidiVerb 4's 128 user memories. Inputs and outputs are on unbalanced ¼-inch connectors; the MidiVerb 4's auto-level sensing feature sets input levels automatically. MIDI support allows the MidiVerb 4 to respond to program change and continuous controller messages for real-time effects parameter changes.

Applied Research & Technology (Rochester, N.Y.) has several affordable effects processors in its product lineup. The first in ART's "Personal Processor" series, the MR-1, is a palm-sized reverb unit designed for instrument amp or recording applications. The MR-1 offers 16-bit signal processing, mono in/out and combo power/clip LED indicator. A single knob selects from the unit's 16 reverb presets; other controls include input and output level buttons (which toggle between 0 dBV or -10 dBV) and a bypass switch. The MR-1 has a list price of $179.

ART's preset-only FXR ($259) is designed for simple "plug-and-play" operation, offering 256 effects presets, including four types of linear reverb, three types of gated reverb, various delay types, tremolo, chorus, flange and panner effects. True stereo operation allows the FXR to process left and right inputs with different effects. Users select presets with the FXR's simple two-knob system, one knob selecting the "family" of effects and the other selecting the specific preset. The FXR offers input, output and mix controls, as well as input signal LEDs. Input and outputs are ¼-inch unbalanced.

ART's FXR Elite II ($345) adds programmability and MIDI support to the basic FXR true-stereo processor. A redesigned front panel sports a large preset selection wheel, as well as two "encoder" knobs. These knobs allow the user to adjust two parameters for each of the Elite II's 256 effects programs, including delay length, reverb high-frequency level, mix, left-effect level and right-effect level. Once changed, programs can be stored back to the Elite II's memory. MIDI support allows for MIDI program change mapping and real-time control of certain effects parameters. The FXR Elite II has ¼-inch unbalanced inputs and outputs, a remote footswitch jack and MIDI in/out/through jacks.

The ART Effects Network ($449) offers simplified programming and a broad range of effects. The Effects Network will function either as a dedicated processor (with all processing power devoted to a single effect), a dual processor (different effects on each channel) or a multi-effects processor (multiple effects in series). User interface is ultra-simple, with a two-line LCD and large rotary knob to select presets or adjust parameter values; parameter changes can be stored to the Effects Network's 100-preset memory. The Effects Network offers balanced ¼-inch inputs and outputs, with front panel-mounted input and output level controls.

Finally, in ART's Personal Processor line is the FX-1 ($159), a true-stereo processor that offers 30 basic effects, including reverb, chorus, flange, delay, doubler, pitch shift and tremolo. The FX-1 also offers dual or triple effects in series and several dual-mono parallel presets. Input and output levels are set with front-panel "more" buttons, which increase the FX-1's input sensitivity and output level, respectively. Users can engage an altered version of any of the 30 effects, effectively doubling the FX-1's presets to 60.

The dbx Project 290 (Salt Lake City) is a dedicated reverb processor that offers six different reverb types in three sizes and three "colors." Front panel knobs set reverb decay time, wet/dry mix, input level and output level. The $400 unit offers 16-bit A/D and 18-bit D/A converters, 40kHz sampling rate, balanced ¼-inch inputs and outputs, four-segment stereo input level meter and digital noise gate. MIDI support allows users to select any of the 54 possible reverb programs and change decay times.

DigiTech (Salt Lake City) offers the 512, the Studio Twin and the Studio Quad V2. The 512 ($229.95) offers 480 effects presets organized into 32 effects combinations; presets include reverb, delay, chorus, flange and pitch shift. Users can tweak two effects parameters for each preset, though there's no way to save the edited sound. A true-stereo unit, the 512 will process left and right inputs separately; it will also perform multi-effects processing in series. The 512 has input, output and mix level controls, unbalanced inputs and outputs and a back panel-mounted threshold control for its built-in noise reduction circuit.

DigiTech Studio Quad V2

The Studio Twin ($299.95) offers a mix of dedicated reverb, modulation and delay effects, as well as numerous serial and parallel multi-effects. Several parameters are adjustable for each preset, and users can store edited programs into the Studio Twin's 99 memory locations. Sound quality benefits from DigiTech's 24-bit S-DISC processor, 18-bit ADC and 20-bit DAC. Inputs and outputs are on balanced ¼-inch connectors; the Studio Twin offers a MIDI input jack for program changes. The Studio Twin also offers a single-

World Radio History

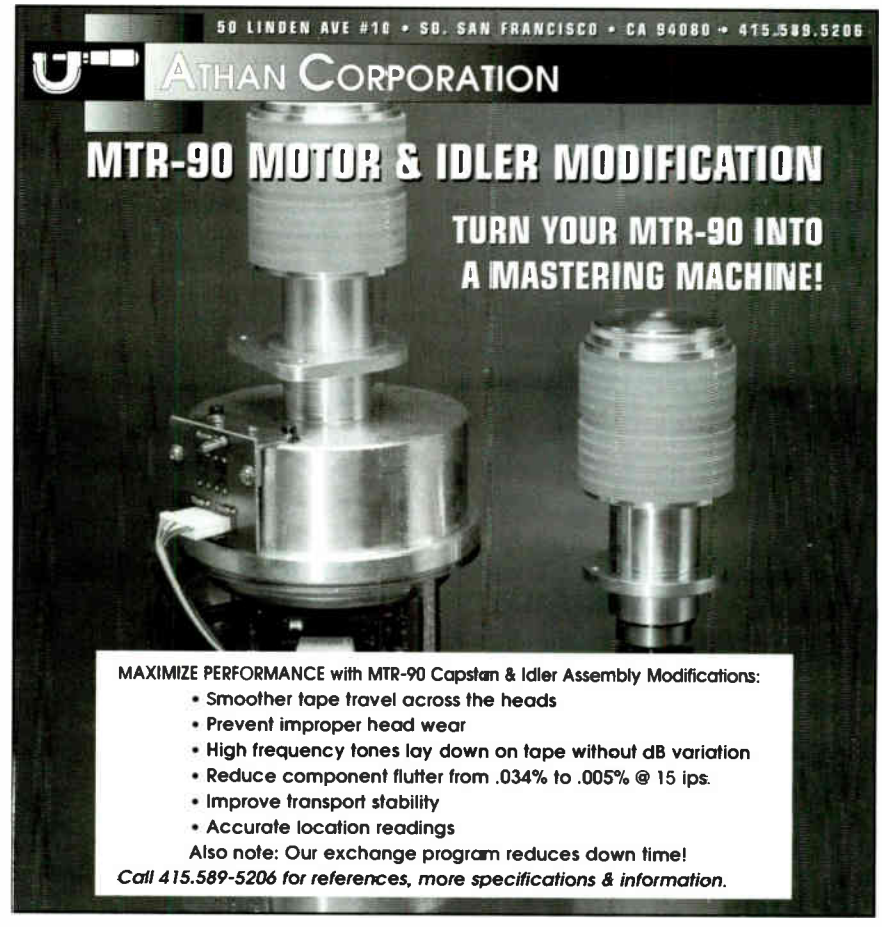
band fully parametric EQ for shaping effects. A built-in noise gate offers ten threshold settings.

Studio Quad V2 ($549.99) updates the original Studio Quad with new effects, a redesigned user interface and a large LCD screen. New effects include intelligent pitch shifting, rotary speaker simulator, "analog" delay, room echo, compression and others. The V2 is a true "quad" processor, with four independent inputs and outputs and multiple signal path routings. Users can configure the unit for parallel, series or series-parallel processing, placing effects in any order. Automatic input leveling sets input gain automatically; output level is selectable between -10 dBV and +4 dBu. Inputs and outputs are on ¼-inch unbalanced connectors. Full MIDI support allows program changes or real-time parameter editing.

Lexicon (Bedford, Mass.) offers two affordable true-stereo effects processors, the Alex and the Reflex. Both offer hall, room, plate, gate and inverse reverb effects; chorus, flange and delay presets; unbalanced stereo inputs and outputs; 16-bit converters and 15kHz effect bandwidth. Both allow the creation of program register "chains" for flexible footswitch control of programs. The Alex ($399) has 16 presets selectable from a rotary knob, with each effect offering three adjustable parameters. Users can save altered programs in one of 16 user memories. Footswitch connectors offer remote control of bypass and program change.

The Reflex ($499) goes beyond Alex's capabilities by adding an enhanced concert hall algorithm with reverb "randomizer" for smoother tails, MIDI control, 128 user program locations and a resonator effect. The Reflex allows front-panel adjustment of up to ten parameters per effect, and dynamic MIDI control of up to four parameters per effect. The Reflex will also set delay times to match MIDI song tempos.

Peavey (Meridian, Miss.) has two low-cost units in its effects lineup, the DeltaFex and the Addverb III. The DeltaFex ($159) offers 16 effects, including reverb, delay, parallel delay/reverb, chorus, flange, phase shift and rotary speaker. Each effect has two adjustable parameters; the rotary speaker effect allows the speed to be toggled with an external footswitch, smoothly "morphing" between the two speeds. When bypassed, the DeltaFex's reverb and delay programs continue to decay. The unit offers stereo inputs and outputs; input, output and mix controls;



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and front panel effects-type legend. The DeltaFex will accept both line- and instrument-level input signals.

Addverb III ($349) is a true-stereo, MIDI-controlled effects processor that will perform up to eight effects at one time. Users can combine algorithms in any order from 35 different effects types, or can devote all of the Addverb III's processing power to an "ultra" reverb effect. Internal processing is 24-bit, with 16-bit A/D and 18-bit D/A converters. The Addverb III configures itself automatically for series or parallel operation and offers real-time control of up to eight parameters per patch through MIDI. The unit includes 128 user memories, 128 factory presets, two data entry knobs and an LCD screen.

The HR-MP5 ($599) is a half-rack-space multi-effects processor from Sony Professional Audio (Montvale, N.J.). It offers two effects blocks with pre/post-switchable 2-band EQ; these blocks can be set to two of the HR-MP5's 51 different effects types. Algorithms include standard time- and modulation-based effects, as well as intelligent pitch shifting, amp simulator, compressor, limiter, wah, subharmonic generator, rotary speaker, distortion, overdrive, vocal canceler and more. The HR-MP5 offers a large LCD, 100 presets, 100 user programs, MIDI control, footswitch input and built-in instrument tuner. The unit offers a 48kHz sampling rate, 18-bit converters and 24-bit stereo internal processing.

Yamaha (Buena Park, Calif.) is currently offering two dedicated reverb processors, the REV100 and REV500. The REV100 ($299) offers linear and gated reverbs, mono and stereo delays, chorus, flange, tremolo and symphonic modulation effects; certain multi-effects programs combine delay or modulation with reverb. Users can adjust three parameters per algorithm; saving the altered program overwrites the original preset. The REV100 has a total of 99 effects program locations. MIDI support allows adjustment of up to eight effects parameters through continuous controllers. The REV100 uses 16-bit A/D and D/A converters operating at a sample rate of 44.1 kHz.

The REV500 (around $500) is Yamaha's latest dedicated reverb processor, using the same proprietary 32-bit DSP chip as found in the company's ProR3 reverb. The REV500 offers hall, room, plate and "special" reverb effects, as well as programs that enhance the reverb with chorus, flange, gate, dynamic filtering and other effects. Inputs and outputs are on balanced XLR or ¼-inch connectors, with selectable -10dBV or +4dBu levels. Four front-panel knobs access the most common reverb parameters; users can adjust up to eight more parameters through a "utility" mode. Built-in side-stick and snare samples allow reverb adjustments without a signal source. The REV500 uses 20-bit converters and a 44.1kHz sampling rate. MIDI support includes program change, parameter edit, continuous controllers and bulk dump.

The Studio 1204 ($249) from Zoom Corporation (distributed by Samson Technologies, Syosset, N.Y.) is a low-cost processor that offers 512 preset programs organized into 32 effects types. Users can adjust two parameters per effect and store up to 100 custom patches. The 1204 offers series and parallel multi-effects, as well as single effects. Effects include reverb, chorus, flange, delay, pitch shift, tremolo, vocoder, two-speed rotary speaker simulator, vocal distortion and noise reduction. A front panel mic input makes the Studio 1204 convenient for dedicated vocal processing, and the unit responds to program change and continuous controllers through MIDI. ■

Loren Alldrin is a freelance producer and writer based in Nashville.

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PREVIEW

OTARI EAGLE AUTOMATION

Otari Corporation (Foster City, CA) announces its new Eagle automation software package for the Otari Status and Elite consoles. Running under Windows 95, the Eagle system offers a color graphic interface with dynamic control of faders, mutes and computer-controlled switches, and frame-accurate fader moves and switches. Eagle allows MIDI systems to communicate with the console and will trigger snapshot events. Supplied standard with new Status and Elite consoles, the Eagle automation package can be used by existing Status and Elite console owners.

Circle 212 on Reader Service Card

SONY DAT RECORDER

Sony's (Montvale, NJ) PCM-R500 rack-mount DAT recorder uses Super Bit Mapping technology for encoding 20-bit digital signals into the 16-bit DAT recording format. Featured are a variable speed cue/shuttle knob and 4-motor tape transport. Audio interfaces include AES/EBU and S/PDIF digital I/O and balanced XLR and unbalanced RCA analog I/O. Pricing: less than $2,000.

Circle 213 on Reader Service Card

BEYER DIGITAL MIC

Beyerdynamic (Farmingdale, NY) is now shipping the MCD 100 digital condenser microphone, first presented at last year's AES convention in Copenhagen. The cardioid MCD 100 features a 22-bit TrueMatch A/D converter and integral DSP that generates a standard AES/EBU output that is said to be transmitted over standard mic cable lengths of 300 meters. A remote-control unit provides attenuation at the mic capsule and frequency response may be modified in EPROM software.

Circle 214 on Reader Service Card

HOT HOUSE TWO THOUSAND AMP

The Model Two Thousand from Hot House (Highland, NY) is a massive 5U, 95-pound amplifier with two mono channels each capable of 950 watts/channel into 2 ohms (or 2,400 w/ch continuously into 1 ohm). Peak current per channel is rated at 200 amps; the system design includes 40 hand-matched European lateral MOSFETS and two custom over-wound toroidal transformers. High-capacitance, low-ESR filter caps guarantee stiff bottom end and fast recovery time.

Circle 215 on Reader Service Card

PRISM SOUND 24-BIT ADC

Prism Sound introduces the AD-124 24-bit analog-to-digital converter (distributed by Prism Media Products, Red Bank, NJ), a one-rackspace unit providing 16/20/24-bit output word length options and a choice of four noise-shaper curves for reduction to 16-bit wordlength in either A/D or D/D modes. The unit has a -118dB noise floor. Dynamic Range Enhancement circuitry allows the AD-124's output to be recorded in high resolution on 16-bit recorders for later editing in 20- and 24-bit modes. The AD-124 also offers auto-dither and dither on/off control. Analog inputs are electronically balanced. Digital I/Os are in AES, S/PDIF coaxial and TosLink optical formats. SDIF-2 output is optional.

Circle 216 on Reader Service Card

STUDER D19 MULTIDAC

The D19 MultiDAC from Studer (Nashville, TN) is an 8-channel, 23-bit digital-to-analog converter featuring a monitor mix output. The single-rackspace unit can operate from a wide range of sampling frequencies (any input can select from any frequency), and output levels are transformer-balanced and feature output level potentiometers. AES/EBU inputs are standard. The unit's MixMonitor feature allows monitoring of any or all channels in mono or stereo via a headphone jack or a five-pin balanced XLR output and a volume control.

Circle 217 on Reader Service Card

DYNAUDIO BM15A

Dynaudio Acoustics (Distributed by AXI, Rockland, MA) has revised its TEC Award-nominated BM15 near-field speaker. The new BM15A features an integrated dual 150W amplifier, the Esotec's new HF driver and Dynaudio Acoustic's high-output 9.5-inch woofer. Power on and clip indicators are mounted on the front baffle.

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PREVIEW

SUMMIT REFERENCE MONITORS

Summit Audio (Los Gatos, CA) offers the Monitor Science ED-81 high-definition reference monitors. Measuring 16x16x14 inches and weighing 45 lbs, each unit has an 8-inch polypropylene LF driver and a 1-inch soft-dome ferrofluid-cooled tweeter. Nominal power handling is 100 watts, sensitivity is 87 dB, impedance is 8 ohms. The MDF cabinets are finished in Night Sky blue and offer five-way binding-post terminals. Price is projected at around $2,000 a pair.

Circle 219 on Reader Service Card

JOEMEEK ENHANCER VC4

JoeMeek (distributed by PMI, Torrance, CA) introduces the Enhancer VC4, a dual-channel, single-rackspace signal processing unit that includes high-frequency compression and tuned resonance circuitry to produce the Enhancer effect. Front panel controls for each channel include: drive; Q, which controls a tuned circuit that resonates the enhanced effect; and Enhance, for determining the amount of enhancement. There are also input gain, bypass and output level controls and colored LED output level indicators.

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BELLARI STUDIO TUBE MULTIPROCESSOR

The RP533 Studio Tube Multiprocessor from Bellari (Salt Lake City, UT) features tube circuitry throughout and combines a mic preamp input section, a compressor/limiter section with sidechain access, and a sonic exciter. Metering indicates input, output or gain reduction levels. I/Os include ¼-inch and XLR connectors. Price: $700.

Circle 221 on Reader Service Card

DB TECHNOLOGIES 24-BIT A/D

dB Technologies debuts its AD 122-96 24-bit stereophonic analog-to-digital converter (distributed by Audio Intervisual Design, W. Hollywood, CA). Capable of converting at 96, 88.2, 48 and 44.1kHz sample rates, the one-rackspace AD 122-96 offers a noise floor of -122 dB, a switchable soft-knee digital limiter and facilities for redithering to 16- and 20-bit formats. The 24-bit ADC also includes programmable digital test tones for system alignment and features AES and external word clock synchronization at 40-51 kHz, 88.2 kHz and 96 kHz. A precision meter bridge is included; an SDIF interface is optional.

Circle 222 on Reader Service Card

SIGNAL TRANSPORT SWING RACKS

Swing Racks™ from Signal Transport (Richmond, CA) simplify access to the rear panels of rack-mounted equipment in confined spaces. Each Swing Rack mounts directly into a wall opening or millwork and pivots forward like a cupboard door, allowing frontal access to rear panels and cabling. Available in single or double (two wide) configurations and in heights of 12U, 15U and 45U, each Swing Rack consists of a welded tubular steel face frame with integral rack rails; top and bottom pivot/strike plates, cable tie panel and reversible swing spacer panel. Swing Racks are offered in a black powder-coated finish; options include rear rack rails, cable tie bars and power strip mounts.

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ALESIS REFERENCE MONITOR

Alesis Studio Electronics (Los Angeles, CA) is targeting its new Point Seven™ shielded reference monitor specifically for multimedia and film/video post-production professionals. The fully shielded two-way monitors may be placed directly next to any computer or video monitor without causing any interference. New driver components offer high power handling and feature new materials—a soft silk dome for the tweeter and a unique non-woven carbon fiber for the woofer. Frequency response is 85-22k Hz and the system can handle 50 watts RMS of program material and 100 watts peak.

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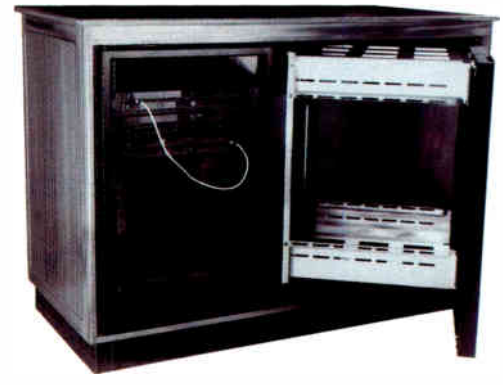

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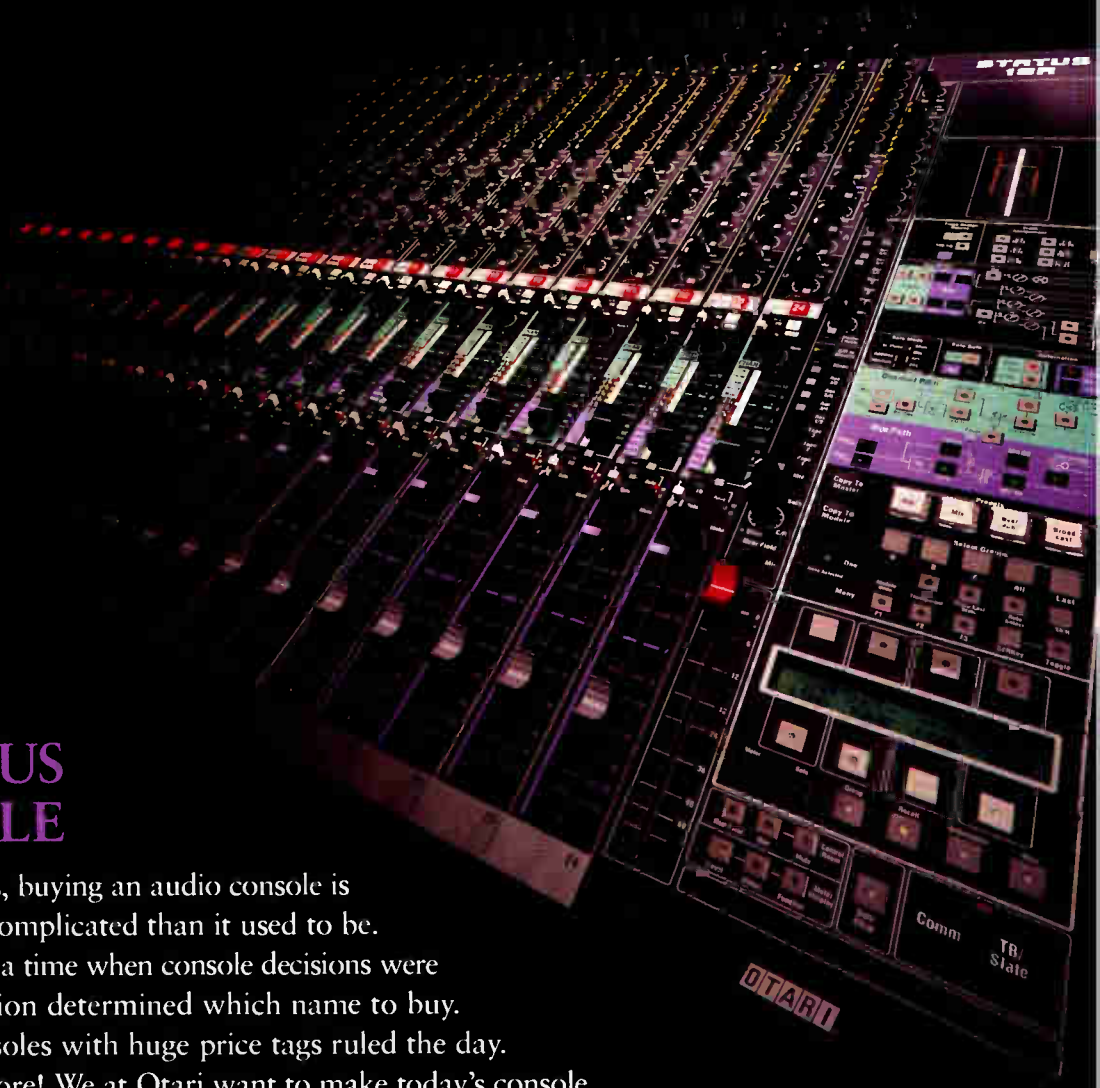

STATUS SIMPLE

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PREVIEW

OVER QUALITY COMP/LIMITER

ADgear's new Over Quality UR-76S stereo compressor/limiter (distributed by GML, Van Nuys, CA) is modeled on the popular—but long discontinued—UREI 1176. Offering familiar front panel layout and controls, the UR-76S has compression ratios of 4:1, 8:1, 12:1 and 20:1 (limiting); attack times range from 150 µs to 2 ms and release times from 130 µs to 1.6 seconds. Meters indicate input, output and gain reduction. Frequency response is claimed to be 20-20k Hz ±1dB. I/Os are electronically balanced.

Circle 225 on Reader Service Card

ART TUBE COMPRESSOR

Applied Research and Technology (ART) (Rochester, NY) introduces the PRO VLA Professional Vactrol/Tube Leveling Amplifier, a 2-channel rack-mount compressor/limiter. Featuring electro-optical (Vactrol) and vacuum tube electronics, providing limiting characteristics similar to those of classic tube limiters, the PRO VLA has variable threshold, compression ratios and output level controls for each channel and fast/slow switches for attack and release times. VU meters track input and output, with gain reduction indicated by 10-segment LEDs. I/Os are balanced XLR and ¼-inch TRS.

Circle 226 on Reader Service Card

HOT OFF THE SHELF

AEA is shipping the LD 202 **Stereoscope "winkie-blinkie,"** a compact battery- or DC-driven stereo unit that displays stereo program material in XY or PANorama modes on a 400-LED display. Call 800/798-9127 or fax 818/798-2378…**Selco's full-color product summary** of knobs, slider knobs, push buttons, analog and digital meters and accessories is available free. Selco is the U.S. distributor for UK-based Sifam Ltd. Call 800/229-2332; fax 714/739-1507; Web: www.selcoproducts.com…**MCM Electronics' newest catalog** (#38) contains over 6,000 electronic components, tools and accessories with same-day shipping. For a free catalog, call 800/543-4330…**Gold Line's Gold Lite/1k** is a Neutrik XLR connector containing a miniaturized 1kHz tone generator and phantom power detector. A red LED lights when phantom power (12-48v) is present and the unit emits a 1kHz mic level test tone, useful for troubleshooting and line checks. Retail is $39.95. Call 203/938-2588 or fax 203/938-8740…**Berkley Integrated Audio Software** (BIAS) announces BIAS Peak 1.5, a new version of the company's digital audio editing software for the Macintosh. Peak 1.5 is the first Macintosh editor to support RealAudio 3.0 Encoder. Call 800/775-BIAS or visit www.bias-inc.com…**Whirlwind now offers Snakeskin® fan-out sleeving** on all of its snake systems. Snakeskin is a color-coded braided sheath that is humidity-, solvent- and flame-resistant to military specs. Call or fax 716/865-8930…**Audio Precision's digital-only version of its System Two audio test set,** the System Two SYS-2300, is available at a reduced price. Call 800/231-7350 or 503/627-0832, or fax 503/641-8906…**Neutrik's Z-Series XLR connectors** are easy to assemble and ruggedly built, with all essential parts enclosed in a heavy-duty rubber covering. Call 908/901-9488; fax 908/901-9608…**Sony Recording Media's tape head cleaning kit,** the CLQ-30K, has three bottles of a new non-alcohol-based cleaning liquid formula and one chamois cloth. Retail is $65. Call 201/599-3445…**TRF Production Music Libraries' new Musictrack library** is a diversified collection of background and theme music, most recorded in several versions, in categories that include Drama & Suspense, Nature, Romantic, Mystery & Emotion, Nostalgia, Urban, Blues, Jazz and Rock. Call 800/899-MUSIC or fax 914/356-0895…**HHB professional's ADAT tape,** the 45-minute S-VHS ADAT45, features a specially formulated high-density binder system and a recording layer of ultra-fine cobalt ferric oxide particles for improved performance and reliability. Call 207/773-2424 or fax 207/773-2422…**Otari's RADAR Version 1.4 software** is free to all current RADAR owners. Features include facilities to link multiple RADARs and slave to Sony P2 and MTC protocols. Call 415/341-5900…**Accurate Sound Corporation's TMM-100 tape motion meter** will measure and display the speed of moving tape and other media from 15/32 to 400 inches per second and measures lengths of up to 100,000 feet. List is $995. Call 415/365-2843 or fax 415/365-3057…The **Waves C1 compressor/gate** ships with a library of more than 80 presets optimized for specific applications. A dynamic processor capable of frequency selective compression, expansion and gating, C1 is a software plug-in for Digidesign Sound Designer ($650) or TDM ($850) systems. Call 423/689-5395. ■

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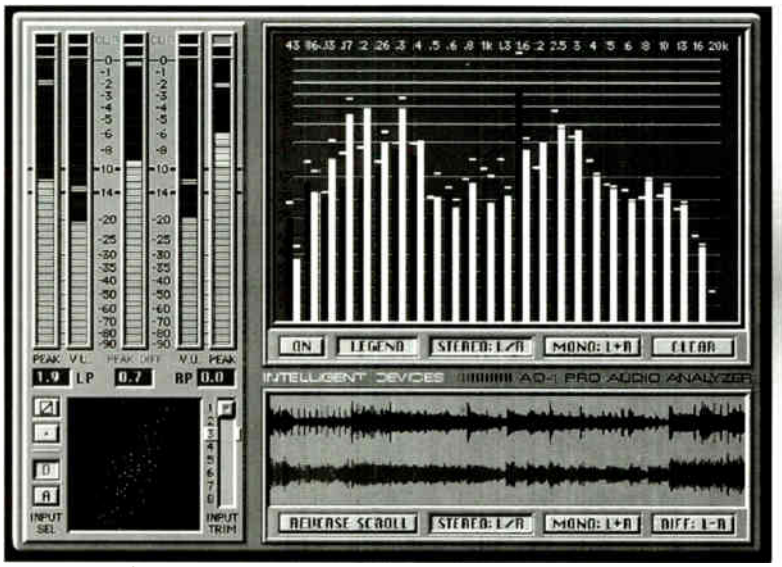
INTELLIGENT DEVICES AD-1

PRO AUDIO ANALYZER



AD-1's color display, shown here in black and white, includes spectrum analysis, waveform monitor, phase scope and VU meters.

Two essential tools are required for serious audio production: a reliable reference monitor system (near-field or otherwise) and reliable, accurate metering. Today, engineers have dozens of options in studio speakers, but when it comes to metering, the choices are either expensive outboard units or the woefully inadequate meters built into most consoles and recorders.

This problem is complex and vexing even to the most experienced engineers. Mechanical meters are far too slow to handle instantaneous peaks, and when you're recording to digital media, exceeding 0 dB brings irreparable—and quite audible—clipping distortion. Unfortunately, the meters on most digital machines offer little more than a ballpark estimate of what's really happening with the audio levels. Some decks flash red at 2, 3 or even 4 dB below zero, while others indicate a clip when zero is exceeded, but only after eight to 15 samples are clipped. To create optimum-quality audio, it's essential to know what levels you're recording at, and anything less than that is like driving down a dark stretch of winding road with your headlights off.

Rather than plunking down thousands for a precision set of outboard digital meters, Intelligent Devices offers another option, its AD-1 Pro Audio Analyzer. This Macintosh-based software is useable without any additional hardware on Power Macs or can be combined with any 16-bit NuBus or PCI digital I/O card (such as Audiomedia II/III, Sound Tools or Pro Tools systems or some of the new low-cost cards coming onto the market). It provides five 242-element, high-resolution, real-time meters with center sum and difference, floating peak bars, 0.1dB resolution and headroom margins—all in full color. The software is $349 for the standard version or $449 for the TDM version. To be sure, it's a bargain price, but as the late-night TV ads say, "but don't order yet—there's more."

The AD-1 also includes dual 1,024-point spectrum analysis displays; a phase scope; and a waveform monitor showing a running history of stereo, summed mono or L/R difference amplitude envelopes. Essentially for a couple hundred bucks, the AD-1 replaces about $6,000 worth of test gear.

Note: Before we go further, I should tell you that *Mix* columnist Stephen St.Croix is one of the principals and software designers at Intelligent Devices. That said, I can say I like the AD-1 software in spite of Mr. St.Croix's involvement. You see, every month, this man puts our editorial staff through a living hell, often forcing us to track him down across the four corners of the earth to get his column in. And in his self-appointed role as the professional audio industry's chief muckracker, he sure doesn't make *my* job any easier. So if anyone thinks I'm writing this as a favor to St.Croix, they can forget it.

The software requires only a couple megs of disk space, and its copy protection allows two HD installations. I tested the AD-1 with a relatively simple system, using the analog and digital inputs on a

BY GEORGE PETERSEN

World Radio History

Digidesign Audiomedia II card in a Mac Quadra 650. The computer is mostly used in the studio for DAT editing or occasionally looping sounds during tracking; as I run PC-based console automation, the AD-1 proved an ideal application for an essentially unused Mac during mix sessions.

The metering section has dual meters (peak and averaging) for each channel, with a center channel meter that's switchable between L+R peak/average or L-R peak/average. Various parameters allow tweaking the meters to personal preference. These include peak hold time (short to infinite, in four steps); clip point; meter decay rate; and meter style (LED, solid bar and emulation of phosphor or 242-step plasma types), so anybody can set up exactly what they need. But be warned: These displays are ruthlessly accurate, showing you the true character of your signals. As the meters have a full 90dB scale, they'll show all of the low-level noise and garbage that lesser meters ignore.

Also provided are momentary and latched clip indicators and margin indicators for the left/right/summed channels. Similar to those found on many pro DATs, the margin (headroom) readouts are indispensable. All of these are instantly resettable by clicking on the display.

The X/Y axis stereo phase display is simple, but eminently useful in any production environment, as a way of monitoring the stereo spread of a signal or checking for out-of-phase conditions or L/R discorrelation. In creative applications, it offers a quick way of checking how signal processing, mix parameters or different mic setups affect stereo imaging. Unfortunately, the phase display is fairly small—perhaps in the next versions, the phase window could be larger.

The spectrum analyzer employs two 1,024-point Fourier engines for its dual-channel, 74dB logarithmic display. Sort of an analog or digital I/O RTA on steroids, this function has 242 light bars for every band and a digital peak response curve with resettable peaks. Again here, users have complete control over update rate, bar decay time, peak hold, L/R or summed-mono display, and the insertion of a pink noise filter that indicates a flat spectrum when analyzing pink noise. Its 25 bands are on ISO centers, which makes it ideal for use with a standard ⅓-octave EQ. In the studio the AD-1 gives an invaluable glimpse into what's happening to a signal from a spectral viewpoint, whether you are trying to fix a mix or figure out what makes a hit song stand out from the rest.

An interesting feature of the AD-1 is the waveform monitor, with an impressive running display that shows a history of all clips as bright red bars, superimposed over the audio waveforms. I was also impressed with the ability to name and store presets of AD-1 display parameters, to instantly configure the unit for whatever task is at hand. Another unassuming but clever feature is an input/output window, which allows switching the incoming audio stream to be monitored as L/R stereo, L+R summed mono, L-R difference and L-R on left and L+R on right, along with output muting and -20dB attenuation.

Combined with the metering, phase, spectral and waveform displays, the I/O window makes the AD-1 system into a logical extension of your console's master module. Few audio products offer so much for so little. The AD-1 is an amazing debut from an innovative company—I wonder what they're up to next?

Intelligent Devices, 7 Hickory Ridge, Baltimore, MD 21228; 410/744-3044; fax 410/788-6370; e-mail indev@clark.net. ■

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HORIZON MUSIC UPGRADE

I/O CARDS FOR THE ALESIS ADAT

There are a lot of ADATs out there—in fact, approximately 100,000 of them. There are also dozens of companies marketing third-party accessories, ranging from converters to outboard controllers. A few have even offered audio enhancement modifications on a limited basis, but so far, these have been fairly expensive and involve sending your deck to a custom shop to be hot-rodded. Performed correctly, such enhancements can make an appreciable improvement in the way the decks sound. However, the down side of such mods is that your machine is then no longer stock, and later servicing and/or maintenance can be difficult, unless you have complete documentation for every cap, resistor or IC that was replaced.

With this in mind, Horizon Music offers its Alesis ADAT Upgrade Cards. Priced at $349.95, this replacement input and output board kit can be installed in minutes—simply unplug a few ribbon cables and replace the stock Alesis boards with the Horizon circuit cards. The upgrade is designed solely for the original Alesis ADAT and cannot be installed in other ADATs, such as the Alesis XT or Panasonic or Fostex models. Unlike other ADAT mods, the Horizon cards can easily be removed and replaced with the stock ADAT boards, should the deck need to be restored to stock condition for servicing or repair.

The Horizon upgrade uses high-speed op amps in a DC-coupled circuit for reduced phase shift in the audio band, while ultra-wide circuit traces and an improved ground plane on the PC boards lower thermal noise and reduce crosstalk. The input board also adds ¼-inch TRS balanced input capabilities, a proprietary automatic input impedance adjustment (600- to 100k-ohm range), and full-range gain control (unity to +40 dB) for the EDAC and ¼-inch input sections. The output board supports up to 50ma outputs (for driving long cable runs), and the ¼-inch outputs can drive professional levels, eliminating the need to use the ADAT's EDAC connectors. If desired, outputs at the -10dB consumer level can be achieved by moving a few jumpers on the output board.

The installation is simple, requiring about ten minutes, and any competent tech should have no problem with this plug-in/no-solder procedure. The only thing that seemed different about the post-mod ADAT is that the new input card is slightly longer than the stock card, and once the boards are in, you need to replace the top panel with a clear Lexan top, which comes with the kit and is pre-drilled with small access holes for adjusting the input gain pots. The clear top lets you see what you're doing and allows visual inspection of the transport for maintenance. The only caveat of the install is that Horizon recommends using a nonmetal screwdriver—such as a fiddlestick—when adjusting input gain, to avoid shorting components on the card while jabbing at the trim pots.

Once I had gains set to my liking, I was ready to start listening. The nice thing about testing modular digital multitrack modifications is that it's so easy to cut tracks simultaneously on two machines and then listen to the results in sample-accurate sync. All tests were made from line-level inputs fed from Millennia Media mic preamps. Although the gains on the input card can be set high enough to accept mic-level signals, having to tweak the gain structure for each source during a session using a fiddlestick seemed like too much trouble. The Millennia was a good compromise—and I like the idea of having eight balanced input jacks on the back of an ADAT.

I began by recording a studio drum set using two room mics, and followed this recording up with vocals, triangle and acoustic 12-string guitar. The difference is subtle, but clearly noticeable, with the Horizon ADAT displaying punchier attack transients (particularly on drums and triangle) and increased clarity. On vocals and guitar, there seemed to be an increase in low-level detail and upper-end reproduction, especially on the upper harmonics of the 12-string. There was also a discernible improvement in stereo imaging. Essentially, the Horizon playbacks sounded nearly identical to what came out of the Millennia outputs.

Anyone looking for better sound from an original Alesis ADAT should look into the Horizon upgrade kit. It's $349.95 well spent.

Horizon Music Inc., 230 North Spring Street, Cape Girardeau, MO 63701; 800/821-3806 or 573/651-6500; fax: 573/651-3460. ■

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TL AUDIO EQ2

DUAL PARAMETRIC VALVE EQUALIZER

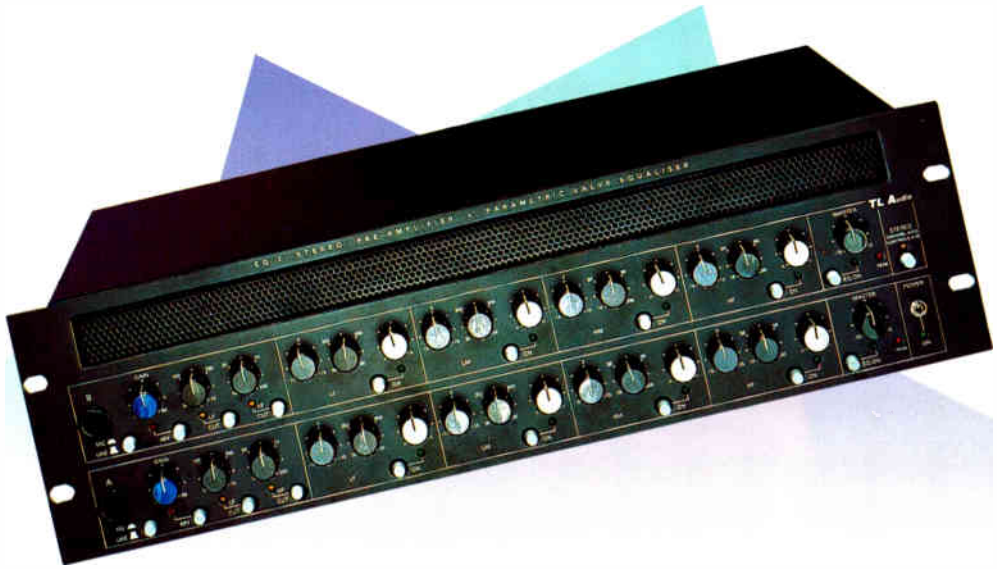
Over the past couple of years, the Tony Larking name (the "TL" in TL Audio) has risen from relative obscurity to obvious respect in North America. And it really all boils down to offering solid, professional tools that are built well and sound great. TL's newest stereo parametric equalizer, which comes bundled with two mic preamps, two direct boxes and tube line-driver functions, is another attractive package in that same tradition.

The somewhat misleadingly named TL Audio EQ2 Dual Parametric Valve Equalizer is more than just an equalizer; the unit actually combines two channels of 4-band tube parametric equalizer functions with variable highpass and lowpass filters, a pair of high-grade, solid-state mic preamps (with switchable 48VDC phantom power), and two direct-box-style inputs for tracking instruments (guitars or keyboards) directly to tape. It's also a true parametric equalizer, with continuously variable controls for both bandwidth (Q) and frequency on each channel.

Inside the three-rackspace chassis is a solid-state power supply that delivers a full 250 volts to the tubes, while reducing heat. The EQ2 runs slightly warm (never hot), and the front panel screen provides all the necessary ventilation. Six ECC83 (the British equivalent to a 12AX7) tubes are used—one on each EQ filter, with a two-stage output driver per channel. The mic preamps are the well-known SSM2017 chips, followed by tube stages, a hybrid design that delivers low-noise performance with a response that's flat from 20 to 40k Hz. Insert points on the rear panel allow the IC stages to be bypassed completely, allowing access to a pure tube EQ stage or just the mic preamps without the tube circuitry. Two additional tubes (one per channel) in a cathode follower stage before the master output permit gain adjustments to tailor the amount of desired tube distortion. It's really no more complicated than setting the channel/master volume ratio on a guitar amp: Clean, fat or dirty—the EQ2 lets you determine the sound you want.

Taking this control aspect to the next step, every band on the EQ, including the HP/LP filters, has individual in/out switching with an LED indicator. Each channel also has an overall EQ bypass switch. The latter helps when making quick A/B comparisons between flat and EQ'd settings, while switches on each band allow the user to bypass any unnecessary circuitry in the audio path. I like that.

The front panel is simply laid out, with filter and gain pots in two rows of 16. The spacing between the knobs is somewhat tight, and I would have preferred a slightly staggered approach—perhaps with the center frequency controls placed slightly above the gain and Q knobs for a little more room. However, I did like the Stereo switch, which allows the knobs of Channel A to control both sides simultaneously.



Each channel's ¼-inch input has a mic/line sensitivity switch. Except for those used on harmonica, I don't own any mics with ¼-inch plugs, so I used the ¼-inch jack mostly for tracking bass, guitar and synth in the control room. In this capacity, the EQ2 is a wonderful—albeit pricey—direct box, but its EQ capability makes a huge difference when tracking to tape.

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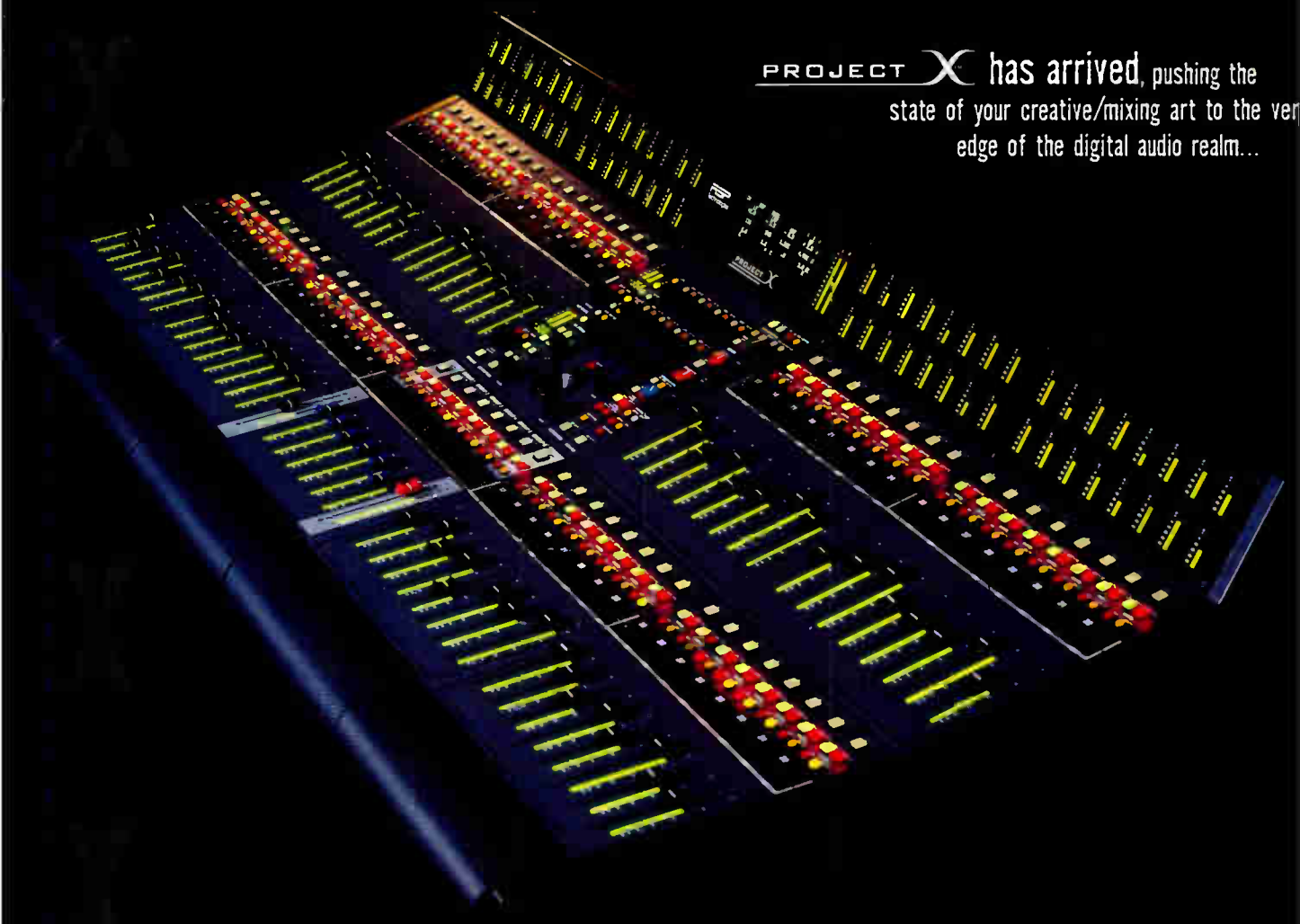
Pushing the State Of Your Art



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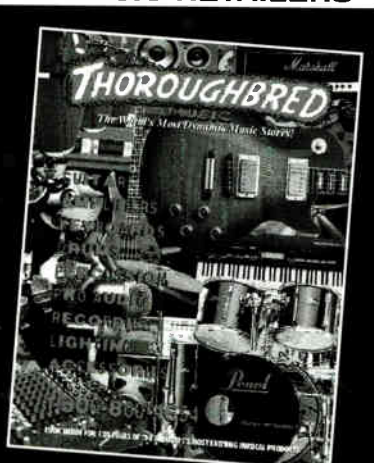

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The back panel has XLR mic inputs, XLR and unbalanced ¼-inch line inputs, ¼-inch insert points and (-10/+4 dB) XLR balanced and ¼-inch unbalanced outputs. Interfacing the EQ2 in any studio situation (large or small) is no problem.

The low and low-mid filters are identical, each with a 30 to 3k Hz range; similarly, the high-mid and high filters each have a 1 to 20kHz range. This provides wide overlapping between bands. Gain controls are ±15 dB with center detent. Although most people make equalization changes by ear, the EQ2 could have better markings on its controls, especially when you want to write down settings for later use. For example, the low frequency adjust is marked as: 30 · 350 · 600 · 3k Hz, with dots for the intermediate points. So questions such as "Where's 60 Hz?" or "What's the halfway point between 600 and 3k?" remain unanswered.

Exact figures for the bandwidth controls are also not given, but the wide (full counterclockwise) setting is quite wide, and the opposite setting provides a medium-wide Q. Anyone seeking tight, notch filter-style operation won't find it on the EQ2. Rather than a surgical tool for removing AC hum, camera noise and other narrow-band problems, the EQ2 is designed for musical, program-style equalization.

And in this capacity, the EQ2 really excels. Unless you're specifically trying to create a distorted sound, the audio pathway is ultra-clean: Even with all the parametric bands switched in (at zero gain), there was no discernible audio difference between the master EQ-in and bypass settings. And used by themselves, the preamps have an uncolored neutral quality, although color can easily be added, if desired.

Whether tracking or mixing, on all kinds of sources (drums, vocals, guitars, bass, synth, strings) the equalization was fast, flexible and—best of all—musical. A bit of tube warmth seems the perfect complement to digital tracking, and the stereo function is ideal for mastering and other program EQ applications. At a U.S. retail of $2,395, the TL Audio EQ2 is fairly—though not inexpensively—priced, considering its first-rate performance.

TL Audio, distributed by Sascom Marketing, 34 Nelson Street, Oakville, Ontario, Canada L6L 3H6; 905/469-8080; fax 905/469-1129; Web site: www.sascom.com. ■

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EVENT ELECTRONICS 20/20

BI-AMPLIFIED AND DIRECT FIELD STUDIO MONITORS

If Event Electronics is a name that is not familiar to you now, it soon will be. The company was founded by three former Alesis principals, including Frank Kelly, one of the main designers of the popular Alesis Monitor One and Monitor Two. Event distributes RØDE microphones in the United States, but its first products under the Event name are the 20/20bas (Bi-Amplified System) and the unamplified 20/20 Direct Field Monitors. My tests focused mainly on the Bi-Amplified System, but we'll also look at the unpowered 20/20s.

Given all of the near-field speakers currently available, one might reasonably ask why any company would wish to create more. In the case of the 20/20 Series monitors the answer is simple: At around a grand for the 20/20bas, and $399 for the direct fields, nothing in the price range can touch them.

The 20/20 Series monitors are two-way systems that combine a 1-inch ferrofluid-cooled, silk-dome tweeter with an extended-range 8-inch woofer.

The cabinets are made from ¾-inch vinyl-laminated MDF and measure 10.75x14.75x11.75 inches, a modest size considering their extended range and large acoustic signature. They have a circular "low air restriction" bass port on the front, which is connected to a long tube on the inside. A small green LED on the speaker ring indicates when power is on and flashes when the input is overloaded. All of the components are of high quality, and 16-gauge wire is used throughout. This last detail is important, as far too many manufacturers use wire that is of lower quality than that used to connect the speakers to the mixer or amplifier, creating a weak link at a crucial point in the audio chain. There is no physical or acoustic distinction between the right and left monitors, and they work equally well in a horizontal or vertical position.

On the rear of the cabinet is a substantial metal panel with three trim pots, jacks for input and AC connections, circuit breaker, AC power switch, and graphics illustrating signal flow, boost/cut frequencies, and how to wire XLR and TRS plugs for balanced operation. Because the plate serves as a combination mounting board and heat sink, it can get rather warm during operation. However, I used the monitors for up to seven hours at a time and at no point did the plate get so hot as to actually burn when lightly touched. Still, you may want to think twice before picking them up immediately after a long session.

The input connector has gold-plated terminals and accepts balanced and unbalanced ¼-inch or XLR plugs. There is an input level trim pot that dials in up to 20 dB of padding for hot signals, though normally this control is set at maximum, where a 1.1 VRMS input produces full amplifier output. There are also trims for high frequencies (±3 dB above 2.6 kHz) and low frequencies (±3 dB at 100 Hz, ±2 dB at 400 Hz). All three trim pots are recessed and require a small flathead screwdriver (or the screwdriver-like tool that is included) to turn. The high and low trims are only to be used to make critical adjustments when the speakers are used in a configuration other than the standard behind-the-console, "equal distance triangle," arrangement.

For example, wall mounting may require cutting low frequencies, while pedestal mounting may require boosting them. Once the adjustments are made for a particular listening environment, it should be unnecessary—and undesirable—to change them; hence, the recessed trim pots. I experimented with all three trims, but when I went to return them to their original positions, I realized that the only way to reset them was visually. Center detents for the high/low trims, and incremental notches for the input level trim, would be a big improvement.

I first used the 20/20bas to listen to mixes made using familiar monitors. Then I used them to solo in-

—CONTINUED ON PAGE 213

BY BARRY CLEVELAND

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SOUNDCHECK

NEW SOUND REINFORCEMENT GEAR AT AES

Following a reasonably healthy year in sound reinforcement, the 101st AES show had plenty of newsworthy product introductions for purveyors and users of live sound equipment. Many manufacturers have improved their product-cycle timing, allowing customers to look and listen early enough in the year to make intelligent decisions for the upcoming season. For those too busy to make the trip to Los Angeles, your faithful scribe has the following report on new offerings unveiled at the show.

Lexicon MPX 1 multi-effects processor

Yamaha REV500 digital reverberation unit

Yamaha (Buena Park, Calif.) introduced an SPX-90 for the '90s, the REV500 ($499 list), which uses the same third-generation DSP chip as its ProR3, with 32-bit internal processing and 20-bit oversampling converters. The 100 presets and user programs are broken into four sets of 25 each: Halls, Rooms, Plates and Special Effects. A large LCD graphically shows changes to parameters, and four rotary controls give quick access to four parameters, with others available from a menu structure. A unique feature of the REV500 is the two built-in sound sources, snare drum and cross-stick, that provide an innovative way to audition presets without an external input.

In other reverb news, **Lexicon** (Waltham, Mass.) introduced the MPX 1 multi-effects processor ($1,299 list), which has a wide array of effects combinations and is a guitar player's dream, or a poor man's PCM 80. This user-friendly stereo device has ¼-inch, XLR and S/PDIF connections, and up to five effects can be configured at once.

Soundcraft (Northridge, Calif.) unveiled the K2 console, similar to the K3 but with semimodular construction, allowing for generous pricing: Suggested retail is $9,295 for 24 channels, $10,995 for 32 channels and $12,995 for 40 channels. The EQ has fixed high and low shelving, two swept mids with switchable Q, and a highpass filter adjustable up to 400 Hz. It comes standard with four matrix outputs, four stereo line-level channels with 3-band EQ, plus four additional stereo returns over the subgroups with high and low EQ. Inserts are TRS jacks on stereo and mono inputs, groups and mix outputs. It retains the K3's cueing and talkback facility and the same MIDI mute scene-set, but no MIDI fader. The eight groups and auxes have fader-swap facility for monitor applications, and there is 9-LED metering on all inputs; a VU meter bridge is standard.

Sabine (Alachua, Fla.) had many new offerings in its booth. The FBX-2020 Dual Feedback Exterminator lists for $1,199, $100 less than its predecessor, the 1802. It has improved 20-bit processing and now offers ten filters per channel, as well as an internal power supply. New to Sabine's line are its SDA Series Auto Digital Delays for alignment of distributed speaker systems. Also featuring 20-bit converters, they have an automatic setup mode that calculates and sets the precise delay time for each channel in a few seconds. Each output has up to four seconds of delay with 20-microsecond resolution. A range of configurations is available—1x2, 1x4, 1x6, 2x4 and 2x8—with list prices ranging from $700 to $1,700. The biggest news, however, was the ADF-4000 multipurpose programmable equalizer ($1,700 list). Incorporating features from previous products, it has 12 parametric filters per channel, any number of which can be used as adaptive FBX filters for feedback control; stereo 31-band graphic EQ; and an RTA. The graphic EQ has the same automatic room equalization setup as the REAL-Q, which allows users to quickly tune a system to a specified response curve. This Multi-Function EQ (MF-EQ) has something for everyone and will allow, for instance, users to pretune their systems using parametric filters and then easily adjust for room modes and for taste on a daily basis.

Symetrix 531E 31-band graphic equalizer

Symetrix (Lynwood, Wash.) introduced the 531E two-space, 31-band graphic equalizer. At a list price of $579, Symetrix went back to the drawing board to incorporate an advanced filter topology

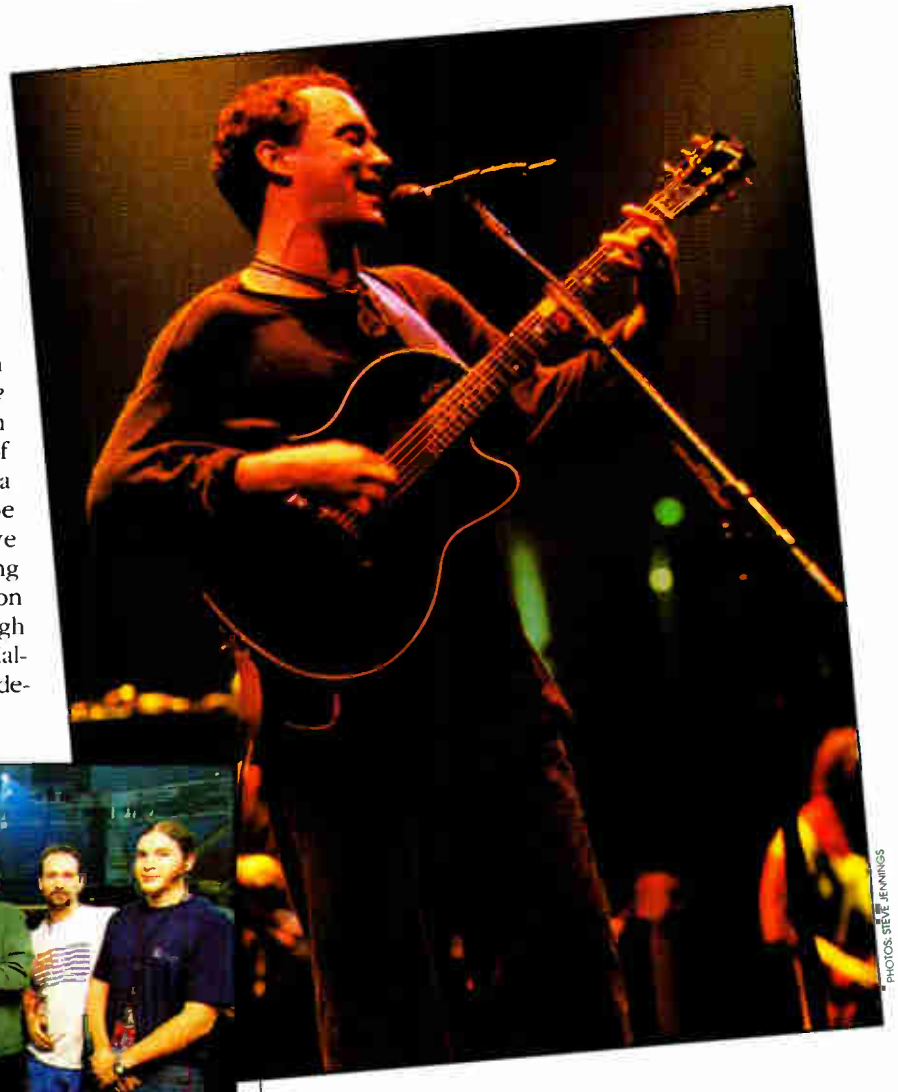
—CONTINUED ON PAGE 142

BY MARK FRINK

World Radio History

A STAGE-EYE VIEW OF THE DAVE MATTHEWS BAND

With a unique lead vocal and Chet Atkins guitar, accompanied by violin, saxophone and backed with bass and drums, the Dave Matthews Band is the closest to a bohemian musical lineup on the circuit today. After releasing an independent live record, *Remember Two Things*, in 1993, the band signed with RCA and recorded two enormously successful albums with Steve Lillywhite, *Under the Table* and last year's multi-Platinum *Crash*. Matthews, a beneficiary of the second-generation, post-Garcia Deadhead audience, seems to be advancing the new alternative acoustic-pop, so perhaps it's fitting that they've also inherited a portion of the Dead's sound system through the services of UltraSound, perennially on the vanguard of innovative design and quality concert sound.



PHOTOS: STEVE JENNINGS

L to R: Owen Orzack, monitor systems tech; Jeff Thomas, FOH engineer; Ian Kuhn, monitor engineer; Glenn Carrier, systems tech; Lonnie Quinn, systems tech; Lyle Eaves, FOH systems tech

BY MARK FRINK

Jeff "Bagby" Thomas has been with Matthews since the beginning, six years ago. He mixes on a Gamble EX 56 using 33 inputs from the stage; tucked underneath the console is a recording rack with 32 API 212 mic preamps in three L200 frames, along with four Tascam DA-88 decks. Effects include a TC Electronic M-5000, an M-2000 Wizard, two TC 2290 delays and an Eventide H3000 D/SE. All inserts are Aphex, with a dozen 651 Expressor compressors used for everything but the drums, where five Aphex 622 gates are used.

Grateful Dead veteran Glenn "Chub" Carrier is in charge of the stage-right side of the P.A., and Lonnie Quinn takes the left, but the entire crew enjoys an easy camaraderie as they collaborate throughout the day. The main speaker hang is two rows of four Meyer MSL-10 speakers, powered with Crest 8001 amps. Three MSL-2s are under-hung for down-fill and powered with Crest 7001 amps, as is everything else in the system. In typical UltraSound fashion, eight Meyer 650 double-18 subs are stacked to each side of the mains in a 20-foot-high line array using a chain motor. Ex-Blind Melon engineer Lyle Eaves is the

World Radio History

FOH tech and uses a Meyer SIM II system and a rack of CP-10 parametrics to equalize the system. East Coast shows have such high demand that they are sold with 360-degree seating, and there are several dozen MSL-3 speakers used to wrap the stage in two side clusters and a rear center cluster.

Ian Kuhn shares the monitor duties with UltraSound crew chief and monitor tech Owen Orzack, mixing on an FOH EX 56 that has a center control section and is split in half to provide separate stereo mixes from the faders for two in-ear mixes. While the rest of the band listens to monitors, violinist Boyd Tinsley and sax player Leroi Moore have been fitted by Michael Santucci with Sensaphonics' new Pro-Phonic 2x two-way in-ear monitor transducers, using Garwood's Radio Station transmitters. This recent change from wedges solves two problems: Tinsley's wedge volume was very loud, with his violin having significant amounts of spill into other areas of the stage; Moore's levels, on the other hand, were low enough that the on-stage volume was masking them and making it hard to hear his sax. The in-ear mixes addressed both problems nicely. "It really cleaned up everything onstage," Orzack comments, "putting both mixes right where they need to be: in their ears."

Each side of the Gamble has extra mic inputs (the "Ultra" mod), and 12 additional line-level inputs are used to cue the mixes, since the graphics aren't inserted. "We looked at several other consoles, but the Gamble won easily for sonic quality," Kuhn says, "and Jim Gamble is always on the other end of the phone if we have any questions." The other monitor mixes are generated from the Gamble's auxiliary buses.

All of the floor monitors onstage are Meyer USM-1 "stealth wedges," and Matthews has three in front of him, with the center used for a band mix and the outside pair for his voice and guitar. Another wedge behind him duplicates the center mix at a higher level. All the wedges are EQ'd with BSS FCS-926 Varicurves, with 12 filters available for Matthews' outside wedges and up to six filters for the other mixes. The drum mix is heard through two of the new Meyer CQ-2 two-way self-powered speakers used in a "Texas headphone" configuration, plus two MSW-2 single-18 subs, augmented with a pair of Aura "shakers" mounted under the drum throne. "The shakers give us a lot of impact in the drum mix; that means we don't have to drive the subs quite as hard," Kuhn explains. "The CQ-2 has a nice, tight pattern that keeps it out of the drum mics." There are also a pair of MSL-4s used for support act sidefills, as are additional stealth wedges.

The mic list is also somewhat unusual. Matthews sings into a Bruel & Kjaer 4011 with a custom windscreen. "UltraSound's plan from several years ago was to use 4011s with in-ear mixes," Kuhn says, "but at the levels we're running his wedges, it works great in spite of the fact that it's only a first-order cardioid." Tinsley sings into a Neumann KM-84i, and drummer Carter Beauford sings into a Crown CM-310 differoid. A CM-310 is also used for Moore's vocal and doubles as his flute mic. "The differoid gives us great rejection and isolates the sound source," Kuhn explains, "and Beauford definitely likes his vocal screaming." Moore's saxes are miked with two more B&K condensers, which go through API 512 mic preamps and then into two M-5000

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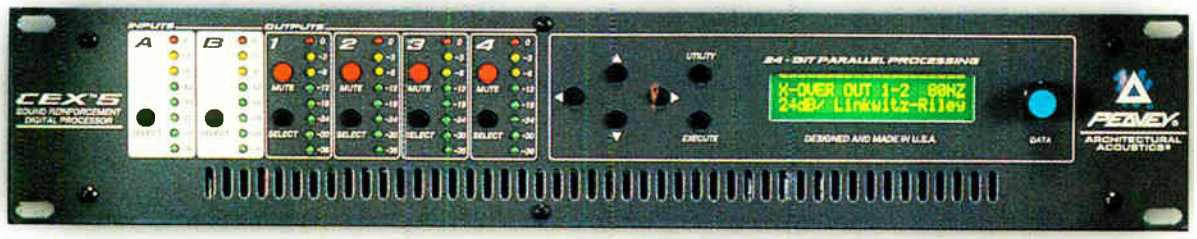

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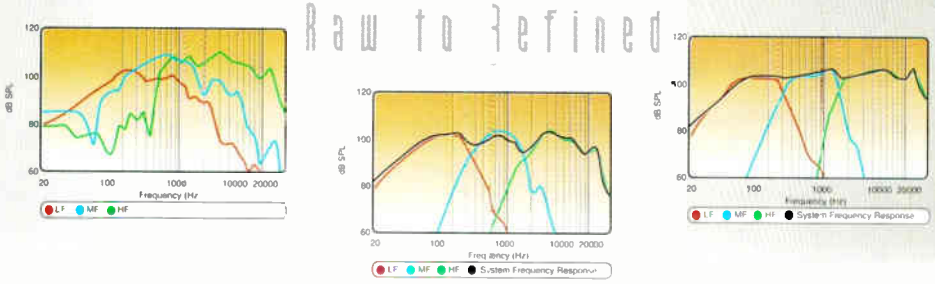

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reverbs. A TC Electronic ATAC at the monitor console is used to remotely change presets on the M-5000s for different songs, mainly pitch change and fattening, plus reverb, and Kuhn uses FileMaker Pro on his Powerbook to print a list of these cues from each night's set list.

The eclectic mic list continues with a pair of B&K 4012s in an X-Y configuration for drum overheads, going through a high-voltage Millennia Media HV-3 mic pre—these are used for most of the drum sound in the in-ear mixes. Other drum mics include Audio-Technica's ATM-25 used on the kick and the floor tom, as well as for miking the bass rig. "It's the best-sounding dynamic for the money," Kuhn says. "We tried them up against some more popular models, and we can have just about anything we want out here." The rack toms are miked with Ramsa S-2 miniature condensers. On snare, Milab LM-25s are used top and bottom. "They would normally be used for vocals, but we just grabbed a bunch of Ultra's better mics, and these sounded best on the snare," Kuhn says. High-hat and splash cymbals have A-T 4050 condensers in shock-mounts, and an AKG 414 is used on the wood block.

To imitate the electric sound provided by Tim Reynolds on certain songs from the record, Matthews' guitar is split and goes to a Fender Deluxe Reverb that's sealed in an iso-box and miked with a Beyer M-700. Everyone onstage seems to have an Eventide GTR 4000 in their rack, used as the ultimate effects pedal. Stefan "Lizard" Lessard's bass rig, adorned with plastic lizards, is a small P.A. in itself, with two Meyer subs and two MSL-2 tops. He and Matthews both have CP-10 EQs in their racks, and Orzack mentioned that they regularly use the SIM machine to check the bass rig and the two USM-1 wedges in front of the drum riser that are part of Matthews' acoustic guitar rig.

We caught an enjoyable, relaxed performance at Portland's Rose Garden that featured what is already a trademark sound. It's refreshing to meet an artist who blends with the band and enjoys hanging with the crew. Perhaps that accounts for the obvious enjoyment of the life they lead, even after a couple of grueling years on the road. Fans can look for Matthews this month in theaters and on college campuses with Tim Reynolds on an intimate acoustic duo tour having even more fun. ■

—FROM PAGE 138, AES GEAR

that claims low distortion and noise specs. Double-sided glass epoxy circuit boards, 60mm metal-shaft sliders and gold-plated XLRs hint at the quality this graphic incorporates into its heavy-duty steel chassis. Features include adjustable 12dB-per-octave highpass and lowpass filters and a gain control that goes from completely off to +15 dB. Also introduced was the 532E, a stereo two-space 31-band graphic with 20mm sliders that lists for $699.

CableTek (Port Coquitlam, B.C.) introduced the JD-4 ($899 list), a rack-mount 4-channel version of its highly acclaimed JDI ($239 list). Developed by a team of Vancouver's top engineers,

CyberLogic NC-400 Series Power System

these rugged DI boxes feature Jensen transformers, a 15dB pad, a supersonic filter and flat response to 80 kHz.

CyberLogic (San Rafael, Calif.) launched the NC-400 4-channel, four-rackspace amp, based on its 8-channel NC-800 Series. Using the same power channel modules, the new amp provides either 1,200 watts or 700 watts into 4 ohms, depending on the modules. The NC-412 lists for $6,800; the NC-407 lists for $5,650. Also shown was a new Class AB power module, the NC-005, which provides 375 watts into 4 ohms and over 500 watts when used in an 8-channel frame. Customers will be able to mix power channels to fit two 1,200-watt channels, a 700-watt and an A/B high-frequency channel into a 4-channel package, for example.

QSC (Costa Mesa, Calif.) introduced several new amps in its PowerLight line. The PowerLight 8.0 is a four-space amp that will put out 4,000 watts per channel into 2-ohm loads. The back of the chassis is loaded with four fans, and the front is entirely vent except for the knobs and switch. Another new PowerLight is the 3.4 ($2,998 list), which is a de-rated 4.0 with an Edison instead of a "range plug" for its AC connection. The two-rackspace PowerLight 2.0 ($2,148

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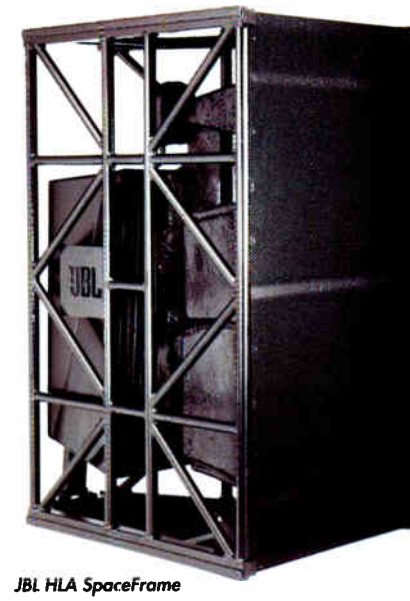
list) produces 650 watts at 8 ohms. Under development are three more models, two intended for bi-amp applications, with a high-power channel, a lower-power HF channel and a crossover, plus a mono-block amplifier, all in a two-space chassis.

The newest amp from **Peavey** (Meridian, Miss.) is the CS 800S ($899 list), which replaces the venerable CS 800 and is rated at 400 watts into 4 ohms.

AuraSound (El Segundo, Calif.) dropped the price of its high-power 18-inch subwoofer transducer to $1,000. They also introduced a new 50-watt bass shaker, the AST-2B-4, which lists for $120. In other transducer news, **TAD** (Long Beach, Calif.) introduced the TD-4003 compression driver ($1,710 list). It has a neodymium magnet, a new 5-slit phase-plug and a 1.5-inch throat, and the terminals connect directly to the 4-inch beryllium diaphragm. TAD's 1-inch compression driver has been similarly re-engineered.

Radian's (Orange, Calif.) 850 ferrofluid-compatible 100-watt RMS compression driver ($530 list), in production for OEM clients for a year, is being offered to retail customers. Available in versions with 2-, 1.4- and now 1.5-inch exits, it is available in 8- or 16-ohm versions, with the replacement 3-inch diameter diaphragm listing for $120. A new low-cost 2-inch compression driver, the 650 ($280 list), uses the same parts, but a smaller magnetic structure is also ferrofluid-compatible. Radian is working on a high-power replacement diaphragm for the TAD 4001 and 4002 compression driver, using Radian's Mylar surround to reduce second- and third-harmonic distortion and stress fractures. List price will be around $350.



JBL HLA SpaceFrame

Perhaps the biggest story of the show was **JBL Professional**'s (Northridge, Calif.) debut of its Horn Loaded Array (HLA)™ Series large-format touring speakers, which improve on technology developed for the AALTO system. The HLA 4895 three-way horn-loaded enclosure ($7,500 list) uses a 14, a 10- and a 2-inch compression driver, the new 2451SL, all mounted on a single Optimized Aperture™ multiband waveguide, providing a nominal dispersion of 40 degrees horizontal by 30

Many manufacturers have improved their product-cycle timing, allowing customers to look and listen early enough to make decisions for the upcoming season.

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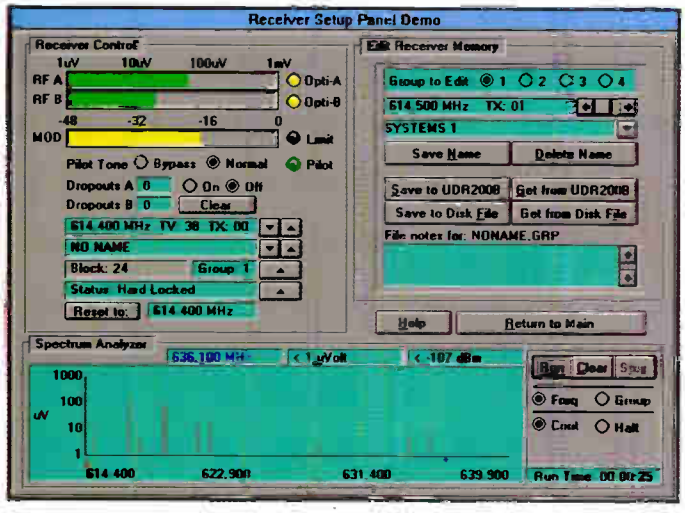

The UDR200B receiver is supplied with LecNet™ software to run under the Windows® operating system. The control panel for an individual receiver shown here includes indicators of present receiver settings and levels, an edit section to make changes, store and retrieve files, and a spectrum analyzer section that provides a spectral plot of the tuning range of the receiver.

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degrees vertical. Using JBL's patent-pending SpaceFrame™ technology, the traditional wooden cabinet structure is replaced with a lightweight, tubular, trapezoidal frame, housing the waveguide speaker. The entire waveguide can be tilted up 15 degrees; downward tilting is accomplished by inverting the speaker. The HLA 4895 measures 52 inches tall and weighs only 210 pounds, so a 16-element array can be flown with two 1-ton motors. JBL's new DCD™ lightweight speaker technology is at the heart of the HLA system. The DCD 14- and 10-inch transducers use a completely new topology, with a neodymium magnet actually inside the dual voice coil, and heat-sink fins on the back to increase thermal transfer. These fins are vertically aligned for passive "chimney effect" cooling. The companion 4897 dual-18 subwoofer ($3,990 list) is the same size, weighs 240 pounds and uses a carbon-fiber/honeycomb composite enclosure and a new port design to increase output by up to 6 dB below 50 Hz.

Turbosound (Middleton, Wis.) introduced a new line of speakers called the HiLight. The three-way bi-amp THL-4 ($3,949 list) has a folded TurboBass™ 18, a 10-inch horn-loaded, next-generation TurboMid™ device covering frequencies from 180 to 4k Hz, and a 1-inch compression driver. It has a nominal coverage of 55° (H) by 40° (V) and a sensitivity of 105 dB (1W/m). The enclosure measures 40x22x28 inches and weighs 200 pounds. Also in the HiLight line is the THL-811 mid-high enclosure ($2,401 list), which is the top half of the full-range HiLight and weighs 79 pounds. It is also available in a skeleton version, without the wooden enclosure, for installations ($1,866 list). The bottom half is available as the THL-818 ($1,886 list), and a double-18 version, the TLH-828 ($3,225 list), is 45 inches tall.

Martin Audio (distributed by TGI North America, Kitchener, Ontario) introduced a new compact version of the

QUICKTIPS

From the Mailbox of Andrea Taglia, Terni, Italy, "via aerea":

"I am an Italian sound engineer, subscriber of *Mix* magazine, where I always read your interesting reports as well as the 'Quick Tip,' where I often find useful suggestions. I have some tips, as well. I hope they are original.

"When I use a wireless mic bodypack on a dancer's body, I often get in trouble with sweat, so I use some plastic film (like the one normally used to cover food) over the transmitter.

"Always with heavy-sweating guys I use a small silicone tube over the Sennheiser MKE2 capsule so that sweat can't come in and alter the sound or destroy the mic.

"Same kind of silicone tube I use with Samson bodypack, but this time on the plug that connects the mic to the bodypack to stop it from unplugging.

"When I am working in theaters or in clubs with highly reverberant surfaces, or where I need precise direction of the horn beam, I use a Plexiglas triangle with the same horn angle (one triangle for horizontal and one for vertical dispersion) that I put on top (for horizontal measure) or on the side (for vertical measure) of the loudspeaker; then I use the beam of a laser pointer (the cheap ones available for conference use) to see where in the audience the horn beams are going—for better positioning of the loudspeakers.

"For monitoring, sometimes I have to use headphones, and it is often difficult to follow musicians' volume requests from song to song. So I have found an inexpensive volume control, Sennheiser HZR6, that has a male jack, 6 meters of cable and a small box at the end with a stereo/mono switch and separate fader volume control for left and right, to go with a stereo female jack for headphones. This way all the musicians can change volume by themselves.

"I hope that any one of these tips can be useful. Best Regards."

Grazie, Andrea! Any other QuickTips? Coming through the Rose City (Roseland Ballroom or the Rose Garden) on tour soon? Drop me a postcard or a line. My new address is 625 NW Everett St., Suite 111, Portland, OR 97209, or call 503/223-2345. ■

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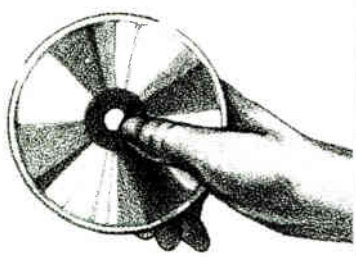

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Wavefront 8. The Wavefront 8C ($3,090 list) is a horn-loaded enclosure with a 12 to cover frequencies from 120 to 850 Hz, a 6.5-inch cone driver and 1-inch compression driver that takes over at 3,500 Hz. It weighs 157 pounds, measures 22x32x36 inches, including wheels, and has a nominal dispersion of 55° (H) by 30° (V). Its internal passive HF crossover allows it to run bi-amp, or it can be switched to tri-amp operation. Its companion folded-horn subwoofer, the WSX ($2,268 list) measures 42 inches tall and deep, 22.5 inches wide and weighs 212 pounds.

Meyer Sound Labs (Berkeley, Calif.) introduced two new self-powered speakers. The PSW-2 ($4,500 list) is a dual-15 enclosure with identical dimensions to the MSL-4. The dimensions of this flyable subwoofer allow it to be arrayed with MSL-4s and conveniently fit into the truck pack. The second new speaker is the PSM-2 self-powered floor monitor ($6,400 list), a two-way enclosure with a 50° conical waveguide, a 12-inch woofer and two angled sides for either vertical or horizontal orientation.

BGW (Hawthorne, Calif.) introduced its Millennium Series of amps, designed to meet the new European safety standards that come into effect this year. Three models, rated at 100, 200 and 300 watts at 8 ohms, list for $699, $899 and $1,249, respectively, and are all under a five-year warranty. These three-space, Class AB amps use the same circuit boards found in BGW's Performance Series and can be fitted with optional autoformers.

The FDS-355 OmniDrive Compact from **BSS** (Nashville, Tenn.) is a single-rackspace processor with three inputs and five outputs—more than half an OmniDrive in half the space. It borrows many features from the original FDS-388, including storage to PCMCIA cards, and lists for $2,949. Typical applications include stereo two-way systems with a mono sub, or a mono five-way system,

BSS FDS-355 OmniDrive Compact processor

NEWSFLASHES

Audio Analysts has been out this winter with tours by Bruce Springsteen, Wynonna, Alan Parsons and Status Quo...**Snow Sound** recently relocated to a 12,500-square-foot office/warehouse space in Berlin, CT. The firm can now be contacted at 860/828-8825; fax 860/828-8573...An EAW speaker system was installed in the **Oakdale Theatre** (Wallingford, CT). North American Theatrix did the installation, which includes a top row of KF853s and a BH853, a second row of SB850s and, below that, four KF850s. An All-EAW system was also installed in the new **Lee Greenwood Theater**, situated at the edge of the Great Smoky Mountains National Park in Kodak, TN. This install was by Ken Porter of Spectrum Sound... **Clair Bros.** provided gear for '96's Jars of Clay tour. Front-of-house engineers used a Yamaha PM4000 console and processing gear from Pre-Sonus, Lexicon, dbx, TC Electronic, Eventide, Summit and Aphex...A new production of Andrew Lloyd-Webber's *Sunset Blvd.* opened in Australia in the fall at the **Regent Theatre** (Melbourne). Sound equipment, including a 72-channel Cadac J-Type console, is provided by local company **System Sound**...The U.S. tour of the Irish musical *Riverdance* is carrying gear from **dB Sound** of Des Plaines, IL. Equipment includes 32-channel DDA CS3 and 40-channel DDA QII consoles and an EV DeltaMax speaker system provided by **Mikam Sound** of Dublin, Ireland...**Stage Accompany** reports installations of its gear at clubs in the Flanders Street Brew Pub in Portland, OR, and the Cafe Iguana in Fort Lauderdale, FL. ■

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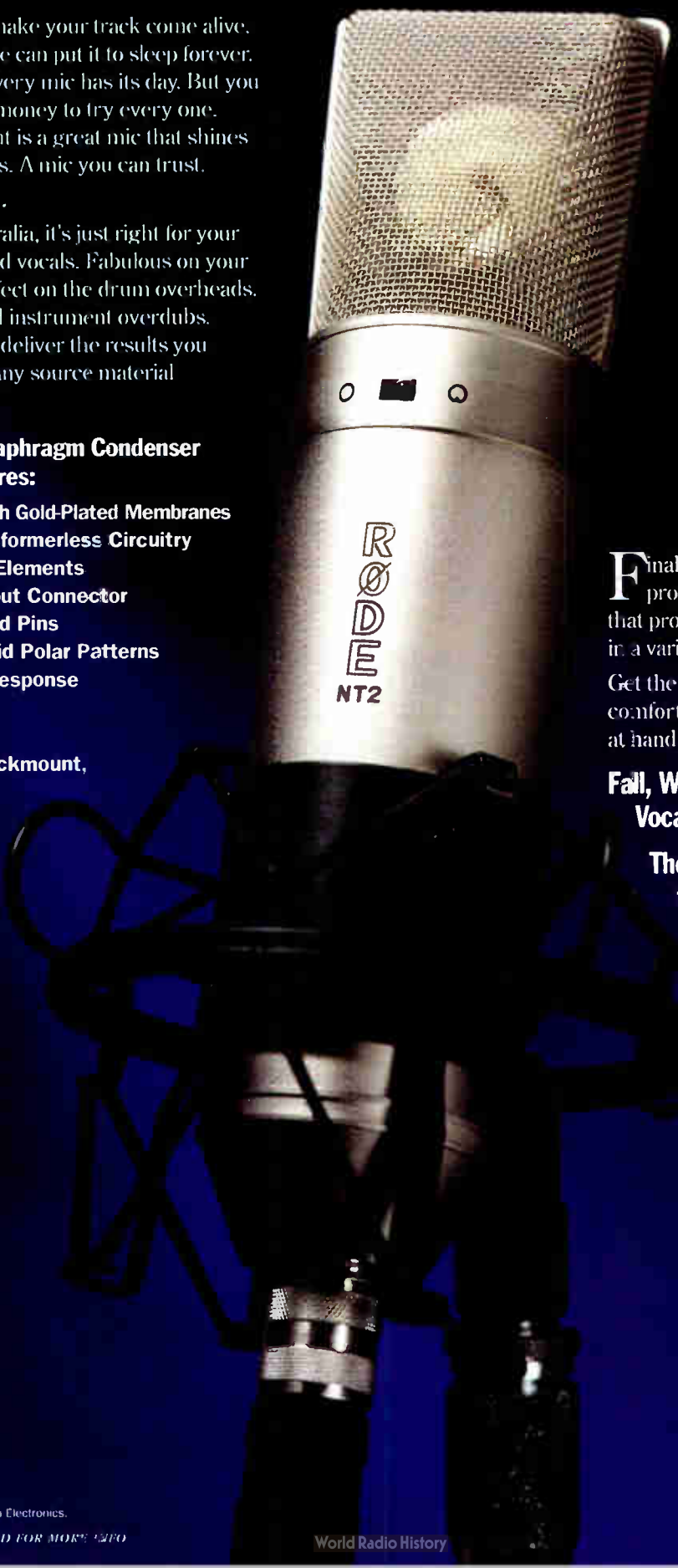

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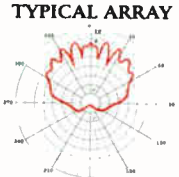
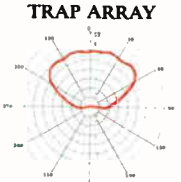


Problem: Three typical 60°/1 cabinets in tight-packed array. Severe lobing problems.

TRAP ARRAY



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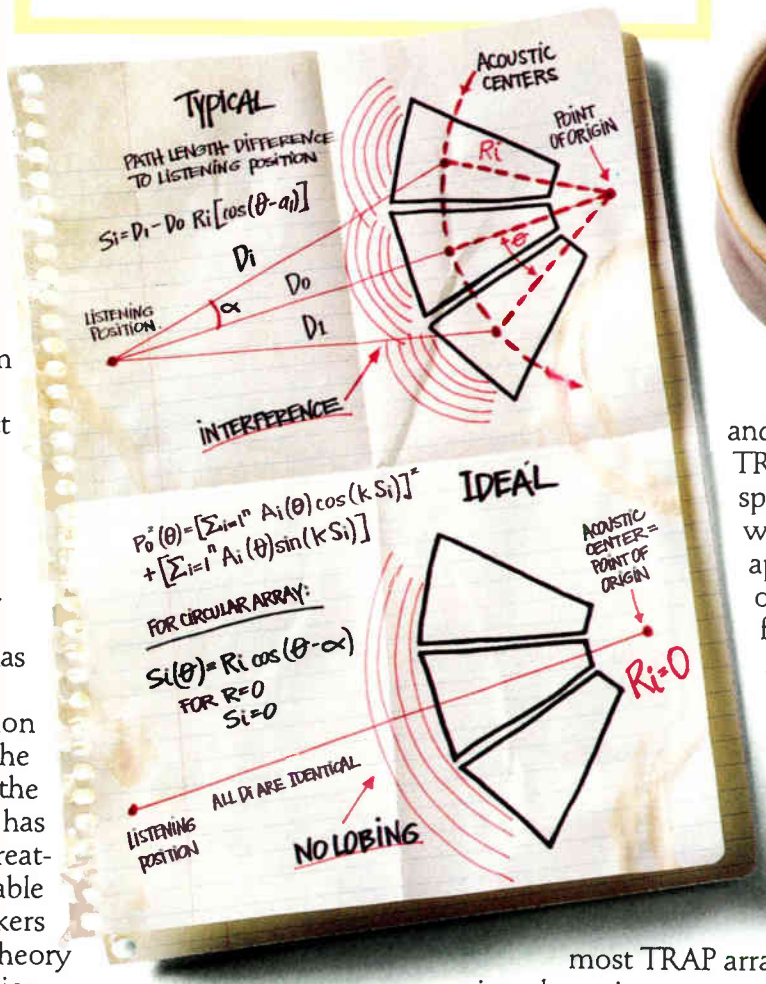

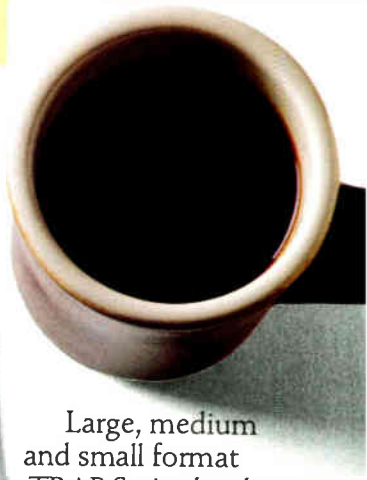

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World Radio History

both with the option of driving the subs from a separate input. It has new 24-bit A-to-D converters, faster limiters and automatic phase correction; 48dB-per-octave slopes are possible. This processor should answer the demands of touring and specialty applications that weren't quite addressed by the original OmniDrive.

In SR microphone news, Sennheiser (Old Lyme, Conn.) introduced the MD-425, a supercardioid dynamic for speech and vocals that lists for under $400 and uses a similar capsule to that found in its MD-5005 handheld wireless. This mic has been designed with low handling noise, good feedback rejection and a lockable on-off switch.

Beyerdynamic (Farmingdale, N.Y.) introduced the MCE 7 omnidirectional micro-lavalier, which is about the size of a match and comes in black or pink. Audio-Technica (Stow, Ohio) was showing its new 4041 cardioid condenser ($395 list), which is essentially a 4051 without a changeable capsule.

AKG (Nashville, Tenn.) introduced two low-cost dynamic mics. The D 770 is a cardioid intended for both vocals and instrument applications, and the D 880 has a supercardioid polar response for greater feedback rejection. They list for $120 and $132, respectively, and the 880 is also available with a switch for $145. AKG uses a new manufacturing process that allows the diaphragm to be fabricated at varying thicknesses. They use neodymium magnets for high output and a patented antivibration system to reduce handling noise.

From the looks of this show it's going to be a good year if the swine in D.C. can keep the economy on track and the Movers and Shakers in our industry can concentrate on products and entertainment that people want.

Well, dawn is coming up and I can hear the rumble of early morning buses under my window at the L.A. Biltmore. Father Guido Sarducci was right on the mark about building that bridge to the future. From the looks of this show it's going to be a good year if the swine in D.C. can keep the economy on track and the Movers and Shakers in our industry can concentrate on products and entertainment that people want. I have less than an hour to toss a 3.5-inch disk under Petersen's door and get my butt to LAX where one of Boeing's finest will take me back to Portland, where a barrista can hand over a double-tall-skinny-almond-mocha in less time than it takes to order one. If I didn't bump into you at the Winter NAMM, then I guess it'll be the NSCA in, where? Charlottesville, now that's a coffee town! Make mine with wings. ■

Mix sound reinforcement editor Mark Frink can be found at most trade shows with his trademark Sharpie, mini-Maglite and screwdriver attached to his lanyard.

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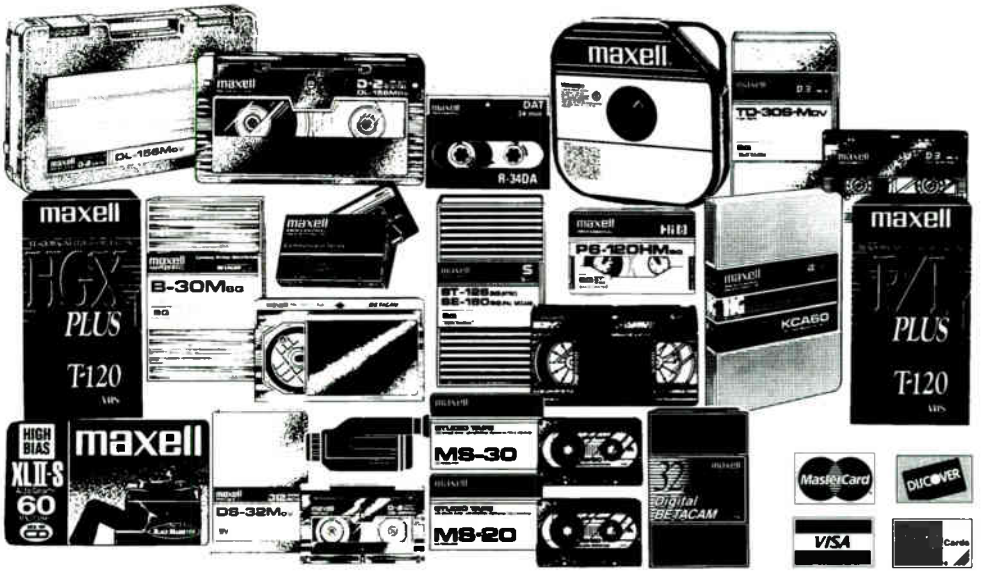

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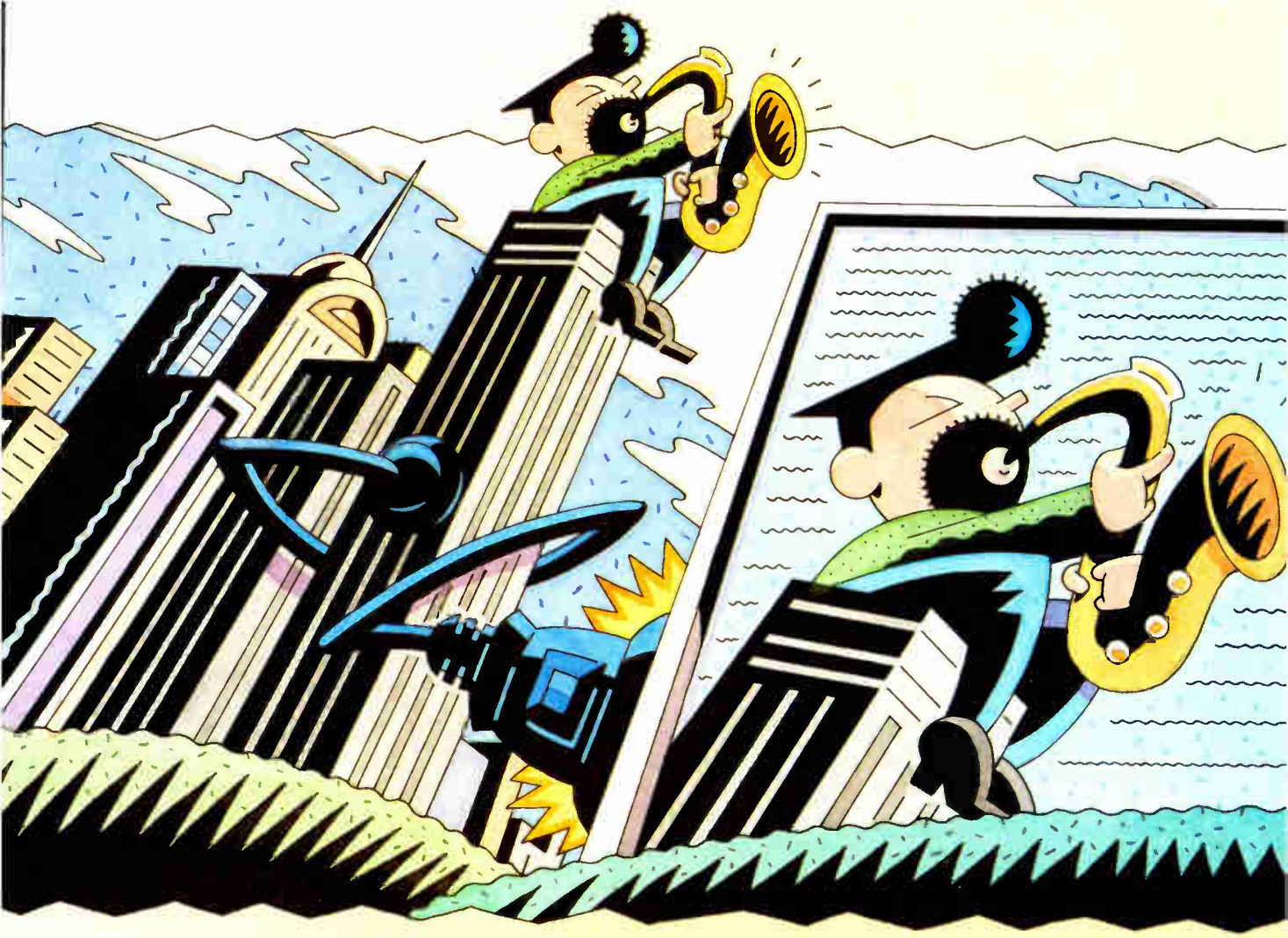

KNITTING FACTORY DEBUTS THE

VIRTUAL STAGE

INTERACTIVE BROADCAST PERFORMANCE COMES TO THE INTERNET

BY EVAN AMBINDER

The digital revolution has already earned its place in the audio recording history books. Chapters on "Modular Digital Multitracks," "Digital Audio Workstations" and "The Compact Disc" are evidence of the extent to which digital ones and zeros have transformed how we create and experience recorded sound. But how has digital audio technology affected live sound production and performance? Aside from the digital effects processors and ADATs humming alongside the FOH mixing board, and the synthesizers, samplers and guitar effects racks blasting away onstage, digital technology has not

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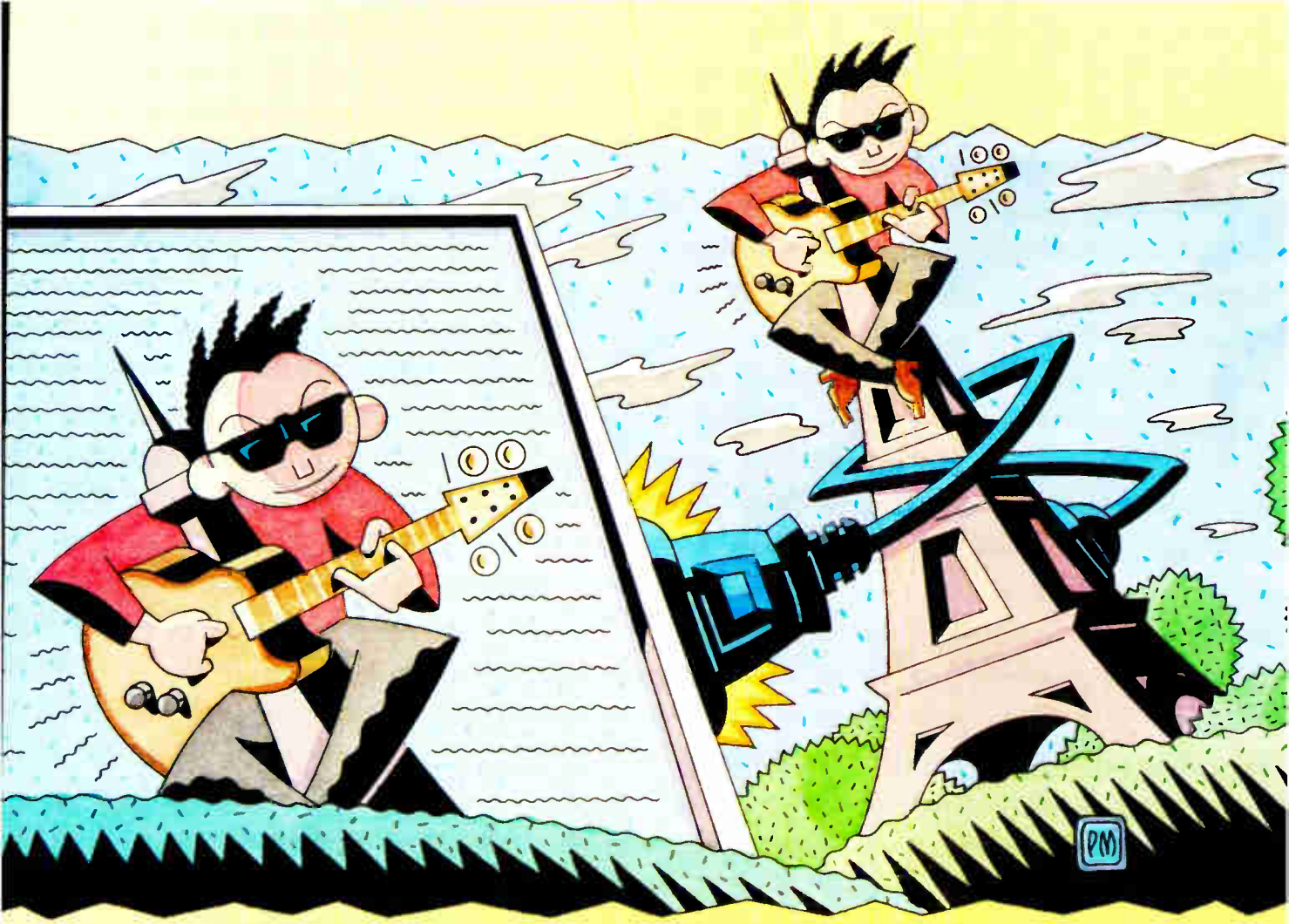

Illustration by Paul Moch

yet revolutionized how musicians perform or an audience hears live music. Thanks to the Internet and high-speed phone lines, though, new applications are beginning to surface.

This past July, Knit-Media—a division of New York's Knitting Factory, the music club and record label that is home to the avant-garde/free jazz/downtown music scene—debuted "V-Stage," or Virtual Stage. For the first time, two groups of musicians, separated by 4,000 miles, performed together in front of audiences at their respective venues and on the Internet. Using ISDN phone lines, audio codecs, a PictureTel 4000 video-conferencing unit and a Xing computer system running Streamworks, the Knitting Factory broadcast audio and video between New York and four European sites over seven nights, enabling the musicians to play together in real time while the audio and video from both stages was combined to create a virtual stage in cyberspace.

"A virtual stage is a stage made of bits vs. a stage made of atoms," says Michael Dorf, the Knitting Factory's owner/director. "At the Knitting Factory, our stage is [made of] atoms. We've got sand underneath it. We've got wood and carpeting. That's a real stage. From there, we take the camera and microphone and essentially digitize the sound and video to create a virtual stage onscreen."

Thanks to creative audio routing and mixing, as well as blue screen imaging technology, audiences at both venues could hear the combined audio through the clubs' respective P.A.s and watch the performers playing at the other venue on an onstage projection screen. Concurrently, Internet viewers logging on to the Knitting Factory's Web site (www.knittingfactory.com) were able to hear a mono audio mix of all the musicians and watch a superimposed video image of both groups performing on a virtual stage.

The shows featured a combination of saxophonist Briggan Krauss and guitarist Brad Schoeppach of the band Phone Tag performing at the Vienna Jazz Festival, the North Sea Jazz Festival and the Paris Festival, while drummer John Mettam and bassist J. Grannelli jammed with them from New York via ISDN phone lines.

"You essentially take five ISDN lines—two are committed to audio and three are committed to video," Dorf explains. "The two audio lines are processed through Dolby AC-2 codecs, which have a 20-bit processor. That's the same one that the Frank Sinatra *Duets* album was made with. Then the video goes through a PictureTel."

Although the AC-2s produce an encoded 20-bit, 48kHz stereo audio signal, by the time the audio had been data-compressed for ISDN transmission and then decoded for playback, it came out of the P.A. system sounding close to FM quality. The Internet

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broadcast output a 16-bit, 8kHz mono signal. "You can run it in stereo, but it's much lower sound quality," pointed out Brett Heinz, chief engineer of the Knitting Factory, who also helped install and troubleshoot V-Stage's elaborate audio and video network.

The live audio feed for all V-Stage shows began at the Knitting Factory, where the drums were miked with a pair of Beyer MCE 83s overhead and a Beyer M88 on the kick. The bass went direct, and the crowd was captured by two Crown PZMs. Mixing engineers Adam Omeljaniuk and Max Lambert, who alternated mixing front-of-house on an Allen & Heath GL3, combined the drums and bass with a return stereo feed of Krauss' saxophone and Schoeppach's guitar. Two Meyer Sound MTS-4 self-powered cabinets and two MSW-2 subwoofers powered by a Crown MacroTech 2400 amp pumped out the house mix. For sweetening, Omeljaniuk and Lambert used a simple effects setup: an Alesis MidiVerb II and a dbx 160 compressor.

The GL3 also output a split feed to three Meyer UPA-1s and a USM-1 wedge for monitoring, as well as to the Knitting Factory's recording studio downstairs, where Heinz mixed the drums, bass and audience mics on a Mackie 32x8, creating a stereo mix for Europe and a mono mix for the Internet's Virtual Stage. Heinz's processing options were more extensive than those for the FOH mix: a Lexicon LXP-1, Sony DPS-R7, Korg SDD-1200, Symetrix expander/gate, UREI limiter and a Joe Meek compressor. Monitors were a pair of Meyer HD-1s.

Heinz's stereo mix of Mettam, Grannelli and the Knitting Factory crowd went from the Mackie to a Dolby AC-2 encoder and then out to an Ascend Multiband Plus, which interfaced the audio with two of the five ISDN phone lines. (An Optimus Promptus was used to transmit the video coming from the PictureTel video-conferencing unit over the other three ISDN lines). In Europe, another Ascend Multiband Plus and Promptus received the respective New York audio and video feeds, and sent the audio to a Dolby AC-2 decoder, which output a stereo analog signal of Mettam and Grannelli to that site's FOH mixing board. The video signal was sent to another PictureTel unit, which transmitted the corresponding New York video to that site's video projector.

Although each European venue provided its own sound reinforcement, they all were equipped with a rig consisting of two Dolby AC-2 codecs, PictureTel 4000, Multiband Plus and Promptus which traveled with Krauss, Schoeppach and their road crew. *Mix* spoke with Herbert Kopecky, technical manager and FOH mixing engineer at Szene Wien in Vienna, about his club's V-Stage sound reinforcement and routing setup. Kopecky took the New York stereo feed from the AC-2 decoder and mixed it along with Krauss' saxophone and Schoeppach's guitar on an Amek Recall by Langley. Krauss' saxophone was miked with an AKG D3600, while Schoeppach's guitar was miked with an AKG C-535. Kopecky also used two channels on the Amek for returns from an Eventide Harmonizer, for pitch shifts on Krauss' saxophone, and four channels for returns from two Lexicon PCM 70s, which added different reverbs to guitar and sax.

"Compressing the signals was essential because of the poor dynamic range of ISDN compared to the dynamics of a Meyer Sound system," Kopecky recalls, "so we also used some Symetrix 525 compressors." He then split the final output mix between four Meyer MSL-4 and four Meyer 650-P speakers for FOH and, via a Soundcraft SM12 board, to Meyer UM-1C floor wedges and UPA-1C sidefill monitors, and also to a Dolby AC-2 encoder. Both the FOH and monitor speakers were powered by Crest 5850 power amplifiers.

Back in New York, Heinz received the European stereo audio feed from the AC-2 decoder, mixed it with the stereo mix he had already created of Mettam and Grannelli in New York and created a mono mix of both feeds for the Xing computer system input. The Xing created an 8kHz, 16-bit mono audio signal and output that went—along with the near-full motion video signal coming from the PictureTel 4000—to a Unix workstation, which put the production broadcast out on the Internet. "I could switch between an outboard stereo mix and what it sounded like in mono coming off of the Internet. There's about a 30-millisecond delay between the two signals, so I just used the switching as a reference," Heinz explains.

One of Heinz's biggest technical challenges, besides routing and mixing audio for three simultaneous stages, was overcoming the 20ms delay inherent in ISDN transmission. "The other band can still basically play in time. The delay becomes apparent, though, when [the audio is] fed back to the

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original band, which hears a 40-millisecond delay. The musicians compensate by having one or both of the bands listening on headphones. You also try to optimize the position of the monitors and use dynamic mics to cut down on any bleeding," Heinz says. In addition, Kopecky compensated for the 40ms delay by putting Aphex 612 noise gates on the stereo inputs coming back from New York.

Dorf credits the Electronic Cafe Network in Los Angeles with the original concept of using ISDN lines to broadcast audio and video: "These two geniuses, Kit and Shari, have been doing video conferences of art events for 20 years. No one's ever heard of them...They never did streaming, but what they did do is point-to-point events. They would go Santa Monica to the Kitchen [in New York] or London using some codecs and the PictureTel. They would do poetry and dance and some music...The breakthrough came when we did an event called Global '95 with MCI. That was just a demonstration of the ability of going point-to-point, and they [MCI] used the Knitting Factory. We struck up a relationship. Next thing you knew, we were fully wired by MCI and we got a PictureTel. And the people from Dolby said, 'Wow, you guys know how to put on events.' All of a sudden they realized there is a potential application here. The concept of streaming and the V-Stage is sort of our invention because we were looking at ways to reach masses, being this conduit [for musicians]."

With Internet growth still exploding, the future is bright for live point-to-point music broadcasts and jams. According to Dorf, "People are starting to do streaming more and more, so the application for V-Stage in the future is pretty remarkable. Imagine sending a remote crew who's got one of these huge satellite dishes to the Master Musicians of Joujouka in Morocco and setting up in their medina in Fez to send the signal up to 30 musicians jamming with Ornette Coleman in New York City, and it's being shown live in Central Park on a huge screen. All of a sudden, you can start having concerts with anybody for anybody. It's absolutely unlimited." ■

Evan Ambinder is a Mix *contributing editor who regularly submits his text via cyberspace. He would like to thank Michael Dorf, Brett Heinz and Jonathan Berridge for their assistance with this article.*

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SENNHEISER UHF WIRELESS MIC RECEIVERS

Sennheiser (Old Lyme, CT) has introduced two new UHF true-diversity wireless microphone receivers, the single-channel EM3031-U and the 2-channel EM3032-U. Both offer 32 programmable frequencies and a frequency response of 40-20k Hz, and cover a frequency range of 434-960 MHz, with maximum switching bandwidth of 24 MHz. Housed in a 1U metal chassis with built-in mains supply, the units offer Sennheiser's HiDyn plus® companion noise reduction for a S/N ratio of over 100 dB, and incorporate PLL synthesis. Both are compatible with all Sennheiser UHF transmitters and provide low-battery indication for SK50, SK250 and SKM5000 transmitters. Each unit is shipped with two telescopic antennae and a mains cable.

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TANNOY INTROS LOUDSPEAKER SYSTEM

Tannoy (dist. by TGI North America, Kitchener, Ontario) has introduced two new loudspeakers, a complementary subwoofer and an associated controller. The T12 loudspeaker features a new 12-inch dual-concentric driver with double-roll cambric woofer suspension and a halogen HF protection system. The birch-ply enclosure incorporates recessed handles, integral pole mount and eye-bolt fly points. The unit's wedge profile makes it usable in ceiling mount and stage monitor applications. The i12 loudspeaker is a similar unit designed for the installation market (as a direct replacement for the CPA12) and features an MDF cabinet with eye-bolt fly points. Both units offer foam and cloth-grille cover options. The Tannoy T40 subwoofer is designed to complement either T12 or i12 and offers a peak SPL of 130 dB and a frequency response of 34-160 Hz from a 15-inch woofer in a birch-ply enclosure. The new TX2 electronic controller, designed to optimize performance of the T12 and i12 loudspeaker, can be used as a full-range device to extend low- and high-frequency response, or as a two-way crossover for subwoofer applications. Balanced outputs include a summed mono subwoofer feed and stereo highpass and lowpass outputs with individual level control.

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QSC POWERLIGHT 8.0 AMPLIFIER

QSC's (Costa Mesa, CA) PowerLight 8.0 PFC amplifier produces 4,000 watts/channel into 2 ohms or 8,000 watts bridged-mono into 4 ohms. Power factor correction (PFC) circuitry lowers peak AC current requirements, and line and load regulation make it insensitive to AC voltage drops. Other power supply features include soft start, automatic AC overvoltage protection and a frequency invariant design that operates on any incoming AC frequency. The PowerLight 8.0 PFC also includes a data port for amplifier monitoring, flow-through cooling with fully variable-speed fans and a Standby mode. Outputs include Neutrik Speakon connectors and special high-output speaker terminals.

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LOW-COST MICS FROM AKG

The new Emotion™ Series from AKG (Nashville) is a line of low-cost, high-performance microphones designed for live performance applications. The first two Emotion mics are the D880 supercardioid and the D770 cardioid, dynamic models that will retail for $99 and $90, respectively. AKG says it reduced the cost of manufacturing these high-quality mics by developing new diaphragm manufacturing techniques and a new capsule suspension system that reduces handling noise. Neodymium magnet assemblies provide high output levels and superior pattern control, improve gain before feedback and reduce proximity effect.

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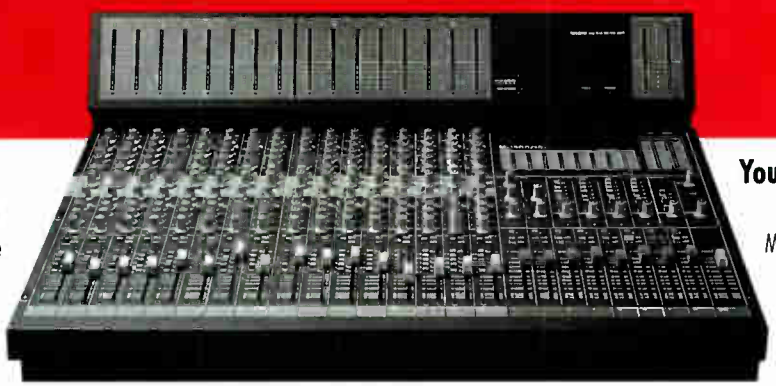

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World Radio History

BY BLAIR JACKSON

RECORDING NOTES

PHOTO: CHRIS STROTHER

L to R: Dan Vickery, Matt Malley, Charles Gillingham, Adam Duritz, David Bryson, Ben Mize

COUNTING CROWS ROCK THE HOUSE

by David John Farinella

When producer T-Bone Burnett and the members of the Counting Crows set up shop in the Hollywood Hills to record their smash hit debut album, *August and Everything After*, the goal was to avoid a high-pressure studio environment and move into less stressful surroundings. The sessions, and the album, were so successful that when the group was ready to record its sophomore effort, *Recovering the Satellites*, management and band alike started taking field trips to find the next "right spot." More than anything else, says guitarist Dave Bryson, staying out of big studios is the best way for *this* band to make a record: "It's so comfortable, you never feel like you're going to work. You never feel like, 'Well, one more day, another thousand dollars.' Even though it's sort of what's happening, you don't have that feeling hanging over your head, which is definitely good for the creative side of things."

After a drive or two around the hills of Los Angeles, the team found a turn-of-the-century mansion once owned by a U.S. congressman. With a two-story foy-er, a large sitting room, a huge ballroom downstairs and space for the band, producer Gil Norton and engineer Bradley Cook to stay, this was the place. For the *August* sessions, Steve Thompson, in Tahoe, Calif., had outfitted the studio for them. This time the

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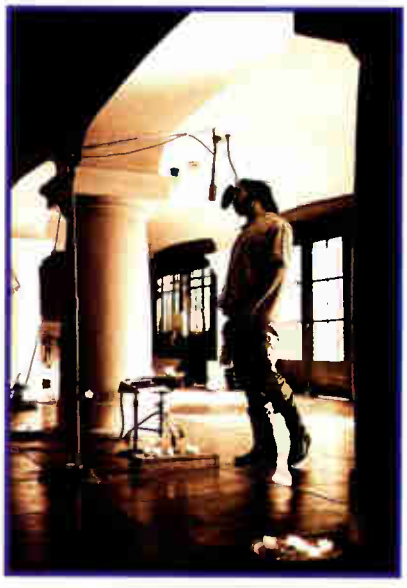

PHOTO: CHRIS STROTHER

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MEAT BEAT MANIFESTO'S RECOMBINANT DUB

by Alex Artaud

For more than ten years, Jack Dangers has crafted music that delights in pulling the rug out from under the listener. As the creative center of the band Meat Beat Manifesto, Dangers has drawn a following with his smooth mix of raw, insistent grooves, atmospheric textures and wry humor. His appetite for the bizarre, combined with meticulous attention to detail, has led numerous artists, including David Bowie, Nine Inch Nails and David Byrne, to tap him as a re-mixer. He's influenced the current trend of blending trance, hip hop, electronic and industrial music, and anticipated jungle in 1990 with his oft-sampled dubby dance floor hit "Radio Babylon." Last year, NIN's Trent Reznor signed Dangers to his label, Nothing Records. Meat

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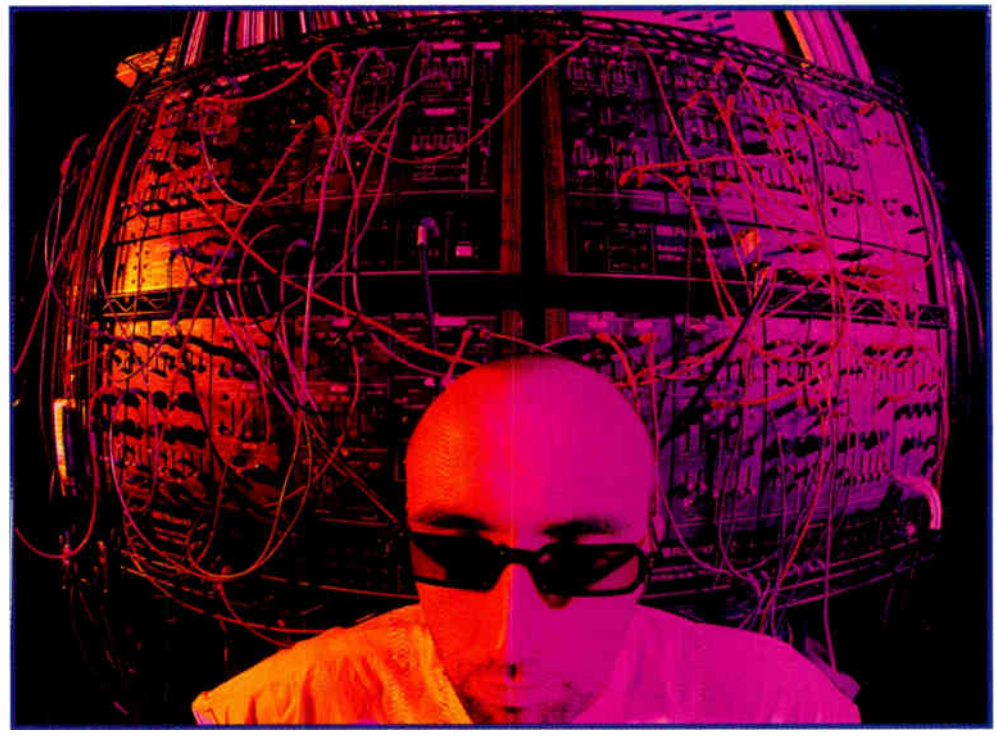

PHOTO: JAY BLAKESBERG

MEDESKI MARTIN & WOOD IN THE SHACK

by Robin Tolleson

Over the past several years, Hawaii has become a regular winter retreat for the hard-working, maverick jazz trio Medeski Martin & Wood. And last year the group talked their label, Gramma-vision, into letting MMW turn their tin-roofed jam house on the Big Island (affectionately known as The Shack) into a recording studio for the making of their recent release, *Shack-man*.

"This was somewhere between a studio recording and a field recording," comments engineer David Baker, who held little hope for the idea after first seeing the power setup at The Shack. "They had put in 15 solar cells, capable of about 80 watts if they were really maxing. And they had eight batteries, bigger than what you'd see in a tractor trailer. The whole thing was capable of putting out a clean 1,500 watts."

The group would start recording in the morning, but by lunch the batteries would lose some punch and they'd have to recharge them using an old Willys truck generator. "There was a four-hour period when we woke up when the batteries were fresh and charged again by virtue of the sunlight," says Baker, known for his studio work with the likes of John McLaughlin, Larry Coryell, Joe Lovano and Maceo Parker. "The power would drop slowly over a four- or five-hour period, and you could hear some hissing, whizzing and buzzing in the Exceltech system." That proved to be a problem in situations such

—CONTINUED ON PAGE 175

PHOTO: MICHEAL MACIOCE

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DAVID BOWIE'S "HEROES"

by Blair Jackson

I came to like David Bowie fairly late in the game. For some reason, I never even heard his early records; they just didn't find their way to my turntable. And the whole Ziggy Stardust/glam business was a bit much for me. Like everyone else, I dug "Young Americans" and "Fame" and parts of *Station to Station*, but believe it or not, the record that really drew me in was Bowie's least commercial disc, 1976's *Low*, made with Brian Eno. There was something darkly compelling about that record, with its strange keyboard textures and moody, disquieting instrumental passages. The follow-up record, *Heroes*, offered some further refinements on this intriguing artistic partnership, and introduced one of Bowie's greatest songs, the stirring title track. The tour Bowie undertook after those records, powerfully documented on the live album *Stage*, produced one of the best concerts I ever attended, and I've considered myself a Bowie fan ever since, though I still find most of his records spotty.

L to R: David Bowie, Tony Visconti and Edu Meyer at Hansa Studio I

What got me thinking about "Heroes" is that last October I saw a trio consisting of Bowie (who played acoustic guitar), guitarist Reeves Gabrel and bassist Gail Ann Dorsey perform an amazing version of the tune at Neil Young's annual Bridge School benefit concert at the Shoreline Amphitheater, south of San Francisco. I was struck again by how well-constructed the song is and how it showcases Bowie's voice so beautifully. Shortly after that show, I contacted Tony Visconti, who produced many of Bowie's albums, including *Heroes*, and submitted a few questions about the recording of the title song. What follows is a narrative edited and assembled from his answers. Take it away, Tony...

Brian Eno during Low album at Chateau D'Hérouville, 1975

David Bowie composing lyrics (window facing Berlin Wall on left)

FIRST, SOME BACKGROUND

The album and title cut were recorded in West Berlin late in 1976, long before The Wall came down. Bowie and I had already made many albums together in many different styles, including *Space Oddity*, *The Man Who Sold the World*, *Diamond Dogs*, *David Live* and *Young Americans*. He had produced *Station to Station* himself, in between filming *The Man Who Fell to Earth* with director Nicholas Roeg. Not expecting to work with him again because of my absence on *Station to Station* and its chart success, I was surprised to get a phone call from David telling me he wanted to make an experimental album with Brian Eno. He wanted to break away completely from all his past styles and do something startling and new.

He said Eno was contributing his bizarre techniques of recording, such as his deck of cards named Oblique Strategies, which offer artistic direction when you cut the deck, and his strange little EMS synthesizer built in a briefcase. He asked what I could contribute, and I told him I'd bring my Eventide digital delay and my new toy, the Harmonizer. I had the second Eventide Harmonizer in the UK, and I had already discovered many of its virtues in my project studio. (I had a 16-track MCI and Trident B range console in my house—very extravagant for those times; we had already mixed *Diamond Dogs* there.) When asked what the Harmonizer did I replied, "It f— with the fabric of time," to which Bowie responded, "Holy shit! Bring it with you." He also warned me that nothing might come of these sessions and that at worst I would waste a month of my life. Another aspect I provided was in the personage of Ricky Gardener,

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a fine left-field guitarist with whom I had been making demos.

The resulting album, *Low*, was not a huge commercial success. In fact, RCA tried to reject it, but it made it through and went on to change the way lots of people have made records since. *Low* was recorded at the Chateau D'Herouville, the "Honky Chateau" of Elton John fame. We weren't treated too well by the seventh owners of this once-fine studio. We were served nothing but rabbit for the first three nights, until we complained. On the fourth night we got rabbit *and* heads of lettuce! As soon as we got everything recorded we upped and left to Berlin to mix it.

Why Berlin? David had already recorded Iggy Pop's *The Idiot* there. The city was very decadent, yet safe due to the heavy military presence in evidence everywhere. Giant black tanks would roll through the city streets at any time of the day. At night, all sorts of clubs catered to all tastes from rock to techno to drag to porn. Artists of all types were plentiful because in an effort to populate the city, the government gave huge grants to any artists who would live and work there. David could wander the streets safely here, hardly recognized due to his crewcut (courtesy of me and my barber's scissors), mustache and a very low-key wardrobe that included a cloth cap as worn by most Berliners. Iggy Pop, who lived in Bowie's spacious apartment, sported the same garb.

FAST FORWARD TO "HEROES"

Now that *Low* was under our belts we were ready to do it again, this time completely in Berlin. We were all put up at the Gerhus Schlosshotel, a castle converted to a four-star hotel. The service was impeccable and the atmosphere was very traditional and reserved.

We would work very civil hours, from 11 to 7, and then spend the evening on the town. Often we'd have a very nice dinner in an expensive restaurant and then go to a club or two. There were many bizarre clubs there, but that's another story! Suffice it to say that Berlin was a great place to be making an album in 1976!

David found Hansa Studios from advice given to him by members of Tangerine Dream and Kraftwerk. There was a more modern studio in the center of town, but we opted for this funkier complex by the Berlin Wall! The control room was of a modest size. The console was a Neve. But the big attraction was the room itself! It used to hold over 100 musicians in Hitler's day, when it was

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put to "good" use recording marching music and music composed for the Führer's rallies. There was a very spacious floor, but there was also a stage, probably for a choir. The studio had a lovely, short natural reverb—about 1.5 seconds, and very controllable with careful miking. The console (about 48 channels) faced the control room window, which faced the Berlin Wall—not 500 yards away. We asked my assistant engineer (a fine engineer in his own right) Edu Meyer if it made him nervous working so close to The Wall—after all, Red guards would often look right into our control room through powerful Soviet-made binoculars. Edu said, "Naw!" Then he took a hanging, overhead light and shone it directly toward The Wall and kept sticking his tongue out. Bowie and I dived under the console and shouted, "Don't do that!" Edu just laughed.

The album was recorded on a 24-track Studer A80 with no timecode, because it was before the days of computerized mixing or locking up two machines. So track 24 was ours to record on! The selection of microphones was mainly German/Austrian Beyers and Neumanns. They had an amazing collection of tube Neumanns and spare tubes that were no longer manufactured at the time. The studio and control room were separated by a long hallway, and the only visual communication was by way of closed-circuit TV. Drummer Dennis Davis used to delight us with his one-man comedy shows he'd do on the CCTV in between takes. The outboard gear was superb for the time, with plates and other gear from EMT and AKG. There wasn't much American gear, but the studio had more outboard gear than most British and American studios back then. I had to bring my own Eventide Harmonizer 910H, because they were still as rare as dragon's teeth in Europe.

This album started the same way as *Low* and the subsequent album, *The Lodger*, did. All the rhythm section and Eno were there on day one. The rhythm section was Carlos Alomar on guitar, Dennis Davis on drums and George Murray on bass—a hard, funky, black section from Nu Yawk. They appeared incongruous compared to the staunchly British Bowie and Eno, but man did it work. Those guys could peel paint off the walls when they played! I never worked with a better rhythm section.

A good portion of the first few hours would just be throwing ideas around. Either David or Eno would have a nice chord sequence they would want the guys to try. On this album there was no "resident" keyboard player, as on *Low*, so although this comes off as a keyboard album, it wasn't in its conception. No songs were pre-written: There were no words or melodies, just chord changes and grooves with working titles. I notice from the credits that "Heroes" was written by Bowie/Eno, but the guitar riff that underlies most of the song is definitely from the head of Carlos Alomar.

This song was a "sleeper" before it had melody and words. As a backing track it was kind of static; others were more exciting. But something, in the form of repetition, was getting under our skins, so we "parked" the song in its guitar/bass/drums form for a week or so and went on to record the other backing tracks. As with *Low*, the first week of recording was meant to be demos only, and then the band would replay them "for keeps." But after the demos were all laid down we looked at each other and realized we had gems in these rough forms. Some of Davis' drum fills were so far out we felt he could never have been that "left-field" if we said, "Okay, this is an official take." I remember tightening up a few of the tracks by editing some extraneous bars out of the 24-track multitrack. (I love the power of cutting across two inches of analog

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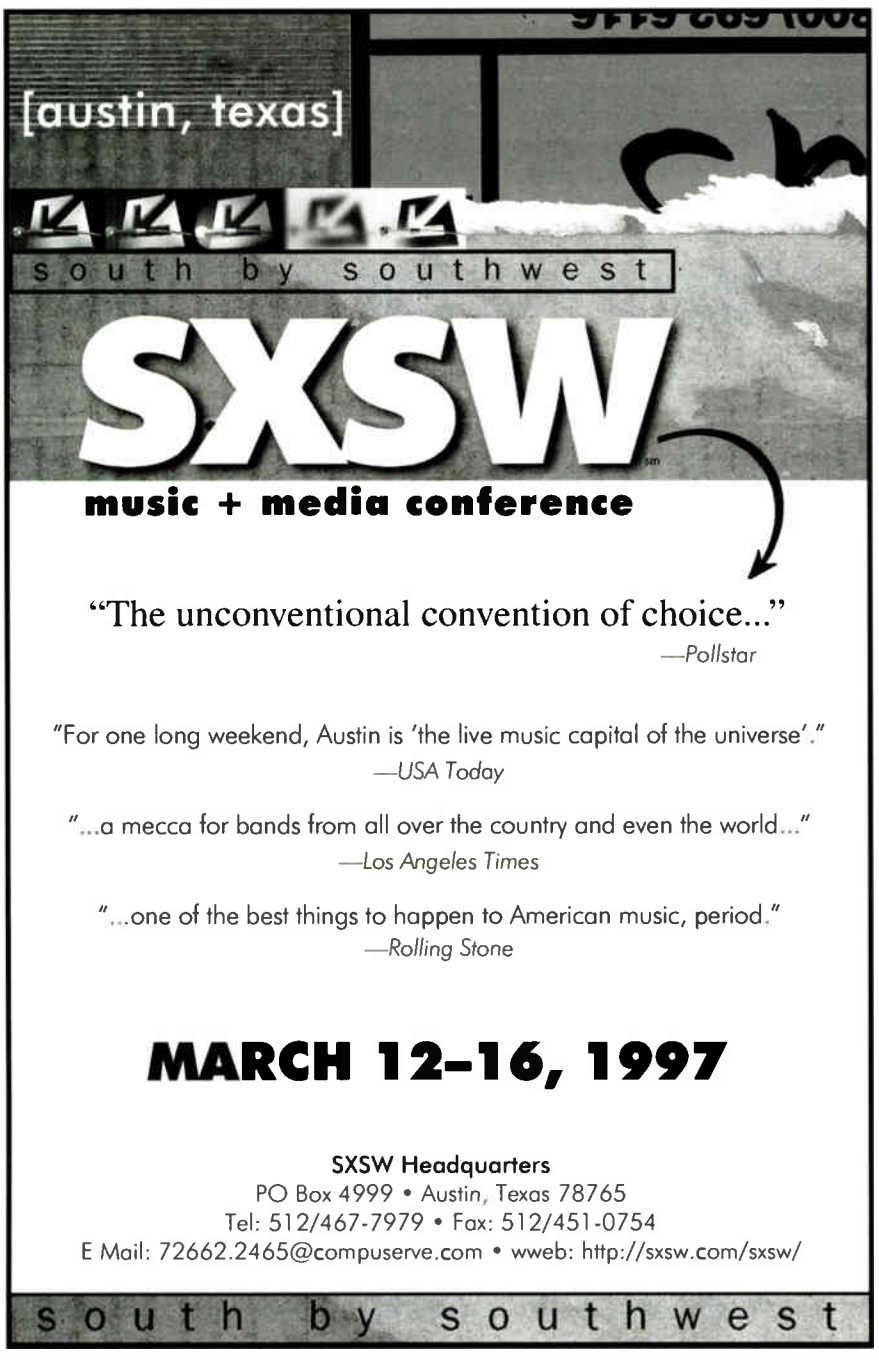
tape—just mute all the tracks except the kick drum; it's as easy as pie).

So the rhythm section was sent home after ten days or so and Bowie, Eno and I got on to the next phase—overdubbing weirdness. At this point, "Heroes" was this long, ponderous track that needed its sections defined. To perk it up, first Eno went out into the studio and played an eight-to-the-bar piano part, just banging the chords out (only five: D, G, C, Em7 and Am7). The rhythm was now even more hypnotic. Next Eno opened the EMS and started poking little colored sticks into the tiny patchbay. A few twiddles and much waving of the joystick and this shimmering, shuddering white noise started coming out. I processed it through something—maybe an Eventide. Instant flanger. Then Bowie cranked up his Chamberlain sampling keyboard, the "better" mellotron. He clicked it to "brass" and played these little stabs from verse two, only it doesn't sound like brass—too puny—but it created another polyrhythm. This track was growing. One of us went into the massive studio and overdubbed a tambourine. And that was it for the moment.

On the weekend, Robert Fripp, guitarist from King Crimson and collaborator with Eno on some "ambient" albums, arrived with only his guitar. (Who needs an amp when you've got Eno's EMS synthesizer in a briefcase? You could see this wasn't the first time they'd done this.) Fripp proceeded to play "processed guitar": That high, sustained "A" in the intro of the song is the first track of processed guitar; then Fripp laid down two more tracks, bending and harmonizing with his previous track. Through the years many people believed this was a keyboard line or Fripp playing with an E-Bow. But the E-Bow wasn't available yet. What you actually hear is Fripp's guitar feeding back in the studio monitors and being processed by the EMS.

Now the track had a complete personality! Still, though, no words or melody. Then it was up to Bowie to write a song to this amazing track. One sunny afternoon, he asked me to leave him completely alone in the control room for an hour or so, so he could write something. I asked Antonia Maass, the female backup singer on "Beauty and the Beast," to take a walk with me. We were "dating." We took a leisurely stroll by The Wall, walking hand in hand. We were in a very animated, playful mood and then stopped and kissed by The Wall. We had a coffee, and then I decided it was time to check up on David. Antonia and I walked into the control room, and David and his personal assistant Coco were smiling. David had written the lyrics to "Heroes" while we were out walking. In fact, he'd seen us from the window and gotten the idea for the entire song from watching us! Our kiss is represented in the fifth verse: "I remember standing by the wall/The guns shot about our heads/And we kissed as though nothing could fall..." I think the whole song could be summed up by that kiss! Despite this horrible wall built to imprison and separate families, we can be "heroes" in defiance by using kisses as a weapon against tyranny. The whole song is an upbeat anthem that says that mankind is capable of climbing out of any mess as an individual!

Still there was no melody! So then Bowie decided he was going to do something that blows my mind to this day: He was going to compose and put the final lead vocal on tape simultaneously. He was also going to sing in that huge studio with the 1,500 ms decay. I asked if he could wait until I set something up. I wanted to catch that ambience on tape. A close mic would destroy it, a mic about ten feet away would not be intimate enough, and a mic about 40 feet away would be ridicu-



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lous—so why not have all three? So I set up the mics and it worked, kind of. I had a tube U47 in his face, and two other Neumanns ten and 40 feet away. I only had a few tracks left and I knew there would be backups to sing, so I got this bright idea to put gates on the 10- and 40-foot mics. It worked beautifully: When David sang verses one and two, neither of the distant mics opened up. But above a certain volume, the ten-foot mic opened and you could hear some of the room. Then, on chorus four when he sang, "I will be king..." the mic at 40 feet opened up and the room exploded with "Bowie histrionics" as he jokingly referred to that verse. Mind you, this is at 3:16, when most songs begin to fade. This one kicks in big time and goes on for almost another three minutes! Every so often I had to stop the tape and David tweaked a lyric here, a melodic line there. But he was composing on mic, and the vocal sounded terrific! I never worked with anyone else who could do this, and in less than two hours it was done. We had a song!

David loved the sound of the room and the gated mics. On the mix we had no need for artificial reverb, the sound was so hot. Then it was time for backups. In keeping with the spontaneous feeling of the session, David and I decided to sing them ourselves and we went out and made them up on the spot. Edu Meyer engineered. Mine is the higher voice with the "Britlyn" accent—half British, half Brooklyn. This didn't take very long either, as David and I had been doing backups since the *Space Oddity* days. Later, we had the song translated to French and German and we recorded those versions a few nights later, backups and all!

For some reason we decided to leave Berlin to mix at Mountain Studios in Montreux, Switzerland, where David was renting a house. We drove from Berlin, through Communist territory to Switzerland (are we not heroes?). The cultural contrast was incredible. Switzerland was clean, bright and so conservative you were not allowed to bring girls up to your hotel room. Still, it was a healthy environment and I enjoyed being there.

Mountain was built to serve the many musical festivals held in Montreux. The studio and control room were small and cramped. We were not allowed to use the huge hall for recording because of constant conventions. Still, like most European studios, the equipment was incredible and well maintained. The mix was fairly straightforward, as most of the effects were already on the multitrack. We slowly panned Fripp's guitar and Eno's shuddering synth from left to right (remember, this was before automation). I remember setting up the levels for different sections and then editing them all together, the way dance mixes are made. I am usually heavy on the kick drum, but in this case a well-defined kick drum made the track drag. So I undermixed it and let the eight-to-the-bar bass guitar chug the track along. There is so much delicate polyrhythmical information in this track, a plodding kick drum ruined the ecology.

The track is 6:07 long, and I think it stands up beautifully—then and now! For radio purposes we edited a shorter version. I have fond memories of that long period of the "Bowie-Eno triptych." It was a time of great extremes of tragedy and exhilaration for both Bowie and myself (T-Rex leader Marc Bolan, with whom I had worked for many years, died in a car crash right after *Heroes*, and my marriage ended right after *The Lodger*). These ground-breaking pieces of music came in a period I doubt will ever be recreated again. Record companies weren't telling us what to do yet; these records were made by artists, not A&R committees, and they nicely captured the spirit of those times. ■

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—FROM PAGE 161, MEAT BEAT MANIFESTO

Beat Manifesto's first release on Nothing, *Subliminal Sandwich*, splices imagery with abandon, conjuring a hypnotic, sci-fi ambience amid layered samples, Theremin whistles and sub-bass rumbles.

An ambitious two-CD set, *Subliminal Sandwich* took eight months over a two-year period to complete. On the first disc, Dangers maintains his trademark bass lines and syncopated rhythms. The production is seamless, from the static radio opening of "Sound Innovation" to the ominous strains of mellotron and melting horns on the first single, "Transmission." One of the strongest cuts, "Future Worlds," features occasional Tom Waits sideman Joe Gore's West African-sounding guitar passages and searing solos over smooth beats and a bass clarinet line by Dangers that rolls along like a lazy cat.

Masterful editing is one of Dangers' strong suits, as on "Nuclear Bomb," where he chops up vocal samples from an old reggae toasting album. "I transferred words to the hard drive and rearranged them into new sentences in time with the music. When we went to clear the samples, the label that released the toasting record didn't know what to make of it. They had no idea of who was saying what because I'd changed it so much!"

On the second disc, Dangers expanded the project to include more improvisational structures, which he developed out of jams with friends. From the drifting arpeggiated tones and vocoded treatments of "Mad Bomber" to the thick, propulsive "The Utterer," Dangers reveals a freeform side that he'd only hinted at before. The second CD also gives him more room to explore some new instruments, including the curious waterphone. The waterphone resembles an upside-down, hollow metallic spider that's filled with water. Bowing the "legs" while tipping the vessel yields a lovely atonal sound reminiscent of ominous B-movie scores. Also notable on the disc are passages of a Theremin that Dangers bought from Robert Moog's company, Big Briar. "I watched *Theremin: An Electronic Odyssey* when I lived in England, and it was incredible," Dangers says. "Soon after the broadcast I contacted Big Briar and they told me that Roger Waters and Brian Eno had also called up to place orders."

Subliminal Sandwich is also a tribute to the studio Dangers began assembling when he moved from Swindon, England, to Northern California in 1994. Though his hybrid playground of analog and digital gear was assembled for pre-production, it is an impressive setup. Its command center is a Macintosh Quadra 950 running E-Magic's Logic Audio and a Digidesign Pro Tools system. Other software includes Sound Designer with DINR noise reduction, and Steinberg's ReCycle, which has been critical for matching tempos and locking grooves. The console is a Mackie 32x8; the main monitors Genelec 1031s. For A/D conversion tasks, there's a Lexicon 20/20, which feeds into a Panasonic 3700 DAT deck. Racks hold various signal processors, including a favorite Summit DCL200, a dual tube compressor/limiter and a pair of vintage Neve preamp/EQ channels that he feeds nearly everything through. Dangers also relies quite a bit on his Eventide DSP4000. For tracking, there are a pair of ADATs. However, he's just as content running everything virtual. Look-

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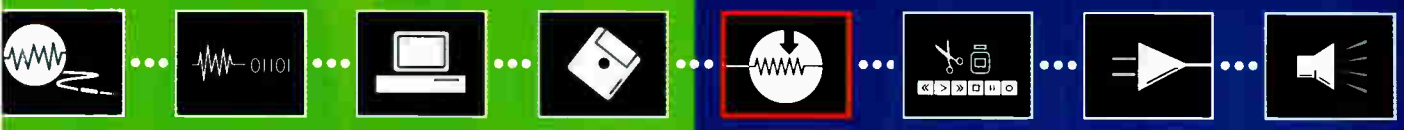

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ing around at his arsenal, he muses, "I was really careful in putting this together. It took quite awhile to get it right."

Roland synthesizers are among his primary analog units and include a Vocoder Plus, a Jupiter-4 Compuphonic, and a Jupiter-8. But the jewel of the collection is a massive Roland 100M modular system, which has filters and a ring modulator that show up all over the album. This is the same unit that Human League used on two albums, *Travelogue* and *Reproduction*. Directly below is a pristine ARP 2600—source of the raspy sequence that cuts through the opening to "Plexus," and a Korg Wavestation rests nearby, around for triggering samples, as is a Roland Octapad. Dangers' primary sampler is the Akai S3200, but he also has a soft spot for E-mu's Emax.

Like 1992's critically acclaimed *Satyricon, Subliminal Sandwich* burgeons with a recombinant musical culture influenced in part by Dangers' encyclopedic collection of more than 8,000 records. Browsing through the vinyl reveals a comprehensive selection of spoken word, soundtracks, electronic, soul and jazz albums. But his sensibility seems closest to *musique concrête*, cut-up techniques and found-sound approaches that grew out of post-World War II experimentation in Europe and the U.S. Near his turn tables are rare to impossible-to-find original releases from the late '40s, '50s and '60s that he has voraciously sought. "I like music done with a limited number of tools," Dangers explains. "Recordings by John Cage, Iannis Xenakis and Tod Dockstader sound just as amazing now as they must have back then."

Yet amid all the work Dangers admires, he has managed to find his own voice. In an industry that typically embraces a genre and then smothers it, Jack Dangers remains a slippery original. His ear gravitates to a whimsical sense in composition, teasing with one mood while escaping off into another. At times, samples feel as if they've been ripped from their moorings, only to be spliced with mischievous abandon. It's the perfect milieu for a gleeful musical terrorist like Dangers, who can point to similarly creative uses of playtime in his early life: "As a boy I loved destroying things. Actually my very favorite toy was a hammer, which I'd use to break all my other toys. Of course, I'd wrap the toys in a towel to avoid making a mess." ■

—FROM PAGE 161, MEDESKI MARTIN & WOOD

as the song "Henduck," an acoustic acid jazz piece where they were looking for high gain on the acoustic bass.

Baker had shipped his two DA-88s by UPS from New York, in hopes of synching the machines up to get 16 tracks, but they couldn't get the sync to occur correctly. "That was actually a blessing in disguise," the engineer says. "They're a live trio, and play 98 percent of their stuff live, so you don't need more than eight tracks. I put the entire drum mix on two channels."

"The humidity keeps people from bringing high-tech equipment to the island," drummer Billy Martin explains. "It'll deteriorate pretty fast. In The Shack all the openings are screens, so the air is coming through all the time. It's a very open-air feeling, but the humidity plays a role in the recording, too. That moist air does something. It has a certain deader sound. And then all the trees—you're surrounded by the forest, and the sound is amazing."

Baker also brought over two Mackie 1604s from New York—"One old model and one new VLZ-1604, and that was really the lifesaver," he says. "With the VLZ, I could plug in oodles of stuff and then decide on a tune-by-tune basis what to punch up to what tracks. With John [keyboardist John

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Medeski] I could have up to eight or nine inputs. With Billy I had four, and with Chris [bassist Chris Wood] it was generally no more than two." The engineer brought his favorite mics over. He likes the warmth of Coles 4038s for bright instruments like Medeski's toy piano, and he uses a combination of mics for the Hammond. "The basic organ setup was pretty simple," Baker says. "I'd usually take a pretty close pair of [AKG] 414s on the top of the Leslie where the high-end rotor is. And then I used an RE-20 on the bottom. I take a D.I. in every case, and depending on the tune, John and I figure out what we want. We used quite a bit of D.I. to get a little more up front on 'Bubblehouse,' that simplistic rock 'n' roll thing that speeds up and slows down. When you get into things like 'Kenny,' that last gospel cut, you get a little more ethereal, and I use a lot less D.I. on the organ."

Baker packed his Countryman direct to use in recording Medeski's Hammond organ. "It's valuable to have a direct patch off the manual of a Hammond, because there's a certain immediacy that you can decide to do what-

MMW engineer David Baker

ever you like with. With three mics on the Leslie and the one direct, you can create a lot of permutations."

MMW is a band that is largely striving to remain analog, with a resistance to samples or synthesizers, according to Baker. "They're basically built around authentic acoustic and/or vintage electric instruments. So that's a blessing in disguise if you're cut down to simplistic equipment. I did bring some compressors along. I love the Aphex Dominator. I used one on the drums' stereo passes and on the bass, along with a simple $200 Alesis stereo compressor. We had a regular LXP-15 when we needed reverb.

"In some ways my job was simpler than ever, because basically here's a band that can pull their stuff out of an RV, set up in virtually any venue and get a decent sound within an hour. So it's not really about record production. I didn't have to become George Martin. It was more, 'How can we capture what's going on there in that little space, get it on tape, bring it back to New York, mix it and have it come out without adulterating it?' The goal was to keep it simple and straightforward, and keep the reverb police happening so that there wasn't a tendency to make things sound too plastic or too commercial."

L to R: Wood, Medeski and Martin in The Shack

For Wood's electric bass, Baker always took a direct track, but he never did bring that fader up in the mix. "We'd always take a miked cabinet with a Sennheiser 421, and roll it off a couple clicks at the mic and stick it up against his four 10s and two 12s; two different cabinets facing the organ. We got ready to mix, and the bass sound was so happening that we were back to just forgetting the D.I. I don't think we used the D.I. on anything." Still, to get the cleanest acoustic bass parts, they did several of them as overdubs, according to the engineer.

"The beauty of Baker's recordings," says drummer Martin, "is if you've got a good sound happening already, he's going to have it down. I've always liked the sound of The Shack; we've always played differently there, and that's really what it sounded like. There's nothing on it. We doctored up a few things, but ultimately it's the raw sound. He has such a great ear, and he has that spontaneous live mix technique down."

Rather than always looking for a new piece of gear to fix a problem, Baker prefers the hands-on approach. "If you really want to get a sound," he says, "with all due respect to every equalizer in the world, just get your butt out of the chair, get on out there and start tweaking things right on the floor. That's where the music comes from." For drums, Baker says, "We'd pull a drum head off, Billy would put a new one on, and say, 'Oh, this isn't as good.' Then we'd put the old one back on, tweak it around to a new position, repitch it, move the mics a couple of inches here or there. It got really serious—if you look closely, there are differences in drum grooves, in actual sounds within the grooves on different tunes. Different tuning, different attitude, he'd go through sticks, brushes, everything to get it right.

Baker used a total of four mics to get Martin's drum sound. "If you've got a drummer that can tune his kit and get a balance in terms of what he plays, then a pair of Earthworks OM-1s might be the answer instead of ten zillion mics," he says. "With Billy I used a Gefell UM-70S, that three-pattern Gefell mic, and put that on figure-8. Somehow it sounded nice on figure of 8, and I just backed it up about a foot off the kick, recorded that and mixed it in with the two OM-1s, which are left-right omni. And then we spiced up the snare just a hair with a classic [Shure] 57. That mix of four mics is hitting the Dominator on the way out of the subgroups, on the way to the DA-88."

"Those Earthworks mics are incredible," Martin agrees. "I had [Baker] put just those two tracks up at one point [during playback], and the bass drum was perfectly mixed in by those two overhead mics. It's amazing. And I think it has a lot to do with The Shack. The bass drum just vibrates the whole shack, so it's really like you're inside this music box. We had to play The Shack, really listen to the mix in The Shack. It worked out great. It was a different approach to the music, which gave us this unique record."

"'Kenny' is an example of that," Baker adds, "a totally unrehearsed gospel vibe, and for me one of the great tracks on the record. It starts out with an organ thing, which we edited down from a longer introduction where John voiced his vibe and his feeling. Then he set up that groove and they just fell into place. If you have a working band and the guys really know each other, you get that kind of magic. I take my hat off to them." ■

World Radio History

—FROM PAGE 160, COUNTING CROWS

band decided they wanted to buy their own gear, so Bryson got to work collecting equipment. "When you're doing a full record, a three-month deal, it made a lot of sense to us to buy the gear, because it's damn near the same cost as renting it," Bryson explains. "It's a wash for one record, but for two it's a total bonus. So, we are the proud owners of a wonderful pile of gear that's now sitting in cold storage in the Bay Area," until they make their next record.

That pile of gear is a nice combination of vintage and newer equipment that made it easy for Norton and Cook to capture the band live. "[Bryson] would ask me what I wanted, and he got me anything," Cook says. "I gave him an outrageous list like, say, a Telefunken 251, and he'd get five or six of 'em and we demo'd them to find the coolest one." Bryson pulled another rabbit out of his hat when Cook asked for a pair of Teletronix LA2As and received two that were made one right after the other. "They were the early kind, like the 540, that doesn't have the limit compress switch on the front," Cook says. "It's compressing when you're hitting 3, and it's limiting when you're hitting 10." Other compressors the team used included UREI 1176s and some ADL tube compressors.

PHOTO: CHRIS STROTHER

For Bryson, who set up his own 16-track studio in Emeryville, Calif., called Dancing Dog Studios, knowing what gear to get was a piece of cake. "I think there are just certain pieces of gear that you need to make a record," he says. "You need a handful of these types of microphones, a handful of this and a handful of that. It's not a big mystery—if you talked to ten engineers and said, 'Give me a list of what you want to make a record,' you'd see a lot of common gear there. Each person would have a little compressor that he or she prefers and all that stuff."

For Norton, one of the things that made this album easier to produce was the fact that he brought Pro Tools along with him to the sessions. "Mainly because we only had one 24-track machine to do edits and things," he explains. "We really didn't have a half-inch machine, so it was another way to try things out and move things around. Especially when you do something like the Counting Crows, where we did a lot of live takes. Now and again you'd get a guitar part that was stunning on take three, but you'd end up on take nine, by which time the guitar player might have gotten bored or he'd lost some of his earlier flourishes. To be able to go back and listen to all the guitar parts again to see where you'd gone, that was great and very fast as well."

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They used Pro Tools not only to edit guitar parts and tracks, but also to comp vocals together from different takes. "Very few of the vocals were overdubs; most of them were just comped out of live performances," Norton says, "because Adam [Duritz, lead singer and songwriter] got into the vibe of it. Once Adam's in the song, then anything can happen, really. Some of the most interesting and extraordinary vocal performances we got were actually when the band was learning the songs and he was really going for things and pushing the songs along."

Indeed, Bryson remembers the day that Duritz showed up with the album's title track, "Recovering the Satellites." "When he brought it in, it was just him and a piano and we all flipped on the song, learned it and recorded it.

"As he was singing, he called out 'One more,' so we could have a big ending, as opposed to having it fall apart," he says with a laugh. "We all kind of got attached to that moment, so we kept it."

While every bit of gear they used was a valuable find, say the engineer and producer, Bryson put the greatest emphasis on finding good microphones. He scoured the back of magazines and called vintage houses to find mics like a Telefunken U47 for Duritz's vocals, an AKG C24 stereo mic that was used on drummer Ben Mize's kit and Charlie Gillingham's piano, and various Neumann models—U87s, M49s and M582s (which they used as the overhead drum mic). Other mics they purchased for the sessions included Sennheiser 421s, and Shure SM57s, SM7s and SM69s. According to engineer Cook, "It was a pretty great variety; I never had a want for a mic, really."

The collection of mics was perhaps more important than usual because of the recording chain Cook and Norton devised: The signal went from the mics to some top-quality preamps—mainly Brent Averill-built Neve 1084s and 1073s, as well as some API 550As and 560As—into the compressors and then directly to the back of a Studer A27 and two Neve BCM 10 sidecars. "There was no patchbay or anything," Cook explained. "It was total old-style." They had a Trident 24 on hand for playback in the control room—formerly known as the dining room—and for the band's Private Q monitoring system, which allowed each bandmember to control his own monitor levels.

As the gear was being delivered and set up by Cook, Bryson and crew, construction workers were milling about making sure the house was soundproofed. "The biggest problem is always the neighbors," comments Bryson. "In both houses we were real careful to make sure we soundproofed them." They double-paned many windows, took some antique windows out altogether, and then sealed the front door of the house with packing blankets and super-heavy rubber stoppers. In all, it took five days to perform the basic construction. "It's a fair amount of work," Bryson says. "It's the kind of thing that if you could record your record out in the countryside and you could find a funky old house that was a mile from any other house, it would be a cheap way to make a record. But to do it in an urban environment, which we've done both times, becomes a not so cheap way to do it."

Acoustical engineer Steve Brandon was brought in to tune the various rooms used for the project, with the control room, in particular, demanding special attention—Cook described it as a

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box of rectangular hell. One of the first problems the team encountered was that they were not allowed to touch any of the existing walls of the mansion, so they put their heads together and band assistant Sevon Wright took a trip to a tent company, which designed and built a custom rig to create a "control room." After that was in place the crew suspended four 5x5 sheets of Owens-Corning 706 Fiberglas above the console to help contain the sound more.

Brandon's second innovation was isolation boxes for the guitar and bass amps—which everyone involved now fondly call "doghouses"—so the band could be in the same room as they were tracking the songs. The plywood boxes were lined with thick Fiberglas and coated with cloth on the outside, and each also had an air duct built in the back, so between takes air conditioning was funneled into the boxes to cool them off. "You just sat right next to them and your amp was blasting inside," Bryson says. "Outside it was audible, but certainly you could talk over it."

Next, the crew turned its attention to Mize's drum kit. The problem, as is often the case in recording projects, was to find a spot where the kit could be isolated, while still allowing Mize to have eye contact and communication with the rest of the band. The two-story foyer, which had pocket doors separating it from both the control room and the main recording room, was deemed the perfect spot. Then, in order to get the best bottom end, the crew built a stage for Mize's kit that consisted of four layers of plywood and drywall. In the end it was so heavy it had to be built in four sections, just to be able to move it around.

Though the foyer was home to the majority of the drum tones found on *Recovering the Satellites*, Cook did sneak down to the house's ballroom to capture a pair of toms that appear at the end of the song "Catapult." And that ballroom, which had an inherent six-second decay, was also used to capture some natural reverb for Duritz's vocals. In addition to the ballroom, they also piped sounds into stairwells and anywhere else that sounded interesting. "We tried to squeeze all the sounds we could out of the rooms while we were there," says Cook.

A lot of thought also went into creating keyboardist Charlie Gillingham's setup, which was affectionately known as Charlie's World. In his space, Gillingham had a grand piano, a Mellotron, a Wurlitzer and, of course, his trusty Hammond B-3, which had its own trickery: Apparently the output from his Hammond went directly into an overdriven Echoplex and then into his Leslie cabinet. As Cook explains it, Gillingham would be playing and pulling out draw bars and flanging the Echoplex tape with his thumb. "It's like a beautiful, meaty, gritty distortion," Bryson says. "It makes the B-3 like a whole new instrument. Any weird sound you hear on our record is Charlie." As an example, he points to the eerie opening of "Children in Bloom."

Three days after the last overdub had been completed, and all the band's gear had been tucked away, the neighborhood in the Hollywood Hills returned to as normal as it gets in the Hollywood Hills. Today, nearly a year after the album was completed, Bryson, Cook and Norton say that they would do it again, in a heartbeat. In fact, Bryson says of this way of recording, "I think the best thing is the lack of pressure, the feeling that you're just with your buddies making music. It's just a really organic way to make a record." ■

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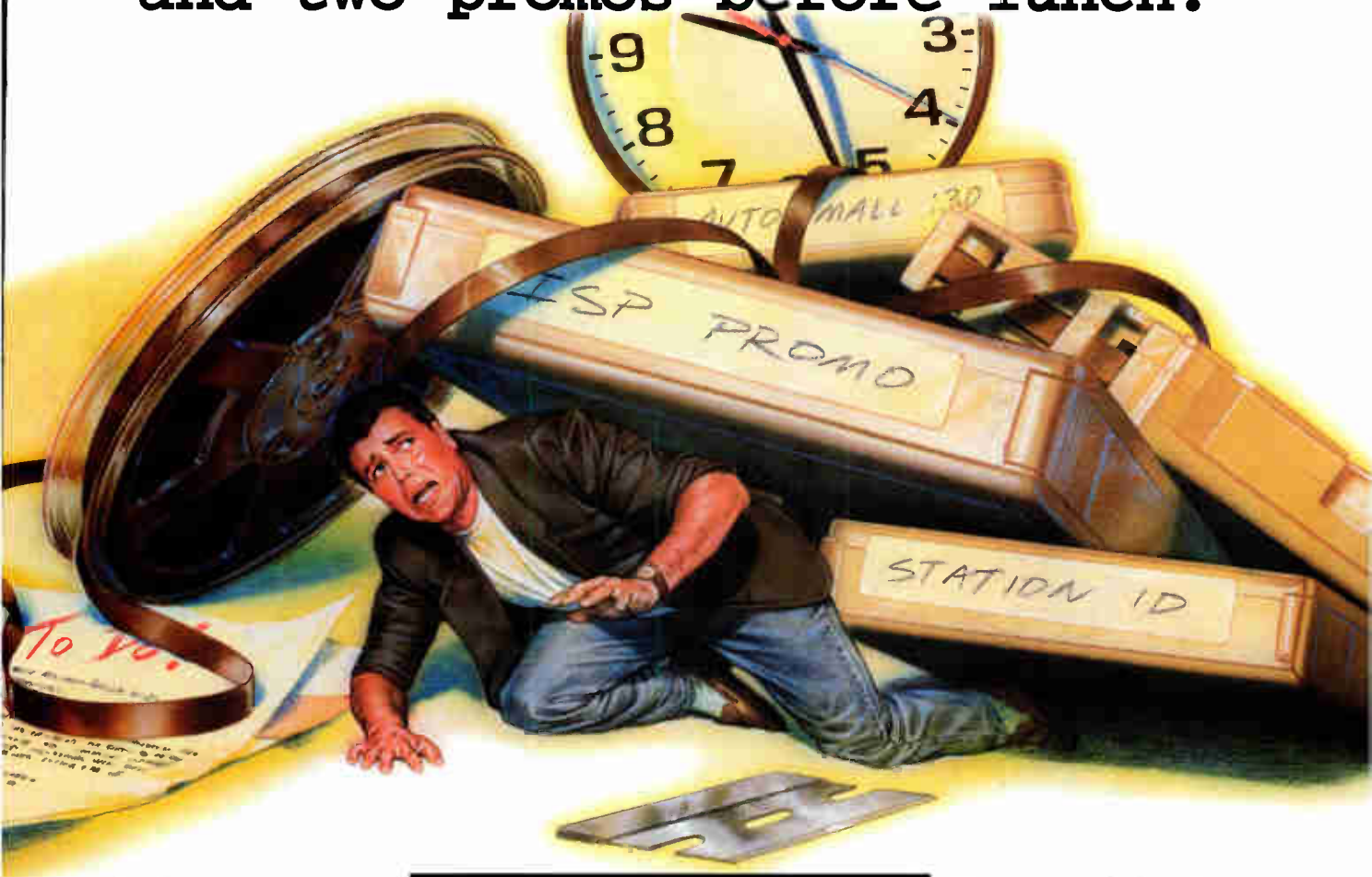

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COAST TO

L.A. GRAPEVINE

by Maureen Droney

Can Am Studios in Tarzana is back—okay, it never really went away, but, to the dismay of many producers and engineers, for the last 2½ years the West Valley facility was closed to outside business while serving as the private studio for Death Row Records.

Previously home to mixes for more than 70 Gold and Platinum albums (including R.E.M.'s *Life's Rich Pageant*, Aerosmith's *Get a Grip*, En Vogue's *Born to Sing* and *Funky Divas*, and hits by David Lee Roth, Bobby Brown, Stone Temple Pilots, Tony Toni Toné, All4 One, Seal, Pink Floyd and Concrete Blonde), Can Am had the winning combo for both rock and soul music.

Owner Larry Cummins gave us some history. "I opened in 1978, just one 24-track room with a small Quad 8 console, in what is now Studio A. I had

—CONTINUED ON PAGE 184

Below: The inveterate Motley Crüe in session at Can Am. At the board are producer Scott Humphrey (L), engineer Lenny De-Rose and Mick Mars. Rear are (L to R) Vince Neil, Tammy Lee, Nikki Sixx and assistant Brian Dobbs.

PHOTO: MAUREEN DRONEY

NY METRO REPORT

by Dan Daley

This is the New York column, and what's more New York than The Great White Way? **Broadway's theater business** has managed to hold its own in the past few years, relying on more revivals than an Alabama evangelical, and upping the technology ante of its productions in order to compete with films, television and CD games.

Above: Mellifluous Elektra rockers Luna recently tracked at Sear Sound (New York). The bandmembers are pictured with assistant engineer Tom Schick (standing, R). Seated are owner Walter Sear (L) and producer/engineer Pat McCarthy.

What are you getting for your (average) $75 ticket? Sound, sound, sound.

"It's gotten huge," says Laura DeBuys, director of marketing for ProMix, an audio supply and installation company in Mt. Vernon, N.Y., that specializes in Broadway shows, corporate/industrial presen-

—CONTINUED ON PAGE 190

World Radio History

COAST

SESSIONS & STUDIO NEWS

Engineer Brian Baker (L) and studio owner Jeff Wells are flanked by men in black Butch Vig and producer Duke Erikson (working a little voodoo on two synched-up 24-tracks) during sessions for Vig's band Garbage at Sound Arts Recording in Houston, Texas.

SOUTHERN CALIFORNIA

Julio's son Enrique Iglesias tracked and edited for an upcoming release in Studio C at Westlake Audio (Los Angeles) with Raphael Perez Botija. Steve Sykes engineered and Mike Parnin assisted...PolyGram soulstress Vanessa Williams tracked and mixed a new single with producer Omar at Skip Saylor Recording (Los Angeles). Ken Kessie engineered the sessions, assisted by Jason Mauza...Producers Charlie Midnight and Martin Guigui tracked and mixed with country singer/songwriter Jamie Lee Thurston at Coney Island Studios (Burbank). Joel Soyffer engineered...Engineer John Paterno and assistant Troy Gonzalez mixed music for Suzanne Vega's upcoming PBS special at Sony Music Studios (Santa Monica)...At

—CONTINUED ON PAGE 194

Duran Duran overdubbed and mixed for their next album at Sound Techniques in Boston. In the SSL suite were (L to R) John Taylor, producer Anthony Resta, Simon Le Bon and producer Bob St. John.

World Radio History

—FROM PAGE 180, LA GRAPEVINE

a partner who was an engineer, and business was great for a couple of years; then, in the 1980s slump, I bought him out and I started to regroup. Brian Malouf came aboard as a runner/assistant—I think I was paying him $50 a week, if you can believe that! He was the drummer in a band then and had been getting into doing live sound. So, I started booking out as a studio with an engineer for demo projects. And we did a lot of jingles and demos. Then we started getting bigger-name work, and one summer we did a Toto album, the Jacksons' *Victory* album and a Pat Benatar album—we just kept getting busier and busier. So by 1985 I put the SSL in, the first, actually, that was sold out of the Los Angeles SSL office. We still had only one room, though, only a 2,000-square-foot area. The next year we expanded into the building next door and built a front office. And in '87 I acquired another 4,000 square feet and built Studio B. Since then, it's been business as usual. We've stayed pretty busy."

The decision to shut out other clients for a long period of time is not an easy one for a commercial studio owner to make. But, according to Cummins, this one worked out great. "Every Death Row album recorded at Can Am that came out went multiple-Platinum," he says. "Snoop's *Murder Was the Case*, Tupac's double-CD *All Eyes on Me*, the Nate Dogg and Dogg Pound albums, and, of course, Tupac's new album is climbing up the charts."

Now, Can Am's two SSL rooms are being refurbished and readied to go back online as a public facility: Studio A with its 52-in SSL 4000 E with G Plus automation, and B with the 72-in version. It's spacious and comfortable. Both rooms have a separate kitchen/lounge, with several other lounges and private spaces scattered through the complex. "It's going to look even better than it did three years ago," says Cummins. Although he was determined to make a splash with reopening, Motley Crüe was already recording in B. "They're in while we are remodeling," explains Cummins. "Ellis from SRS called me and said, 'I've got a booking—you may want this.' And I said, 'No, we're closed for the month of November, I don't want anything.' Because I really wanted to concentrate on making the place look gorgeous before anyone stepped back in the door. But he called me back and said we could remodel around them. We'd already gone through all the equipment in B, so we put in the new speakers, tuned them and went for it. And the band has been great. They're working around us as we finish up construction.

"I've been very fortunate," he concludes. "We've always had great bands in here. And I've always felt that when the customer comes through here, once they've booked in, it's their place, their room. And I'll bend over backwards to keep them happy. I make sure that clients get out of the place what they need. And it's worked well over the years."

"You'll be surprised when you

Indie faves Silkworm recorded for their next Matador release at Robert Lang Studios in Seattle. Clockwise from top left are incorrigible recordist Steve Albini and bandmembers Michael Dalquist, James Hale, Tim Midgett and Andy Cohen.

Chic freaks the Butthole Surfers mixing at NRG Recording (North Hollywood, Calif.): L to R are producer/engineer Matt Wallace, singer Gibson Haynes, assistant John Ewing Jr. and guitarist Paul Leary.

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PHOTO: MAUREEN DRONEY

In session at Grandmaster: producer J.P. Plunier (L) at the Neve with engineer Todd Burke; Virgin recording artist Ben Harper and assistant engineer Erica Stephenson look on.

walk through the door," Grandmaster Recording Ltd.'s owner Alan Dickson had promised me, and he was right. I'd never been there, and it was a good day for a visit. The rain was over, the air was clear and so were the freeways. It was that perfect Los Angeles December day—sunny, smog-free, and the drive from Woodland Hills to Hollywood took only 20 minutes. (Eat your heart out, New Yorkers.) Once there, I coasted to a stop on a funky block of Cahuenga and rang the bell to what looked to be a deserted storefront. But behind the streetside broken windows and boarded-up facade was a comfortable and creative atmosphere where I found guitarist/songwriter Ben Harper in working on the Neve 8028 console for his third Virgin Records release.

"The sound starts at the door here," laughed Harper's co-producer J.P. Plunier, referring to the original construction of the facility, which was begun 25 years ago, and at the time had been

Organist Eddie Layton commemorates 30 years of playing for the New York Yankees with a new album of classic baseball themes and medleys out next month on Silva Screen Records. Pictured are (L to R) label president/CEO Yusuf Gandhi, director of sales Ivan Galdberg, Layton and director of promotion Melanie Masterson.

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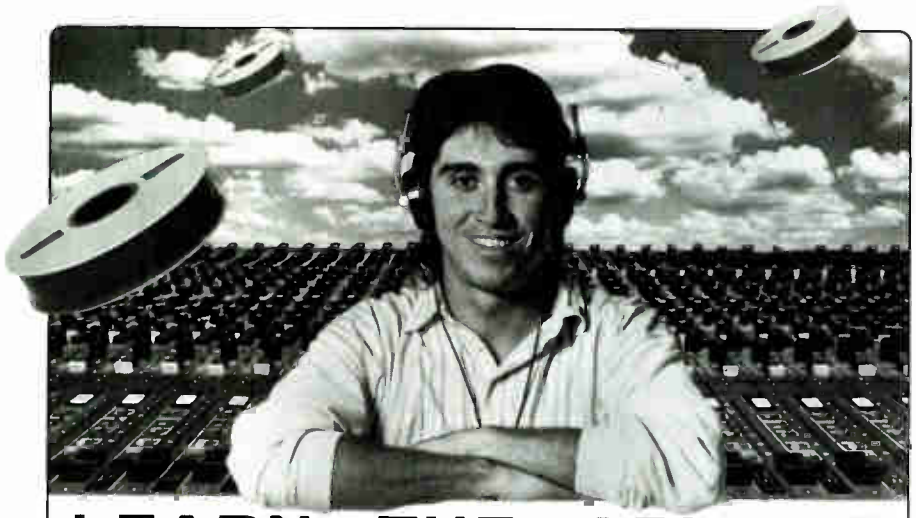

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acoustically state-of-the-art. That sound is working again, and Grandmaster has recently played host to clients No Doubt, Social Distortion, Red Hot Chili Peppers, the Goo Goo Dolls and Black Crowes.

Owner Dickson started our tour in the original studio space, A, which was set up for vocals. The old-fashioned, 35x35x14-foot room was filled with Harper's extensive guitar collection, and he took time out to show me his National and Weissenborn axes and to give a mini lecture on their history before we proceeded. Immediately behind the main studio was B, another, more hard-edged room also used frequently for drums and guitars. "This room is funky but famous," commented Dickson, explaining that in the drum machine-happy '80s much sampling of live drums had been done there by those enamored of the room's live acoustics.

Still further, behind B, stretches a huge warehouse/garage, 5,600 square feet complete with a tieline-equipped stage, upon which bands from Tool to Los Lobos have recorded tracks. The garage has a grungy, road-warrior look, and it has been the site of several videos, including one for Matthew Sweet. It's also been the site of what Dickson calls "cruelty to pianos," when the Sylvia Massey-produced Tool were recorded torturing one of the instruments with crowbars and sledgehammers, with the coup de grace being an attack with shotguns, some of whose pellets remain embedded in the warehouse's back wall.

From there we trekked back through the recording rooms and headed up a brass-railed spiral staircase to the lounge, a rustic room with a cozy fireplace and television, where we settled in for a few moments while Dickson explained a little about Grandmaster's past. Originally the site of the Hollywood Fuel & Feed Yard, complete with parking for horse-drawn buggies in the back, the site was taken over in 1971 by Dickson, a musician who (foolishly, he now says!) wanted his own studio. In those early days some of Stevie Wonder's *Songs in the Key of Life* was recorded there, and the studio kept growing, with its owner finding, in that common quandary of all musician/studio owners, that he was spending more time keeping the studio running than making music. Still, he continues occasionally hands-on with projects to this day, although he ruefully comments that his last production was a couple of years

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ago for the Swedish band Mogg. "It's just the way it worked out," he says. "Like today, when you leave, I'll head into the shop and fix some cables. It keeps you busy—there's always something to maintain." That maintenance has gotten easier in the last year, though, since Neve designer and technician Geoff Tanner has opened up an on-site workshop.

Grandmaster's control room features that previously mentioned 32x16x24 Neve 8028, a wise purchase made seven years ago, and includes eight vintage RCA/Altec tube mic preamps, along with a Studer 827 and an MCI JH24. On hand for outboard are, among other items, Fairchild 670 limiter/compressors, Altec A 322C limiters, Neve 2254s, Pultec EQ, AMS Reverb, an Eventide H3000 and what the Grandmaster staff refers to as their EMT 140 "Thunder Plate."

Upcoming in '97? Grandmaster is looking forward to tracking for the Foo Fighters new release. ■

Got L.A. news? Fax it to Los Angeles editor Maureen Droney at 818/346-3062.

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—FROM PAGE 182, NY METRO

tations and special events such as the Super Bowl (and which also has a branch in Orlando, Fla.). "Broadway has changed in the last decade. It used to be a bunch of people down front singing, and everyone could hear them. Now they're running around all over the stage and have helicopters to deal with."

That reference to *Miss Saigon*'s massive (and loud) stage prop gives an idea of what shows are up against, soundwise. In response, the sound designer has become as crucial to the success of a Broadway show as the director. "Audio special effects have become integral parts of major Broadway productions," explains DeBuys. "But the director can't know what every piece of gear like a harmonizer or delay is, so the sound designer listens to the show and then works with the director putting the right equipment into the production." Some of the special effects are prerecorded at ProMix's own studio (formerly AFI) in Manhattan, where sound designers work on a coincidentally but aptly named Yamaha ProMix 02R console.

ProMix, which does shows including *The Hunchback of Notre Dame, Rent, A Christmas Carol, Sunset Boulevard, Showboat* and the forthcoming Andrew Lloyd Weber spectacular *Whis-*

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LOS ANGELES RECORDING WORKSHOP

tle Down the Wind, has been putting ever-larger sound systems into Broadway houses to cover the larger sound needs of shows, mainly EAW systems with 860 cabinets. Small footprint consoles like the Cadac ones that ProMix uses are preferred because, says DeBuys, "They need to lose as few seats as possible for sale to help defray the high cost of these productions."

Showboat alone uses 48 Sennheiser Mk50 wireless microphones, and eight racks of Sennheiser EM1046 wireless receivers. Delays, harmonizers and reverbs fill up outboard racks in Broadway theaters that many studios would envy. (The limited-run *A Christmas Carol* has 50 channels of wireless and 60 Motorola walkie-talkies at MSG's Theater, also known as RF Central.) Monitoring remains fairly conventional, using EAW stage wedges, although there is an occasional call for the Garwood in-ear monitoring that ProMix distributes for.

Domonic Sack is director of operations for Sound Associates (www.soundassociates.com), a Manhattan-based company that works with both Broadway and broadcast, providing equipment and expertise for shows such as *Smokey Joe's Cafe*—which was one of the first shows to use wireless headsets to fend off feedback from the complex monitoring system—*Beauty & the Beast* and *Victor Victoria*. He says that as sophisticated as the main house sound systems are, they sometimes pale in comparison to the house intercom systems. "Broadway may seem like a narrow niche in audio, and it is, but it's a niche with a lot of aspects, more so than even television or live sound," Sack says. "Not only are there between 25 and 35 wireless microphones running during a performance, but also six to 12 stations of wireless intercom and that many again of walkie-talkie communications. And this is on top of all the usual theatrical systems. As a result, frequency coordination is a very specialized part of the process. And the reason is because the shows have gotten so complex. The stage manager has to manage hundreds of cues during a show, to the winches, to the fly floor, to the carpenters, to the lighting electricians. You need a very sophisticated communications system to talk to everyone through the show."

Another component that falls to audio to manage is the closed-circuit video, which also comes under the heading of internal communications. Stage hands and performers need to get their cues from the conductor, who in these complex productions is often un-

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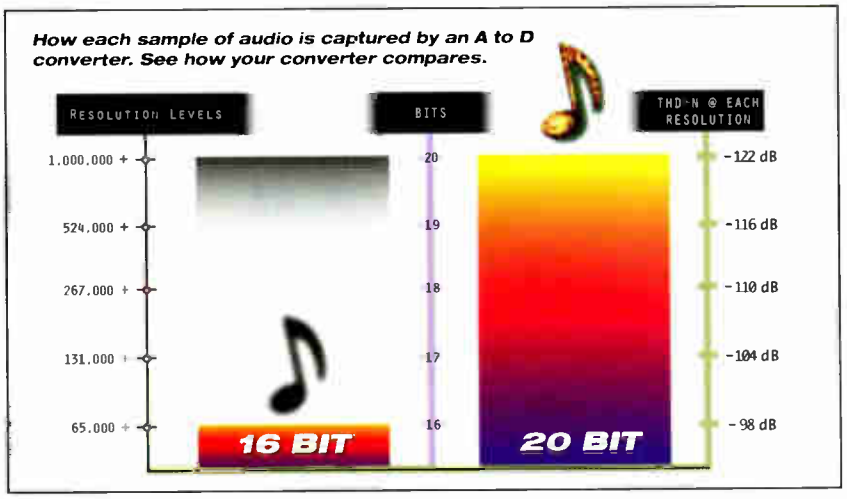

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derneath a covered pit in another room altogether. And the FOH mixers and lighting personnel also need to see the degree of various stage set movements. "It's far more complex than it looks from the audience," Sacks says.

BASF Magnetics held a tape shootout at Avatar Studios in late October. An invited audience of engineers, producers and studio owners came to make their own comparisons of BASF's SM900 and Quantegy's 499 and 3M 996, which Quantegy now manufactures. Mic signals were pumped through a Neve VRP console, then to three matched Studer A800 MkIII decks, then fed through Genelec 1031A and Yamaha NS-10 monitors. ■

Spotted a New York trend or significant upgrade? E-mail Dan Daley at danwriter@aol.com or fax 615/646-0102.

—FROM PAGE 183, SESSIONS & STUDIO NEWS

Alpha Studios in Burbank, producer Dave Donnelly and producer/engineer Gary Brandt remixed the Red Hot Chili Peppers' version of Ohio Players' classic "Love Roller Coaster." The Peppers first cut the tune for the recent *Beavis and Butthead* movie soundtrack...ZZ Top remixed their single "Bang Bang" with production team Bar Nine and mixing engineer Stoker in Studio A at Paramount Recording in Hollywood...At Image Recording (Hollywood), engineer Chris Lord-Alge mixed tracks for Rocket Records artist Daniel Cartler's debut with producer Fred Maher and assistant Michael Dy...Rob Chiarelli mixed songs for Chrysalis/Echo act D-Influence at the Enterprise Studios (Burbank) with assistant Jimmy Hoyson...

NORTHEAST

At Studio 4 Recording (Conshohocken, PA) Geffen newcomers Snot mixed their debut with Butcher Bro. Phil Nicolo. Interscope act Goat Boy was also in, mixing with both Butchers, Phil and Joe Nicolo...Producer Daniel Cantor mixed a new live album for Rick Berlin at Notable Productions in Watertown, MA. Cantor also worked on tracks for the new Hummer release...Rockabilly guitarist Paul Burlison tracked for an upcoming Sweetfish Records release at Sweetfish Recording with help from musicians Kim Wilson, Jim Wieder and Richard Bell. Doug Ford engineered...At BearTracks Recording (Suffern, NY) Spanish artist Edu Engonga cut basic tracks for EMI with producers Pepe Dougan and Victor Feijo, engineer Stan Wallace and assistant Rick Pohronezny...David Ivory engineered the sophomore DGC album by The Roots at his studio housed in Philadelphia's legendary Sigma Sound...Boston rockers Angry Hill demo'd new songs at hometown studio Sound Techniques with producer/engineers Ted Paduck and Mark Jackson...Jon Lucien worked on MIDI and pre-production material for his next Shanachie release at East Side Sound in New York City with engineers Lou Holtzman and Federico Panero...Q-South recorded their debut for new label Times Square Records with producer Susan Rogers at Baby Monster Studios in New York City...Producer Tony Moran mixed new singles for Arista smoothies Kenny G. and Barry Manilow on the Neve VR60 in the new Studio A at Infinity Studios (Brooklyn, NY) with engineers Bob Rosa and Dave Saronson...

NORTHWEST

Sasha Konietzko of KMFDM produced a new record for Mercury artists Treponem Pal at Seattle's Sound House Recording. Scott Crane engineered... Leftover Salmon tracked

Rock quintet Ampage worked on their Higher Source Records debut at Hollywood's Cherokee Studios. Bandmembers look on as producer Duane Barron (L) and engineer Jeff Claven work the board.

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The Swing Journal Magazine All-Stars tracked a Milestone release in Studio A at Clinton Recording in New York City. Pictured (L to R) are Benny Golsen, Roy Hargrove, Grover Washington Jr., engineer Troy Halderson and Ed Thigpen.

PHOTO: KIERAN CONNELLY

and overdubbed for Hollywood Records in Studio A at the Kerr/Macy Music Group (Denver, CO) with producer/engineer Justin Niebank and assistant Jeremy Lawton...New remote recording facility Real Image Recording (Portland, OR) tracked bluesman Curtis Salgado at three Oregon shows, recording to Sony PCM 800...

NORTH CENTRAL

Producer Bob Rock finished Veruca Salt's highly anticipated new Outpost/Geffen release in Studio 5 at the Chicago Recording Company with help from engineers Randy Staub and Brian Dobbs...Former members of The Jayhawks mixed a new, as-yet untitled American Recordings project at Smart Studios in Madison, WI, with producer Brian Paulson and engineer Mark Haines...Pink Noise Test mixed their Interscope debut with Van Christie at Warzone Recorders in Chicago. Jason McNinch engineered...Producer Big Jim Wright and engineer/programmer Jeff "Madjef" Taylor were in Jam & Lewis' Flyte Tyme Studio A and Oarfin Studios in Minneapolis working on remixes of the single "This Weekend" for A&M recording artist Ann Nesby...

SOUTHEAST

The Georgia Mass Choir overdubbed for the Disney movie *The Preacher's Wife* at Doppler Studios in Atlanta, GA. Nick Gleny-Smith produced the sessions, and Joseph Magee and Mike Wilson engineered...At House of Blues Studios in Memphis, TN, Collective Soul tracked and mixed an upcoming Atlantic release with producer Ed Roland, engineer Greg Archilla and assistant Malcolm Springer... Tammy Graham overdubbed and mixed for Arista at Masterfonics (Nashville) with producer Barry Beckett, engineer Csaba Petocz and assistant David Hall...Mark O'Connor remixed a self-produced release for Sony Classical with engineer Dave Sinko at Sound Emporium in Nashville...Metal masters Obituary tracked for their fourth Roadrunner Records project at Criteria Recording in Miami with producer/engineer Jamie Locke and assistant Chris "Scooby" Spahr...

SOUTHWEST

K-Pop mixed their debut release for Nub Records at the label's facility, Nub Studios, in Norman, OK. Corey Roberts engineered and co-produced with the band...

STUDIO NEWS

New owners for Sugar Hill Studios in Houston, TX: longtime studio engineers Andy Bradley, Rodney Meyers and Dan Workman (under the name RAD Audio Inc.) purchased the two-room complex and plan to replace it with an entirely new, three-room design to be built in downtown Houston...Santa Monica, CA, music recording and post-production house Leeway Studios opened its doors this month. The studio button-designed facility features Tascam DA-88 and Sony ¾-inch digital multitracks, tons of outboard and fresh air...Big Round Records opened a new professional ½-inch 8-track recording facility in Dodge City, KS, for in-house use and for hire. ■

DELTRON GOTHAM

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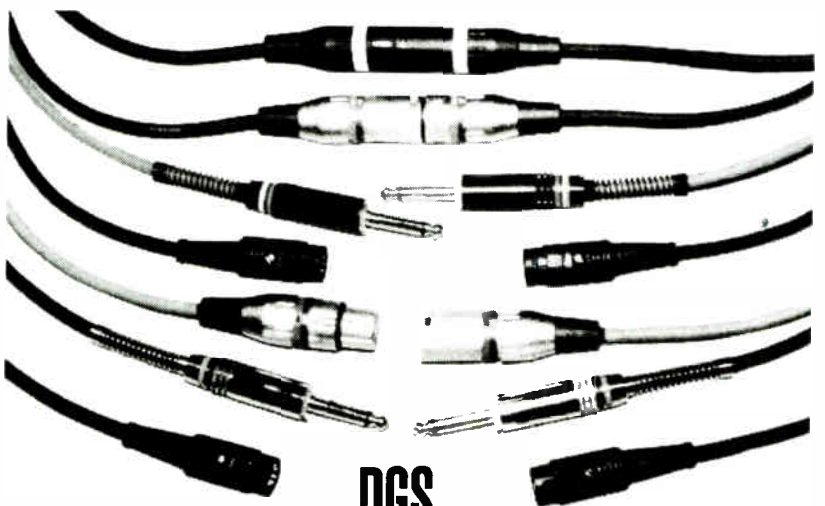

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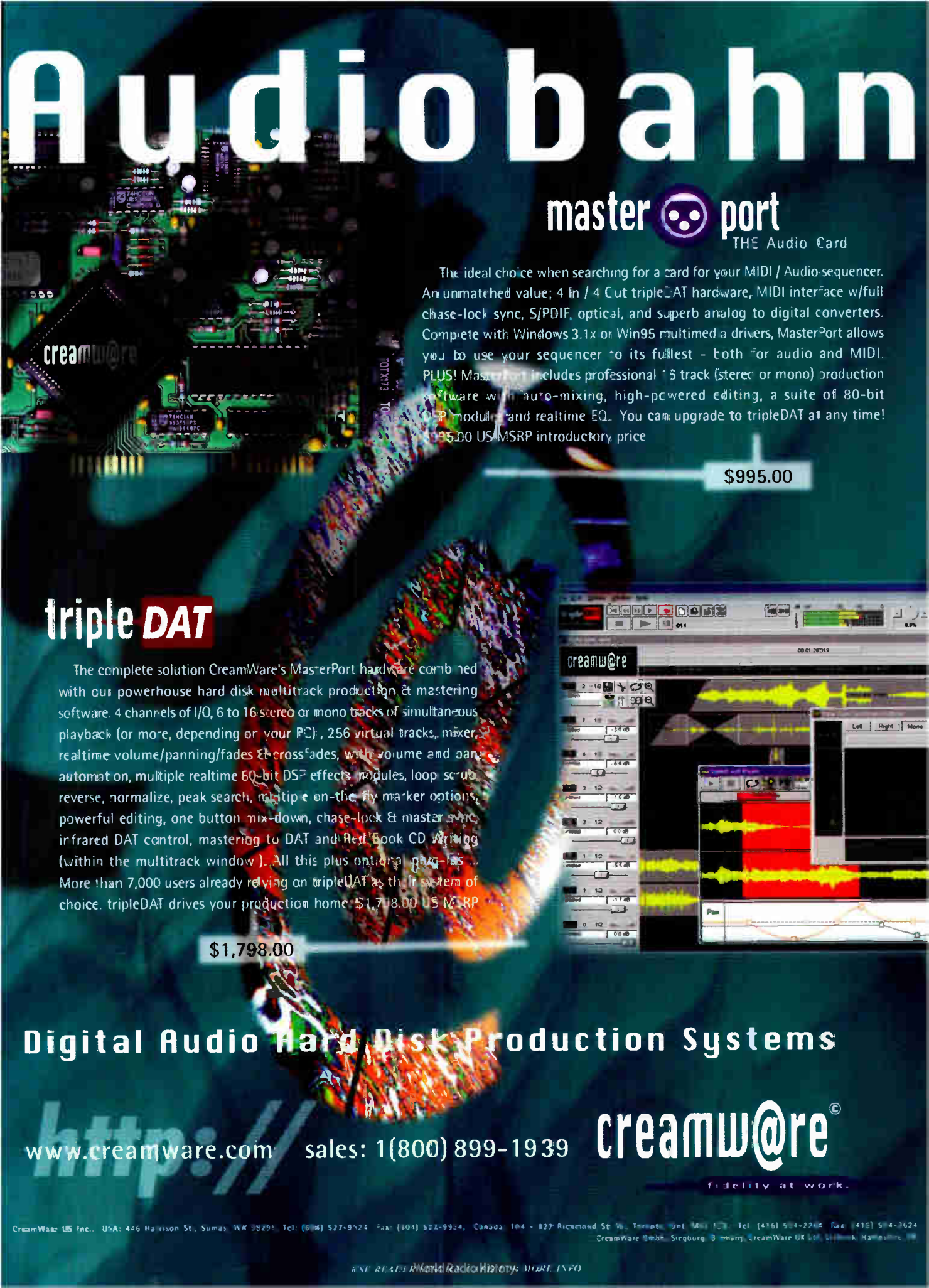
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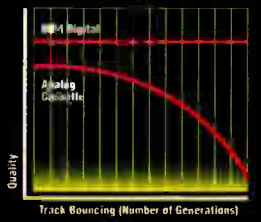

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South Point Productions is a place where the subtle things get noticed and make a difference. Our professional, friendly atmosphere encourages innovative production. The studio relies on 32 tracks of digital audio, an API Legacy console, Pro Tools DAW, plus an extensive line of MIDI equipment to best produce the kind of music your project requires; from audio post to full-length albums.

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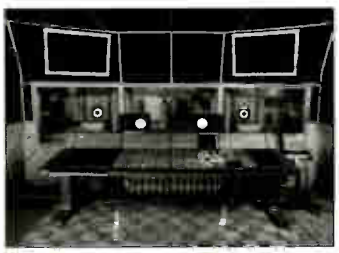
Santa Fe Center Studios in Albuquerque, New Mexico is uniquely qualified to offer the most flexible audio production facility in the Southwest: 2 control rooms, 6 isolation chambers, each with varied qualities running the gamut of acoustics from no influence, small, medium, large live reflective influences to a delay/reverberant chamber. MIDI/dubbing production suite also available. Equipment from Focusrite, Lexicon, Apogee, Digidesign, Amek, Eventide, Sony. Escape the big city and give your next project the attention it deserves.



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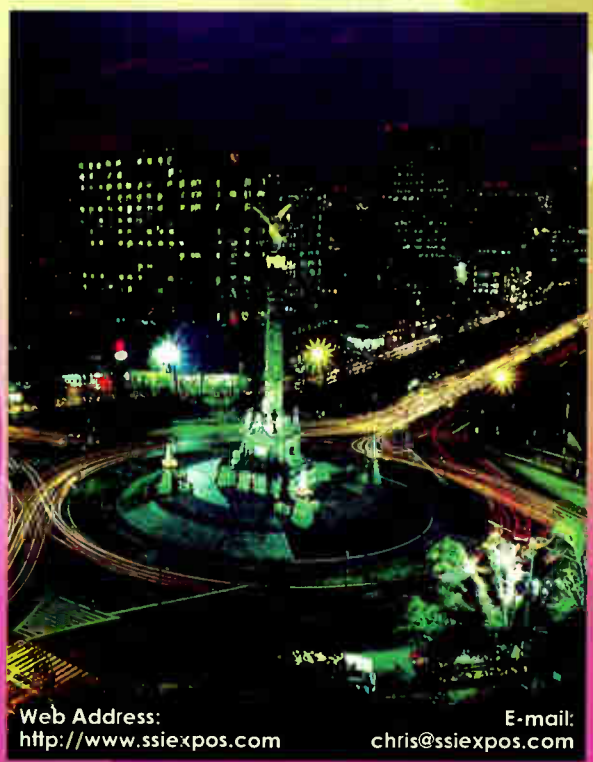

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102 MKII / 103
Stereo Mixdown Cassette Decks

Best values for musicians, studio operators and production houses, the 102 MKII and the 103 consistently produce only the highest quality tape recorded output

They Feature:
- 60dB signal-to-noise ratio and wide frequency response using any type of cassette tape.
- Dolby B/C noise reduction and Dolby HX Pro extends high frequency performance up to 6dB and minimizes distortion.
- Bias -sensing electronics automatically chooses best recording settings for the type of tape you load – Normal, Metal or CrO2
- Record/Mute autospacer automatically inserts 4 seconds of silence between songs or broadcast segments
- Independent L / R stereo level and master record level controls

Tascam 103 Advanced Features:
- 3-head system allows you to record on a tape and monitor it at the same time, without rewinding
- MPX filter button eliminates pilot and sub carrier broadcast tones that can interfere with Dolby noise reduction

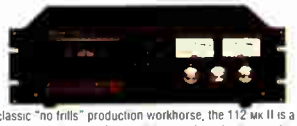
202 MKIII
Dual Auto Reverse Cassette Deck

Provides high-fidelity sound reproduction and a wide frequency response, as well as a host of features to help you easily dub, edit, record or playback onto/from one or two cassettes.
- Normal speed and high-speed dubbing
- 4-second autospacer
- Dolby HX Pro sound extends high frequency performance and minimizes distortion on Normal, Metal and CrO2 tape.
- Create a professional-sounding composite tape from several sources. Functions like Intro Check, Computerized Program Search, Blank Scan and One Program quickly find the beginning of tracks you want
- Twin two-head cassette decks in a durable rack-mount housing that can be used separately or in tandem during recording and playback for total flexibility.

302
Double Auto Reverse Cassette Deck

All the features of the 202 MKIII ,plus more recording and playback flexibility. Thats because the 302 is actually two independent cassette decks, each wit their own set of interface connectors, transport control keys and noise reducing functions
- Auto-reverse capability on both decks
- Individual/simultaneous record capability--both decks
- Independent RCA unbalanced in/out for each deck
- Cascade and Control I/O let you link up to 10 additional machines for multiple dubbing or long playing record and playback applications

112 MKII
Stereo Cassette Deck



The classic "no frills" production workhorse, the 112 MK II is a 2-head, cost effective deck for musicians and production studios Extremely rugged and reliable, the 112 MK II is ideal for production mastering and mixdown. It also features a parallel port for external control an and optional balanced connector kit means it is flexible enough to integrate into any production studio.

112R MKII
Bi-Directional
Stereo Cassette Deck

The 112R MKII is a sonically uncompromising, auto reversing and continuous play cassette deck. It offers the finest independent head auto-reverse design at this price level, plus it has extra dubbing and editing features for long program recording.

All the features of the 112 MK II *plus*—
- Three-head transport with separate high-performance record and playback heads. The heads combine with precision FG servo direct-drive capstan motors to provide the highest standards of reproduction quality and performance.
- Hysteresis Tension Servo Control (HTSC)virtually eliminates wow and flutter rby maintaining consistent back tension on the tape all through the reel, combatting inconsistencies brought on by extreme temperatures and humidity.
- Auto Reverse mode plays or records in both directions before stopping, switching sides on the fly.
- Continuous Reverse mode allows you to loop the tape during; playback up to 5 times, or record in both directions, without pausing to flip the tape and re-engage the record mechanism.

marantz

CDR620 Compact Disc Recorder

The CDR620 is a next-generation stand-alone write-once CD recorder. It offers a truly comprehensive set of features for a wide range of applications including recording studios, mastering facilities, post production, broadcast and more.
- Includes a sample rate converter, a DAT start ID/CD track converter, auto-increment mode, an ISRC encoder, programmable digital fade-in/out and an index recording capability.
- SCSI-2 interface for connection to popular hardware/software and virtually any PC for use as a CD-ROM recorder.
- High oversampling 1-bit A/D (64x) and D/A (128x) converters.
- Subcode sensing or adjustable level sensing for automatic track incrementing. Also supports manual track incrementing.
- Wired remote provides control and status of all CDR620 operations. Both index and ISRC code recording can be activated, as well as catalog number recording (EAN/UPC). The remote also supports copy prohibit on/off and emphasis on/off.
- Ignores SCMS (Serial Copy Management System), permitting unlimited archiving.
- Has a comprehensive array of analog and digital inputs/outputs, including multiple digital audio interfaces (AES/EBU and IEC-958-II) and balanced +4/-10dBu selectable analog input and +4dBu balanced analog output
- Cascade feature provides simultaneous parallel operation of multiple machines, and a 9-pin parallel (GPI) interface facilitates external automation.

PMD-101/201/221/222/430
Portable Professional Cassette Recorders

The world standard for field recording, the PMD line is also the value leader. They all feature RCA line input/outputs, 1/4-inch headphone jack, built-in speaker, pause control, audible cue and review, tape counter, full auto shut-off and low battery indicator.
- All models except the PMD-430 have 1/2 speed playback/record capability. With 1/2 speed playback, musicians can slow down complicated passages for analysis. And when played back at 1/2 speed, the pitch is lowered by exactly one octave, so the notes are still musically correct—ideal for figuring out complicated solos or picking patterns
- By recording at 1/2 speed, a three hour meeting can be recorded on a single tape. A built-in mic and automatic level control make operation simple, and built-in speaker makes transcription convenient.
- 1/2 speed recording is equally ideal for churches, because 90 minutes can be recorded on a single side of tape—no interrupting to flip the tape over.
- Three standard 'D' cell batteries provide up to 7-1/2 hours of operation and the optional RB430 rechargeable battery delivers up to 5-1/2 hours.

General	PMD-101	PMD-201	PMD-221	PMD-222	PMD-430
Stereo/Mono	Mono	Mono	Mono	Mono	Stereo
Heads	2	2	3	3	3
Inputs/Outputs					
Mic Input	1/4-inch	Miniplug	Miniplug	Mini/XLR	1/4-inch
Condenser Mic	Built-In	Built-In	Built-In	Built-In	—
Remote Jack	—	Yes	Yes	Yes	—
Modular Tel. Jack	—	Yes	Yes	Yes	—
External Speaker Jack	—	Yes	Yes	Yes	—
Record Controls					
VU Meters	—	1	1	1	2 (illuminated)
2-Speed Recording	Yes	Yes	Yes	Yes	—
Dolby B NR/dbx NR	—	—	—	—	Yes
Mic Attenuation	—	0,-10dB, -20dB	0,-10dB, -20dB	0,-10dB, -20dB	0,-15dB, -30dB
Ambient Noise Cont.	—	Yes	Yes	Yes	—
MPX Filter	—	—	—	—	Yes
Manual Level Control	—	Yes	Yes	Yes	—
Limiter	—	Yes	Yes	Yes	Yes
ALC	Yes	Yes	Yes	Yes	—
Peak Indicator	—	—	Yes	Yes	—
Playback Controls					
Pitch Control	±20%	±20%	±20%	±20%	±6%
Bias Fine Adj.	—	—	—	—	Yes
Tone Control	Yes	Yes	Yes	Yes	—
Memory Rewind	—	—	Yes	Yes	Yes

Telex

ACC2000/4000 Cassette Duplicators

Designed for high performance and high production, Telex duplicators also offer easy maintenance and ease of use. The ACC2000 is a two-channel monaural duplicator, the ACC4000 is a four-channel stereo duplicator. Each produces 3 copies from a cassette master at 16X normal speed and with additional copy modules you can duplicate up to 27 copies of a C-60 original in ***under two minutes.*** And they copy both sides at once.
The XL Series feature "Extended Life" cassette heads for increased performance and wear characteristics. They also offer improvements in wow and flutter, frequency response ,S/N ratio and bias.

Easy Maintenance:
- Slanted work surface and "heads-up" cassette platform prevent oxide build up on the heads and makes cassette loading and unloading easier.
- Three point tape guidance system eliminates skew problems and prevent unnecessary wear and tear on the tape head mechanism.
- Audio and bias, along with head adjustments, are made easily from the top of the unit and a switch on the back engages the head and pinch roller for convenient cleaning.

Fingertip Operation
- Individual rotary audio level controls
- Peak reading LED indicators
- Side A or A/B select button
- Stop all tapes instantly, at any point during the copy or rewind cycle.
- Short tape indicators alert you if a tape stops before the original does, identifying incomplete copies caused by jam or short.
- Automatic or manual selection of rewind and copy operation;
  –Rewinds tapes to the beginning or end automatically (AUTO mode) or manually.
  –In AUTO mode the copy button activates the entire rewind/copy/rewind sequence. In manual it starts copying immediately.

ACC2000 Mono MasterModule:
- 1/2 track,two-channel monaural duplicator produces 3 copies from a cassette master at 30 ips (16X normal speed).
- Expands up to 27 positions by adding ACC2000 copy modules.

ACC2000 XL Mono Master Module:
- Same features as ACC2000, ***plus***– Extended Life cassette heads.

ACC4000 Stereo Master Module:
- 1/4 track, four-channel stereo duplicator. Same features as ACC2000 Mono Master Module/

ACC4000 XL Stereo Master Module:
- All features as ACC4000, ***plus***– Extended Life cassette heads. Can be configured for chrome or ferric cassette duplication.

ACC2000 Mono Copy Module:
- Each module has four copy positions with erase heads and controls for side select.
- LED displays indicate end-of -tape status for each pocket.

ACC2000 XL Mono Copy Module:
- Same features as ACC2000 Copy Module, ***plus***–Extended Life cassette heads. Connects to ACC2000 XL Master Module.

ACC4000 Stereo Copy Module:
- Same as ACC2000 Copy Module except 1/4 track,four-channel

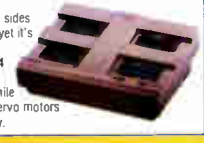
ACC4000 XL Stereo Copy Module:
- Same as the ACC4000Copy Module, ***plus***–Extended Life heads. Configurable for chrome or ferric cassette duplication.

Copyette EH Series Duplicators

The Copyette series produce high quality, low cost cassettes in large quantities at nearly 16 times normal speed. Available in two versions,the Copyettes are capable of duplicating either one cassette or three at a time. Also available in both mono and stereo models.

Stereo Copyette 1•2•1
Weighing only 8 lbs. (3.6 kg), this unit has a durable, impact resistant housing and includes a removable power cord, carrying handle and protective cover An optical non-reflective end-of -tape sensing system that provides gentle tape handling

Stereo Copyette 1•2•3
This duplicator copies both sides of three cassettes at once, yet it's as small as the 1•2•1. It weighs only 12 pounds (5.4 kg) and includes a hard cover to protect the unit while not in use. It uses all DC Servo motors for the ultimate in reliability.



Equitek Series
Studio Condenser Mics

The "bench mark" for cost and performance, the Equitek series of microphones incorporate a unique servo design and exceptional flexibility to provide extraordinary ballistic capability and exceptional transient response.

Shown with optional ZM-1 Shockmount

E-300

A multi-patterned side address mic that combines vintage capsule design with advanced head-amp electronics, the E-300 has an unusually wide frequency response of 10 Hz to 20 kHz and an exceptional dynamic range of 137 dB. Also extremely low self noise of 11dB. Ideal for the most critical applications.

Unique powering of all mics is accomplished with a pair of rechargeable nicad 9-volt batteries in combination with 48-volt phantom power. This overcomes inherent current limiting associated with most phantom power supplies and can supply ten times the current.

E-200/E-100

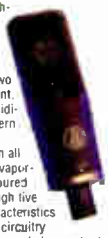
The first member of the current Equitek family, the E 200 is also a dual capsule side address multi-pattern condenser mic, but with lower specifications than the E-300. The E-100 uses the same electronics as the E-200, but with only one of the same capsules in a supercardioid pattern.
- Frequency response of 10 Hz to 18 kHz
- Dynamic range of 137 dB • Low self noise of 16 dB

audio-technica.

AT4033
Cardioid Capacitor Microphone

The AT4033 is a transformerless, studio microphone designed for use in the most demanding applications.
- Utilizes a gold-plated, "aged-diaphragm" condenser element with an internal baffle plate to increase signal-to-noise ratio, which coupled with low-noise transformerless electronics, makes the AT4033 ideal for critical digital recordings.
- Dynamic range is 123 dB without the built-in attenuator.
- Accepts up to 140 dB SPL without capsule or electronic-system distortion above 1% T.H.D. and a built-in switchable 10 dB (nominal) pad increases it to 150 dB.
- 2-micron-thick vapor-deposited gold diaphragm provides accurate reproduction of even the most subtle sounds.
- Permanently installed internal open-cell foam windscreen.
- Integral 80 Hz hi-pass filter for easy switching from a flat frequency response to a low-end roll-off.

AT4050/CM5
Multi-pattern Studio Capacitor Microphone



Supremely transparent and accurate, without sacrificing warmth and ambiance, the AT4050 expands upon the AT4033, to set the standard for studio performance mics.
- New large-diaphragm design utilizes two capacitor elements to provide consistent, superior performance in cardioid, omnidirectional and figure-of-eight polar pattern settings.
- To achieve a warm, true-to-life sound in all polar pattern settings, Audio-Technica vapor-deposits pure gold onto specially-contoured large diaphragms which are aged through five different steps to ensure optimum characteristics over years of use. The transformerless circuitry results in exceptional transient response and clean output even under extremely high SPL conditions

SENNHEISER

HD 265

The HD-265 is a closed dynamic stereo HiFi/professional headphone offering a high level of background noise attenuation for domestic listening and professional monitoring applications. It is a suitable choice for monitoring applications in professional studios and to match the top of the range HiFi systems, delivering a clear and tonally balanced sound with a minimum of distortion

HD 580

The HD 580 is a top class open dynamic stereo HiFi/professional headphone. The advanced design of the diaphragm avoids resonant frequencies. The HD 580 can be connected directly to HiFi systems of the highest quality, in particular DAT, DCC, and CD players. This headphone is an ideal choice for the professional recording engineer recording classical music

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APHEX

106 Easyrider
4-Channel Auto Compressor

- Four individual channels in one rack space
- Automatic layered attack and release times
- Independent switches for fast or slow processing
- Dial in compression up to 20 dB
- Independent on/off switches
- -10 dB/+4 dB switch on each channel
- Voltage Controlled Attenuator (VCA) 1001 outperforms all other VCA's.
- Linkable pairs for stereo applications

107 Tubessence
Dual Channel Thermionic Mic Preamp

The 107 provides two discrete preamp channels, each with its own dedicated controls. A switchable 48 volt phantom power supply makes it compatible with all mics. The 107 delivers outstanding sonic performance, as well as a great degree of presence, detail, openness and image. It also provides extended high frequency response without any harshness and an improved bass response.

- Two independent channels with front panel XLR inputs
- Up to 64dB of gain available
- 20dB pad with red LED indicator
- Two LED input meter
- Full 48 volt Phantom power with red LED indicator
- Low cut filter with red LED indicator, 80Hz, 12dB/octave
- Polarity inversion switch with LED indicator
- Individual channel remote mute capability
- Switchable +4dB/-10dB output with 1/4" TRS phone jacks

TUBESSENCE: Combines the best attributes of both tube and solid state circuitry to provide performance unmatched by conventional designs. The solid state front end is transformerless and only expensive, great sounding capacitors are used in the signal path. The tube circuit imparts the sonic characteristics of tubes without the extremely high voltages, heat, fragility, and short life span of conventional tube circuitry.

109
Parametric EQ with Tubessence

The Aphex 109 is an extremely versatile and high performance single rack space parametric vacuum tube equalizer with unique features, flexibility and sound.

- True tube circuit (Tubessence) in the output stage for a "warm", "sweet" and "rich" sound
- Dual (stereo) two band or mono four band equalizer configuration offers flexibility for general sweetening to critical problem solving situations
- In Dual Mode each channel has +/- 10dB of input gain, a Low-Mid (20Hz-2kHz) band and a Mid-High (200Hz-20kHz) band
- Each band has +15dB/-15dB boost or cut with center detent (flat), sweepable frequency adjustment, variable bandwidth, and switchable peak or shelving filter mode.
- Operates in the EQ flat (calibrated center detent) mode yet still passes signal through the Tubessence vacuum tube stage. This is helpful for "warming up" digital signals.
- 1/7- octave to 2 octave bandwidth adjustment
- Switchable -10dBV/+4dBu operating level

t.c.electronics

Wizard M2000
Studio Effects Processor

The M2000 features a "Dual Engine" architecture that permits multiple effects and six different routing modes. There are 250 factory programs including reverb, pitch delay, delay, chorus, flange, phase, ambience, EQ, de-essing, compression, limiting, expansion, gating and stereo enhancement. The M2000 also features 20-bit analog conversion, AES/EBU and S/PDIF digital inputs/outputs, "Wizard" help menus, 16 bit dithering tools, Tap and MIDI tempo modes and single page parameter editing.

- The array of enhanced pitch shift (up to 8 voices), chorus, and delay effects are characterized by their precision and versatility. Everything from the fine and subtle to the wide and spectacular is handled with equal superiority. The algorithms in the dynamics section are unique as stand-alone effects, but are particularly useful in combination with other effects. Those might be de-esser/room, gated hall or compressed pitch. The possibilities are endless.
- Tempo Tap function allows tempo to be adjusted in beats-per-minute and sub-divided any way you like—even in triplets. The tempo can also be read from MIDI.
- Preset "Gilding" (morphing) function ensures seamless transition between effects. Very useful in mixing situations

ALESIS

3630 Compressor
RMS/Peak Dual Channel Compressor Limiter with Gate

The most powerful compressor in its class, the 3630 is a dual-channel compressor that offers Ratio, Threshold, Attack and Decay controls to handle the toughest signals. It also offers a choice between RMS and Peak compression styles, plus Hard and Soft Knee dynamic curves for every application from subtle gain control to in-your-face punch. Ideal for use in applications from studio recording and mixing to live sound reinforcement and broadcast.

- Dual mono or linkable true stereo operation.
- User selectable Peak and RMS compression styles as well as hard knee /soft knee characteristics.
- Dual 12-segment LEDs display gain reduction and input/output levels.
- Each channel's built-in noise gate has an adjustable threshold and close rate to ensure clean, transparent performance.
- Sidechain input for ducking and de-essing.
- 1/4-inch inputs/outputs switchable for -10dB and +4dB.

M-EQ 230
Dual 1/3 Octave/Precision Equalizer

Used extensively in recording studios since 1989, the M-EQ 230 provides 60 bands of EQ in a single rack space. Covering every band from 25 Hz to 20 kHz in 1/3 octave increments the M-EQ 230 is ideal for tuning the monitors in your project studio or even getting the most out of a home stereo setup.

- Two independent 30-band 1/3 octave graphic equalizers
- Engineered with Alesis' Monolithic Integrated Surface Technology gives you more features and better audio performance than many 2-space rack devices
- Equipped with 1/4" and phono jacks
- Auto Power Muting function protects your components form power on/off transients
- In/out switch allows you to easily compare your original signal to the equalized sound

NanoVerb
18-bit Digital Signal Processor

The NanoVerb breaks new ground in performance and sound by implementing an advanced, high-fidelity digital signal processor in an ultra-compact, easy-to-use and incredibly affordable package. If you're on a tight budget, you want to check out the Nanoverb, it has the features you need to get started.

- Introduces 16 powerful preset effects, including hall, room, plate and non-linear reverbs, true stereo chorus, flange and delay.
- Also includes three multieffects programs—chorus/room, chorus/delay/room and rotary speaker/room—allowing you to achieve a complete instrument or vocal effects setup from a single unit.
- Adjust knob provides complete control over delay time, reverb decay etc. by allowing you tweak each program until it's just right for your music.
- Equipped with professional 18-bit A/D and D/A converters and a 20-bit internal processor that operates at three million intructions per second.
- Front-panel includes input level, effects mix, output level, program and adjust controls and dual-color signal input/clip LEDs. Rear panel interfaces include stereo 1/4-inch input and output jacks.
- Incredibly affordable, you can put two or three in your rack for dedicating to multiple sources. (Ultra compact, it requires only a 1/3 rack space.)

MicroVerb 4
Preset/Programmable 18-bit Signal Processor

An affordable solution for great sounding effects processing, the MicroVerb 4 goes far beyond the capabilities of any processor in its class. It offers the ability to edit and store your own customized programs, to utilize versatile multi-effects configurations and to take advantage of complete MIDI implementation.

- 18-bit D/A and A/D converters and 20-bit internal processor combine with the clean effects algorithms to offer a frequency response from 40 Hz to 20 kHz and a wide dynamic range. The result is ultra-clean, great-sounding effects for every application.
- 100 preset and 100 user-editable effects include many varieties of reverb, delay, chorus, flange and more.
- Advanced effects include rotating speaker simulation, auto-pan, tap tempo delay and dual-send setups (send one effect to one channel and a completely different effect to the other).
- Many of the effects are in true stereo and several offer up three effects at once.
- Each program provides two logical effects parameters that you can adjust in real time using two front-panel edit knobs or MIDI controls. For example , on a reverb program you can change decay and frequency content, and you can edit time and feedback of delays. Up to 100 edited programs can be saved to a dedicated user bank.
- Responds to MIDI program change and modulation, and it provides a special two-way TRS footswitch jack that offers both bypass and control functions.
- Easy-to-use "set-and-forget" interface offers a bright LED program number display. Just dial up a program number and start playing– that's all.
- Fits in a standard single rack space.

MidiVerb 4
Dual Channel Parallel Prosessor with Auto Level Sensing

The MidiVerb 4 extends Alesis' line of affordable professional multi-effects processing. It provides the sonic quality and programming power required for studio recording and live sound reinforcement while maintaining an incredible degree of affordability.

- Superb effects algorithms provide a wide variety of dense, natural-sounding reverbs, rich chorus and flange, versatile delay, rotating speaker simulation, pitch shift, panning and more.
- Auto Level Sensing feature automatically sets your input signal to the optimum level to take advantage of the MidiVerb 4's wide dynamic range.
- 18-bit oversampling digital converters add to the excellent audio fidelity, with a resulting 20 kHz frequency response and a dynamic range over 90dB.
- Provides complete MIDI implementation, so you can change programs and modulate parameters in real time with MIDI controllers (pedals, mod wheels, etc.).
- Each of the 128 preset and 128 user-editable programs use one of 32 configurations, or arrangements of effects. You can set up mono or stereo single effects, dual mono effects with separate mono-in and out for each channel, and multi chain configurations that provide two or three effects at once.

QuadraVerb 2
Dual Channel Octal Processing Master Effects w/Digital I/O

Alesis' most powerful signal processor, the QuadraVerb 2 offers the amazing audio fidelity of a high-end dedicated vocal reverb while providing powerful multi-effects capabilities.

- 300 programs (100 preset and 200 user-editable).
- Octal Processing allows use of up to 8 effects simultaneously in any order. You can choose between over 50 different effects types for each block, including reverb, delay, chorus, flange, rotary speaker simulation, pitch shift, graphic and parametric EQ, overdriver and more.
- Special features like five seconds of sampling time, triggerd panning and surround sound encoding are also built in.
- Selectable -10 dB and +4dB levels, servo-balanced TRS inputs and outputs.
- AOAT Digital Interface allows you to work entirely in the digital between the Q2 and an ADAT XT.

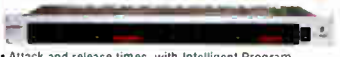
A R T

Tube MP
Personal Preamp Processor

- Power/Peak LED for precision monitoring of power status and clip point.
- Input control has two ranges of gain, +26dB - +60dB and +6dB - +40dB.
- +20dB gain boosts input level for mic usage, or pad for accepting line levels.
- Phantom power supplies power to mics that require +48V phantom power.
- Phase reverse for worry-free multi-microphone placement.
- Output control for trimming back to unity gain.
- Genuine 12AX7 tube shapes and warms the sound of any transducer, from mics to piezo pickups.

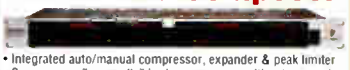
BEHRINGER

MDX 1200 Autocom



- Attack and release times, with Intelligent Program Detection, prevents common adjustment errors.
- Newly-developed, powerful noise gate.
- Switchable soft knee/hard knee characteristics for varied sound pressure levels.
- Bright, illuminated LEDs show gain reduction.

MDX 2100 Composer



- Integrated auto/manual compressor, expander & peak limiter
- Compresses "musically" in dynamic range without any audible "pumping" or "breathing".
- Attack & release times are controlled automatically or manually.
- Interactive Gain Control (IGC) combines a clipper and peak limiter for distortion-free limitation on signal peaks.
- Servo-balanced inputs and outputs are switchable between +4dB and -10dB.

White instruments

4200A and 4400
L-C Series 1/3 Octave Active Equalizers

- The 4200A (active, cut only graphic EQ) and 4400 (active graphic EQ) provide 28 1/3-octave filters on I.S.O. centers from 31.5 Hz to 16kHz. Hand-tuned inductor/capacitor (L-C) resonant circuits provide the ultimate in performance and reliability.
- Better than 108 dB signal-to-noise ratio with no degradation even when filters are used.
- Continuously adjustable high and low-pass filters band-limit unwanted subsonic and ultrasonic noise.
- Three outputs and powered accessory crossover socket facilitate distribution and level control to three subsystems. (Bi-amp or tri-amp operation with optional 2-way and 3-way plug-in crossover networks.
- The 4200A has a -15 dB control range, the 4400 has a ±10 control range.

4700 1/3 Octave R-C Active Digitally Controlled Equalizer

Similar in specifications to the 4200A/4400 EQs, the difference is that all functions of the 4700 are digitally controlled.

- Ten non-volatile curve memories and ten preset memories using EPROM, so no need for battery backup.
- 10dB boost/cut in 0.5dB steps.
- Adjustable high and low pass filters and gain. (8 steps)
- Digitally controlled by front panel or remote control.
- Password access assures security.
- The control circuits of multiple 4700s can be linked together to form a network of equalizers. The network can be controlled from the first 4700's front panel or optional RS-232, PA422 interfaces. Each network features 10 user programmable presets accessible via computer control, front panel selection or contact closure using the optional Remote Preset Select Interface.

DSP 5024
Digital Signal Processor

- 2 input, 4 output signal processor with 107 dB of dynamic range.
- Crossover can be configured as 2-way, 3-way, 4-way or dual 2-way.
- Adjustments can be performed in frequency 1Hz steps, slope (6, 12, 18, 24 dB/oct.), shape (Butterworth, Bessel, Linkwitz-Riley).
- Parametric filters include boost, cut, high pass, low pass, rising shelf and falling shelf, adjustable in 1 Hz steps, 1/10 dB steps and bandwidth from 1/70th octave to 4 8 octaves.
- Delay up to 680 ms on each output.
- Ten non-volatile memories and presets with password security.
- Remote preset select interface includes PA422.

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JBL

Control 5
Compact Control Monitor Loudspeaker

The Control 5 is a high performance, wide range control monitor for use as the primary sound source in a variety of applications. It's smooth, extended frequency response combines with wide dynamic capability to provide acoustic performance that's ideal for recording studios, A/V control rooms & remote trucks.

- 6-1/2 inch (165mm) low frequency driver provides solid, powerful bass response to 50 Hz and a pure titanium 1-inch dome handles high frequency response to 20 kHz
- Both transducers are magnetically shielded, allowing use in close proximity to video monitors
- Dividing network incorporates protection circuitry to prevent system damage and utilizes high quality components including bypass capacitors for outstanding transient accuracy
- Molded of dense polypropylene foam, with a choice of black, gray or white finish
- Pleasing enclosure allows it to easily fit into any environment.
- A host of mounting systems including ceiling, rack and tripod allow positioning in exactly the right spot for best performance

4200 Series
Studio Monitors

The 4200 Series are console-top monitor models designed specifically for use in the near field. Both the 6.5-inch (4206) and the 8-inch (4208) offer exceptional sonic performance, setting the standard for today's multi-purpose studio environment.

- Unique Multi-Radial sculptured baffle directs the axial output of the individual components for optimum summing at the most common listening distance (approx. 3 to 5 ft)
- The baffle also positions the transducers to achieve alignment of their acoustic centers so that low, mid and high frequency information reaches your ears at the same point in time, resulting in superb imaging and greatly reduce phase distortion
- Curved surface of the ABS baffle serves to direct possible reflections of the shorter wavelengths away from the listening position, eliminating baffle diffraction distortion
- Vertical alignment of the transducers across the baffle center produces natural mirror-imaging
- Pure titanium diaphragm high frequency transducer provides smooth, extended response
- Magnet assembly is shielded, allowing placement near magnetically sensitive equipment like CRT's, tape recorders, etc
- Low frequency components also feature magnetic shielding making the 4200 Series monitors ideal for use in video post production facilities as well as music recording studios

6208
Near Field Studio Monitor

An internally bi-amplified near field studio monitor, the 6208 provides excellent reference in a small, portable package. It combines optimized electronics with an 8", two-way speaker system on a Multi-Radial baffle that aligns acoustic centers of high and low frequency transducers. The transducers are magnetically shielded to allow safe placement near sensitive equipment such as tape recorders and video monitors.

- Electronically balanced input is compatible with both -10 dbV and +4 dBu nominal operating levels and input connection can be via XLR or 1/4" connectors
- An electronic, 2.6 kHz crossover, designed specifically to compliment the acoustic characteristics of the transducers, feeds dual amplifiers utilizing discrete circuitry. The amplifiers feature a low feedback design, with no slew rate limiting and extremely low distortion
- The eight inch, low frequency transducer delivers a long, linear excursion resulting in a smooth extended bass output with low power compression. It is coupled to a one inch titanium diaphragm, high frequency transducer with patented "diamond pattern surround" exhibiting flat response, +/-2 db from crossover point to 20 kHz.
- The Multi-Radial(tm) baffle aligns the acoustic centers of the high and low frequency transducers, ensuring that all frequencies arrive at the listening position at precisely the same time. This unique baffle design also greatly reduces diffraction and phase distortions. Dispersion characteristics of the 6208 reduce the effects of changing acoustical environments and achieve consistent, accurate imaging.

MACKIE

MICRO SERIES 1202-VLZ
12-Channel Ultra-Compact Mic/Line Mixer

Mackie's fanatical approach to pro sound engineering has resulted in the Micro Series 1202-VLZ, an affordable small mixer with studio specifications and rugged construction. It delivers no-compromise, non-stop, 24-hour-a-day professional duty in permanent PA applications, TV and radio stations, broadcast studios and editing suites—where nothing must ever go wrong.

- Working S/N ratio of 90dB, distortion below 0.025% across the entire audio spectrum and +28 dB balanced line drivers
- 4 mono channels with discrete, balanced balanced mic/line inputs and 4 stereo channels (12 inputs total)
- Line inputs and outputs work with any line level, from instrument level, to semi-pro -10dB, to professional +4dB.
- Switchable phantom-powered (48v) inputs for condenser mics
- Every input channel has a gain control, pan pot, low EQ at 80 Hz, high EQ at 12.5 kHz and two aux sends with 20dB gain
- Master section includes two stereo returns, headphone level control and metering

MS1402-VLZ
14 x 2 Compact Mic/Line Mixer

Balanced inputs and outputs, 3-band EQ, AFL/PFL and deluxe tape monitor/Control Room feature. Nice long 60mm faders, six studio-quality mic preamps and extra Alt 3-4 stereo bus—in less than 1.3 square feet of space.

- Studio grade mic preamps (chs. 1-6) with high headroom, low noise and phantom power. Also incorporate low cut filters to cut mic handling thumps, pops and wind noise. Lets you safely use low shelving EQ on vocals
- Trim controls (ch. 1-6) with ultra wide range (+10 to -40dB) handle everything from hot digital multitrack feeds to whispering lead singers and older, low output keyboards
- Pan control with constant loudness and high L/R attenuation so you can pan hard left or right without bleed-through
- Two aux sends per channel with 15dB extra gain above Unity
- 60mm log-taper faders are accurate along their whole length of travel and employ a new long-wearing contact material for longer fader life & uper resistance to dust, smoke etc
- Control room/phone matrix adds incredible tape monitoring, mixdown and live sound versatility.
- Mute switch routes channel output to extra ALT 3-4 stereo bus. Use it for feeding multitrack recorder channels, creating a sub-group via control room/phones matrix, monitoring a signal before bringing it into the main mix or creating a "mix minus"
- Solid steel chassis instead of aluminum or plastic

The new MS-1202, 1402 and 1604 all include VLZ (Very Low Impedance) circuitry at critical signal path points. Developed for Mackie's acclaimed 8•Bus console series, VLZ effectively reduces thermal noise and minimizes crosstalk by raising current and decreasing resistance.

CR-1604 VLZ 16-Channel Mic/Line Mixer

Hands-down choice for major touring groups, studio session players, as well as broadcast and sound contracting. The CR-1604 VLZ features everything you would expect from a larger console, and then some! 24 usable line inputs with special headroom/ultra-low noise Unityplus circuitry, seven AUX sends, 3-band EQ, constant power pan controls, 10-segment LED output metering and discrete front end phantom-powered mic inputs.

- Lowest noise and highest headroom (90 dB working S/N and 108 dB dynamic range)
- Genuine studio-grade, phantom powered, balanced input mic preamps on channels 1-16. All CR-1604 VLZ discrete input mic preamp stages incorporate four conjugate-pair, large-emitter geometry transistors. So whether recording nature sound effects or heavy metal, miking flutes or kick drums, you get the quietest, cleanest results possible
- 3-band EQ with mid-frequency sweep and low cut switch
- AFL/PFL solo and mute switches with overload and signal present indicators
- Rear panel features include insert points and 1/4-inch XLR tape inputs/outputs
- Rotary input/output "pod" allowing three different positions for set-up

Digital Multi-Track Recorders

TASCAM DA-88

- ATF system ensures no tracking errors or loss of synchronization. All eight tracks of audio are perfectly synchronized. It also guarantees perfect tracking and synchronization between all audio tracks on all cascaded decks - whether you have one deck or sixteen (up to 128 tracks!)
- Incoming audio is digitized by the on-board 16-bit D/A at either 44.1 or 48KHz. The frequency response is flat from 20Hz to 20KHz while the dynamic range exceeds 92dB
- Execute seamless Punch-ins and Punch-outs. This feature offers programmable digital crossfades, as well as the ability to insert new material accurately into tight spots. You can even delay individual tracks to generate special effects or compensate for poor timing

SONY PCM-800

- Flawless sound quality, outstanding reliability and professional audio interfacing with AES/EBU digital I/O and XLR analog I/O connections
- Combines audio functions such as precise auto punch in-out digital cross fade technology, external synchronization with SMPTE/EBU time code and selectable sampling frequencies of 44.1 and 48kHz
- Shuttle dial for precise tape control, variable speed playback of 3% in 0.1% increments and a flat frequency response from 20Hz to 20kHz
- Operate up to 16 PCM-800's in perfect sync with optional RCC-S1 sync cables, for up to 128 channels of digital audio recording
- Optional OABK-801 Sync Board provides SMPTE/EBU time code generation and chase sync. It locks to the incoming time code with subframe accurate offset— ideal for audio-follow-video applications. Also synchronizes to external video reference signal
- Optional RM-D800 provides comprehensive remote control over all PCM-800 functions. The RM-D800 can control up to six units for up to 48 channels of digital audio.

ALESIS adat xt

8-Track Digital Audio Recorder

An incredibly affordable tool, the ADAT-XT sets the standard in modular digital multitrack recording. With new features and enhanced capabilities, the ADAT-XT operates up to four times faster than the original ADAT, offers an intelligent software-controlled tape transport and provides onboard digital editing and flexible autolocation.

- Onboard 10-point autolocate system provides quick access to multiple tape locations. Four specialized locate points make your recording sessions quicker and easier
- Includes remote control with transport and locate functions, offers a footswitch jack for hands-free punch-in
- Advanced transport software continuously monitors autolocation performance and the head constantly reads ADAT's built-in sample-accurate time code—even in fast wind modes
- Dynamic Braking software lets the transport quickly wind to locate points while gently treating the tape
- Servo-balanced 56-pin ELCO connector operates at +4dB to interface with consoles with +4 dB balanced inputs/outputs. Also unbalanced -10dB inputs/outputs (phono connectors)
- Has an electronic patch bay built-in so it can be used with stereo and 4-bus consoles
- Make flawless copy/paste digital edits between machines or even within a single unit. Track Copy feature makes a digital clone of any track (or group of tracks) and copies it to any other track (or group) on the same recorder. This allows you to assemble composite tracks for digital editing

ALESIS

Monitor One
Near Field Studio Reference Monitor

Designed by engineers with decades of experience, the award winning Monitor One provides the last critical link in the recording studio's signal chain, giving you an accurate reproduction of what is being recorded.

- Delivers excellent image and transient reproduction, powerful bass, and smooth, extended high frequency detail
- Exclusive SuperPort speaker venting technology eliminates the "choking" effect of port turbulence for solid high-power bass transients and extended low frequency response
- Ferrofluid cooled 1" silk-dome driver eliminates the harshness and ear fatigue associated with metal or plastic tweeters, making it easy to mix on for extended periods
- Monitor One's powerful bass incorporates a proprietary 6.5" low frequency driver with a mineral-filled polypropylene cone and a 1.5" voice coil wound on a high-temperature Kapton former.
- They come in a mirror-image left/right pair covered with a non-slip rubber textured laminate for stable mounting.

Monitor Two
Mid Field Studio Reference Monitor

While today's popular music demands more bass at louder volumes than a small near field monitor can possibly produce—the Monitor Two delivers—at a price no higher than many of these smaller speakers.

- Utilizes a 10" three way speaker design with a unique asymmetrical crossover to maintain the same accurate tonal balance and imaging of the Monitor One—but with a much larger sound field
- 10" low frequency driver incorporates Alesis' SuperPort speaker technology to provide powerful, extended bass.
- 5" mid frequency driver offers exceptional mid frequency detail
- 1" silk dome high frequency driver delivers a broad but natural frequency response from 40Hz to 18kHz
- Covered in a non-slip rubber finish, the Monitor Two comes in a mirror imaged pair for mixing accuracy.

TANNOY

PBM Series II
Reference Monitors

The PBM II Series is the industry standard for reference monitors. They feature advanced technologies such as variable thickness, injection molded cones with nitrile rubber surrounds and the highest quality components including polypropylene capacitors and carefully selected indicators. With a Tannoy monitor system you are assured of absolute fidelity to the source, true dynamic capability and most important, real world accuracy.

PBM 5 II

- Custom 5" injection-molded bass driver with a nitrile rubber surround for extended linearity and accurate low frequency reproduction. They are better damped for reduced distortion and exhibit more naturally open and detailed midrange.
- Woofer blends seamlessly with the 3/4" polymide soft dome ferro-fluid cooled tweeter providing extended bandwidth for extremely precise sonically-balanced monitoring.
- Designed for nearfield use, the PBM 5 II cabinets are produced from high density medite for minimal resonance and features an anti-diffraction radiused front baffle design.

PBM 6.5 II

- Transportable and extremely powerful, the PBM 6.5 II is the ideal monitor for almost any project production environment.
- 6.5" lowfrequency driver and 3/4" tweeter are fed by a completely redesigned hardwired hand selected crossover providing uncompromised detail, precise spectral resolution and flat response.
- Fully radiused and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.

PBM 8 II

- High tech 1" soft dome tweeter with unmatched pattern control and enormous dynamic capability. 8" driver is capable of powerful bass extension under extreme SPL demands.
- Hard wired crossover features true bi-wire capability and utilizes the finest high power polypropylene capacitors and components available.
- Full cross-braced matrix medite structure virtually eliminates cabinet resonance as a factor.
- Ensures precise low frequency tuning by incorporating a large diameter port featuring laminar air flow at higher port velocities.

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DA-P1
Portable DAT Recorder

- Rotary two head design and two direct drive motors for the best transport in its class.
- XLR-balanced mic/line inputs (with phantom power) accept signal levels from -60dB to +4dB.
- Analog line inputs & outputs (unbalanced) plus S/PDIF (RCA) digital inputs and outputs enable direct digital transfers
- Uses next generation A/D & D/A converters for amazing quality.
- Supports 32/44.1/48kHz sample rates & SCMS-free recording.
- MIC limiter and 20dB pad to achieve the best possible sound without outside disturbances.
- TRS jack & level control to monitor sound with any headphones.
- Built tough, the DA-P1 is housed in a solid, well-constructed hard case. It includes a shoulder belt, AC adapter & 1 battery.

HHB
PDR1000/PDR1000TC
Professional Portable DAT Recorders

- Direct drive transport with 4 heads for confidence monitoring.
- Balanced XLR mic and line analog inputs and two RCA analog line outputs. Digital inputs and outputs include S/PDIF consumer (RCA) and AES/EBU balanced XLR
- Left/Right channel mic input attenuation selector(0dB/-30dB)
- 48v phantom power, built-in limiter & internal monitor speaker
- Illuminated LCD display shows clock and counter, peak level metering, margin display, battery status, ID number, tape source status and machine status
- Supplied Nickel Metal Hydride rechargeable battery powers the PDR1000 for two hours. The battery has no "memory effect" and is charged in two hours with the supplied AC Adapter/charger

PDR1000TC Additional Features:
In addition to all the features of the PDR1000 recorder, the PDR1000TC is equipped to record, generate and reference to time code in all existing international standards.

- All standard SMPTE/EBU time codes are supported, including 24, 25, 29.97 (drop frame and non-drop frame) and 30 fps.
- External syncronization to video, field sync and word sync.

FOSTEX
D-25
Digital Master Recorder

Professional digital master recorder featuring the confidence monitoring, and insert editing using a 4-head transport. Sync functions for any pro application including the ability to chase sync to a master timecode. The D-25 will resolve to external references such as WORD/VIDEO/DAT frame signal + WORD.

Features:
•16 MBit RAM buffer.• Instant Start & Edits. •Scrub from tape or buffer. •Jog/Shuttle from 1/2X to 16X. •SMPTE/EBU TC generator/reader. •On board chase/lock sync. •RS-422 slot. •Independent left/right recording. •4-head 4-motor transport

D-30
Digital Master Recorder

The Fostex flagship professional post production DAT recorder, the D-30 contains all the features of the D-25, plus large high resolution backlit LCD display which shows all parameters at a glance; Intuitive hierachical menus from 10 dedicated soft keys; two RS-422 ports for added flexibility.

Panasonic
SV-3800/SV-4100
Professional DAT Recorders

Designed for professional applications, the SV-3800/SV-4100 have highly accurate and reliable transport systems with search speeds up to 400X normal, and 20-bit D/A converters to satisfy the highest professional expectations both in terms of sound and functionality.

Roland®
A-90EX Master Controller for the Next Century

The A-90EX is an 88-note, weighted master controller with the best keyboard action currently on the market—bar none. It offers incredibly realistic piano sounds, powerful controller capabilities and 'virtual' programmable buttons which can be configured to operate your software and other devices. The A-90EX combines the majestic sound of a concert grand, the expressive action of a fine acoustic keyboard and the comprehensive MIDI functions of a master controller—all in a portable stage unit.

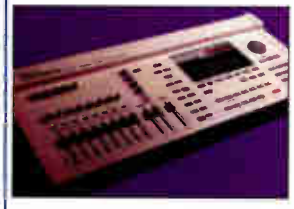
Keyboard Controls
- Master volume slider lets you control the volume of your entire MIDI setup without changing the balance between connected devices.
- A Global Transpose switch transposes all connected sound sources without changing the transpositional relationship between the individual devices.
- Sequencer Control Section lets you control song selection, tempo and other parameters easily and quickly.

Superb Sound
- The A-90EX's sound source is the result of an exhaustive and detailed sampling process. First, the best of the world's finest concert grands were sampled. Then each note was sampled under controlled conditions (mic position, stage and hall acoustics etc.) Only after extensive trial and error were the very best samples selected and incorporated.
- The A-90EX's sound source gives you access to a wide variety of sounds, including two types of stereo-sampled grand pianos, various styles of acoustic and electric pianos (including classic Rhodes sounds) and a generous selection of synthesizer textures.
- The versatility of these sounds is enhanced with 64-voice polyphony– indispensable for realistic piano sounds, giving you all the capacity you need for lush, sustained passages.
- For additional texture, there is also a generous selection of built-in effects, including several types of reverb and chorus.

Extensive Performance Configurations
- The A-90EX can store up to 64 Performances, which may consist of up to four of the A-90EX's preset Patches along with various user-configurable parameters such as zone, effects on/off and MIDI channel. Optional M-512E Memory Cards, stores an additional 64 Performances (per card).

88 Key Keyboard
- Proprietary 88-note hammer-action keyboard offers the natural resistance and rebound of an acoustic piano.
- Velocity-sensitive, the keyboard brings out every nuance of your dynamics, from pianissimo to forte. Selectable velocity curves let you choose the sensitivity that best suits a particular musical style or sound source.
- Keyboard also offers channel aftertouch-sensitivity - a powerful function for controlling external sound sources.
- The keyboard can be split into eight zones (four internal and four external, or you can assign all eight zones to external devices). It also has 20 different controls and connectors for instant access to internal and external devices.

Built-in Sounds
- 128 patches from the Roland JD-990, JV-1080, Sound Expansion Series, JV-Series and SR-JV80 Series expansion boards. Customized patch names can also be stored in the database. Optional Voice Expansion boards like the VE-GS1 offer a wide selection of GM and GS sounds and the VE-JV1 offers synth textures from Roland's JV-series synthesizers.



DM-800
Digital Audio Workstation

A compact, stand-alone multi-track disk recorder that provides an amazing array of features at an unbelievably low price. Whether for music production, post production or broadcast, the DM-800 lets your work easier and faster. A full function workstation, the DM-800 performs all digital mixing operations from audio recording, to editing, to rotation track-bouncing, to final mixdown. It fully supports SMPTE and MIDI time codes and also features a built-in Sample Rate Resolver to synchronously lock to any time code.

VS-880
Digital Studio Workstation

The VS-880 is an integrated digital recorder, mixer, editor and fx processor in one. A complete digital studio workstation, the VS-880 handles everything from data input and recording to mixing and mastering in one superbly styled, compact unit. It provides 64 recordable tracks, CD-quality digital audio and studio-quality multi-effects with the optional VS8F-1 Effect Expansion Board. Storage is accomplished via the internal Iomega Jaz drive. You can record 500 total track minutes or 60 minutes of recording time per track in Standard Mode on one 1GB Jaz disc.

Digital Recorder:
- Eight discrete tracks, each with eight "layers" of virtual tracks. Record up to eight "takes" per track for a total of 64 recording tracks. At final mix-down, simply select the best take for each discrete track. You can even compile the best parts from various takes to create a perfect track.
- High-quality 18-bit A/D and D/A conversion, selectable sampling rates include 48, 44.1 or 32 kHz. The VS-880 is a non-linear, random access recorder/editor, so no memory is wasted on unused tracks or blank sections within recorded tracks.

Digital Editor
- Non-destructive recording and editing lets you easily return to any pre-recorded or pre-edited state. You can "Undo" up to 999 edits, even after conducting multiple recording/editing sessions. You can redo your song from any desired point, instead of going back to the beginning and starting all over.
- Copy, move and replace like using a sequencer or word processor. Cut and paste on one track or on multiple tracks, (like track bouncing on an analog machine)–sound quality is always the same no matter how many editing steps are done.
- Compress or expand playback time. Specify time length from 75% to 125% of the original while the original playback pitch remains unaffected.
- Insert a "marker" anywhere in a song (up to 1000 markers) with instant access to any mark. Preview/Scrub function lets you execute a pin-point search for the first notes or the beginning of a phrase, while you monitor.
- All virtual track performance data can be stored and named as a Song (up to 200 Songs), complete with mixer, effects, mark and locate settings.

Studio Effects:
- Optional VS8F-1 Effect Board provides two completely independent stereo multi-effects processors, allowing you to control every aspect of your recording without leaving the digital domain. Access during either recording or mix-down.
- 200 patches (preset & user) based on 20 resident algorithms
- Effects include everything from delay, reverb and chorus to distortion and speaker emulation. Some feature 3-D sound processing from the Roland Sound Space (RSS) system.
- Guitar effects like overdrive and distortion are included as well as a COSM-based guitar amp simulator.

Digital Mixer:
- Digital mixer features 8 + 6 inputs, 8 recording busses, 1 stereo AUX send and 1 stereo master output. A coaxial digital input accepts a stereo (2-channel mono) digital signal
- There are 4 analog audio inputs (1/4" phone and RCA jacks).
- You can record up to 6 channels, including 4 analog and 1 digital stereo source simultaneously on 4 tracks. Using the digital coax out, you can archive your final mixes to DAT.
- For the simplest mixer/recorder configuration, the VS-880 gives you an 8-channel mixer with mixer channels and recorder tracks corresponding directly. The Input Mix/Track Mix mode turns the VS-880 into a 14-channel mixer capable of mixing 6 input sources and 8 recorded tracks at one time.
- Sync sequence data from an external MIDI system, along with 8 recorded tracks, for simultaneous playback and mix-down right on the VS-880, no submixer required.
- Built-in parametric EQ, with all tonal contouring represented on the display for instant confirmation. In Input -> Track mode, EQ offers three bands--High (Shelving), Mid (Peaking), and Low (Shelving) and 8 channels. In Input Mix/Track Mix modes, a 2-band EQ is available.
- Every mixer parameter setting, including internal routing and EQ settings, can be captured as a "snapshot." Up to 8 snapshots can be stored and switching among them is as simple as touching a button. Fader movements can be recorded with an external MIDI sequencer for fully automated mix-downs.

Other Features:
- Built-in 1G Jaz drive for storage left; you take audio with you–just like tape. Built-in SCSI port offers additional storage capability with SyQuest, MO drives, DAT tape etc.
- MIDI connectors let you sync the VS-880 with a MIDI sequencer, either as a master or slave. Sync through MIDI Time Code or MIDI Machine Control.
- You can record mixer settings and fader movements into a MIDI sequencer. Playing the sequence back, in sync with the VS-880, affords fully automated mix-down capabilities. Has a MIDI Clock–dedicated track independent of the main tracks, so you can even sync to a non-MTC/MMC compatible sequencer. Stack two VS-880s via MIDI and you'll get a digital recording system with 16 discrete tracks and as many as 128 total tracks.

SOUNDSCAPE
DIGITAL TECHNOLOGY LTD.

SSHRD-1
Hard Disk Recorder/ Editor

A professional Multitrack Digital Audio Workstation for the PC, the SSHDR1 combines the highest quality processing hardware with easy-to-use Windows-based software for the most complete and affordable solution for high quality digital audio recording and editing on the PC. The SSHDR1 has over 50 powerful editing tools and is expandable from 8 to 128 tracks, with up to 32 inputs and 64 outputs. Ideal for a wide range of applications ranging from, recording music in project studios with an 8 track system, to multiple unit 32, 48 and 64 track systems used by major TV and film studios for audio post productionlinked to video.

The SSHDR1 consists of two major components, a 19" rack unit which contains all the audio processing hardware and an intuitive and elegant software front end for Windows. The hardware, which connects to the PC via the included host interface card, can record 16 bit digital audio from the analog or digital inputs in stereo and play back up to 8 tracks simultaneously mixed through 2 or 4 analog or digital outputs.

All audio processing, disk handling and synchronization is carried out by the powerful DSP in the hardware, so literally any PC can be used—even a 386 with only 4MB of RAM. By putting all of the processing power into its' own hardware instead of relegating it to your PC, the SSHDR1 also frees up your PC and allows it to act merely as a 'front-end' view into the hardware workings. Multiple units can be locked together with sample accuracy, a feature which requires no additional software or hardware upgrades. Soundscape DAWs have 'rock solid' synchronization to analogue, digital or video tape recorders and even chase timecode when varispeed is used.

- Using the virtual tracks, up to 64 audio takes can be recorded at the same timing position in an arrangement, allowing for instance, a sub mix of multiple backing vocal harmonies, dialogue or sound effects to be selected on any physical track later.
- Arrangements are created in the arrange window which display PARTS of a soundtrack and play the actual recorded audio TAKES on disk. A TAKE can be used in different ways by any number of PARTS which can play all or any section of the TAKE, e.g. a chorus vocal can be recordec just once, but used four times within an arrangement. These PARTS build up the soundtrack, and can be edited in a non-destructive way at waveform level 'on the fly', even while chasing incoming time code.
- Move, Copy, Trim, Slip, Solo, Repeat, Delete, Cut, Glue edit functions.
- Solo and Multi-track audio scrubbing.
- 999 named markers (insert on the fly')
- Realtime fade In/Out (8 selectable curves)
- Automated Punch In/Out.
- Volume contouring.
- Powerful noise gate (10 parameters with 'floor' settings to remove silence or signals from a mix, ideal for ADR).
- Normalize process to 0dB.
- Stereo link tool for stereo editing.
- Varispeed ±10%.
- Nudge edit using arrow keys.
- Supports all SMPTE formats, including 29.97 and 29.97 Drop frame.
- 9 customizable Tool Pages.
- AVI video file support with full synchronization (requires Video for Window V1.1).
- Optional EDL File support with full auto conform via RS422.
- Zoom in/out history (8 levels) Windows V1.1.
- Volume and Pan controls (real-time, non-destructive, with full automation via MIDI).
- Assignable fader grouping.
- Merge (stereo digital mix-down).
- Reverse/Phase Invert/Compute tempo.
- Optional Time Module features Time-stretch/Time compression Pitch shift and Sample rate conversion.
- Insert Left/Right Locators 'on the fly'.
- 8 physical output channels, selectable for each PART within a virtual track.
- Non-destructive sample-resolution editing with "glitch-less join
- Total disc space is dynamically shared by all tracks
- Cycle record mode with stacked TAKES and pre-roll (like analog multi-track tape recorders)
- Synchronization MIDI Song Positioner + MIDI clock or MIDI time code
- Time axis display in SMPTE (hours, min, seconds and frames) or Measure (bars and beats); readout of time between locators
- Arrangements are saved in separate arrange files on the host PC

World Radio History

AD INDEX & READER SERVICE PAGE

PAGE	READER SERVICE NUMBER	ADVERTISER
80	001	Acoustical Solutions
108	002	Acoustic Systems
59	003	AKG
115	004	AKG #2
IFC	005	Alesis (Studio 12R Mixer)
191	006	Alesis (Point Seven Monitor)
231	-	Allen Sides' Mic Cabinet
95	008	Amek
3	009	AMS/NEVE
51	010	Anthony DeMaria Labs
20-21	011	Aphex Systems
37	012	Apogee Electronics
121	013	Athan Corporation
199	014	Audio Engineering Society
163	015	Audio Precision
137	016	Audio-Technica
42	017	Audio Toys (ATI)
40	018	Audix
17	019	BAG END Loudspeakers
204-205	020	B & H Photo-Video
206-207	021	B & H Photo-Video #2
114	022	Brainstorm
92	023	Bruel & Kjaer
89	024	Burlington A/V Recording Media
151	025	Burlington A/V Recording Media #2
146	026	Cabletek
99	027	CAD
104	028	CAIG (ProGold)
104	029	CAIG (CaliLube MCL)
180	-	Canadian Music Expo
112	030	David Carroll Electronics
80	031	Caruso Music
88	032	City Music Fixtures
121	033	Conservatory of Recording Arts & Sciences
197	034	Creamware/Mediamagix
98	035	The DAT Store
193	036	dB Technologies
39	037	dbx Professional Products
71	038	Denon Electronics
196	039	DGS Pro Audio
67	-	Digidesign
35	040	DigiTech
105	041	Disc Makers
30	042	Dolby
190	043	Dreamhire
27	044	Duracell USA
190	045	EAR Professional Audio/Video
135	046	Eastman Kodak Co.
6-7	047	Emagic
91	048	Ensoniq
81	049	Euphonix
93	050	Europadisk
31	051	Event Electronics (20/20bas)
149	052	Event Electronics (RØDE NT2)
117	053	Fairlight
166	054	Focusrite
69	055	Fostex
122	056	Full Sail Center for the Recording Arts
82	-	Future Disc Systems
96/97	057	Gand Music & Sound
156	058	Garwood Communications
154	059	Gold Line
96	060	Groove Tubes Audio
169	061	Hafler
170	062	Hannay Reels
75	063	HHB Communications
195	064	HHB Communications #2
148	065	The Hollywood Edge
165	066	Hot House Professional Audio
90	067	Institute of Audio Research
BC	-	JBL Professional
28	068	Joe Meek
186	069	JRF/NXT Generation
173	070	Korg/Soundlink DRS
174	071	KRK Monitoring Systems
145	072	Lectrosonics
47	073	Lexicon
192	-	Los Angeles Recording Workshop
186	074	MacBEAT
IBC	075	Mackie (HR824)
14-15	076	Mackie (8-Bus Console)
108	077	Manhattan Production Music
164	078	Manley Laboratories
167	079	Markertek Video Supply
111	080	MartinSound (Martech)
113	081	MartinSound (Neotek)
109	082	MediaFORM
147	083	Meyer Sound
26	084	MicroTech Conversion
230	085	Mix Bookshelf
213	086	Mix en Espanol
198	-	Mix Online
24-25	087	Neumann/USA
38	088	Night Technologies International
172	089	Northeastern Digital
142	090	NOW! Recording Systems
134	091	NRG Research
53	092	Otari
126	093	Otari #2
73	094	Pacific Microsonics
19	095	Peavey (CS800S)
65	096	Peavey (RP 500)
123	098	Peavey (DELTAFEX)
141	097	Peavey (CEX-5)
155	099	Peavey (PVM T9000)
106	100	Platinum Audio LTD
62	101	Power Technology
142	102	Polyline
146	103	QCA
143	104	QSC Audio Products
9 & 11	105	Quantegy/Ampex
129	106	Rane
188	107	The Recording Workshop
150	108	Renkus-Heinz
98	109	Rhythm City
194	110	Rich Music
87	111	Ricoh
96	112	Rocket Lab
55	113	Roland
41	114	RSPE Audio
133	115	RSP Technologies
140	116	Sabine
83	117	Sascom Marketing
13	118	Sennheiser
175	119	Signal Transport
1	-	Solid State Logic (SSL)
102	-	Solid State Logic (SSL) #2
107	120	Sonic Solutions
50	-	Sony
171	121	Soundcraft
110	122	Soundscape Digital
43	123	Soundtracs (Virtua)
131	124	Soundtracs (Topaz)
168	-	South by Southwest
112	125	Speir Music
144	126	Stewart Electronics
178-179	127	Studer Professional Audio Equipment
188	128	Studio Consultants
203	129	Studio Sound International
29	130	Sweetwater Sound
52	131	Sweetwater Sound #2
63	132	Symetrix
2	133	Tannoy
49	134	Tascam (DA-38)
79	135	Tascam (DA-P1)
159	136	Tascam (M1600)
176	137	Tascam (DA-30 MKII)
56	138	TC Electronic (DK-Audio)
61	139	TC Electronic (Wizard/Finalizer)
36	140	THAT Corporation
134	141	Thoroughbred Music
181	142	360 Systems
164	143	Walters-Storyk Design Group
185	144	Waves
187	145	Westlake Audio
192	146	West L.A. Music
157	147	Whirlwind
194	148	Whisper Room
23	149	Yamaha (02R & 03D)
57	150	Yamaha (MX12/4)
189	151	Yamaha (REV500 & ProR3)
201	152	Yamaha (MD4)
54	153	Z Systems

World Radio History

MIX READER SERVICE

For more information about products & services in Mix:

1. See the opposite page for a listing of Reader Service numbers for advertisers in this issue.

2. Circle the Reader Service numbers that correspond to each advertisement or editorial item in which you are interested. (Maximum of 20 numbers.)

3. Complete all information on the card below. Please check ONE answer for each question unless otherwise indicated.

4. Mail card postage-free!

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Reader Service inquiries are mailed directly to the advertiser, who is solely responsible for sending product information. *Mix* does not guarantee advertiser response.

MIX **Reader Service** P.O. Box 5069, Pittsfield, MA 01203-9856
Issue: *Mix*, February 1997 **Card Expires:** June 1, 1997

Name/Title _____

Company _____

Address _____

City/State/Country _____

Zip/Postal Code _____

Phone (_____) _____

1) Your company's primary business activity (check ONE):
01 ☐ Recording studio (including remote trucks)
02 ☐ Independent audio recording or production
03 ☐ Sound reinforcement
04 ☐ Video/film production
05 ☐ Video/film post-production
06 ☐ Broadcast/radio/television
07 ☐ Record company
08 ☐ Record/tape/CD mastering /manufacturing
09 ☐ Equipment manufacturing (incl. rep firm)
10 ☐ Equipment retail/rental
11 ☐ Contractor/installer
12 ☐ Facility design/acoustics
13 ☐ Educational
14 ☐ Institutional/other (please specify)
_____

2) Your job title or position (check ONE):
15 ☐ Management—President, owner, other manager
16 ☐ Technical & Engineering—Engineer, editor, design engineer, etc
17 ☐ Production & Direction—Producer, director, etc
18 ☐ Sales & Administration—Sales rep, account executive, etc
19 ☐ Artist/Performer—Recording artist, musician, composer, other creative
20 ☐ Other (please specify)
_____

3) Your role in purchasing equipment, supplies and services (check ONE):
21 ☐ Recommend the purchasing of a product or service
22 ☐ Specify makes, models or services to be purchased
23 ☐ Make the final decision or give approval for purchase
24 ☐ Have no involvement in purchasing decisions

4) Your company's annual budget for equipment, supplies and services:
25 ☐ Less than $50,000
26 ☐ $50,000 to $149,999
27 ☐ $150,000 to $249,999
28 ☐ $250,000 to $499,999
29 ☐ $500,000 or more

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31 ☐ Files/future purchases

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33 ☐ Recording studio/production facility
34 ☐ Audio/video retailer
35 ☐ Newsstand
36 ☐ From a friend or associate

7) Where your audio-related work takes place (check all that apply):
37 ☐ Commercial (public) production facility
38 ☐ Private (personal) production facility
39 ☐ Corporate or institutional facility
40 ☐ Remote or variable locations

001	026	051	076	101
002	027	052	077	102
003	028	053	078	103
004	029	054	079	104
005	030	055	080	105
006	031	056	081	106
007	032	057	082	107
008	033	058	083	108
009	034	059	084	109
010	035	060	085	110
011	036	061	086	111
012	037	062	087	112
013	038	063	088	113
014	039	064	089	114
015	040	065	090	115
016	041	066	091	116
017	042	067	092	117
018	043	068	093	118
019	044	069	094	119
020	045	070	095	120
021	046	071	096	121
022	047	072	097	122
023	048	073	098	123
024	049	074	099	124
025	050	075	100	125

126	151	176	201	226
127	152	177	202	227
128	153	178	203	228
129	154	179	204	229
130	155	180	205	230
131	156	181	206	231
132	157	182	207	232
133	158	183	208	233
134	159	184	209	234
135	160	185	210	235
136	161	186	211	236
137	162	187	212	237
138	163	188	213	238
139	164	189	214	239
140	165	190	215	240
141	166	191	216	241
142	167	192	217	242
143	168	193	218	243
144	169	194	219	244
145	170	195	220	245
146	171	196	221	246
147	172	197	222	247
148	173	198	223	248
149	174	199	224	249
150	175	200	225	250

250

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001	026	051	076	101
002	027	052	077	102
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005	030	055	080	105
006	031	056	081	106
007	032	057	082	107
008	033	058	083	108
009	034	059	084	109
010	035	060	085	110
011	036	061	086	111
012	037	062	087	112
013	038	063	088	113
014	039	064	089	114
015	040	065	090	115
016	041	066	091	116
017	042	067	092	117
018	043	068	093	118
019	044	069	094	119
020	045	070	095	120
021	046	071	096	121
022	047	072	097	122
023	048	073	098	123
024	049	074	099	124
025	050	075	100	125

126	151	176	201	226
127	152	177	202	227
128	153	178	203	228
129	154	179	204	229
130	155	180	205	230
131	156	181	206	231
132	157	182	207	232
133	158	183	208	233
134	159	184	209	234
135	160	185	210	235
136	161	186	211	236
137	162	187	212	237
138	163	188	213	238
139	164	189	214	239
140	165	190	215	240
141	166	191	216	241
142	167	192	217	242
143	168	193	218	243
144	169	194	219	244
145	170	195	220	245
146	171	196	221	246
147	172	197	222	247
148	173	198	223	248
149	174	199	224	249
150	175	200	225	250

250

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World Radio History

—FROM PAGE 16, FLAT ON MY BACK

kind of ignored them. Also, I had terrible luck with the handwriting recognition used by the Apple Newton, so I was generally discouraged by all pen-based systems. But with my new crash-caused Toy Re-evaluation Program in place, I asked a close friend to pick up a Pilot for me. I chose Circuit City for two reasons. First, it was amazingly cheap there—only $225; and second, if I hated it, I knew I could return it within 14 days.

When it was finally brought to me (I had been impatiently waiting for an *eternity*...almost 33 minutes), I ripped the shrinkwrap off in one smooth stroke (another ten minutes; I *told* you I was damaged), and laid down to the task of learning to write on it so that I would get something close to what I was shooting for onscreen.

This was the first surprise: It worked! It reads a language called Graffiti—several years old, actually, and it took me a total of ten minutes to learn it. The result is that this little machine converts my handwriting into true ASCII text as fast as I can write, with a very, very low error rate. And I get fewer errors every day. Very nice.

It impresses the locals when I whip it out. Not because I am writing on a touchscreen (they have all seen *that* before), but because when I show them the results, what they see is what I was writing (they have *never* seen that before).

USRobotics has done this right. While the Newton tries to be everything, the Pilot does several things fast, cleanly and with a minimum of effort. When you erase text on a Newton (which you do a *lot*, unless you can understand "pig up life act airport to fight!"), you get a cute animated cloud of chalk dust accompanied by a poofing sound. But for those few times that you erase text on a Pilot, it just goes away. If it is more than the undo buffer can handle, you get a simple warning.

The Pilot has a calendar, a To Do list and a database, all with subcategories and cross-program word search. And *here* is why I am writing about it in this column: It comes with a Windows interface and program to backup, enter, archive and edit stuff, which is then automatically bidirectionally synchronized with the little machine with the push of a single button on the very slick cradle that the Pilot sleeps in. This application, Pilot Desktop, imports and exports databases from the real world, opening a veritable plethora of possibilities for us studio and music guys (and gals; I found the Pilot interface to be totally free of sexually discriminating functions).

For those 400 of us remaining Mac users, there is an optional Mac version of the Pilot Desktop application, along with a Mac serial adapter, for $15 MSRP. This began shipping on 12/4/96 at 3:23 p.m. (and so my column waited until 12/5/96 to get to *Mix*, much to their dismay). It works, too!

So, those of you with huge CD-based sound effects libraries can load the listings right into the Pilot and find them instantly by writing their names or any key word you choose. The Lookup function starts looking as soon as you start writing, and as you add letters, it filters further, while the Find function allows you to enter a word and hit OK to begin the search. These work perfectly and are even fun.

I have loaded in all my phone contacts, all of my music CDs, all of my CD-ROMs and studio maintenance lists. Some of these are huge (thousand-entry) lists, and sure enough, the Pilot is very, very fast. I will be loading in all of my studio patchbay assignments this weekend—several hundred points with half of them normaled to default gear. This has always been a pain to look up on paper. I have tried lists and graphic charts, but neither is fast enough, and both take up too much desk space in a world where there are no desks. I think the little Pilot will be the answer.

The Mac application works quite well, though it is clear that it came from the Windows version and, most importantly, importing databases *works*. The only bad thing about it is that there is no backlight, so you kind of need the power of the Force to read it in the dark.

If you want to do what I am doing with one of these, you might need the larger model 5000 with five times the memory of the little 1000. I ended up exchanging them. For you extremists, there is also a memory card that gives you ten times the capacity of the little one. Mine will be here in a few days. One last tip: If you know you want the memory card, get the little 1000, because you throw away the card that comes with it, so you don't want to pay more for what you toss than you have to. Have fun. ■

In lieu of flowers, SSC requests that you pet the nearest cat and whisper his name.

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March 1997

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MIX

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—FROM PAGE 21, SHRINKING THE SYNTH

ity, asking for 20% more to do real-time synthesis may not be such a hot idea. As one observer puts it, it's no bargain using a quarter of a $300 chip to make music, when you can do the same with a $20 dedicated DSP chip and get all of it.

Another problem is that software synths have a hard time being played in real time: When they respond to MIDI data coming in from an external source, like a keyboard, there is often a delay in processing the data, known as latency. I've seen latencies from 50 milliseconds up to 300 milliseconds, and even longer in some cases, any of which are totally unacceptable in any kind of performing or recording environment. So while they may work okay for playing back prerecorded files, software synths are not very useful for creating them.

As with onboard hardware synthesis, the most common form of software synthesis is PCM sample playback, although other methods are certainly feasible, and even though no announcements have been made, at least two manufacturers have been talking about releasing other types of synthesis engines. The quality of the sounds, rather than being fixed in hardware, is adjustable—in some cases by the user. On even the fastest CPU, there's always going to be a trade-off between sound quality and either polyphony or image quality—and in the latter case, it means most users will opt for better pictures and worse sound. And it's not like there's a lot of quality to spare: At their best, none of the software synth engines I have heard yet sound *really* good. Certainly they're a step up from the old "Sound Smasher" cards, but what I've heard ranges in quality from halfway decent to seriously awful.

You might be asking at this juncture, what's the point of all this? Why do we want to put all of this synthesis power in the hands of every computer user? Are we trying to make composers and sound designers out of everybody? Not hardly. What this is all about is trying to create a reliable delivery system for reasonable-sounding music under extremely restricted conditions: i.e., over the Internet. There's this problem with the Internet (and with another popular delivery system, CD-ROMs), which can be summed up in one word, a word that makes anyone who's tried to work with audio on it cringe: bandwidth.

Despite all the solemn industry pronouncements that "In the next century bandwidth will not be an issue!" bandwidth is always going to be an issue. (Remember when they said that nuclear power was going to make electricity "too cheap to meter"?) Like CPU speed, what we demand from our Internet connections will constantly keep pace with the capacity. And even when we've got cable modems and DVD, audio is always going to be the poor cousin, the afterthought, something to be given whatever bandwidth or disc real estate is left over when the visual folks have had their fill. Nobody likes sitting in front of their computer waiting for images to materialize (why do you think they call it the "World Wide Wait"?), and they're going to like even less waiting for audio to download, or even for the buffers required by streaming audio to fill.

You can't do much about compressing audio, not if you want it to sound good. Yes, there are some remarkable strides being made in conveying intelligible speech at 28,800 bps, but no one can pretend that this is an acceptable way to transmit music. Even with an ISDN or T1 line, handling more than one channel of high-quality audio at a time is next to impossible, so creating any kind of multichannel sound environment—either to create a surround field, or to allow the user to mix multiple sources—is out of the question.

If there's a synthesizer already in your computer, however, and you feed it MIDI data, you can avoid all of these problems. The bandwidth of MIDI is anywhere between 1/100th and 1/10,000th of what's required for digital audio, and the fidelity of the playback is not at all dependent (assuming the receiver has decent buffering) on the speed of the connection. It's really no more demanding than text, and so you don't need to tell your browser to lower the music quality just to preserve the visuals any more than you would need to tell it to stop sending text because it's slowing down the graphics.

If the synthesizer can use alternative sound sets of downloadable samples, then its capabilities are effectively unlimited: A clever programmer can create a sound set that will encompass everything needed for a game, movie or interactive presentation, and either preload it into the receiving computer, or send it down the line incrementally, during slack periods. A lot of music and sound effects can be created from just a couple of megabytes of well-designed samples. With playback engines already onboard, either in software or hardware, this "cheap" synthesis transforms itself into something very different: the high-fidelity alternative for Internet audio.

All of this, no doubt, is leaving both quality-conscious audio engineers and MIDI purists horrified. The fact that the best we can hope for in terms of soundtracks in this brave new world of the Internet is access to a few megabytes of samples accompanying a telephone-quality voice track is sobering, to say the least. For an industry that has striven for so many years to attain the highest reproduction quality, it's pretty odd to be staring down the barrel of sonic mediocrity and calling it the future. We'll just have to hope that as our audiences jump on the Internet, they don't throw out their CD players and hi-fi VCRs. And as content providers, we'd better not throw out our MIDI sequencers. ■

Paul Lehrman had a musical score premiered at Lincoln Center last month (really!) but they forgot to put his name in the program. On the other hand, his new book, Getting Into Digital Recording, *published by Hal Leonard, does have his name on it.*

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—FROM PAGE 42, VOCAL MIKING

recording some of the most influential vocalists around.

"There is absolutely nothing more important than being prepared when it comes to recording vocals," Reitzas says. "Prior to working with a vocalist, I'll always do research on the artist. This could be anything from reviewing their previous albums or maybe even placing a phone call to another engineer who has recorded that artist. If I find myself on a session that is tracking well before a vocal session takes place, this becomes my opportunity to ask questions of an artist or look for hints about his or her likes or dislikes about recording vocals.

"Before a session begins, I'll conceptualize what I'd like the results of the session to be, and usually I can select two or three mics that I feel would be appropriate for the style of music or vocalist," he says. "At this point, I'll verify all of the microphone connections and start to listen to the general sound characteristics of each mic. From this listening test I'll have a pretty good idea which microphone will most likely sound the best. I'm a big believer in the magic of a first take so I had better have my shit together before the vocalist even steps up to the mic. I want that first vocal take to be a usable performance for my comps." Three other important aspects Reitzas stresses are one, an inspiring, well-balanced headphone mix; two, track management—"I'll make myself aware of the existing sounds that are recorded on each track of the multitrack, and then I'll rearrange tracks (only in the digital domain) or I'll create some type of clone or safety in order to free up as much available track space as possible"; and three, the vibe—"Candles, floor lamps and even incense can add to the mood of a session like you wouldn't believe."

Reitzas' favorite mics are tube models, and although he'll usually rent mics that have been successful for him in the past, he'll often experiment with the selection of mics a studio has to offer. "I tend to listen for a microphone that exhibits the characteristics of full body. I want a mic that has a lot of bottom and fullness," he explains. "Ninety percent of the time I use a tube mic in combination with the Night Technologies Air Band found on their EQ3 and PreQ3. Each recording session has its unique highlights, and I try to remember the characteristics of all the mics I've used and how they might play a part in any of my future recordings."

Reitzas describes his typical signal path: "Microphone, NTI PreQ3, NTI EQ3, compressor, two 3-channel mults, tape inputs. Then the tape outputs are fed in my vocal comp box, and its output feeds the tape input of what I use as a comp rack. I'll even monitor that comp rack with a bit of the Spatializer to add more presence and pull it out of the speakers slightly. Once I started using the NTI equipment for recording, I began noticing much more positive feedback from the artists about their vocal sound." Once a vocal sound has been determined by the selection of the microphone, preamp, EQ, compressor etc., Reitzas says the remaining factor is "the ability to mold several vocal performances into one while maintaining the integrity and feel of spontaneity. For this, the Sony PCM 3348 has become my most valuable tool.

"Recording vocals is not rocket science," Reitzas concludes. "With what I've expressed about preparation, it should be fairly straight-ahead to record. Experience is my best friend; When I remember what didn't work the way I had planned it, then I am able to avoid those problems in the future. I am constantly aware of what is happening before I hit the Record button on any machine, always knowing what I am erasing and what I am about to record." ■

Sarah Jones is an assistant editor at Mix.

There is absolutely nothing more important than being prepared when it comes to recording vocals.
—David Reitzas

INSIGHTS

—FROM PAGE 30, MARK V. CRABTREE

and dialog dual-track faders and assignable joystick panners.

Another system we showed at the AES convention was the Logic DFC, or Digital Film Console. We've listened very carefully to what people said about our Logic Series and came up with new series of modules for the control surface, including PEC/DIR [monitor and record-arming] switches and a special version of the digital engine.

Are you looking at integrating systems—using a network topology with multiple control surfaces communicating to central recording and processing resources?

It could be done currently, but the problem is that when you get into that area, the practicalities don't match the technical enthusiasm—if you're not careful, you end up queuing for resources.

Within the heading of our WorkFlow networking topology, we've got a lot of development going on, including a high-speed serial link with StarNET and SyncroNET machine control [courtesy of the firm's recent acquisition of the 1.12 S.Bus synchronizer and interface technologies from Audio Kinetics].

What do you think sets AMS Neve apart from its immediate competition?

I've not yet seen an analog-technology company make a first-class job of moving into the digital arena. The requirements are very different; you've almost got to up-end your company completely before you can make a success of it. I see many people announcing digital consoles, but there's a lot more to it than making the first one work. There's all the interfacing that has to be sorted out, all the investment in after-sales service—there's a lot more than meets the eye.

You think there's an advantage not coming from an analog background?

Digital is where AMS started, so we know how that is supposed to work. We've made the mistakes early on, and we know what the solutions are.

So you've enjoyed the past 20 years with Advanced Music Systems, and now AMS Neve?

It's taken a long time to get to this position. I've known where I've wanted to be. This is the shape I wanted it to be in, and I'm pleased that I got there. ■

Mel Lambert currently heads up Media& Marketing, a consulting service for pro audio firms and facilities.

World Radio History

—FROM PAGE 56, THE FORCE RETURNS

Only when they were ready for a take did they put the original 4-track "Goldwyn master" up on a dubber. Summers notes that it had been recorded on polyester stock and was in good shape, but nevertheless they had someone watching that dubber like a hawk.

To reduce the signal path to a minimum while making the 5.1 print master, the 4-track master was not routed through the SSL Series 5000. Instead, for each channel, Summers patched the Dolby A-Type NR output direct to the DH-1, then to the GML EQ, and finally to the Dominator. This output was not sent back through the board but was instead inserted into the bus-summing network that combined it with the other elements coming in. Summers says that while they did their best to be as "nerdy pristine" as they could, a few times they needed to bring the 4-track into the board when making transitions into scenes.

Two SR-encoded 35mm 6-track masters were made simultaneously on Sondor mag film recorders, with one of them immediately vaulted as an "imbibition master," Summers' reference to the original Technicolor dye-transfer printing process that resulted in fade-proof prints.

The master that wasn't salted away was used to create the print masters for each of the three digital formats for the trilogy's release: to Dolby Digital via its proprietary magneto-optical drives; to DTS via its P-8 hard disk recorder, which would make the one-off duplicating master CD-ROMs; and to SDDS via a 3348 running at 44.1 kHz.

The 6-track was also used to make the 2-track print master, which was archivally recorded to 35mm mag in addition to the Dolby MO recorder—for shooting the track negative. During all of these subsequent transfers, the 6-track master remained on the same machine that it had been recorded on.

Eventually, new home video masters will be made for the films, both in 2-track matrix-encoded and 5.1 formats, in what will be the fourth and presumably final video release of the trilogy. (It might be interesting if an alternate track on laserdisc or a DVD version would feature the original mono mix, which would of course not be conformed to the final 1996 edit, letting viewers know what Lucas' favorite 1977 mix sounded like.)

M&E

There will be new foreign-language mixes made of all three films in the *Star Wars* trilogy, and the hunt is on for the original cut units and premixes of all versions. These will be conformed to the 1996 edits of the films, with Burtt and Summers hoping to do as many versions at Skywalker as possible.

Once Burtt and Summers were finished with the 6-track domestic version of *Star Wars*, they still had to do a M&E version the old-fashioned way—virtually from scratch—because they would be unable to separate the English-language dialog from the music and effects. To create a new stereo M&E master, they had to retrace Burtt's steps in what was the last work done on *Star Wars* at Goldwyn Studios in 1977. What they ended up with "was not an exact duplicate of the 4-track mix, but then again it never was," says Summers.

Of course, this means that music had to be remixed from scratch (i.e., the edited 3-track music mixdowns). The original music editor on the *Star Wars* trilogy, Ken Wannberg, helped in getting together the music for the special edition. The revamped Mos Eisley scene in *Star Wars* features one new piece of music that was originally recorded for the trash-masher sequence. *Return of the Jedi* will feature some newly recorded music because one of the new scenes will be a revised "Sy Synoodles" performance for Jabba the Hutt.

All three films begin with the famous Alfred Newman 20th Century-Fox logo, including the "CinemaScope extension." Burtt recalls that, amazing as it may seem, a stereo recording of that couldn't be found despite everyone looking high and low. He found a 35mm 4-track mag print of the Marilyn Monroe film *River of No Return*, and transferred it to ¼-inch tape, and that's what was heard in the final film. "The fun thing was that there was this wonderful contrast—this tinny Fox logo and then *Star Wars* hits the screen, and the contrast made it bigger than it was."

For *Empire Strikes Back* and *Return of the Jedi* there was a new stereo recording of the Fox logo music, conducted by John Williams, although Burtt notes that it was soft-pedaled a bit in those films. Yet another new recording of the Fox logo was made recently, although the funky original was still used in the mix of *Star Wars* because the film had already been mixed, Burtt notes with no small glee.

•••

Burtt says that all this work was "silly in some respects because the public accepted the film at that time," which is an understatement of Death Star proportions. "But the filmmakers still wanted to do it differently, and it's given us some real satisfaction. And I think it certainly will show through on this re-release because one of the things we have to deal with is people's expectations. They want *Star Wars* to be what they *think* it was and what their memory of it is, and I think we've come close to that. Not only have we upgraded the sound quality [of the track], but we'll also be going out in all three digital sound formats."

Should any so-called purists feel that Lucasfilm has tampered with *Star Wars*, instead of enhancing it, they should realize what *could* have happened. "It was talked about doing the film from scratch, but I felt it was unnecessary because it was a product of its time," Burtt says. "The decisions that you make late at night getting it done in the heat of battle often give you creative gems that you can never consciously repeat carefully and slowly later. Having to ship the next morning, you're focused and selective and get what you want, even if it's from a bad punch-in. I didn't want to sit back and leisurely pick it apart and try to think, 'Well, this little Foley footstep could be a lot better, let's go record it.' This isn't going to matter now."

While their sister visual effects company is working with today's whole new generation of computer graphics, as opposed to the film compositing used during the time, the sound technology that Burtt and Summers used, while improvements at every step (Dolby SR on the new print master vs. Dolby A-Type, quieter mag stocks, moving-fader automation, Cedar de-hissing), does not represent fundamental leaps in style. All of which suited them very nicely in documenting once and forever this landmark soundtrack. ■

Larry Blake is a sound editor/re-recording mixer who lives in New Orleans. His next film, love jones, *will be released this month in as many digital theaters as are not playing the* Star Wars *trilogy.*

World Radio History

—FROM PAGE 136, EVENT ELECTRONICS 20/20

dividual instruments and create new mixes, which I listened to on a variety of reference monitors and other types of speakers. In both cases, they performed extraordinarily well. The stereo imaging remained well-defined, and there was no apparent coloration of any frequencies, even at very high and very low listening levels. Very, very impressive.

Next, I listened to a stack of CDs ranging from orchestral works to acoustic jazz to heavy metal. I chose recent state-of-the-art digital recordings, "restored" recordings from the '20s and '30s, and examples of just about everything in between. The 20/20bas was ruthless in its honesty, masking no imperfection or subtle detail. Great recordings sounded great, and not-so-great recordings sounded...well, not so great. That's about the best endorsement that a monitoring system, at any price, can get.

Speaking of price, I should probably mention that one set of "familiar monitors" I used for my tests were Meyer HD-1s, and that the 20/20bas compared favorably in many ways. This is no mean feat, considering that the HD-1s retail for four times as much.

The 20/20bas has ample power to handle just about any close-in monitoring situation. The low-frequency and high-frequency amplifiers are rated at 130 watts and 70 watts continuous, respectively. The active fourth-order crossover is at 2.6 kHz. Frequency response is listed as 45 to 20k Hz (±2 dB, ref 500 Hz), which may in fact be the case, even though that is a lot of bottom end for an 8-inch woofer, no matter how efficient the system.

I can say for sure that whatever the lowest frequencies reproduced are, they are remarkably tight and well-damped.

Last, but by no means least, I was able to listen to both sets of monitors for many hours at a time without experiencing any ear fatigue, even at fairly high playback levels.

The unpowered 20/20s are identical in size and driver complement to the powered versions, except that they have slightly less low end (50 to 20k Hz) and they have a second-order crossover at 2.2 kHz. They are rated at 150 watts program/200 watts peak into 4 ohms. Connections are made to standard five-way binding posts. At 22 pounds, they are six pounds lighter than the amplified versions.

Although I preferred the sound of the powered monitors, the 20/20s weren't far behind. Most of the clarity and definition was there, and what was missing may have had more to do with their compatibility with my power amplifier than anything intrinsic to the speakers. The bottom line is that these speakers deliver awesome fidelity, and at $399 a pair, they are quite a bargain.

Both the 20/20bas and the 20/20 Direct Field monitors set new standards for reference monitors in their respective price ranges. Their accuracy makes them suitable for use in professional studio applications, while their cost makes them accessible to those on more modest budgets. Anyone seeking a solid studio reference monitor should give these a listen.

Event Electronics, 6383-B Rose Lane, Carpinteria, CA 93013; 805/566-7777; fax 805/566-7771. ■

Barry Cleveland is a San Francisco-based composer, recording artist, engineer and producer. He also plays guitar with the improvisational quartet "Cloud Chamber."

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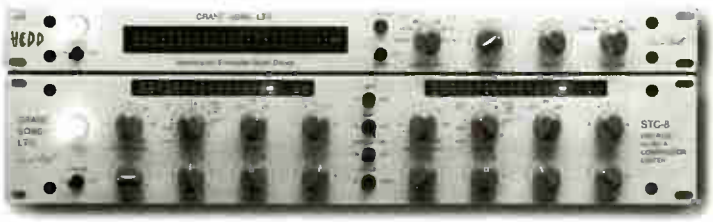

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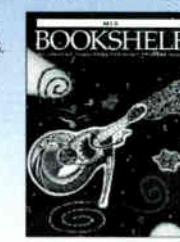

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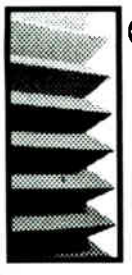

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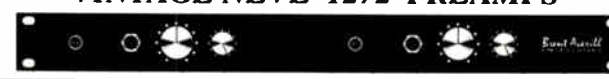

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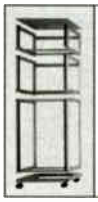

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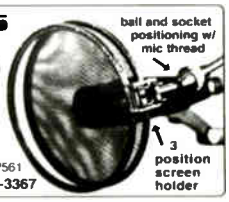

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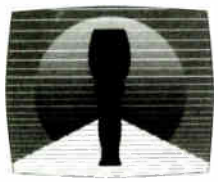

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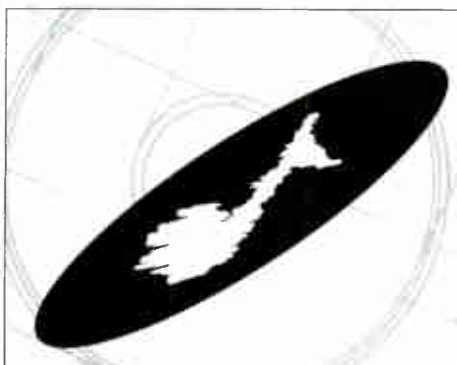

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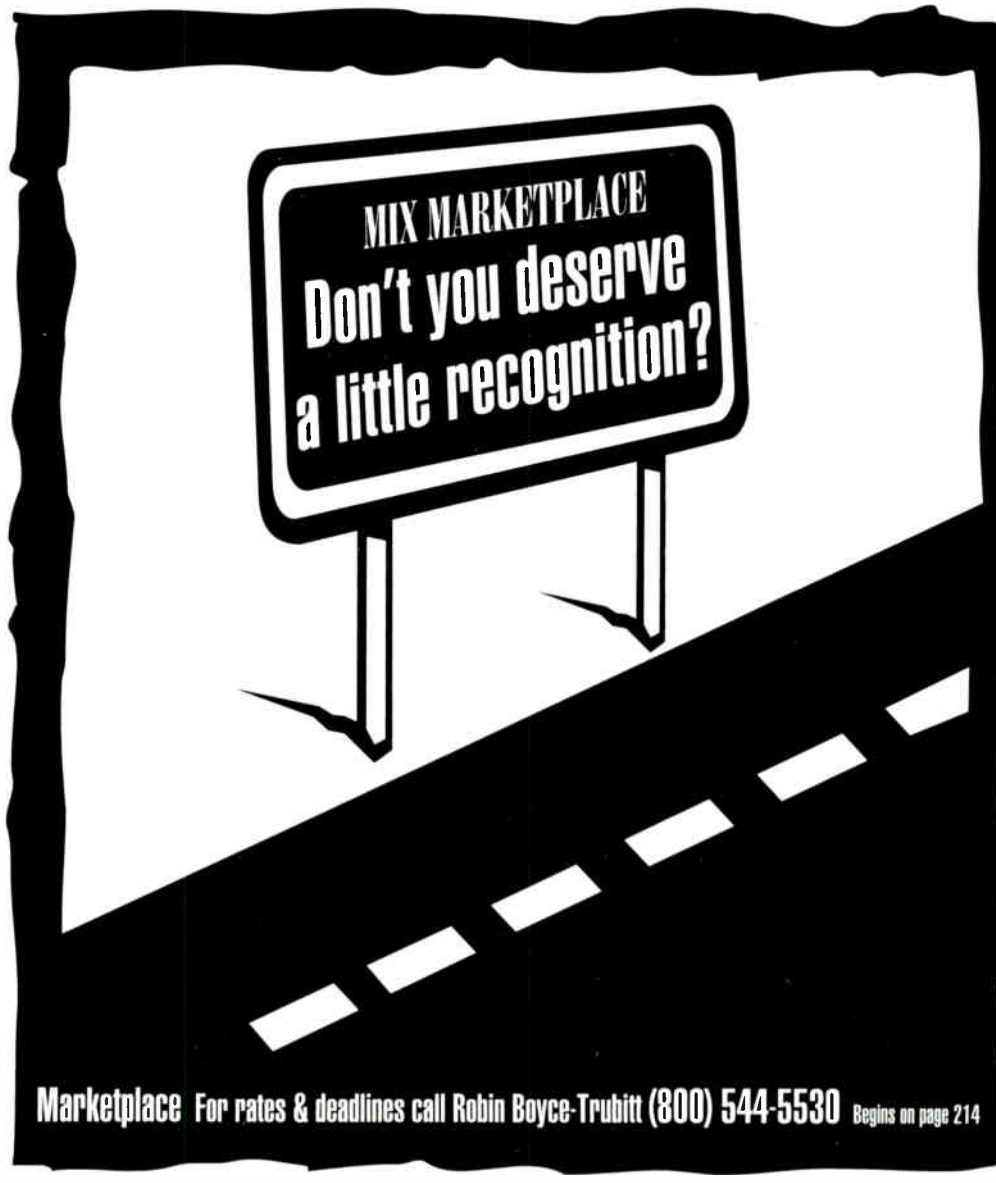

Marketplace For rates & deadlines call Robin Boyce-Trubitt (800) 544-5530 Begins on page 214

World Radio History

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Closing: Fifteenth of the month, six weeks prior to the cover date (ex: April issue closing is February 15). Ads received after closing will be held for the next month unless otherwise stated. Cancellations will not be accepted after the closing date. Copy changes and cancellations must be submitted in writing.

Other requirements: Full street address (PO boxes aren't sufficient) and phone numbers must accompany all requests. All words to be bold should be underlined. Copy must be typed or printed legibly in standard upper/lower case. Publishers are not responsible for errors due to poor copy. Arrangement of characters may be altered in typesetting process due to space. The publishers are not liable for the contents of advertisements.

The small print: No stated or implied discounts allowed on new equipment sales. Publishers reserve the right to refuse or discontinue any ad deemed inappropriate.

Send coupon payment to: **Mix Magazine Classifieds: Attn: Robin Boyce-Trubitt, 6400 Hollis St., #12, Emeryville, CA 94608, tel. (800) 544-5530 or (510) 653-3307; fax (510) 653-8171. e-mail: boycemr@cardinal.com. Payment must be included with copy: check, Visa, MasterCard or American Express accepted. Sorry, no billing or credit available.**

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- ❑ Acoustic Consulting
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- ❑ Maintenance Services
- ❑ Multimedia
- ❑ Music Products/Software
- ❑ New Products
- ❑ Recording Services & Repairs
- ❑ Records, Tapes & CD Services & Supplies
- ❑ Studios
- ❑ Video Equipment
- ❑ Miscellaneous

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Name _____

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Signature _____

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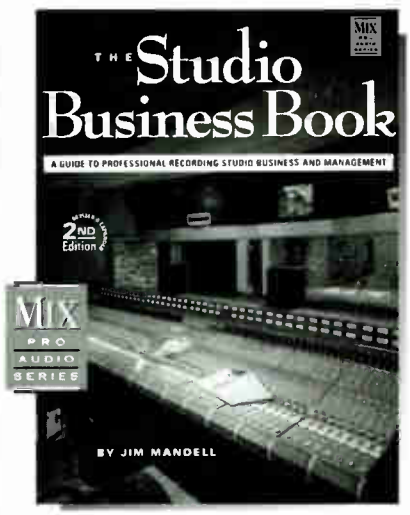
NEW FROM MIXBOOKS

The Key to the Studio Business!



The new second edition of this widely-used book is a necessity for anyone running or owning a studio, whether it's a project setup, a midrange commercial facility, or a world-class room hosting the stars! Author Jim Mandell gives you in-depth, detailed, *specific* information on:

- Writing a business plan and getting funding
- Choosing and buying equipment
- Determining monthly expenses and setting rates
- Developing new income sources and making contacts
- Advertising and PR
- Scheduling and studio politics
- Managing, hiring and firing personnel

The Studio Business Book also includes special sections on the legal issues surrounding home project studios and writing an employee handbook, plus a guide to terms and technology and other resources.

Item 1319A, $34.95 plus $4.00 shipping and handling.

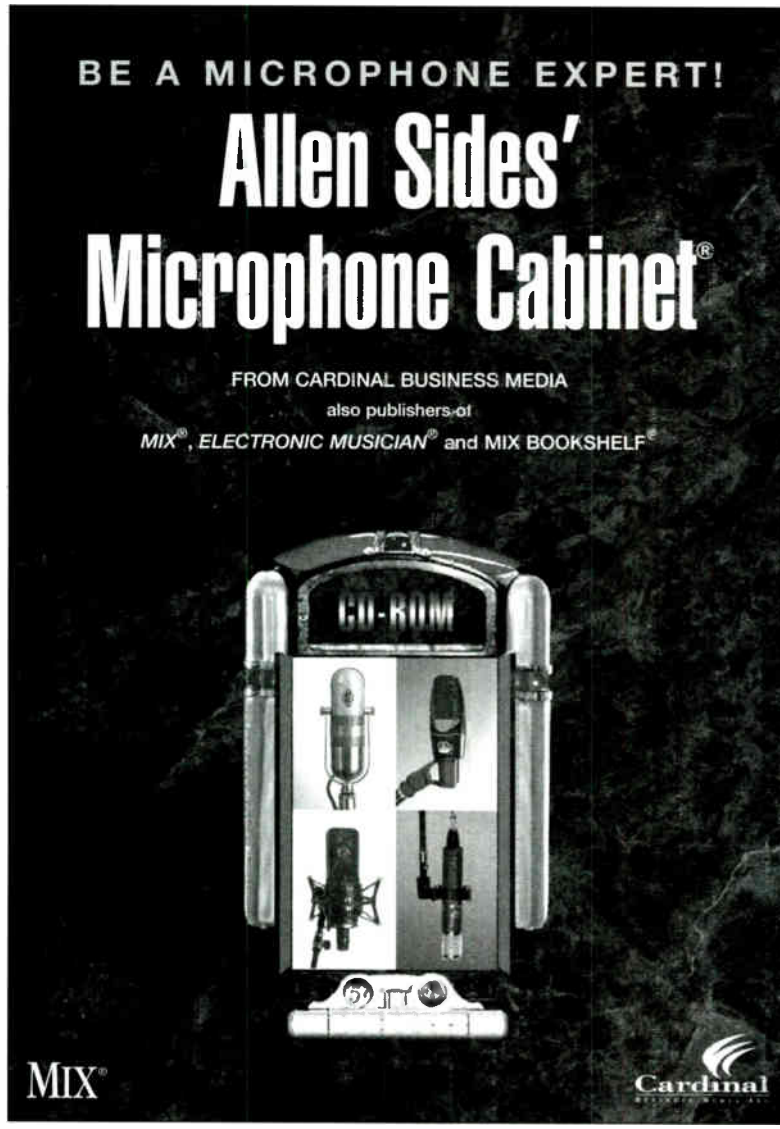
TO ORDER, CALL TOLL-FREE: (800) 233-9604

MIX Reader Service

For more information about products and services advertised in this issue, fill out and return *Mix*'s postage-paid reader service card! You'll receive information directly from the advertisers whose products interest you.

World Radio History

A revolutionary new microphone auditioning tool on CD-ROM!



Allen Sides has recorded and mixed sessions for dozens of world-class artists such as Ry Cooder, Count Basie, Ray Charles, Sinead O'Connor and Brian Setzer.

David Schwartz, producer of this CD-ROM project, is the founder and former editor-in-chief of *Mix*.

"The Microphone Cabinet is now a required reference tool for all of our classes. It really shows students the importance of subtle differences between mics, but best of all, I can secretly use it too!"

David Gibson
Founder and Chief Administrator
California Recording Institute

"What a great educational tool! My students can now learn the technical specifications and the sonic characteristics of microphones which normally aren't available to them. With studio time in such demand, it's a great way to get to know the mics before going into the studio."

Wesley Bulla
Coordinator of Recording Studio Curriculum
Belmont University

"Hey, I got the CD-ROM and it's great! Finally, you get a chance to look in a top engineer/producer's toolbox without having to buy all of the tools."

David Miles Huber
Author and musician

This unique, fully interactive CD-ROM lines up the top classic and contemporary professional microphones for a series of audio comparison tests on dozens of instruments.The disc features:

- A "Selector Cabinet" of both popular and classic mics for recording each instrument.
- 16-bit Red Book audio samples of the selected mics and instruments.
- Allen Sides' "Tips" for getting the best sound from each microphone.
- A high-resolution color photograph of each microphone and the mic placement setup for each instrument.
- Complete specifications for each microphone.
- A color photograph and description of each musical instrument.
- A "Microphone Basics" section by noted author John Woram.
- A directory of the microphone manufacturers.

This amazing disc features tests of 66 mics and 33 different instruments. The microphones were chosen from the world-renowned collection at Sides' Ocean Way/Record One studios in Los Angeles. Sort by microphone to check out the best instruments for each, or sort by instrument to see which mics you should use. **Item MC) $69.95** plus $9.95 shipping and handling.

Call Toll-Free!
800.233.9604

World Radio History

FEEDBACK

FLETCHER FAN

I found "A Reader's Guide to Vintage Gear" pretty organized and straightahead for such a complex subject. The author matches model numbers with opinions, and opinions with reasons, which provide the reader with an occasional basis for disagreement.

Missing from this by-the-numbers approach is the brand-name snobbery which usually evolves along the lines of what we own, or what is pointed out to us with an air of braggadocio at some studio or gig. Missing, too, is the reminiscing style, which tells me nothing and leaves me, well, envious.

The author makes a clear separation between the objective and subjective statements. In fact, I did not catch his name until the self-described "sales weasel" evoked other animal similes from the same source.

More articles from Fletcher (unless he has clammed up).

A.A. Fontana
Fontana Studio
East Greenwich, R.I.

DETAILS, DETAILS...

Here are some corrections to Fletcher's article on vintage gear (Nov. '96 *Mix*).

1. The year of rosewood fret boards on Fender Strats is 1959, not 1960.

2. The pictured labeled LA2 is an LA2A. The picture of A&M's gear shows a green-face LA2 that I sold them. Note the difference in the meter.

3. The EMI Redd 37 (Beatles) console, which I sold to Lenny Kravitz, was built entirely from V72S modules, not V72A. The V72S is identical to a V72 but has 4 dB of extra gain.

4. The LA1 was designed by Teletronix. When Bill Putnam bought the design, he made it work and issued the original green LA2 (not A). The gray paint finish came on the first LA2As.

5. The major functional difference between a Neve 1084 and a 31102 is that the latter lacks an inboard output transformer. If you rack up 31102s, you will need to wire some into the circuit.

6. The Neve 1081, 1083, 31102 and the 33609, 32264 limiters all use either the 440 (discrete) or 640 (IC) output amps, which are Class AB, not Class B. They use 24-volt powering, not 15. Class A or AB? The 1081 as well as the 31105 (8078 console) use AB output stages and are the most popular consoles!

7. The input transformer of a 1272 is different from that found in the aux modules Fletcher uses to build mic preamps.

8. As the former owner of Helios console #1 (from Olympic Studio 2), later striped by Fletcher, I thought the modules were lacking in high end, low end and dynamic range, although great records have been made on Shure mixers, too. It's in the hands.

9. The ITI MEP 130 has a switch on the bandwidth control that makes the high- or low-band shelving.

10. The Pultec EQP1A3 has a solidstate rectifier vs. the EQP1A's tube rectifier. The EQP1A3 has slightly better harmonic distortion specs as a result.

11. The green Pultec EQH2 lacks 20 cycles in its low-frequency selection; the silver one does have it.

12. Fletcher is a nice guy.

Dan Alexander
Dan Alexander Audio
San Francisco

QUESTIONING QUESTIONING AUTHORITY

In response to Phil Radelat's letter, titled "Question Authority" (November 1996 "Feedback"): Wow, you really feel passionately about digital audio. Your attack of Stephen St.Croix and his attachment to analog makes me wonder whether you know anything about him. He not only commits column after column to digital audio, but he designed the digital workstation software made by Spectral for their Producer editing system. If you had read his articles, you would see his dedication to furthering the development of audio—both analog and digital. He is, in fact, one of the few who not only design pro audio equipment, but actually use it.

Your statements that analog and any who support it should be "put out to pasture" make me wonder how broad your experience is. I own and use both analog and digital equipment. Digital gives the most power to manipulate audio, and analog has, for some applications, more "musicality." Many of the most successful engineers working today track to analog and then transfer to digital. Perfect or not, analog can add a desirable element. You rail against "pleasing fidelity." May I remind you that what we are making is music. If either analog or digital can provide pleasing fidelity, bring it on!

I see very few people who are proponents of only analog. Nothing will stop the exponentially increasing development of digital audio. If you need to work only in the digital domain, great. But don't be threatened by those of us who use the medium appropriate to the task at hand, be it analog or digital. Start really listening. Be more tolerant. Get more information before you lash out. And lighten up.

Kirt Shearer
Paradise Studios
Sacramento, Calif.

FROM THE HEART

As one of those $50-a-night sound guys who can actually mix well, I applaud Mr. Grumpmeier ("Insider Audio," May '96 *Mix*); he is absolutely correct. I work at a nightclub running FOH and an onstage monitor mix by myself. Sometimes, there are three or four bands in one night, and I still manage to produce excellent audio. My secret? I listen to and care about the quality of the sound, and I am intimately connected with the band and the audience. For 15 years, I have been trying to advance my career while listening to incompetent engineers butcher some of my favorite bands. I don't understand how these guys get their jobs with these acts, and it is unbelievable that they manage to keep them. What people forget is that live audio is an art, not a science. It is something that comes from your heart and your soul, not your RTA. Anybody need a good audio engineer?

Chris Munson
Charlottesville, Va.

Send Feedback to Mix, *6400 Hollis St. #12, Emeryville, CA 94608; fax (510) 653-5142; or mixeditorial @cardinal.com*

World Radio History

REALITY FOR $1500 A PAIR. INTRODUCING THE HR824 ACTIVE MONITOR.

If you've been trusting the quality of your creative product to passive monitors costing $400-$600 a pair, there's an astonishing revelation waiting for you. In our opinion, the active, biamplified HR824 is the most accurate near-field monitor available — so accurate that it essentially has no "sound" of its own. Rather, Mackie Designs' High Resolution Series™ HR824 is the first small monitor with power response so flat that it can serve as a completely neutral conductor for whatever signal you send it.

Mackie acoustic engineer David Bie uses scanning laser vibrometry to map HR824 tweeter dome vibrations. Film at 11.

SCIENCE, NOT SNAKE OIL.

Internally-biamplified, servo-controlled speakers aren't a new concept. But to keep the cost of such monitors reasonable, it's taken advances in measurement instrumentation, transducers, and electronics technology. In developing the HR Series, Mackie Designs sought out the most talented acoustic engineers and then made an enormous commitment to exotic technology. The HR824 is the result of painstaking research and money-is-no-object components, not to mention thousands of hours of listening tests and *tens* of thousands of dollars in tooling.

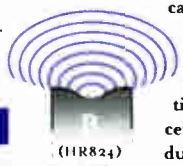
FLAT RESPONSE... ON OR OFF-AXIS.

One of the first things you notice about the HR824 is the gigantic "sweet spot." The detailed sound field stays with you as you move back and forth across the console — and extends far enough behind you that musicians and producers can hear the same accurate playback.

The reason is our proprietary exponential high frequency wave guide. Without it, a monitor speaker tends to project critical high frequencies in a narrow beam (Fig. A) — while creating undesirable edge diffraction as sound waves interact with the edges of the speaker. Imaging and definition are compromised. The "sweet spot" gets very small.

HR824 Active Monitors accept balanced or unbalanced ¼" and XLR inputs. Jacks & removable IEC power cord face downward so that the speaker can be placed close to rear wall surfaces.

Like biamped speakers, wave guides aren't a new concept. But it takes optimized internal electronics and a systems approach to make them work in near-field applications.



(HR824)

The HR824's wave guide (Fig. B) maximizes dispersion, time aligns the acoustic center of the HF transducer to the LF transducer's center, and avoids enclosure diffraction (notice that the monitor's face is perfectly smooth.) The exponential guide also increases low treble sensitivity, enabling the HF transducer to handle more power and produce flat response at high SPLs.

CLEAN, ARTICULATED BASS.

Seasoned recording engineers can't believe the HR824's controlled low bass extension. They hear low frequency accuracy that simply can't be achieved with passive speakers using external amplifiers. Why?

First, the HR824's FR Series 150-watt bass amplifier is directly coupled in a servo loop to the 8.75-inch mineral-filled polypropylene low frequency transducer.

It constantly monitors the LF unit's motional parameters and applies appropriate control and damping. An oversized magnet structure and extra-long voice coil lets the woofer achieve over 16 mm of cone excursion. Bass notes start and stop instantly, without "tubbiness."

Second, the HR824's low frequency driver is coupled to a pair of aluminum mass-loaded, acoustic-insulated 6.5-inch passive drivers. These ultra-rigid drivers eliminate problems like vent noise, power compression, and low frequency distortion — and couple much more effectively with the control room's air mass. They achieve the equivalent radiating area of a 12-inch woofer cone, allowing the HR824 to deliver FLAT response to 42Hz with a 38Hz, 3dB-down point.

Third, the woofer enclosure is air-displaced with high-density adiabatic foam. It damps internal midrange reflections so they can't bleed back through the LF transducer cone and reach your ears. The typical problem of small-monitor midrange "boxiness" is eliminated.

A TRUE PISTONIC HIGH-FREQUENCY RADIATOR.

We scoured the earth for the finest high frequency transducers and then subjected them to rigorous evaluation. One test, *scanning laser vibrometry*, gives a true picture of surface vibration patterns. Two test results are shown in the upper right hand corner of this ad. Figure C is a conventional fabric dome tweeter in motion. You needn't be an acoustic engineer to see that the dome is NOT behaving as a true piston.

The Mackie HR824 Active Monitor. ±1.5dB from 42 to 20kHz.

Figure D shows our High Resolution metal alloy dome at the same frequency. It acts as a rigid piston up to 22kHz, delivering pristine, uncolored treble output that reproduces *exactly* what you're recording.

INDIVIDUALLY OPTIMIZED.

We precisely match each transducer's actual output via electronic adjustments. During final assembly, each HR824 is carefully *hand-trimmed* to ±1.5dB, 42Hz-20kHz. As proof, each monitor comes certified with its own serialized, guaranteed frequency response printout.

Fig. C: Uneven fabric dome tweeter motion distorts high frequencies.

Fig. D: HR824 alloy dome's uniform, accurate pistonic motion.

The HR824's front board has "radiused" edges to further eliminate diffraction; an "H" brace bisects the enclosure for extra rigidity.

Mackie is one of the few active monitor manufacturers that also has experience building stand-alone professional power amps. Our HR824 employs two smaller versions of our FR Series M-1200 power amplifier — 100 watts (with 150W bursts) for high frequencies, and 150 watts (200W peak output) for low frequencies. Both amps make use of high-speed, latch-proof Fast Recovery design using extremely low negative feedback.

TAILOR THEM TO YOUR SPACE.

Because control rooms come in all shapes, sizes and cubic volumes, each HR824 has a three-position Low Frequency Acoustic Space control. It maintains flat bass response whether you place your monitors away from walls (*whole space*), against the wall (*half space*) or in corners (*quarter space*). A low frequency Roll-Off switch at 80Hz lets you emulate small home stereo speakers or popular small studio monitors.

CONFRONT REALITY AT YOUR MACKIE DESIGNS DEALER.

We've made some pretty audacious claims in this ad. But hearing is believing. So bring your favorite demo material and put our High Resolution Series monitors through their paces.

If you've never experienced active monitors before, you're going to love the unflinching accuracy of Mackie Designs' HR824s.

If you've priced other 2-way active monitors, you're going to love the HR824's $1498/pair price* AND its accuracy.

*$1498 suggested U.S. retail price per pair.

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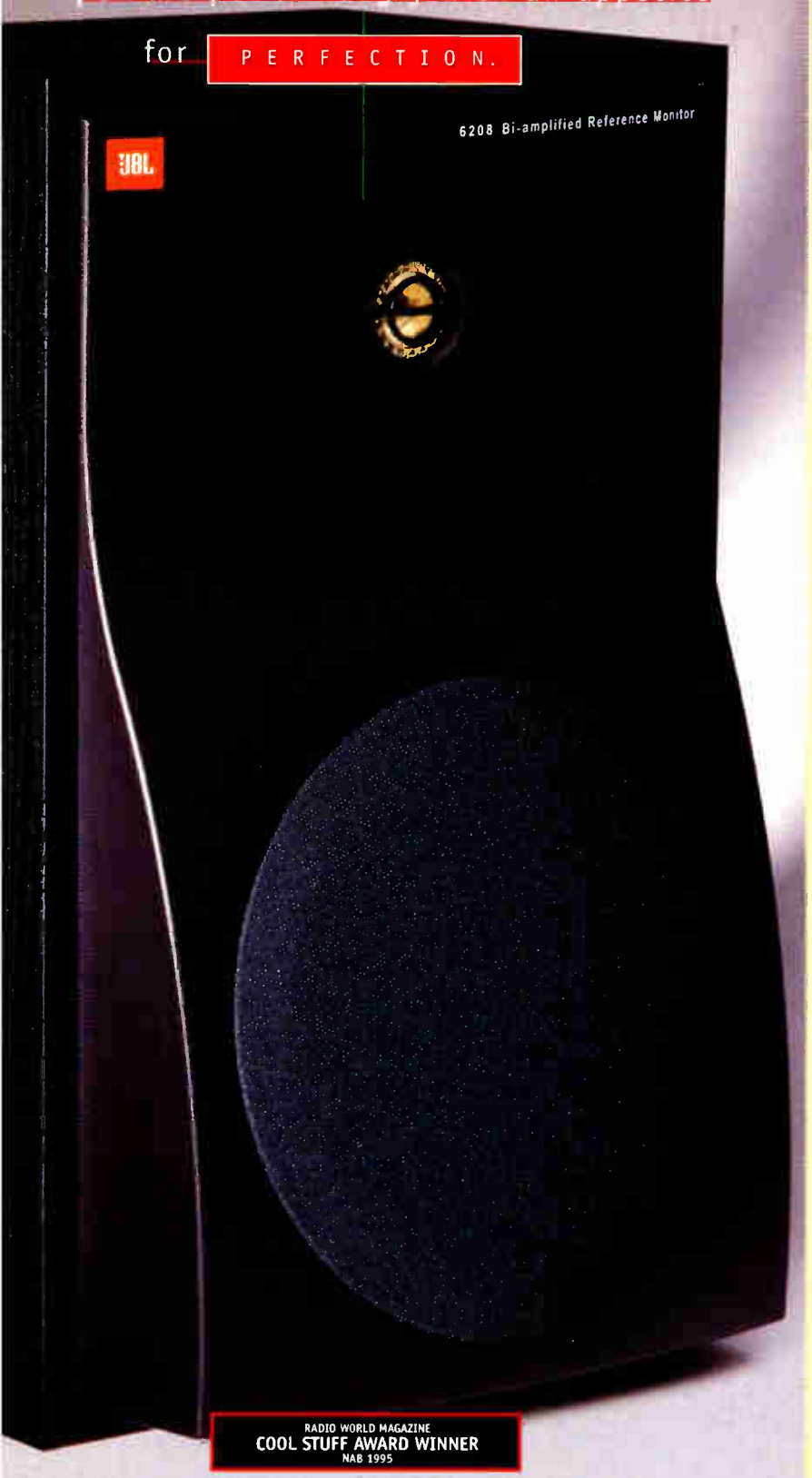
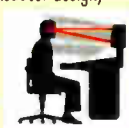
The JBL 6208 Bi-Amplified Reference Monitor

For the power hungry with an appetite for PERFECTION.



The Best System Starts with the Best Parts.

JBL has more experience in designing and building transducers for professional studio monitors than any other company in the industry. We not only use the latest engineering and design equipment, but also the most important test device of all, the human ear. We believe in physics, not fads, so while other companies pick parts off somebody else's shelf, we create our components from scratch. And by utilizing more than 50 years of experience in transducer design, we create the perfect transducer for each system.



Multi-Radial Design - An Ideal Solution to a Complex Problem.

Combining individual transducers into a system is a delicate balance of acoustics, electronics and architecture. Our exclusive Multi-Radial baffle is contoured to bring the drivers into perfect alignment, so the high and low frequencies reach your ears simultaneously. This reduces time smear for a smooth transition between the low and high frequency drivers. In addition, the gently rounded edges of the 6208 provide controlled dispersion and balanced power response. That means even off-axis, you will hear an accurate representation with wide stereo separation and an immense depth of field.

Gold/Titanium Hybrid Dome.

By mating the materials to a large magnetic structure, the 6208 can produce extremely flat frequency response and low distortion for hours of fatigue-free listening. JBL pioneered the use of the light but rigid gold/titanium hybrid construction to provide a transient response that is quick and precise for pinpoint accuracy.

Shielded Drivers for Flexible Placement.

JBL shields all of the drivers so you can place the 6208 right next to your audio workstations without interaction. Gone are the days of compromised monitor placement in your production environment.

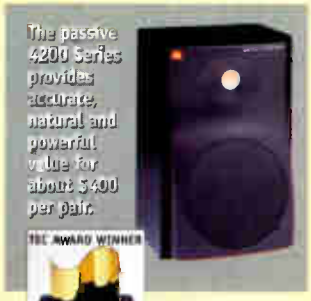
Why Bi-Amplification?

It's a simple fact, a separate amp for each speaker produces the most accurate sound. Each of the 6208's two amplifiers is designed to reproduce the assigned frequencies. And by combining the amplifiers inside the cabinet, you improve the amplifier's ability to control the speaker it's driving for controlled low end punch.

> "We played just about every type of instrument through these speakers and they reproduced it with flying colors."
>
> - *Bobby Owsinski*
> EQ Magazine

Active Crossovers Provide Accurate Response Tailoring.

By carefully tailoring each amplifier's performance to the response characteristics of the drivers, you get the most faithful reproduction possible. By using active crossovers, power is not robbed by possive components like inductors and resistors. The result is clear, accurate sound at the highest levels.



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