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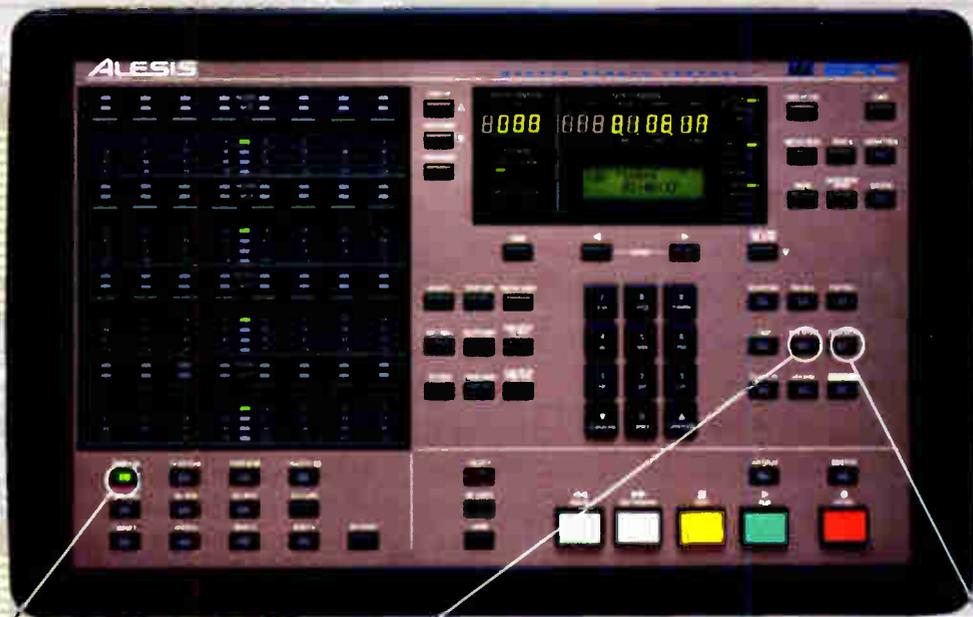
The Power Of Digital Editing

Part One Of A Series

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The Alesis BRC™ Master Remote Control puts the power of digital copy-and-paste editing in the hands of all ADAT® users. Take that great backing vocal on the first verse and fly it into verses two and three. Or, create the ultimate montage sax solo by copying and splicing of many different takes with single-sample accuracy. The BRC gives you the advantages of a hard disc recording system with the security of a tangible tape-based storage medium.

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For the complete story about the BRC Master Remote Control, pick up the new ADAT Digital Recording System brochure. It's available only at your Authorized Alesis Dealer or by calling 1-800-8-ALESIS. BRC and ADAT MultiChannel Optical Digital Interface are trademarks of Alesis Corporation.

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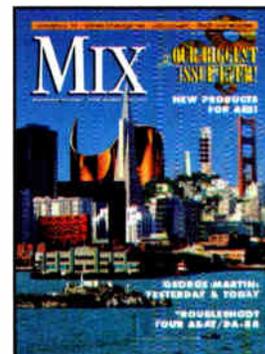
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Cover: This unique montage blends classic San Francisco landmarks with professional audio gear and the bronze sweep of the TEC Award. Note the transformation of the former B of A building (far left) into a mixing console tower. The photographs of S.F. were captured on the Sausalito Ferry at various points along its route. The TEC Award photo is by C. R. King, and the product shots were supplied by the manufacturers. The final 40.4 MB image was created with Photoshop 2.51 and Collage 1.0 on a Quadra 950 with 136 MB of RAM and a 1 GB hard disk array. **Artist & Photographer:** Paul McCrell.



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FROM THE EDITOR

Technology vs. Creativity

In a matter of days, thousands of audio professionals will pack into San Francisco's Moscone Center for the 97th Convention of the Audio Engineering Society, featuring technical sessions, workshops and a dazzling array of new products from hundreds of manufacturers.

Unfortunately, technology is a double-edged sword. No one disputes that advancements in computers and electronics have made our lives easier, increasing the availability and affordability of powerful, simple-to-use audio tools. But at the same time, does a 96-track digital recording system ensure a superior final product over one produced on a 2-inch, analog 16-track? If a classical recording can be captured using five microphones, will it be that much better with 40 mics? Does a computer-controlled, fiber optic-linked sound system guarantee that a house engineer will deliver a great mix to 50,000 fans at a stadium show?

Don't get me wrong. I love technogadgets as much, if not more, than anyone, but I'm still a firm believer in the "simpler is better" approach. The use of technology for technology's sake can destroy the essence of a musical piece, whether it's overblown string pads on '70s releases, the shakuhachi flute patches that have permeated recordings during the past five years, or some engineer laboring for hours (or days!) programming a hi-hat part. There's nothing inherently wrong with any of these sounds or techniques; they all have their place and purpose. But the use of technology simply because it's available can transform the creative process into robotics.

Whenever I hear musicians complain about the fact that their last project wasn't successful because "it was only 8 (or 16, or 24) tracks," I think back to producer George Martin and his engineering team creating *Sgt. Pepper's* on a pair of 4-track recorders! From his work with the Beatles to his current projects, Martin has influenced several generations of producers, yet never let technology get in his way. In this issue, Mel Lambert chats with Martin, who will give the keynote speech at AES.

This month, *Mix* weighs in at a substantial 348 pages—our largest issue ever! And we've expanded in two directions: technical editor James D'Angelo (a successful engineer/producer with major label experience, an MS degree in electrical engineering and circuit design chops) has joined our staff; and *Mix* can now be reached on the Internet at 74673.3672@compuserve.com.

So circle November 10-13 on your calendar and drop by and say hello at AES booth #744. If you can't make the show, don't despair: We'll provide complete coverage of the AES show in future issues. And remember, creativity (and the creative use of technology) wins over technology every time.

See you at the show!



George Petersen,
Editor



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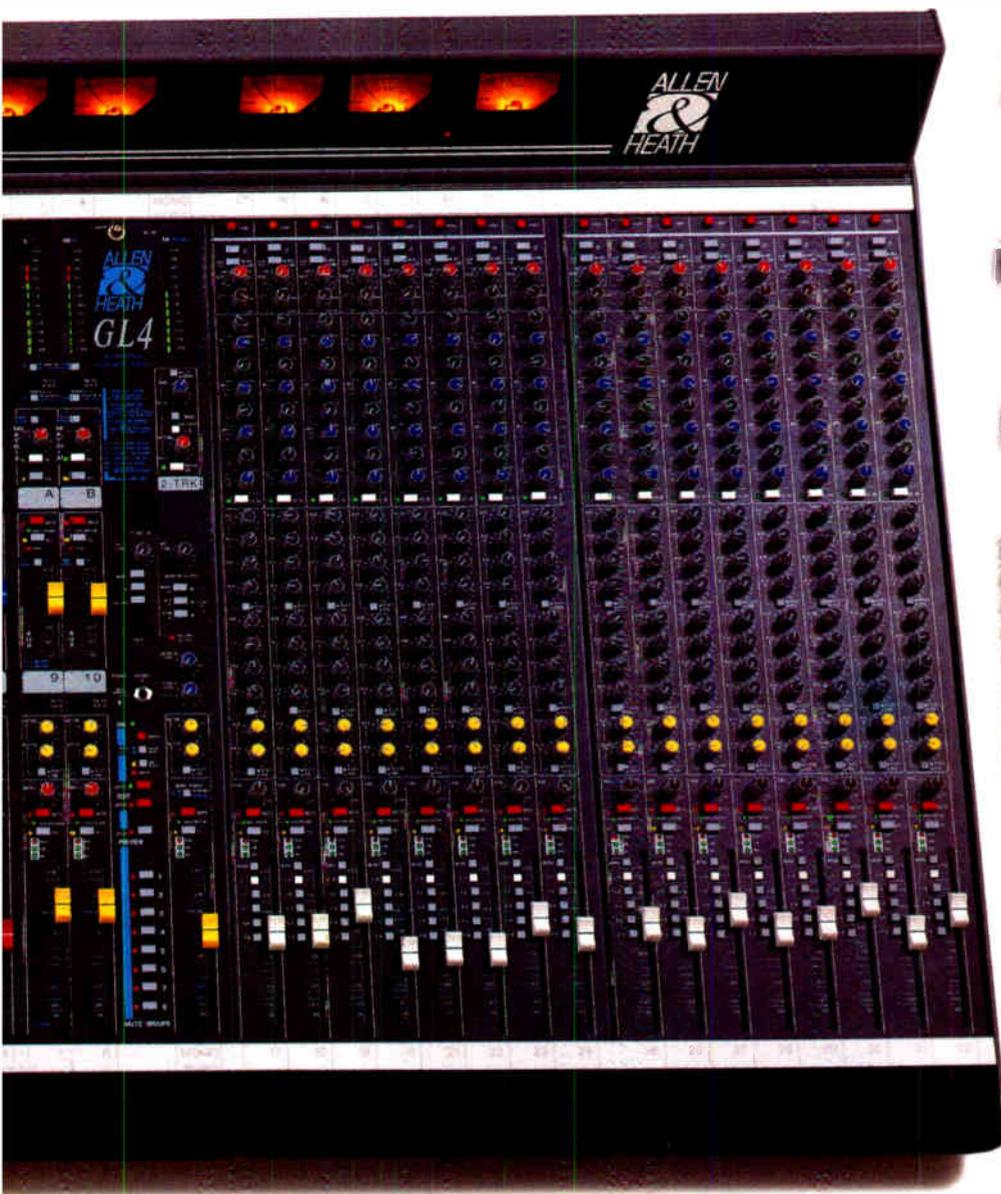
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GAIN

A new high performance pre amplifier stage matches the input source to the console. Wide ranging (MIC +6 to +60dB, LINE -14 to -40dB) gain control with a linear compensated law to ensure a smooth even response over the whole 270° range.



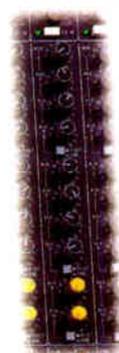
Phase Reverse

Reverses the phase of the input source to correct the phase differences often encountered in microphone placement. cables wired in phase and reverse wired microphones. Reversing the phase of a signal can also be used to minimize acoustic feedback microphones in live sound mixing.



MIC/LINE

Selects either the MIC or LINE input source. Our MIC/LINE switch works as a 20db pad. Our MIC/LINE switch allows you to plug line level inputs into the XLR connector. No more getting out adapters to get your XLR line level sources into the console.



AUX Sends

10 aux sends with individual level controls and pre/post fader switching allow uncompromised routing to combinations of external effects devices, cue systems, stage monitors and the like. These are arranged in two groups of four, and one group of two for logical grouping of effects and monitor sends. Internal jumper options allow permanent configuration for pre or post fader rather than switched if required. Further jumper options select the pre-fade sends to be pre or post EQ and pre or post mute (pre EQ post mute standard setting). In stage monitor mode the 10 aux sends become the 10 mixes per input, all post fader and EQ to allow total functionality as a dedicated stage monitor mixer.



Input Meter

For complete control of the channel signal level a 3 stage LED meter shows pre fader signal presence (dynamic indication starting from -20dBu) 0dB normal level and signal peak (5dB below clipping).



Routing

This bank of switches routes the post pan signal to the L/R and Groups (in pairs) and the pre pan signal to the MONO mix. In STAGE MONITOR applications the MONO buss is used for AFL monitoring to the stage engineers wedge speaker.



Input Channel Strip

Our input strip has seen some major new developments in electronic theory. The Mic pre amp has been redesigned to get the most from the latest technology. We extended the strip to design away dual concentric stacks and ensure all AUX send busses could be accessed via individual knobs. And finally, we have extended the conventional performance characteristics to increase maximum output to +27dBu and as a mark of confidence we measure the frequency response from 20Hz to 30kHz. The drop at 50kHz is still only -11dB, the cleanliness and openness of a signal can only be achieved with this level of performance.

(Back of Console)



MIDI Capabilities

MIDI in, out and through allow you to run the programmable mute system via any MIDI external control. In addition the system can be set up to send program change to external devices so that as you change from scene to scene your effects or any other devices can change simultaneously. These and many more implementation schemes are available on the GL4.

Fader

100mm long throw smooth travel fader offers +10dB boost above the normal 0 operating level. A raised write on strip below the fader is used to number and identify the channels.



Group Module

This is where it all happens. The Allen & Heath GL4 is designed for maximum flexibility with absolutely no compromise in the application you configure it for. That's the philosophy behind the layout of the group master section. In CH Monitor or Recording, wherever the application of the moment, the ideal control layout can be arranged. The topology that we have chosen to achieve this has never been used before on a console in this price range.

Programmable Mute Groups

The system is a total no brainer to operate. Hit the **Mute Group Master** button and the mutes come on with their corresponding red LEDs lit. Hit **Mute Preview**, select another master and the green LEDs tell you which mutes are going to come on when you go to that group. Hit the **Group Edit** button, mute master button, and change the status of each mute. Green LEDs tell you whether they're assigned to that group. Hit group edit again and voila! those changes are stored. Heck, if you really want to get fancy or want out the MIDI capabilities we've got up our sleeve.



AUX Reverse Section

This is where the whole Front of House/Monitor Console switching thing takes place. When these switches are depressed, it routes what was the auxiliary Master level to the corresponding group or Left/Right fader below. (You'd use all the channel auxes in the Post fade Post eq position, remember they're mixes now). In order to get the wedge mix, the source select switch for the mono master fader is what you need. This button switches the source for the mono fader from the mono buss to the AFL/PFL circuit. You'll notice that each of what USED TO BE the aux master sends has an AFL switch on them. Now those buttons turn the mixes on and off in your wedge mix. Cool huh!

Matrix

Of course no sound reinforcement console worth its salt is complete without a matrix section. The Allen & Heath GL4 has an 11x2 matrix that has the unique ability to tie into corresponding auxiliary sends. This is very cool for doing on the fly cue mixes and mix minus stuff.

CURRENT

SOURCEBOOK JOINS MIX FAMILY

Cardinal Business Media Inc., publisher of *Mix*, *Electronic Musician* and *Mix Bookshelf*, recently acquired *Recording Industry Sourcebook* and related properties from Ascona Group Inc. of Los Angeles. "This acquisition makes us the largest publishers of databases for the music and recording industries," says Hillel Resner, Cardinal's Music and Entertainment Group publisher and publisher of *Mix*. "It will enable us to provide a powerful array of information products for music and recording professionals, all from a single source."

Sourcebook is a 500-plus-page compilation of resources for music business professionals and contains listings of major record labels, publishers, producers, promoters, manufacturers, distributors, artists and other suppliers to the industry. *Sourcebase*, a computerized version of the *Sourcebook*, is also available in both Macintosh and PC configurations.

Sourcebook's publisher and president, Brad Burkhart, will continue in a management role with Cardinal following the acquisition and will direct the creative and

sales efforts for the *Sourcebook* and *Sourcebase*.

RECORD PLANT FORMS NEW COMPANY, ACQUIRES EFX

Following up on an item reported last month, *Mix* spoke to Record Plant chairman Rick Stevens, who leads an investment group that has formed Media Holdings Group Inc., an umbrella company set up to acquire and operate firms in music recording, post-production and sound design for motion pictures, television and advertising. Media Holding's first acquisition was leading post house EFX Systems of Burbank.

Stevens, whose corporate title with Media Holdings is vice-chairman, says that he and partners Richard d'Abo (chairman) and Tom Kirsch (president) got together and started talking about the future of technology and the service facilities business. "There's a convergence of the technologies that involve media production right now," Stevens says, "and it clearly is in any intelligent person's interest in our industry to not narrow themselves into a corner that may be extinct some day. We decided that

it was the right time to form a company whose stated purpose was to find companies that are the best in their category, or which have the potential to be the best in each category that comprises music, film and video production today.

"Anyone can go out and buy a lot of equipment," Stevens says, "but the most important element is the people who can make a business successful. For example, the creative sound design team we have at EFX—there's a team of 50 people here that took ten years to hire, develop and cultivate. You can't create that overnight. We wanted to walk into a situation where we had that kind of a creative staff available to us."

Strong management was also a consideration, as Stevens will be running multiple companies and relying on others for day-to-day management duties. Media Holdings is expected to continue acquiring businesses, although they will also involve themselves with start-ups; their current project is starting up an Internet domain that relates to music and film.

MIX ON COMPUSERVE

Mix readers now have their own on-ramp to that storied information superhighway. The editorial staff invites its readers to correspond about editorial issues via electronic mail on our new CompuServe account. Current CompuServe subscribers can now send e-mail and files to *Mix* at 74673,3672. Those who have access to the Internet can send e-mail to 74673.3672@compuserve.com. (Note that a period replaces the comma in the latter address.) All questions and comments concerning editorial issues—brickbats as well as bouquets—are welcome.

—CONTINUED ON PAGE 16

FATHER GUIDO TO EMCEE TEC AWARDS

Father Guido Sarducci, a longtime fixture on *Saturday Night Live*, will be the master of ceremonies for the Tenth Annual Technical Excellence and Creativity Awards, to be held Friday, November 11, at the Westin St. Francis in San Francisco. Sarducci will join a stellar cast of presenters, including Ray Benson, Booker T. Jones, George Martin, Boz Scaggs and Don Was.

Along with awards in 24 categories, two special awards will be presented: Frank Zappa will be inducted into the Hall of Fame, and Herbie Hancock will be on hand to accept the Les Paul Award.

A few tickets are still available. The \$85 cost includes a reception, sit-down dinner and the awards ceremony. For more information or tickets, call Karen Dunn at (510) 939-6149 or stop by the *Mix* booth (#744) at the AES Convention. ■



The performance
of our audio products
appeals to these.
The commitment of
our company
appeals to what's
in between them.



It's no surprise that Avid Technology's digital audio workstations are fast becoming the systems of choice for discriminating audio post-production professionals around



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intuitive user interface.*

the world. After all, Avid offers a full line of audio solutions for every step of the post-production process.

Systems like Avid AudioVision® and our new Avid AudioStation® provide a level of speed, creative flexibility and editing

precision unlike anything you've ever experienced. And they're compatible with our Media Composer® and Film Composer® nonlinear editing systems for video and film, which lets you streamline your entire post-production process.

To find out more about audio solutions from a company that's totally committed to the present and future of audio post-production, phone 1-800-949-AVID.



We get a lot of calls from folks asking about who's using Mackie 8•Bus Recording/PA consoles.

Good question. After all, a board's only as good as its users.

So we grabbed the latest stack of 8•Bus Warranty Registration cards and hit the phones.

The names in this ad represent a cross section of current 8•Bus users. They range from platinum supergroups tracking new albums to high school choirs, from bar bands to sound designers working on network TV series and feature films. There'd probably be more names but we didn't want to make the type any smaller than it already is — or keep tying up our already clogged phone system.

As our production of 8•Bus boards increases, so does this list.

In a way, it's confirmation of the raves that magazine reviewers have heaped upon the console. Above all, it's proof that the Mackie 8•Bus is a serious tool for professionals. A tool that's getting used day-in and day-out for major projects.

Call our toll-free literature line 8AM-5PM PST and talk to a genuine Mackoid (no voice mail!). We'll send our obsessively-detailed 24-page color brochure on the 8•Bus Series.

Then become a part of this list by visiting your nearest 8•Bus dealer.



Currently in Spain tracking new album on multiple Mackie 24•8 consoles.
Def Leppard

Sound design & mixing of commercials for G.I. Joe, Kenner Toys, Hasbro Toys, Transformers 1/2-hour show, infomercials.
Lawrence Wakin • Tapestry Productions Inc. • New York, NY



Tracking for Madonna.
Shep Pettibone • Mastermix Productions Ltd. • New York, NY

Recorded Grammy-Nominated "Sunday Morning" off of the album Millenium on 24•8, currently working on new album exclusively on console.
"The 24•8 survived the 7.1 San Fernando Valley earthquake. It's definitely built for rock 'n' roll."
Sheldon Reynolds • Earth Wind & Fire • Los Angeles, CA

Music scoring for Pepsi Cola and McDonalds and Six Flags TV & radio commercials.
The Listening Chair • Dallas, TX

Recording and mixing of acoustic music & sounds from the American West. Recent albums include "Charlie Russell's Old Montana Yarns" by Raphael Cristy and "Where the Red-Winged Blackbirds Sing" by Jim Schulz.
Bruce Anfinson • Last Chance Recordings • Helena, MT

Pizza Hut commercial scored to film, scoring of theme presentation for The Baseball Network, self-produced album "Rick DePofi and the Mels," currently producing NY Noise's 1st solo artist, Aaron Heick (Chaka Kahn's alto player).
Rick DePofi & Craig Bishop
New York Noise • New York, NY

¹ Former posts include quality assurance with Warner Brothers, Sheffield Labs, Rainbow

OUR 8•BUS REALLY

Concert sound reinforcement at the Showcase Theater.
Bob O'Neill, Manager of Entertainment • Six Flags Great Adventure Theme Park • Jackson NJ

Used by students for learning recording and sound design.
The School of The Art Institute of Chicago, Sound Department Chicago, IL

Jazz choir sound reinforcement and recording.
Dwayne Pedigo • Plano East Senior High School • Plano, TX

Sound effects, music and voice for Atari arcade games.
Brad Fuller • Atari Games Corporation • Milpitas, CA



Mackie 32•8 Recording/PA console \$4,995⁴

The Stand \$295 each⁴

24•E 24-ch. expander \$2,995⁴
MB•E Expander Meter Bridge \$695³

The Stand \$295 each⁴

Tracking for R&B and rap groups including vocals for Polydor artist T. Max.
Brad Young & Dow Brain
Underground Productions
Boston, MA



Dialog editing for Untouchables, TV series and Movies of the Week. "I work out of my home now. It's quite an achievement to be able to get a higher sound quality than most of the other sound houses in town."
3-time Emmy winner David Scharf
Helix Sound • Los Angeles, CA

Wide range of multimedia projects including major motion pictures (the names of which can't be divulged).
John Acoca¹ • Oracular Multimedia
San Francisco, CA

Records, Chief Mastering Engineer at JVC.
Quote: "It's a great board, dude. Buy it!"

Albums for alternative groups Twenty-Two Brides and The Cucumbers, demo for Freedomland.
John Williams • Ground Zero Studios • New York, NY

"Praise Songs" contemporary Christian album/CD, "Body Builders" children's album/CD.
Peter Episcopo • Bridge Song Media • Old Bridge NJ

Sound design for Pepsi Cola TV spot aired during last January mondo-bowl.
Hans ten Broeke² • Buzz, Inc.
New York, NY

Sound reinforcement for theater presentations and concerts in a 300-seat theater.
Centre Culturel Franco-Manitobain • Winnipeg, MB, Canada

² Quote: "It's the only analog component in my room. You hardly know it's there, it's so transparent."

CONSOLES WORK.

In studios...in clubs...in video and film production facilities...
on the road: A sample of what satisfied 32•8, 24•8 and 16•8
owners are doing with their consoles (as of late April, 1994).

OTHER PROFESSIONALS WHO OWN AND USE MACKIE DESIGNS 8•BUS CONSOLES*



Frank Serafine, feature movie
sound designer/SFX wizard in
the Foley Room at his Venice,
CA production complex.



Scoring for two
Fox Television
NFL promos,
theme & scoring
for PBS children's
series *Storytime*,
song demos
& album tracking,
TV commercials,
infomercials
& demos.

John E. Nordstrom II
Love Den Productions
Pacific Palisades, CA

Album/CD tracking
and mixing for the groups
Mean Solar Day
and *Product*.

Ramsey Gouda • Onion Head
Studio of Chicago • Chicago, IL

Worship service and
in-house con-
cert sound
reinforce-
ment,
recording
of sermons.
New Life
Assembly of
God
Lancaster,
PA

Sound
reinforcement
in a live
blues club
showcasing
live, regional &
national

acts such as *Savoy
Brown,
Jr. Wells, etc.*
Manny's Car Wash
New York, NY

Rental for film mixing projects
and home
studios. "We love
them because we
never see them.
They're great for
our business."

Chris Dunn • Dreamhire
New York, NY

Dave Abbruzzese,
drummer for Pearl Jam

Slash,
guitarist/songwriter,
Guns 'N Roses

Steve Brown,
guitarist/producer for Trixter

Natalie Cole,
solo artist

Greg Droman,
Grammy-nominated engineer
for Linsey Buckingham

Gregg Field,
drummer for Frank Sinatra

Michael Frondelli,
Engineer-Producer (Eric
Johnson, Crowded House, etc.),
Creative Director for Capitol
Records

Bill Gould,
bassist for Faith No More

Bashiri Johnson,
percussionist for
Whitney Houston, Madonna

Mick Jones,
producer for Van Halen,
guitarist for Foreigner

Art Neville,
producer, The Meters,
keyboardist, Neville Bros.

David Frangioni,
MIDI specialist/Engineer
Aerosmith, Elton John, and
Extreme

Danny Kortchmar,
producer for James Taylor,
Billy Joel, Rod Stewart

Bruce Kulick,
guitarist for Kiss

Kyle Lenning,
President Asylum Records,
Nashville

Clair Marlo,
Artist, Producer

Queensryche

Dave "Snake" Sabo,
guitarist for Skid Row

Ben Sidran,
producer

Leo Sidran,
songwriter for Steve Miller

Steven Tyler,
singer for Aerosmith

*Mention in this list is intended to indicate ownership only
and does not in any way denote official endorsement.



Producer Ricky Peterson's Pre/Post
Production Room with Mackie Designs 24•8
at Paisley Park.

R&B radio remix of *Boz Scaggs'*
"I'll Be The One" for Virgin
Records, recording solo album
for the Japanese
Go Jazz label.

Ricky Peterson, producer,
Paisley Park
Minneapolis, MN



DNA sampling CD with
mega-drummer **Bernard
Purdie** (3000+ album credits)!
Frank Heller³ • Weasel Boy
Recording • Brooklyn, NY

⁴Suggested retail price. Slightly
higher in Canada.

³Quote: "This job had extremely unusual
and demanding monitoring & effects
requirements. I honestly couldn't have
done it without the 32•8."

MACKIE.

20205 144th Ave NE • Woodinville • WA • 98072 • 800/898-3211 • FAX 206/487-4337
Outside the US, call 206/487-4333 • Represented in Canada by S.F. Marketing • 800/363-8855

INDUSTRY NOTES

Cutting Edge in San Francisco is sponsoring "An Evening with Rupert Neve" on November 9. Call (415) 487-2323 for info...London, UK-based Soundcraft hired Mike Johnson as the company's new managing director. Johnson succeeds Philip Hart as MD, following the latter's move to head up Harman's newly formed Pro Group...Spatial Sound Inc. of Fairfax, CA, hired Jonathan Kramer as vice president of sales and marketing. New reps for SSL include Pacific Audio Group in Southern California and Synergy Technology in the New York Metro area...Doug Cook of AudioTechniques was named chairman of the New York chapter of the AES...Two hires at Otari Corp. (Foster City, CA): Chris Schilling was appointed to the newly created position of sales manager for M.I. products, and Jan Hebel is the new Northeastern regional sales manager, working out of New York...Dave Larsen was appointed national sales manager for the Spirit (Sandy, UT) line of consoles. Related appointments included Susie Boudreaux to sales administrator and Lane McNess to technical support manager...E-mu Systems of Scotts Valley, CA, hired keyboardist Larry Nelson as North American product specialist and Matt Ward as product marketing manager for the company's studio application products...Dolby Laboratories Licensing Corp. named Larry Poor to the position of director, technology marketing...William J. Spears is the new contract engineering manager at Lone Wolf Corporation in Redondo Beach, CA...Eric Levine joined Mobile Fidelity Sound Labs (Sebastopol, CA) as executive vice president/general manager...Shawna Brackenbury was appointed customer service manager for the Mark IV Audio Oklahoma City Group...IRP Professional moved to 1111 Tower Ln., Bensenville, IL 60106; phone (708) 860-1993, fax (708) 860-1997...Alpha Systems Lab Inc. (Irvine, CA) hired Roberto C.

Medrano as vice president of sales and marketing...Wayne D. Freeman assumed the newly created post of director of North American operations for Australia-based Fairlight. He will be working out of the offices of U.S. distributor Fairlight DSG in L.A...BBE Sound Inc. relocated its headquarters to larger facilities nearby at 5381 Production Dr., Huntington Beach, CA 92649. Phone and fax numbers remain the same...Charles Riotto was appointed director of operations of New York-based ITA...DAT repair and maintenance company NXT Generation relocated its primary service facility to 6759 Plantation Manor Loop, Fort Myers, FL 33912; phone (813) 561-4191, fax (813) 561-4194. The company will maintain a fully staffed branch service facility at the old Greendell, NJ, location...SRS Labs Inc. (Santa Ana, CA) was issued another patent for its 3-D sound technology, increasing the count to four issued U.S. patents and a number of issued and pending foreign patents...Several appointments at Intelligent Resources Integrated Systems, headquartered in Arlington Heights, IL: the company hired Steve G. Kukla as director, new business development, and Steven H. Schmidt as technical services representative. Michael A. Taylor and Richard M. Hergott were promoted to regional sales manager posts East and West, respectively...Michael P. Schulhof, director, Sony Corp. and president and CEO, Sony Corp. of America, will deliver the keynote address at the winter Consumer Electronics Show in Las Vegas in January...Full Sail Center for the Recording Arts in Winter Park, FL, formed a new division, Cloud 9 Media Inc., to develop and market interactive software products for the consumer, business and educational markets. The company's management team includes Robert Jakobsen, president, and Peter Mueller, VP marketing/sales. Full Sail's Jon Phelps will serve as chairman of Cloud 9. ■

—FROM PAGE 12, CURRENT

GALAXY AUDIO ACQUIRES VALLEY

Galaxy Audio (Wichita, Kan.) recently acquired signal processing gear manufacturer Valley Audio Products of Merriam, Kan. As a division of Galaxy, the company is known as Valley Audio and has relocated to Wichita.

"One of the weaknesses of Valley was marketing," says Galaxy CEO Brock Jabara, "and another was commitment to inventory. We're going to try to address both of those problems"

Galaxy is going into high gear on production of Valley's Model 730 Dyna-Map digital processor in order to eliminate a backlog of orders. R&D to fully configure the platform of the 730 for digital fader and computer interfaces will also continue as a priority project.

Valley was originally known as Allison Research, and then as Valley People, and Jabara says Galaxy will stand behind products manufactured by these older incarnations. "If we've got parts," he says, "we'll fix anything that's been built in the lineage."

CORRECTIONS

From September's Sound-for-Picture Supplement: In the "Manhattan Post" article, Ron Bochar is the editor who makes his editorial home at C5, and the quotes that follow should be attributed to him, not Stan Bochner, who also worked on *Wolf*. And in "An L.A. Travelog," John Cook of Hollywood Digital took over mixing duties on *The Larry Sanders Show* on the fourth episode of the season, working at the Scenaria in Audio 1.

The September SADiE digital audio editor Field Test included a screen shot of the SADiE Transport window with incorrect color on p. 140. Interested readers can see the colors accurately reproduced by contacting SADiE Inc. at (615) 327-1140 or via CompuServe at 74204,1407; or stop in at the company's AES booth. ■

November 1994.

When Powerful Hardware,
Superior User Interface,
Abundant Features And
"No Crash" Performance
Rock The Price Barrier.

It Must Be Roland.

DM-800
Digital Audio Workstation.

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HE DOESN'T

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"The final playback was a revelation!"

That's what Tony Brown wrote to us after being set loose in Masterfonics with Vince Gill and the AT&T DISQ™ Digital Mixer Core to mix "When Love Finds You."



**"Our artists love it. I love it.
The improvement in sound is dramatic."**

Tony Brown, President/MCA Nashville

What double-threat producer/record company exec wouldn't be impressed? After all, most of the world's digital multitrack tape machines are hooked up to analog mixing consoles. So the pristine digital presentation is compromised at the final step of the production process. But not when the mixing system gives the creative freedom to move instantly from analog to digital at the touch of a button.

Created by AT&T and Bell Labs, the DISQ Digital Mixer Core works in concert with the analog board in your studio. Using the faders and knobs of the control panel you're already comfortable with.



There's no learning curve. Just connect the system to your Neve-VR or SSL-E/G analog board and you'll be mixing digital in no time. Or select a new, fully integrated digital mixing console featuring the automation technology of Harrison by GLW. The result: Sound that is richer, warmer and truer than anything you've ever heard.

Systems are already up and running in LA, Miami, Nashville, New York and Tokyo. And releases mixed on the DISQ system are in the stores. We suggest you take a listen.

Want full details? Call 1 800-553-8805.



by Stephen St.Croix

LIFE IS LIKE A BOX OF CLOCK BITS

PRERAMBLE AND NOTICE OF DEVIATION

When we last saw our author, he was poised on the edge of techno-political disaster. He was actively engaged in a total trashing of a certain manufacturer, knowing full well that every time he flies to Laguna Beach to catch a wave, he has to literally drive past their front door on his way from John Wayne Airport. But, as all good things must eventually come to an end, he moves on. What follows is the column that he leaves behind as he departs for just such a trip. Not the column that he promised last month, but a new one about what to buy and how to use it. The promised column on media will now appear in the December issue. Why the change? It's just one of those things, kind of like, "Why is your boss so much dumber than you, and how come he can't see that you actually know more than he does?"

HIS STORY, AS TOLD BY THE MIX HISTORIANS

I first got involved (three years ago) in all this CD-R stuff because I wanted to build an oldies CD for the car, but when I found out how much that would cost, I just bought another car instead. Then I bought a hundred oldies CDs with the change.

Well, the picture has changed, and now everything that you need to do this (and other actually *useful* things) has dropped well into the rational range of the average Class 3 American Techno-Geek. You know who you are: You have some very cool toys, but you are not actually licensed for possession of a laser capable of emitting over 300 milliwatts. You can read, but you can't write.

So what *does* it cost these days to make your own CDs? You can get a pretty good Mac for a couple of grand, interface/DSP hardware and all the necessary software for a couple more, and the actual CD-R machine for another \$2,500. I have just



burned several archival Mac data backups and several more music CDs with just such a low-cost setup, and it *worked!* Interested in the details? (Note: As it is my belief that you can't currently trust any converter that costs less than a car, I am leaving converters out of this story.)

The goal here was to build a system that would make perfect audio CDs and data CD-ROMs—no different from those produced by the biggest and baddest gear, but for the smallest possible investment. Here is how I did it. Oh yes, I should remind you that the first assumption is that the de facto computer is the Mac. If you are an MS-DOS kinda guy, you

"This is the real thing"

Robert Scovill

--Winner, TEC Award 1992 & 1993.
"Best Sound Reinforcement Engineer"



Robert Scovill knows microphones. Named by his peers "Best Sound Reinforcement Engineer" worldwide for two years running, he has mixed for acts like Rush and Def Leppard. His first choice in microphones is Neumann.

"During the pre-production stages of a tour, an incredible number of decisions are placed in my hands. Neumann has made some of these decisions very easy, indeed. There are a lot of look-alikes out there, but Neumann is the real thing."

Introducing the KM 184 - a small diaphragm condenser microphone designed for critical recording and live sound applications. With 20Hz to 20kHz frequency range and 138dB maximum SPL, the KM 184 is particularly useful for percussion, cymbals and brass instruments. It is also excellent for capturing the subtle nuances of acoustic guitar and orchestral performances with its extremely quiet (16dB A-weighted) self-noise. Best of all, it has that *Neumann Sound*.

Now, with the KM 184, you have hand-built, legendary Neumann performance for less than \$600.* Neumann... the choice of those who can hear the difference.



Neumann's new
KM 184 Microphone
shown actual size

KM 184

Neumann USA

6 Vista Drive, PO Box 987, Old Lyme, CT 06371
Tel: 203.434.5220 • FAX: 203.434.3148
West Coast: Tel: 818.845.8815 • FAX: 818.845.7140



* MSRP.
Subject to change
without notice

USE READER SERVICE CARD FOR MORE INFO
World Radio History

have just found something that you don't have to do today—sort of a gift of five minutes: don't read this column. Move on to whatever's next in your life.

CLEAR AND PRESENT STRANGER

Okay, maybe it's not such a stranger to us after all. Basically, there seems to be one clear and present leader out there if you want to get 16-bit digital audio in and out of your Mac for under a grand—the Digidesign Audiomedia II system. I stress that I am not sure that I would depend on its analog conversion for anything more than intelligence-gathering—you know, stuff like the good old dual-channel, differential-laser, surveillance, remote voice-acquisition systems. But if you live in the 44.1 world, this is the door to your Mac. It has digital I/O, a 56001 DSP and the right glue to make it happen, all for the price of dinner and a Broadway play. It comes with software that I won't comment on because of something my mother once told me, but I'll get back to that in a month.

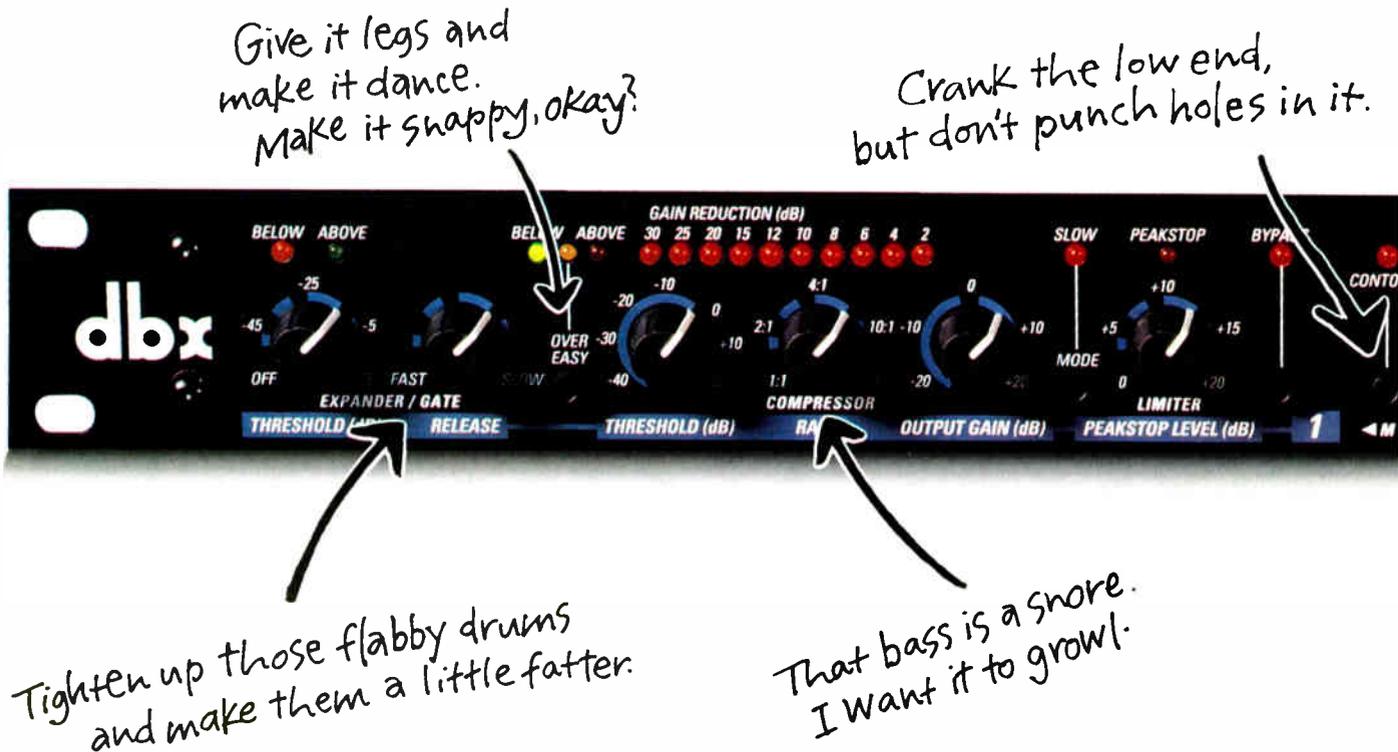
Next you need a drive that will provide a nice, fast, noninterrupted gigabyte. After one full year of shopping and comparing (for another DAW design project), I have settled on the Micropolis 2217 AV (see details in last month's column). This drive won't remain a stranger to the audio community for long. Now, this is

Remember that the top of this crop means the lowest-priced drive that works.

where it gets interesting. You need a CD recorder. Again, in the spirit of the column, I shopped until I dropped, then I copped from the top of the crop—but stop! Remember that the top of this crop means the *lowest*-priced drive that *works*. Today that honor clearly goes to Pinnacle Micro and its RCD 202, at \$2,500 complete.

It successfully recorded onto every brand of media that I tried, (except for one single failure), and I even tried the real garbage ones.

There certainly are more elaborate systems available, both free-standing and SCSI, but if access to the PQ code is enough, this device will do the job 90% of the time for a fraction of the price of the others. Here's how. Remember that I told you to go to Digidesign for the interface/DSP card? Well, go there again and get MasterListCD. This little package is the other half of the magic formula. It knows the necessary technotrash about most SCSI CD recorders and comes with a chart that tells you how fast your Mac and your hard drive have to be to make CDs with most of the recorders that are out there. It knows about the Pinnacle, and it works. Though it's not real pretty, MasterListCD gives you control over the basic CD-mastering stuff, up to and including PQ coding in a reasonably straightforward, manageable way. The manual is actually informative to novice CD engineers, and the program is rationally designed. I



use it all the time now. Probably one of the best things about it is that you can instantly audition the songs in its list, so you can set levels and L/R balance with great accuracy. A single keystroke jumps you from one tune to the next in under half a second, so you hear the differences in each tune immediately, making even the tiniest change apparent. You can easily trim levels and balance in 0.1dB steps. If you should ever re-sequence, it takes mere minutes to level-match again. Nice.

WAIT...ER, THERE'S A FLY IN MY SOUP (OR IS IT IN THE OINTMENT)

I would like to see two little changes, though. I want to drag more than one tune at a time onto the record list, and it would help level-matching even more if you could define a play offset for each tune. Though it certainly is valuable to jump from tune to tune rapidly, it would be even more useful if the jump instantly took you ten or 20 seconds into each song, after the opening fade-in and build-up are done and the levels are maxed out and stable. Evan Brooks (the primary perpetrator of this pack-

age) tells me that these changes are, in fact, forthcoming. Now that I have printed this promise, present MasterListCD users might start calling the people at Digidesign and bugging them, and poor Evan could be yanked from crucial new projects for a day or so to implement these little changes, and in retaliation for the interruption, may never again reveal planned improvements to me. Okay. Forget I said anything. But as long as he's mad already, I would also like to see a beautiful full-color, three-dimensional, holographic, virtual-reality data-glove interface, but I think I'll go to therapy to cure that. The fact is that it works, it's painless, and it pays for itself with the first few CDs that you burn.

Back to the hardware. Actually, it's pretty simple. Same thing: It works, it's painless and it pays for itself with the first few CDs. Really. Now this is even more surprising than it first appears, because the RCD 202 uses exactly the same mechanism that I trashed in last month's column: the JVC...sort of. Pinnacle's favorite trick has always been to find an optical drive mechanism that is pretty close

to what they want, and then force the manufacturer to make custom changes—sometimes firmware, sometimes hardware. They occasionally make even more changes themselves, or maybe not. Anyway, these little changes are often just enough to make it work, and the RCD 202 is one of those cases, especially when you consider that the end price of the machine is actually half a grand less than the comparable system from the source, JVC.

There is still the issue of its wimpy 64k cache (you did read last month's column, didn't you?). For audio CDs, MasterListCD and the advice that comes with it will get around that limitation, which is why I recommend *only* that package at this time for use with that drive. Again, we are trying to get pro results here for the least bucks.

DATA EARTH STOOD STILL

Anyone who has had his saucer (or hard drive) crash knows that a disaster of that magnitude can bring the Earth to a dead stop. So, if you have a Mac and you buy all this gear to

—CONTINUED ON PAGE 278

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Soundstorm, Burbank

Gordon Ecker's busy facility (sound for "Black Beauty" and "The Fugitive") has a Foundation 2000 which controls and chases a JVC S-VHS video deck "beautifully."

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Foundation 2000 is the fastest and easiest to use digital audio workstation available today. Dedicated editing buttons let you work at lightning speed, intuitively. Define a splice, cut it, and play it back instantly. Don't like it? Undo it and re-do it up to ten levels deep. And Foundation's Removeable Project Environment lets multiple editors work on a single machine.



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Merrill Lynch, New York

Scott Kersey is the audio engineer who recommended Foundation 2000 for one of the largest private television networks in the U.S.

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Vermont Public Radio

Sam Sanders, a happy Foundation 2000 user since January, estimates that he has cut his production time in half.

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Fostex

by Glenn Zelniker and Roger Taylor

JITTER HYSTERIA

UNDERSTANDING TEMPORAL UNCERTAINTY



Ask audio pros to state their primary concerns about digital audio and the answers will likely include "jitter." These jitters are caused in large part by three problems: the need to be upset by something, misinformation and fear of the unknown. We can't do much about the first point, so let's look at the latter two problems, with some practical guidelines for successful digital audio interconnections.

Jitter is a term used to describe the temporal uncertainty in the period of a signal. In other words, it is the constant variation in the arrival of the transition times of the signal, as shown in Fig. 1. The solid waveform shows an ideal (jitter-free) digital signal, and the gray area indicates a region of temporal uncertainty within which the transition time for a real-world (jittery) signal would actually occur.

To describe jitter quantitatively, we can look at Fig. 1 and see that there is a maximum uncertainty in time on either side of the ideal transition arrival time. The difference be-

tween these times is called the peak-to-peak jitter, or T_{pp} . The jitter depicted is of a random nature: The darker the shade of gray, the more likely that a transition will occur at that time; the lighter the shade of gray, the less likely. For random jitter, it is more useful to speak of the RMS (root-mean-square) jitter, or T_{rms} , which gives a measure of the average magnitude of the distribution of the transition times.

JITTER IS NOT ALWAYS RANDOM

Jitter also can be periodic. For example, the arrival time of the transition can fluctuate continuously between its early and late extremes at a constant frequency. Jitter also can assume a more complex form than merely random or periodic. Whatever the case, it is useful to describe jitter in terms of its spectral characteristics. Just as an audio signal can be characterized by a frequency spectrum, so too can jitter. Thus, the jitter spectrum describes the jitter as a function of amplitude and frequency. Periodic jit-

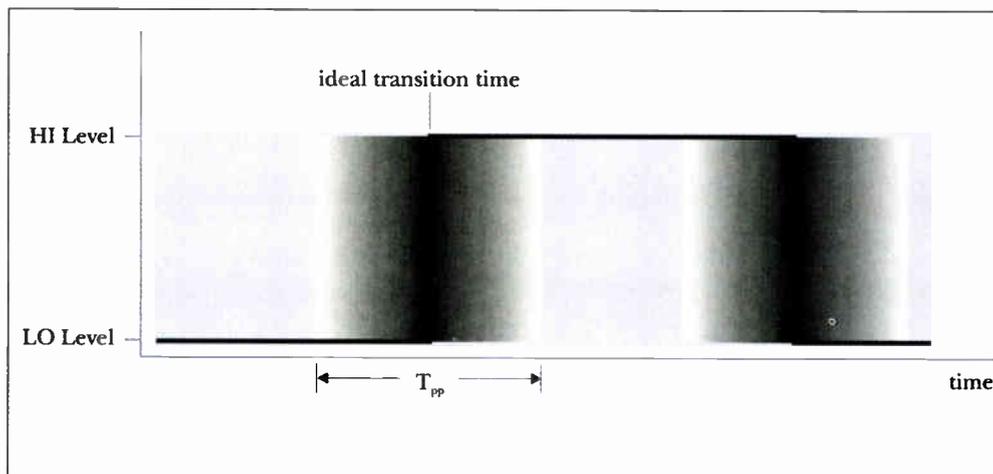


Fig. 1: Jitter is an inconsistency in the time when a signal changes from its zero state to maximum level

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ter is characterized by a jitter spectrum consisting of a spectral line at the jitter frequency, and random jitter is characterized by a broadband jitter spectrum with spectral content over a wide range of frequencies.

Before we discuss jitter in any more depth, we first need to have a cursory understanding of two other topics: data conversion and the reception of the AES/EBU signal.

DATA CONVERSION

It can be argued that the sampling theorem is the theoretical result that makes the entirety of digital audio possible. To paraphrase, the sampling theorem states that it is possible to represent and re-create a band-limited analog waveform from a discrete set of samples of that waveform.

There are many variants of the sampling theorem, but the one relevant to digital audio requires that the samples be taken uniformly in time at a rate equal to or greater than twice the bandwidth of the analog signal. This sampling rate is referred to as the Nyquist rate.

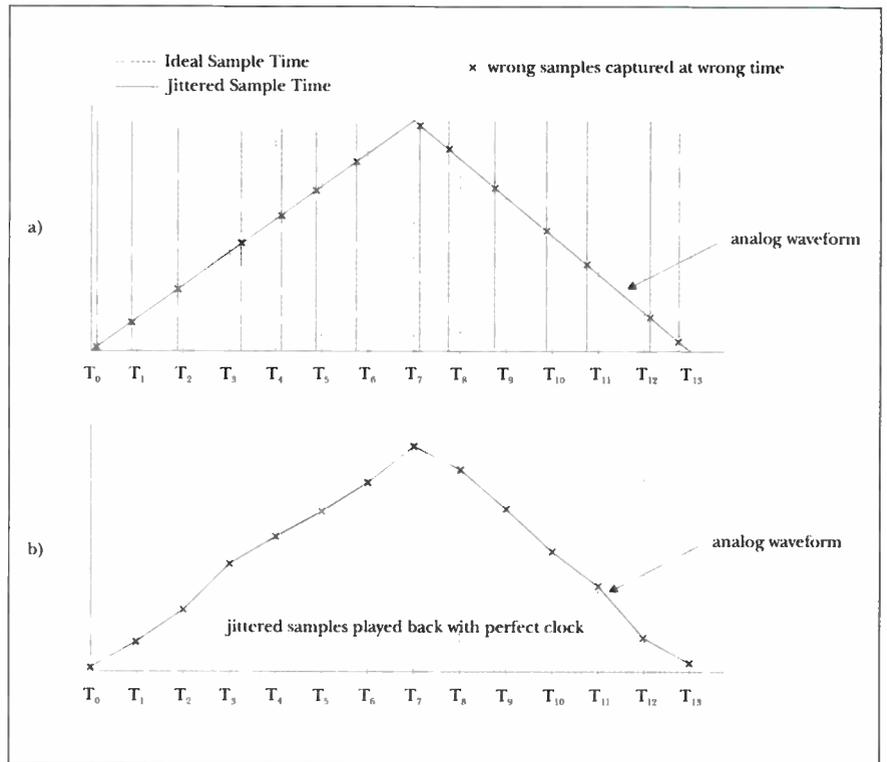


Fig. 2: The effect of jitter on a sampled analog waveform

The method of reconstructing an analog signal from a discrete set of samples (D/A conversion) is given in

the proof of the sampling theorem, with one slight problem—it's impos-
—CONTINUED ON PAGE 278

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Dawn Ilmx shown with the ADX Ensemble automated controller by PR & E

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WHEN IT COMES TO RECORD WILL PUT YOU IN A C

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

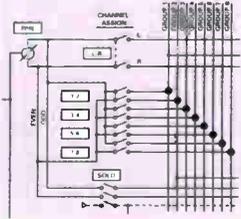


DING, MOST OTHER CONSOLES OMPROMISING SITUATION.

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

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

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



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



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GEORGE MARTIN

YESTERDAY & TODAY

RECOGNIZED THROUGHOUT THE WORLD of music as one of our most versatile and innovative producers, conductors and arrangers, George Martin has been a part of the music industry for almost four and a half decades. In 1950, after studying music at the famous Guildhall School of Music, London, and playing oboe professionally, Martin began recording classical music. He was made head of EMI's Parlophone label in 1955, and during the next 15 years, he produced a wide cross-section of artists, culminating in his eight-year association with the Beatles.

In the mid-'60s, he formed a production company with three other producers, and in 1970 opened Air Studios in London's Oxford Circus—followed nine years later by Air Montserrat, which was destroyed by a hurricane in 1989. In 1993, Air Studios relocated to its new home at Lyndhurst Hall in North London. [See page 48 for more information about Air Lyndhurst—Ed.]

During the '70s, Martin worked extensively with American artists here in the States, including The Mahavishnu Orchestra, America, Jimmy Webb, Neil Sedaka and Cheap Trick. He also worked with Paul McCartney on

BY MEL LAMBERT

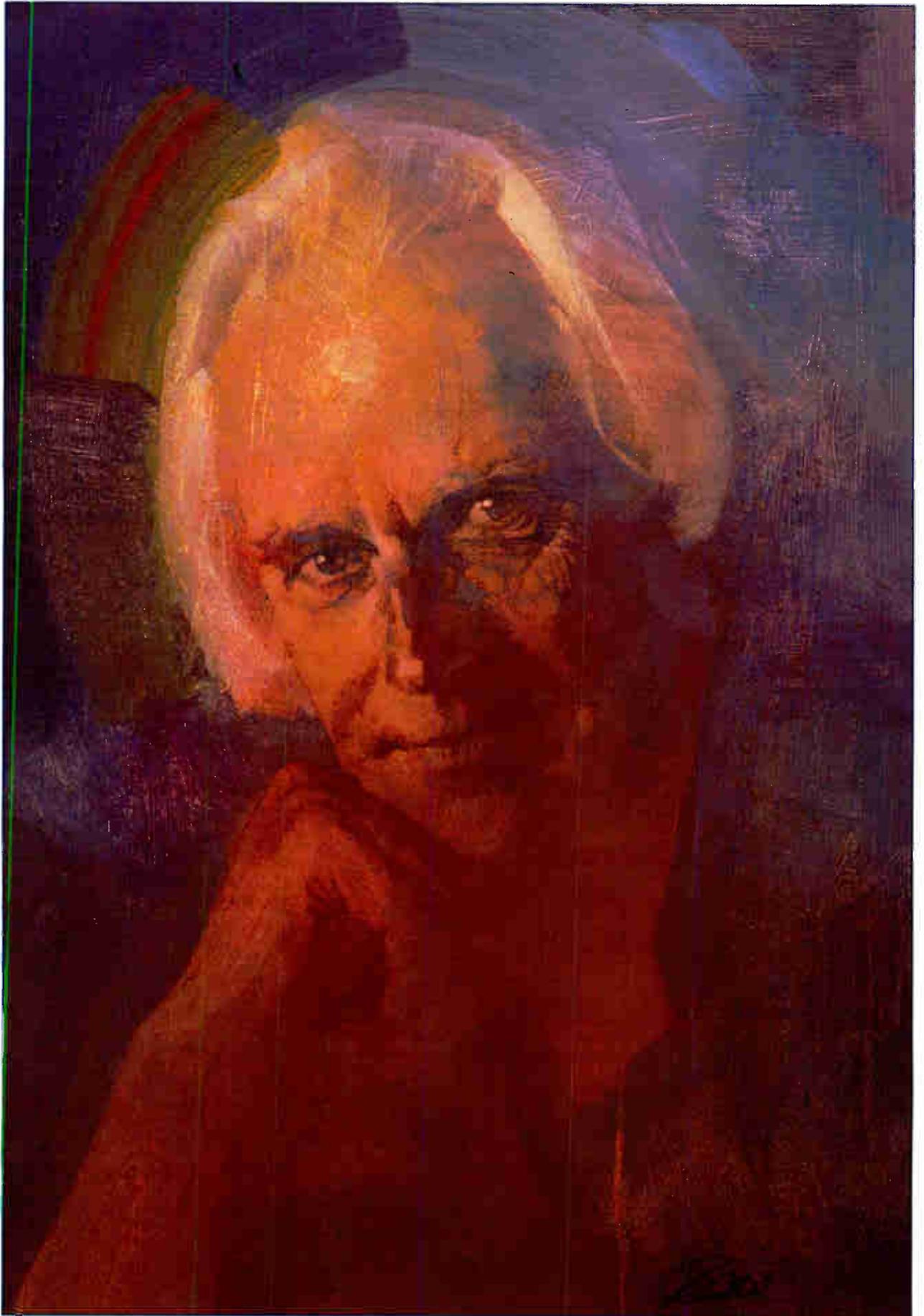
two solo albums: *Tug of War* and *Pipes of Peace*.

He has composed music for *A Hard Day's Night* (for which he received an Oscar nomination), *The Family Way*, *Yellow Submarine*, *Live and Let Die* (for which he won a Grammy Award), and *Give My Regards to Broad Street*, with Paul McCartney. He was also commissioned to compose a suite for harmonica and strings for celebrated harmonica player Tommy Reilly and the Orchestra of the Academy of St. Martin-in-the-Fields.

Recipient of an honorary doctorate of music from the Berklee College of Music, in 1987 Martin produced and directed a new recording of Dylan Thomas' *Under Milk Wood*, followed by an album with Jose Carreras of Andrew Lloyd Webber songs. In July 1992, he was invited to perform at the Festival D'ete of Quebec, with the Quebec City Symphony Orchestra and the King's Singers. In December of that year, he produced a special live version of *Under Milk Wood* at Air Lyndhurst in aid of The Prince's Trust.

Although Martin has reduced his workload in recent years, in mid-1993 he produced a cast recording in New York of *Tommy*, followed in October by symphony concerts

ILLUSTRATION BY DAVID GROVE



in Sweden and Brazil. Recently, he completed *The Glory of Gershwin* with Larry Adler, assisted by Elton John, Sting, Carly Simon, Sinéad O'Connor, Elvis Costello, Cher, Peter Gabriel and a host of other stars. *Gershwin* reached Number Two on the English charts and went Gold within ten days of its release.

We caught up with this prolific producer by telephone at his home base in West England.

Mix: How do you define your role as a producer in the studio?

Martin: In 1950, when I started working in the business, the record industry was a pretty small affair, and the amount of record producers was also pretty small. The term "record producer" was never used; the role was something that evolved. If you asked me to define the role of a producer, I'd have to define the way in which I regarded myself over the years. Producers come in all sorts of shapes and sizes. There is a tendency these days for producers to come up from the engineering ranks; some very good producers have emerged from that kind of background.

Mix: You have more of a background as a musician and arranger. What do you bring to a production with that kind of experience?

Martin: A good producer has got to really have an understanding of music, and a catholic love for it. Unless you're very specialized, I think that you have to have a very universal approach to music, to have the temperament to like a lot of music. Which, fortunately or unfortunately, I do! If you're very narrow in your outlook, you're not going to make a good record producer, because you have to be pretty tolerant, too. But, in terms of music, it is very important to have an understanding of how music works, although I don't think it's absolutely a prerequisite that you have a musical education. I think that if you've got to have a feeling for music, it does impinge very heavily on the resulting production.

A record producer is responsible for the sound "shape" of what comes out [of the session]. In many ways, he's a designer—not in the sense of creating the actual work itself, but he stages the show and presents it to the world. People say, "Yes, that was a marvelous show that Leonard

Bernstein did." But it wasn't Leonard Bernstein who staged it; it was somebody else. The record producer is the guy who actually puts the frame around everything, presents it to the public and says, "This is what it is." It's his taste that makes it what it is—good or bad.

Mix: Do you choose the material?

"A record producer is responsible for the sound 'shape' of what comes out [of the session]. In many ways, he's a designer — not in the sense of creating the actual work itself, but he stages the show and presents it to the world."

Getting to know an artist, a group or an orchestra over a period of time, do you have a better understanding of their musical directions?

Martin: Yes, indeed I do. One of the fundamental aspects in terms of pop records is the song or the material; the actual creative work you're dealing with. If you're dealing with something that's got really good raw material, then your task is made that much more easy. If you're dealing with dross, then no matter what a genius you are as a producer, it's still going to be rubbish. The critical factor is the beginning: the song, the music you're dealing with.

Mix: How do you determine if a song is good or, to use your words, dross? Suppose you turn up at a session and there are maybe ten songs the band is considering recording. Some of them you like and some of them you may not like. What's the criteria you use to decide that the latter go in the "dross" pile?

Martin: That's a good question. I think, again, it's taste. Obviously, if you look at any amount of songs or records, everyone can have a different opinion. When I did this album recently of Gershwin [*The Glory of Gershwin*, celebrating Larry Adler's 80th birthday; recorded in November 1993], we had 18 songs [recorded by] 17 artists. The critics actually were completely at loggerheads with each other. One said the Peter Gabriel track was stunning; another didn't rate it at all; another guy said the Jon Bon Jovi track was the worst thing he'd heard in years; another one said it's the *best* track on the album! So it's "horses for courses." The taste of the producer does affect what material is selected. But I think that he's got certain yardsticks to go by. It is possible to categorize what is a good song and what's a bad song. There are bad songs that have made it, but, generally speaking, the material that does make it is better than the stuff that doesn't.

Mix: So you tend to rely on things like the "tingle factor?" Some intuition that says this is a damn good song. I like it. I think the people that we're inviting to listen to this music will like it. So, on that basis, it's probably worth recording?

Martin: Yes. I think the writer is not the person who is likely to be able to judge that best of all. It does require another person who can look at it dispassionately, because everyone likes their own baby better than the baby next door! It is inevitable that a writer will think more highly of his work than somebody else's. And they get blind to the fact, and they get jealous, too. If you don't like a thing that they've worked on and refined, and thought it was pretty good, they get very upset about it. So you have to be very careful.

Mix: Did you find that was the case with what the world would consider as your most famous clients, the Beatles? John and Paul wrote a great deal of material, but occasionally you weren't that keen on a particular song. Maybe the lyrics didn't work for you?

Martin: I was very lucky with the Beatles, because almost every time they came to me with something, it was brilliant. In the beginning, some of the early material from the "Love



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Me Do" days was the best I could dig out of them, and I wasn't very happy about it. I didn't think it would be a hit, and I needed to find "hits" for them. The kind of material they had been writing wasn't, in my opinion, likely to set them alight. But once we got "Please, Please Me" under our belt, they seemed to realize what a good song needed to be. From that moment on, through "I Wanna Hold Your Hand" and "She Loves You," they came forward with the most wonderful material. It was brilliant; it was different. Every one took a new twist, and that pretty well maintained the whole of their career. Occasionally toward the end, they would get a little bit lazy. There were some things during *The Magical Mystery Tour*—the freaking out bits—that didn't seem to make much sense.

In the main, however, the material the Beatles gave to me was gold; there was practically no dross at all. I've worked with other people who've brought me something and I've said, "I think you ought to go back and rewrite that." Or that we ought to scrap it completely. Or maybe put a different kind of tune in the middle and alter it. I think that's the creative part that a producer can do; he can shape the music. If the producer is able to convince the artist that he knows what he's talking about, he can actually lead the writer into producing better work than maybe the writer does by himself.

The songs that Paul and John wrote together were really wonderful material. There's no question in my mind: They are the greatest songwriters of this century. (I don't think I'm being biased, although I happened to work with them all that time!) It doesn't mean to say that everything they wrote was marvelous, but it was the highest consistency of success that I've ever experienced.

Mix: In the '70s, you started to work more with American bands in L.A. and other cities.

Martin: I did that because they asked me to, and it was a way of earning money. Also, it was a great relief after nearly a decade of working with the Beatles to have the freedom to work with other talent. If someone came up to me and said, "Would you make an album with me?" I could say, "Why not, let's give it a whirl. If it doesn't work out, no

problems." But you didn't have the awesome responsibility of saying, "God, I've got to worry not just about this single and album, but next year, the year after that and..." It was a kind of relief when it all ended, and I was able then to go off and have one-off projects with different people.

Mix: Was it a passive role; they came to you? Or did you search out people that you'd always wanted to work with and let it be known that, if the opportunity presented itself, you wouldn't mind working with them in the studio?

Martin: There were lots of people I would have liked to work with, but life is too short. Nowadays, I'm turning things down because time is very precious. To make an album, you've got to devote almost half a year of your time; it's important now that I do not fritter my life away.

Mix: Who of the people you haven't worked with would you like still to have the opportunity to record?

Martin: There are an awful lot. A lot of people I admire enormously. I think Elton John is terrific; he's one of the people I would love to have made records with. I think enor-

“These days, people tend to forget that sound begins in a room—the physical environment makes all the difference. What the studio itself is going to sound like? What microphone techniques are going to capture those sounds?”

mously highly of Sting. Bob Dylan—I had the pleasure of working with him in Japan recently—he's one of the most interesting writers we've had in my lifetime.

Mix: When you began to work increasingly in America, did you notice a different kind of American-

style production, vs. a European or English style?

Martin: No, I don't think so. Music is a universal language. Back in the '70s, while working with American musicians, there was a slight difference, maybe the horn sections are a little bit more crisp. Rhythm sections had a particular sound, a kind of L.A. sound: a mixture of synths, keyboards and guitars that was quite distinctive. I didn't want to get into the trap of having that kind of sound; I like to have rhythm sections the way I always felt them to be. I really think the records I made would have been the same had I been making them in America or in England.

Mix: What do you look for in a studio? A good engineer? Good technical performance?

Martin: These days, people tend to forget that sound begins in a room—the physical environment makes all the difference. What the studio itself is going to sound like? What microphone techniques are going to capture those sounds? If you have a good sound in a studio, and an engineer who knows how to use microphones, that's half the battle. Today, people seem to forget the first part and seem to get straight into the manipulation [at the console]. I think that a knowledge of acoustics—the way music should sound in a room—is very important.

Of course, after that, you have the best equipment: very good microphones, a really good desk and good monitoring. A lot of control rooms I've worked in might have had good monitors, but they haven't paid enough attention to the acoustics in the room itself. You would end up with varying characteristics that were quite different wherever you stood. I like something that I know is consistent. The engineer has got to be somebody who has a good sense of sound and understands what you're trying to get. Again, I've been lucky in working with people who are very fine engineers and musicians themselves. If I work with them long enough, we tend to know each other so well that we don't have to say a great deal to each other; they tend to know what you're looking for.

Mix: You don't consider yourself to be a very technical producer. Do you tend to get the sound you want in the room and then leave it pretty

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much up to the engineer to give that back to you in the control room?

Martin: It depends if we're talking about a rock 'n' roll session with guitars and keyboards, drums—obviously you have a particular way you'd like the group to sound. You might say that drum sounds a bit dull or like it to be "snappier"—those little subtleties of difference of taste that every producer has. When it comes to other sounds, like horns and orchestral sessions, then I will be very particular about the kind of sound I want. Again, it's something that I believe has to start in the studio. If you're dealing with an orchestral sound, you've got to have a good room. You get it right there, and then you go and check in the control room. The engineer has to realize the kind of sound you're looking for, in [terms] of clarity and good "liquid" sound from the strings, and so on.

Mix: Do you try and keep it simple? Do you believe in "Less is More" as a philosophy?

Martin: Yes, absolutely! Certainly, whenever I considered putting an arrangement together for a song, whether it's purely working with the

artist and the group and backing vocals, or a full-blown orchestra that I'm actually scoring, then I think that "Less is More" is a very good principle. It's fairly easy to learn the rules of orchestration and write for instruments. The difficult bit is knowing where to stop, and knowing what to leave out. Because every bar and every note that you come to is a little fork in the road; you can go one way or the other. You are continually making decisions. I say to myself, "Pull back there. Don't do that. That's over the top. Let's come back here; let's make it simpler, cleaner lines."

In other words, I try to make an arrangement something that you can hear distinctly but beautifully. Don't clutter; make sure that whatever you add doesn't get in the way of things. If you're going to make an effect, make sure it's a good one. It is summed up very much with minimalism. Of course, I've been guilty as anybody of lush orchestrations. But I've tried to be fairly clean in my writing.

Mix: Continuing the studio theme, Air Studios, London—of which you enjoyed part ownership—was com-

pleted in the early '70s. Was the idea behind Air London and Air Montserrat that you needed a more controlled environment, one that you could become more familiar with on an ongoing basis?

Martin: Yes. Every studio has good things and bad things about it. So you think to yourself, "If I had a studio that I've designed and built myself, then it's bound to be exactly what I want." Certainly, when we built the first Air Studio that was true; I was very pleased with the sound of Air Studio #1 in Oxford Circus. It became a very popular room. The people we had working there developed a particular style of working, which I was very pleased with.

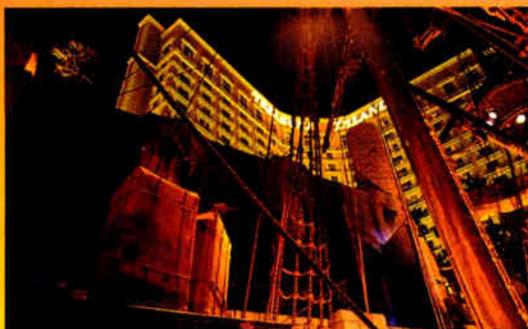
Montserrat Studios began, purely and simply, because I'd been doing so much work in America. I've worked in many, many studios and, although they were all pretty good, they lacked what I was looking for. I thought maybe I could have a studio near America that I can persuade people to come to, and which fits my bill. That's why I built Montserrat. I opened in 1979, the studio complex was subsequently destroyed by Hurri-

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cane Hugo, which devastated the remote Caribbean island in 1989—Ed.]

The latest project is Lyndhurst Hall, our new studios in Hampstead [North London], where we've got the biggest and the most expensive and the most complicated, but also the most beautiful studio I've ever had. It's certainly my last one; I won't do any more after this! There are lots of other studios I've worked in I still enjoy, but I like my own one best of all.

Mix: Was the design of the largest studio at Air (The Hall) reflective of your move toward orchestral productions? A studio where you could record soundtracks and more complex choral productions?

Martin: Yes, I've come full circle. When I started in 1950, the first thing I did was record classical music, and nothing else. Curiously enough, some of those orchestral recordings I made in the early '50s have recently been re-issued by EMI, which is very flattering. They came to me and asked me: "Did you produce these?" And I said, "Yes, I did." "Well," they said, "we're going to re-issue them. Can we put your name on them?" To which I said: "Of course." Yet I re-

flected a moment. "Of course you didn't ask me in the '50s; I never got my name on them in *those* days." But it's very nice to have that kind of reflection.

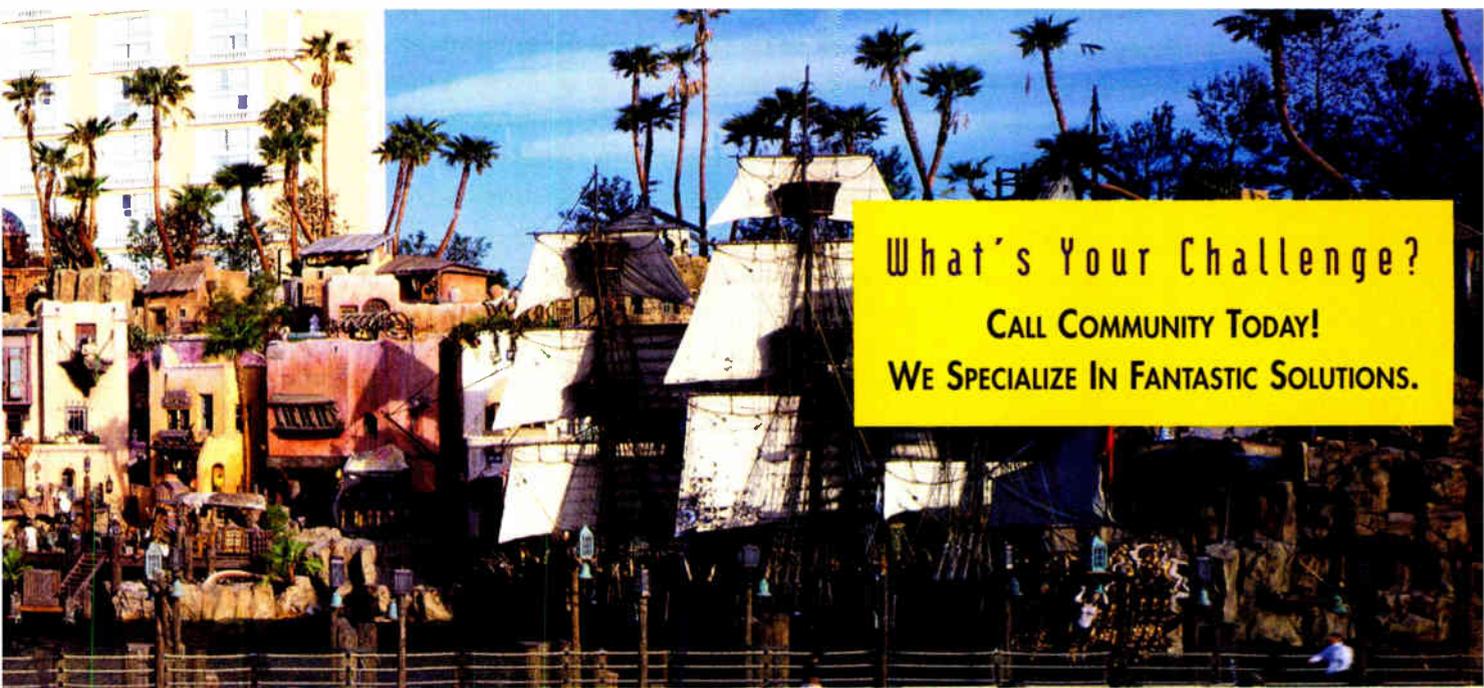
I do like live music. Having spent all my life making recordings, it may seem funny, but I really enjoy working with musicians and getting something out of them. Funnily enough, this Gershwin album was recorded almost completely live. Elton John, Sting, Elvis Costello and so on, were recorded with the orchestra in The Hall at Air Lyndhurst. It was good fun—almost like doing a concert! Cher came in and she saw the orchestra and said, "Are they going to be there when I'm singing?" "Yes," I said. She answered, "Oh, I've never done that." "Well," I said, "it's quite fun, because it means that if you don't like what they do, we can change it. If the key doesn't suit you, we can change it around. Or if you don't like a phrase, we can modify that, too." She found it an interesting and enjoyable experience, even though she'd never done it like that before.

Mix: The majority of the Gershwin

sessions were recorded at The Hall? **Martin:** Yes, almost everything. The Carly Simon basic tracks were done in New York, but I put the orchestra on in The Hall. The only orchestral sounds that weren't done in Air Studios, ironically, were on "Rhapsody in Blue," which I did with Larry [Adler] at the very end. We were running out of time to finish the record; Air was booked solid, and I couldn't get in. I was very cross that I couldn't record him in Air, but we booked into Abbey Road Studio 1.

Mix: Let's turn to other recent sessions. A cast recording for the New York production of *Tommy*, released in July 1993. What brief did you receive from Pete Townshend?

Martin: Pete rang me up and said, "We've got a show coming up of *Tommy*. It's been running in La Jolla [California, during a regional tour], and we'll need a cast recording. Would you like to do it?" So I said, "Pete, thank you very much for asking me, but why don't you do it yourself?" "First of all," he said, "I'm really too close to it to give it a good judgment; secondly, the show's going out [on tour], and I don't want to worry



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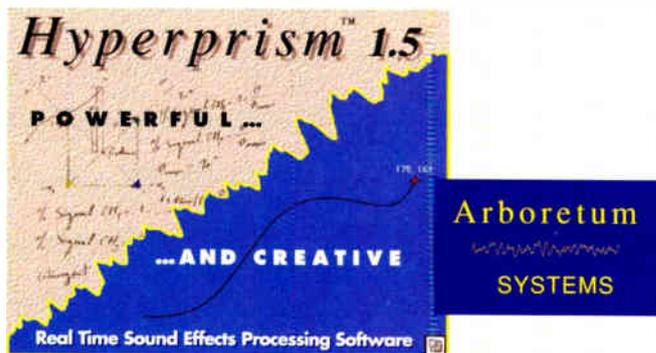
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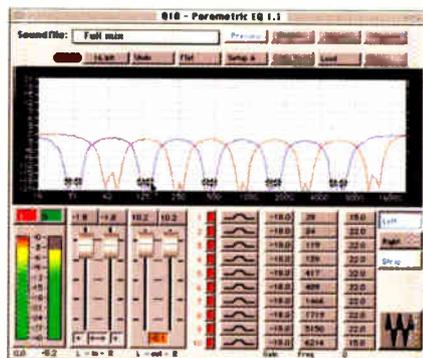
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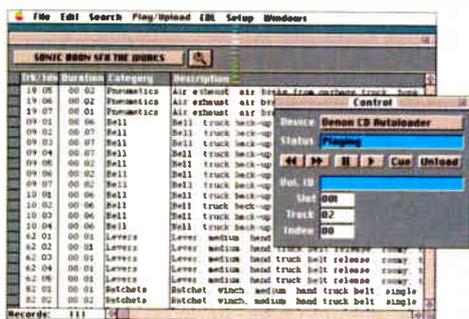
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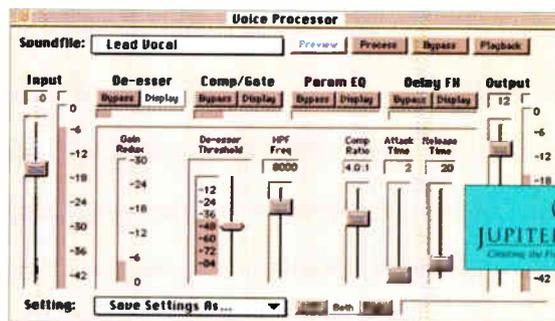
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about the recording. Anyway, you can do it better than I would." Which was very sweet of him.

It's an incredible show. I went to see *Tommy* many times and got to know it pretty well before we went into the studio. I had to decide just how I was going to do it since it had to be done very quickly. Obviously, when you've got a show that goes on every night, the cast are bound to get a bit tired. So we had to work very fast to get the best out of them. But it worked very well—well enough to get a Grammy Award [for Best Cast Album].

Mix: Where did you record the *Tommy* cast album?

Martin: New York. We had to do it there, because I wanted the cast and the stage band. We recorded on a Saturday and Sunday. I went to New York and looked around all the studios. In the end, I chose the new Hit Factory; it's got a nice big room with some [isolation] booths. It worked out very well indeed. We mixed the tracks back in England.

Mix: You also remixed the soundtrack album for *Backdraft*. Do you enjoy film work?

Martin: Hans Zimmer is an old friend of mine; we used to work together back in the early days in England. While he was scoring *Backdraft*, Hans rang me up and said that he was working pretty much round the clock, and the film company was pushing this film out earlier than they had said. "They want me to finish the score sooner than they said originally, and they also want to have a soundtrack record out almost straight away. It would be a tremendous help to me if you came in and did [the soundtrack] for me, so that I can concentrate on the writing side." That's what we did. I came in to L.A., and we worked side by side on that project. I mixed the soundtrack album while he was still recording the film track. He's such a good musician and a hell of a nice guy anyway; it was a delight.

Mix: A lot of your recent projects have been with live music. Obviously, The Hall at Lyndhurst lets you record some of these sessions, but you've been in Rio and Sweden for classical performances. Do you like to conduct a large orchestra and bring the score to life?

Martin: Yes, it's inevitable human nature. It's a great buzz to go out

"The essence of my approach to records: If it's not going to be enjoyable, don't do it because life is too short."

there and be applauded. I've got quite a collection of orchestral symphonic scores that I've built up over the years, so from time to time, I do concerts. I do them in England, but I also go abroad. In Scandinavia, they keep asking me to go back, and I did a concert in Brazil last October. I've got concerts lined up for next year in Spain and Argentina. I don't want to make a career out of it, but it's nice to perform something and have lots of people clapping and saying you're good, even if you know you're not!

Mix: Do you find time to write? Do you still have a musical bent in that direction?

Martin: Yes, I do. I've been doing music for plays and that kind of thing. I did all the music for *Under Milk Wood*. [A spoken-word recording of Dylan Thomas' novel, with Anthony Hopkins, Jonathan Pryce and Freddie Jones, with Welsh actors and singers in supporting roles, including Sian Phillips, Bonnie Tyler, Tom Jones and Harry Secombe.] I still keep my hand in a little bit, but I'm tending to wind down now.

Mix: Were you tempted during the recording of *Under Milk Wood* to have another producer work with you? Having written the score and arrangements, and then conducting the orchestra and choir, you also produced the album. Was it easy to handle all of those roles simultaneously?

Martin: Yes, I enjoyed it. I guess that you have realized that in my life I like to do lots of different things. *Under Milk Wood* was nice, because I was working with Anthony Hopkins, and he was directing the actors. We also did a live performance [in December 1992] of *Under Milk Wood* at Air Lyndhurst, which Prince Charles came to [as president of The Prince's Trust].

Tony [Hopkins] did the direction for that project and helped put together the live show. I like working with actors—putting together a sound picture—using sound effects as well as music in the background.

Mix: We spoke earlier about artists that you'd like to have worked with. Were there any productions that you've enjoyed through the years, but which could have been better?

Martin: I don't think I can honestly give you any example of that because it's not the way I think. If I hear things on a record that I don't like, I say, "Well, okay, that's it." And I tend to write it off. All the records that I consider to be great, I like unqualifiedly. It would be very arrogant to say if I'd done that it would be much better. Some of the early Beach Boys records are still to me absolute bloody magic; I couldn't fault them, and I wouldn't want to change them.

Mix: Any sessions you'd rather have avoided?

Martin: Yes. Obviously you don't record all your life without having some real boo-boos. I once had a flirtation with heavy metal, and I regretted it very much. It didn't seem to me to have any sense. It would be wrong to quote artists to you, but there have been a very small amount of people that I would rather not have worked with. But you don't really know until you actually start working with someone just how it's going to work out. And, if you're adventurous, you must try different things—and I've certainly tried lots of different things.

The vast majority of everything I've done has been enormously enjoyable, and successful, too! But I think that's the essence of my approach to records: If it's not going to be enjoyable, don't do it because life is too short. I've always tried to look ahead whenever I've flirted with an artist. "Shall I make that record? Will I get on well with them? Will it be a good relationship?" That's the most important thing of all. Unless you have that good relationship, I don't think you make good music. ■

Former editor of Recording Engineer-Producer magazine Mel Lambert currently heads up Media&Marketing, a consulting service for pro audio firms and facilities.

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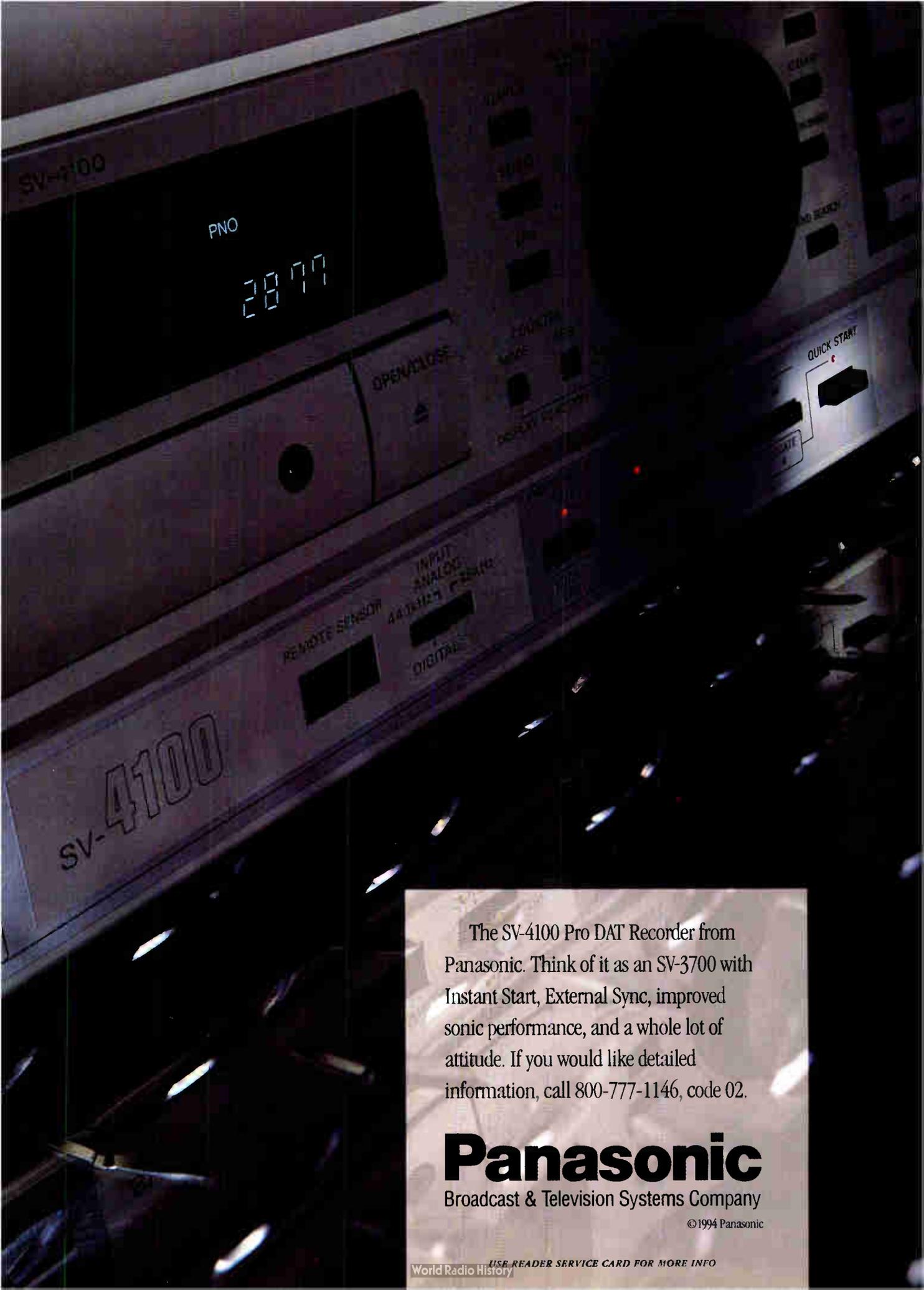
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AIR LYNDHURST

A LONDON LANDMARK WITH A NEW LEASE ON LIFE



BY MEL LAMBERT

When George Martin finally realized that his services as a producer were worth a heck of a lot more than he was earning as a staff producer for EMI's Parlophone label in the mid-'60s, he formed Air Ltd. (Artists Independent Recording). Having established a base from which he and his Air partners could embark upon independent productions, the next step was to build a facility that could serve as a "home studio" for their projects.

In 1970, the team opened Air Studios in London's Oxford Circus, followed nine years later by Air Montserrat, which was destroyed by a hurricane in 1989. During the late '80s, with the lease on the original central-London site due to expire, Martin and his partners began the search for a new location. High on his wish list was a large recording area for symphonic and orchestral sessions, with enough space to provide multiple rooms that could handle film and TV post-production as well

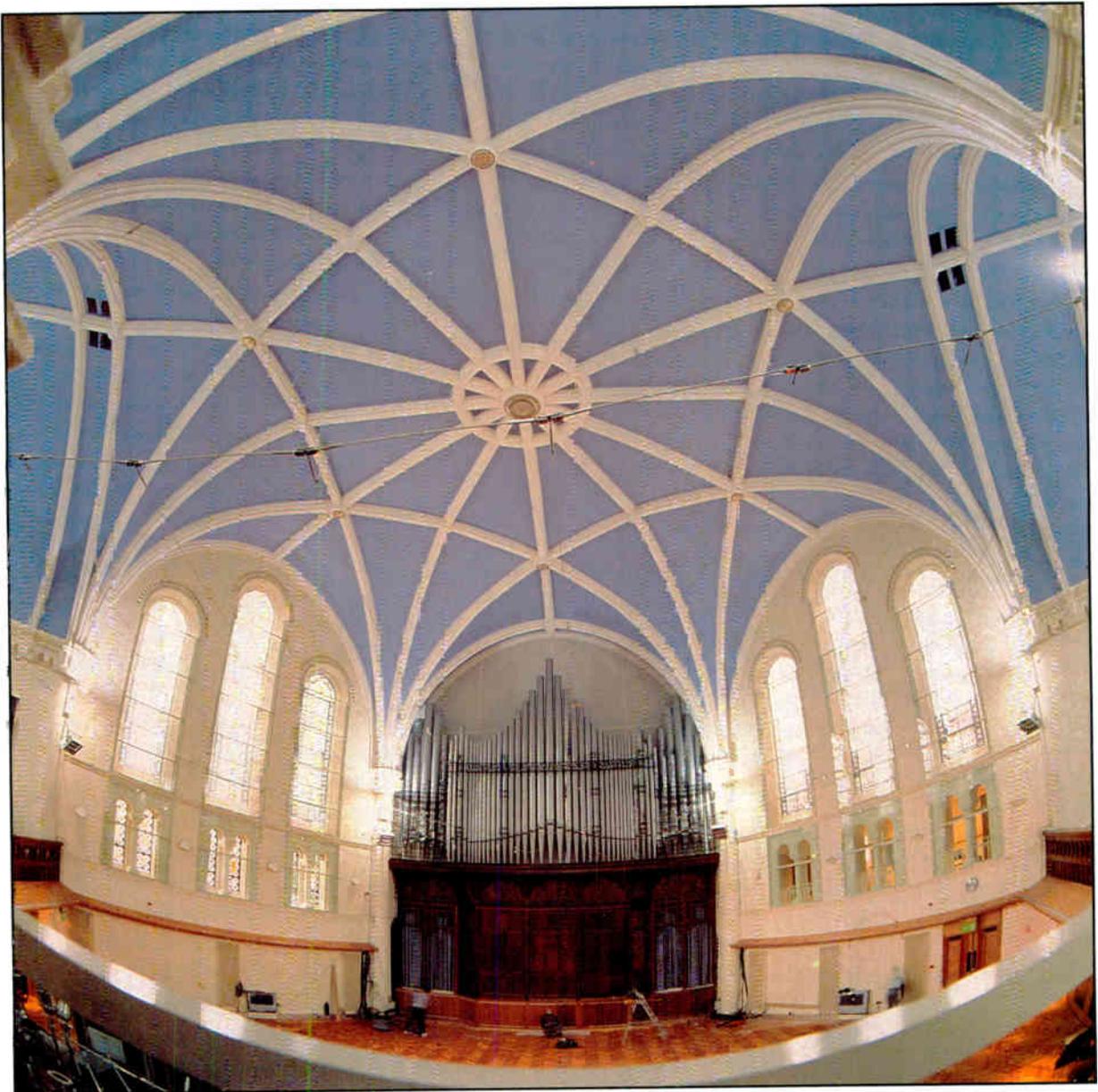
as music recording. After a great deal of searching, Air settled on Lyndhurst Hall, a Victorian chapel and lecture hall located in the Hampstead suburb of North London.

Given the high costs involved with such a conversion project—the fabrication of five state-of-the-art production environments, plus accommodations, in a listed Victorian building—Air, now owned by The Chrysalis Group, soon realized it was going to need some financial assistance. According to Air partner John Burgess, "Through Kazanaga Nitta [former managing director of EMI Records, Japan], George secured an introduction to Pioneer, the consumer electronics manufacturer. After many meetings with the company's president, Seiya Matsumoto, including visits to the new site, Pioneer agreed to become 50/50 partners with Chrysalis in the project."

The new studio complex has cost a reported £15 million (just over \$23 million U.S.).

Left: The vintage Neve 8078 with Focusrite modules in control room 1; right: the 1,600-square-foot Studio 1, modeled after Studio 1 at Oxford Circus.





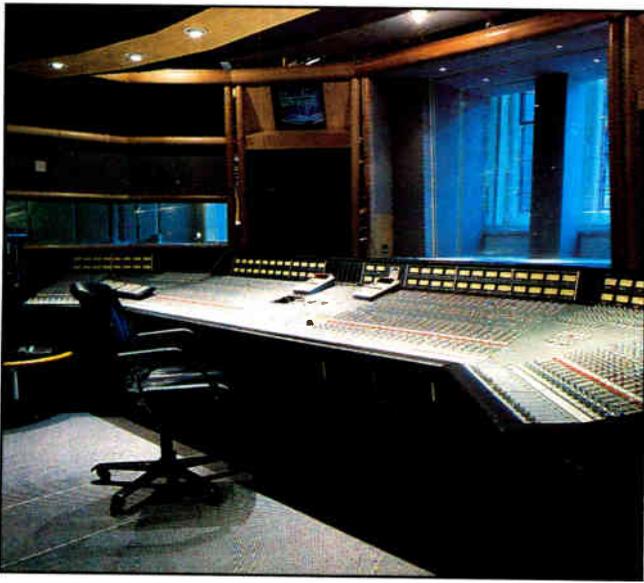
STUDIO DESIGN BRIEF

“From the very start, we realized that we were faced with a formidable project,” recalls Dave Harries, Air Studio’s sales and technical director. “The site had been allowed to fall into a poor condition; there was a lot of restoration work to be done so that we could retain the overall look of the building. Also, because it is a Grade II-listed building, we were limited in the number of changes we could make to the exterior. In the end, we decided to essentially gut the insides of the hall and side buildings and—within the shell—build floating control rooms and recording areas. We retained the outside walls with their stained-glass windows, but they are really just decoration. The internal studios and control rooms are completely isolated from one another and the external structure.”

The Hall, the showcase at Air Lyndhurst, is 5,000 square feet and capable of holding 100 musicians and a 150-voice choir. Note the original stained-glass windows surrounding the tracking area.

The new studio complex comprises two main areas. The original lecture hall has become The Hall, Air Lyndhurst’s largest recording area, with a companion control room. A new basement area for the power, air-conditioning and related systems now forms the bottom level of the four-layer tower of control rooms occupying the core of the main building. Each control room in the tower is of identical shape and dimensions, with corridors and recording areas leading off the core. In this way, all load-bearing walls could be laid out in the same plane, which simplified the design of foundations and support walls. The large basement structure also provides mechanical isolation for the control rooms, which are laid on floating slabs above it.

In conjunction with designer Angus MacPherson, Air set up a separate company, Macademy Ltd., to de-



Left: Studio 2's 80-input SSL 8000 G Plus. Right: the AMS Logic 2, with AudioFile Spectra Plus, in Studio 3.

sign rooms and monitoring systems for the new complex, with acoustic consultancy by Richard Galbraith and Ian Knowles of Sandy Brown Associates. The studio monitoring systems were designed in close collaboration with Andy Munro of Dynaudio Acoustics. In addition to The Hall, the three new control rooms in the main building were laid out (in ascending order) as Studio 1, Studio 2 and Studio 3, with video dubbing and post-production suites located above Studio 1's recording area.

THE HALL: LARGE ORCHESTRAL SESSIONS

The Hall is arguably one of the world's largest recording venues. "The room is over 5,000 square feet in area and capable of accommodating a 100-piece orchestra," Harries explains. "The hexagonal floor area is covered in reclaimed pitch pine blocks from the hall's original floor. The original architectural curves within the domed roof ensure that the acoustic performance does justice to any symphonic recording. And we have found that artists and

players like the fact that the double-glazed, stained-glass windows let in lots of daylight, if that's the producer's preference."

The Hall's recording area is supplemented by three large galleries capable of accommodating up to 300 people, either seated as an audience or standing in a choir. To allow rigging for televised events, the hall is prewired for lighting and video cameras. In addition to conventional orchestral recordings, The Hall has been used for film scoring and related functions. Remote broadcast ve-

AIR LYNDHURST STUDIOS

A BRIEF HISTORY

In 1876, a group of local parishioners, led by missionary R. F. Horton, raised enough money to buy a site at the corner of Lyndhurst Road and Rosslyn Hill in Hampstead, London. Having disposed of the Rosslyn Hill frontage for housing, they then had the corner site free of charge to build a chapel. They chose architect Alfred Waterhouse, who was by then at the height of his architectural prestige. He had built the famous Manchester Town Hall in 1877, and in 1880 had completed his most famous building, the Natural History Museum in South Kensington, London. In 1876, he had completed the first part of an imposing red-brick building in Holborn, central London, for the Prudential Assurance. It was something of a coup for this tiny congregation in Hampstead to obtain such a distinguished architect.

What he built for them in 1883-84 was a hexago-

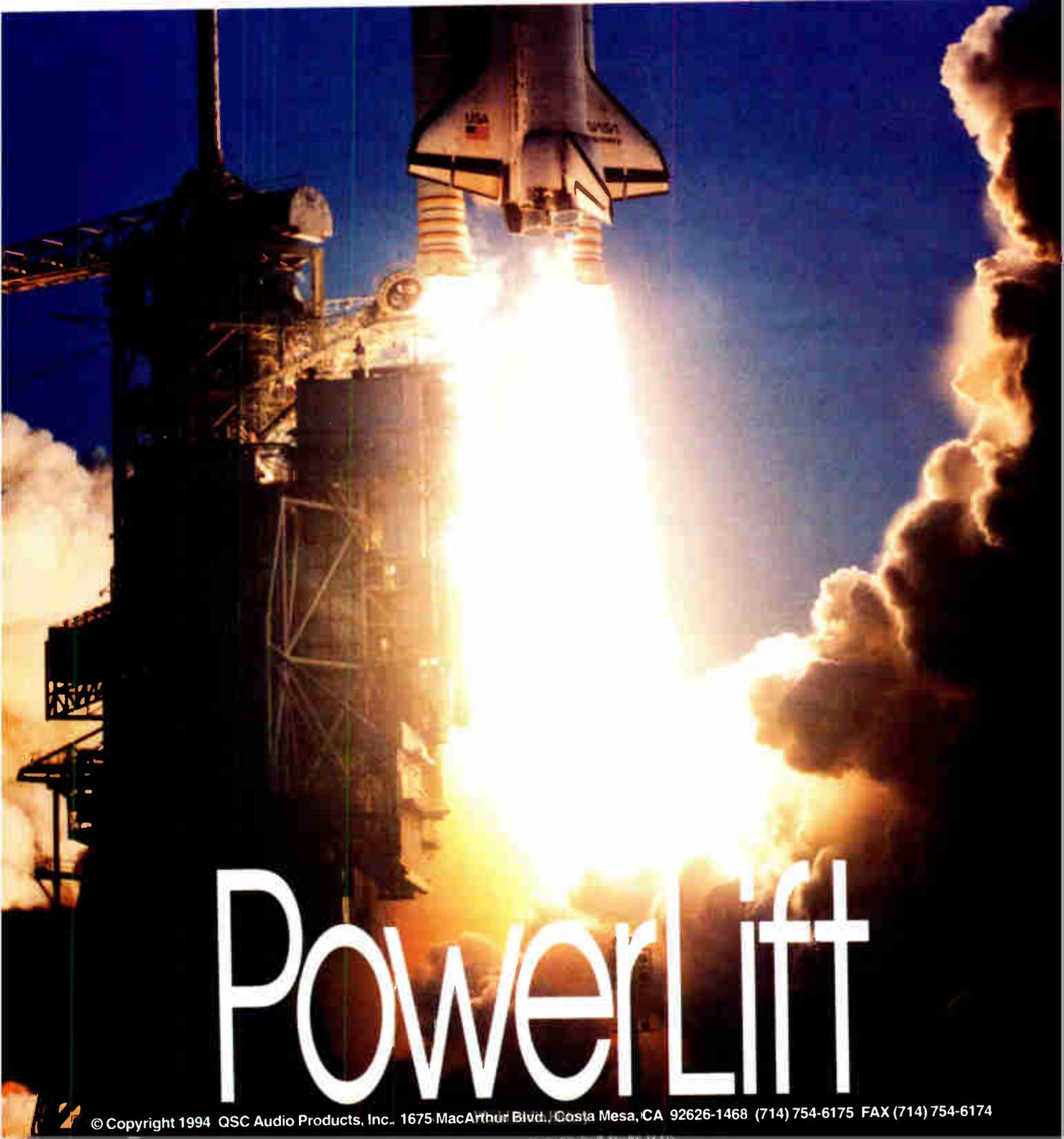
nal chapel that could hold up to 1,150 people, with a lecture hall attached, costing £30,000 (approximately \$46,500 U.S.). Like most churches, Lyndhurst Chapel was a thriving concern up to World War II; thereafter, attendance declined until 1978, when it was forced to close.

Air purchased the building in 1990. Under the leadership of George Martin, the firm began a restoration and construction program to create a new home for Air Studios, which had been forced to close due to an expired lease in Oxford Circus. Maintaining many original features, including the superb stained-glass windows, the main hall of the church has a gallery running around three sides and is capable of seating an audience of more than 600 people. This hall also includes a large control room. The rear part of the building, originally a school, houses another large recording studio—Studio 1—two overdubbing/mixing studios (Studios 2 and 3), a post-production suite (Dub A), plus residential accommodations with in-house catering.

—Mel Lambert



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A large control room flanked by four isolation booths is situated below the central gallery. The two larger booths, each measuring 500

square feet, are fronted by a tracking system capable of fully isolating the enclosed areas with acoustic doors, or opening fully to extend the main recording area. The doors run on guide tracks set into the floor and are capable of offering a reported 40

dB of sound attenuation. "This versatile space is augmented by a variable acoustic system," Harries adds, "capable of adjusting the reverberation to an absolute ideal for every recording combination."

"The Hall's versatility has been

A VINTAGE NEVE 8078 FOR STUDIO 1

"THE STORY OF A7971"

According to studio manager Malcolm Atkin, the story of Air's much-prized Neve console began in 1978, the year that George Martin decided to build a studio on the small Caribbean island of Montserrat. "For some years," Atkin recalls, "we had become increasingly concerned about the sound of the consoles that Neve had supplied to Air. The monitor mixes sounded great, but, when it came up the input side of the console, something was missing." The cause was soon identified as phase errors being introduced by the many transformers used in consoles at that time.

When confronted with the evidence, and the risk that "Air would go elsewhere for a console for its new studio," Atkin says that the manufacturer brought in the big guns. "At that time, [founder] Rupert Neve had not worked for the old company for some years. He immediately came up with the answer, saying that he could design a desk with an unequaled specification."

A year later, Neve and his design team had completed a 56-input console with a separate 32-channel monitor mixer. To reduce cable capacitance and resultant HF attenuation, the board featured remote-controlled mic preamps. "Most of the offending transformers had been removed," Atkin says. "The remaining ones were a new toroidal design utilizing an innovative tertiary feedback circuit. For the first time, the active circuitry used a new op amp [TDA 1034]. The cut switches were also ramped to remove clicks.

"The original bandwidth was an enthusiastic 170 kHz! However, to reduce blue-smoke problems, this was soon slugged to 60 kHz. Even the equalizer went through six revisions before our [then] chief engineer, Geoff Emerick, was happy with the result."

The new Neve Model 8078 was installed at Air Montserrat in 1979. "Reports soon started coming back from the West Indies about this fabulous-sounding console," Atkin remembers. "Within two years, Air had purchased two more consoles for the London studios. The third of our three boards, installed in Studio 3 at Oxford Circus in 1982 and code-named 'A7971,' utilized a different, all-input design. Then Neve decided that manufacturing by this method was too expensive and never made another console to this specification. By the late '80s, it was becoming obvious that 56 channels was insufficient. With the help of Focusrite, an extra 16 input channels had been added, for a total of 72 inputs."

Although the Montserrat studio building was destroyed by Hurricane Hugo in 1989, the console was eventually purchased by A&M Studios, Los Angeles. Its other sister now lives at Bryan Adams' studio in Vancouver. The last of the trio—the in-line design from Oxford Circus—has been completely refurbished prior to installation during 1994 in Studio 1 at Air Lyndhurst.

"By then, the console was showing its age—it required a major upgrade," Atkin explains. "Our first requirement was an automation system; GML was the unanimous choice. The engineering was superb, and, because the faders are addressed remotely, there was no risk of scanning noise on the mix buses. The down side, however, was installing two miles of ribbon cable! Additionally, as we

had already taken the decision to replace every front-panel pot and switch, there was a one-off opportunity to utilize the eight-event switches available within the Massenburg system.

"Obviously, console system design had come a long way in the intervening years," he adds. "Having made the decision not to change the electronics—in any way, in case we 'improved' the sound—Air's engineering department set about examining possible enhancements to the console. Any one-off system design suffers from the prototype problem. However hard you try to design a perfect console, the fact is you only get one chance to get it right!"

"The original monitor bus soon became the mix bus," Atkin continues. "The fact that not all the channels routed to it was a major irritation; it had to go! We also realized that 24 groups going unused during mix mode was a total waste. We needed a routing switch from the auxiliary sends. Separate echo returns on the main facilities panel are unnecessary—give us a proper split-cues modification. Give us automation control on the aux sends; group trims on all the groups instead of faders on the first eight; SSL-style machine control status on the meters; recall on the patch bay. All the Air engineers input their ideas on the ways in which we could make improvements.

"After 18 months of hard labor, I'm happy to report that we got it all done, and a lot more besides," Atkin concludes. "My thanks go to Air chief engineer, Rob Haggas, and Harry Day of Westwick Installation, for a superb job. And to David Nally for dealing with GML and designing the event interface cards for us. And finally, all the wiring team for some of the neatest work I've ever seen!"

—Mel Lambert

Two Amazing Things Happened in 1994

1

The King of Pop
Married the
Princess of Rock

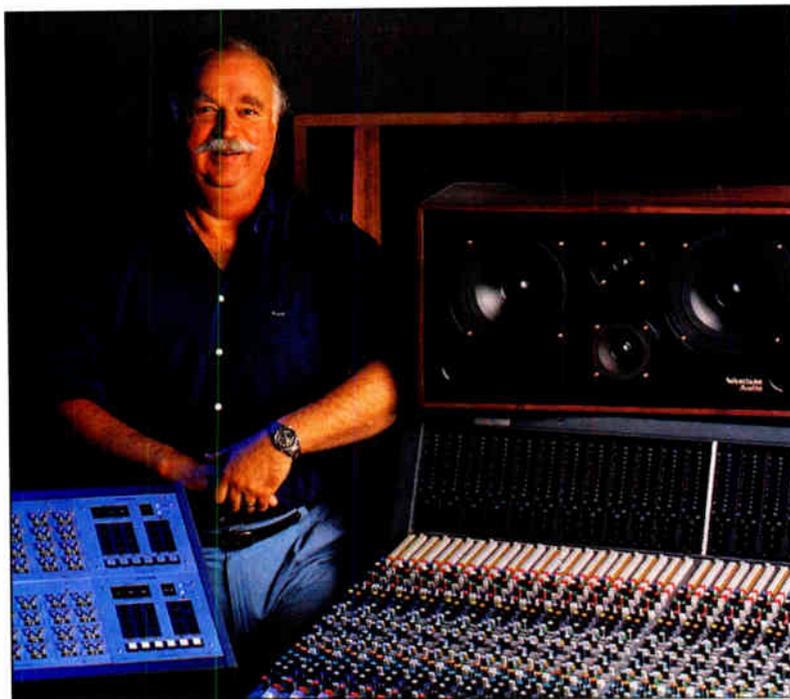
2

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

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Bruce Swedien on Location at the Hit Factory, New York

"These are the first monitors I've been able to spend a lot of time with and be comfortable at the end of the day. The detail is simply great!"

— Bruce Swedien on BBSM-8 monitors.

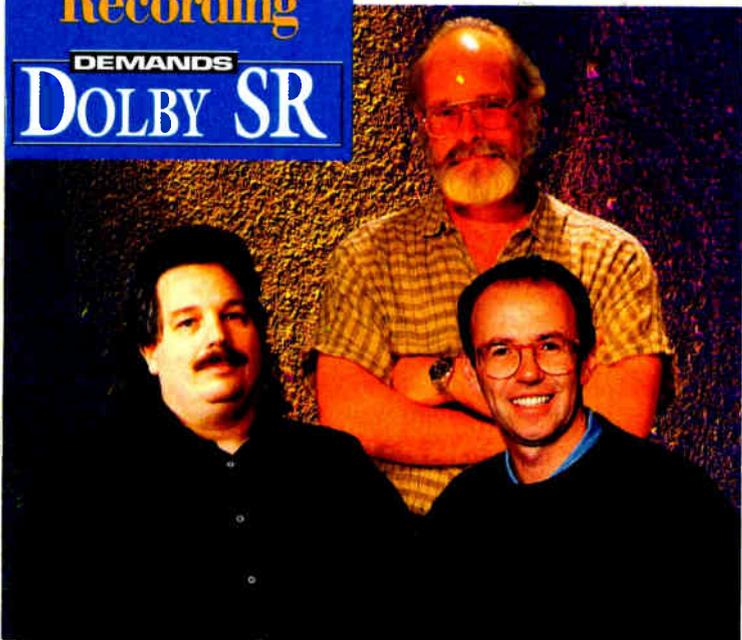
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Clockwise from top: David Hewitt, Guy Charbonneau, Kooster McAllister

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David Hewitt, *Remote Recording Services*

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Guy Charbonneau, *Le Mobile*

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Kooster McAllister, *Record Plant Remote*

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Dolby SR Credits: Rod Stewart, *Unplugged and Seated*; Eagles, *Reunion*; Al Jarreau, *Tenderness*.

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underlined by the many varied events that we’ve successfully accommodated,” he continues, “from large parties, rock albums, motion-picture scoring, classical music [recording and TV concerts]. Mid-range RT-60 in the main recording area is around four seconds, a value that can be varied down to two seconds if we cover the gallery with acoustic absorbent drapes.

“For a recent recording of Elgar’s ‘Pomp and Circumstance’ with the Royal Philharmonic Orchestra, we had 95 musicians on the main floor, a 100-voice choir in the center gallery, plus an organ. It was quite something!” The very first session in The Hall, in January 1993, was a film score conducted by (the late) Henry Mancini for *Son of the Pink Panther*.

The 500-square-foot control room is located centrally between the galleries and faces the main hall recording area; it provides excellent views of the recording area through a large window. To the left of the control room is an artists’ lounge, and to the right is the machine room. The console is a 72-channel Neve VRP Legend equipped with Flying Faders automation. The room is fully equipped with LCRS monitoring, using custom-designed Dynaudio, TAD and Tannoy speaker systems.

STUDIO 1: TRACKING/OVERDUB SUITE

“Although The Hall is obviously our new ‘showcase,’” Harries concedes, “we are proud of Studio 1, which has been designed to encompass many of the attributes from Air’s original Studio 1. The functional plaster walls have been replaced with curved glazing that reveals the original stained-glass windows.”

The floated floor covers 1,600 square feet and is capable of holding up to 60 musicians. A sliding-door system enables the space to be divided into two acoustically separated areas at any one of three alternative points in the room. Three guitar amplifier booths and a single mobile isolation booth are also available, as well as a Bosendorfer grand piano with a MIDI Forte system.

“We modeled the ‘acoustic signature’ of this new room on the sound we liked so much in Studio 1 at Oxford Circus,” Harries explains, “but with the ability—thanks to the movable sliding doors—of making it slightly deader or more live-sound-

ing, depending upon the type of music being recorded."

The control room measures 600 square feet and commands clear views of the studio through a large window. The control room features the vintage Neve/Focusrite console originally installed in Air Studio 1 at Oxford Circus.

"This desk is unique," Harries confides, "having been specially designed by Rupert Neve during the late '70s to George Martin's and Geoff Emerick's specifications. The board is based upon the original 8078 modules and was Rupert's last design before leaving the company. With 72 channels and its renowned remote mic preamps, this console has been recently updated by Air's technical department and now features a GML Moving Fader automation system." (For details on Air's modifications, see sidebar.)

STUDIO 2: REMIX SUITE

"Studio 2 was designed specifically as a state-of-the-art mixing room with the highest acoustic integrity," Harries says. "During the initial design stages, the room dimensions were computer-calculated to optimize the minimum standing-wave interference. At the same time, room treatments were specified and selected to ensure perfect reverb characteristics. The monitoring system was installed to fully integrate with all of these acoustic elements."

The control room features an 80-input Solid State Logic 8000 G Plus multiformat production console, fitted with 72 channel strips, Total Recall and Ultimatum moving fader automation. A separate 80-square-foot live area is available for vocal overdubs.

"We consider that the combination of the SSL's superb sound quality, the no-compromise room acoustics and the sonic accuracy of the monitoring in Studio 2 present the engineer and producer with the ultimate in mixing environments," Harries boasts.

STUDIO 3:

MUSIC AND FILM/VIDEO POST

Like Studio 2, Studio 3's control room measures 500 square feet, with a compact, 80-square-foot isolation booth. The room features an AMS Logic 2 digital console fitted with 48 four-layer channel strips and integral 8-output AudioFile Spectra Plus hard disk recorder/editor. Storage capaci-

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ty on the AudioFile is eight track-hours, extended to ten hours with a magneto-optical update. The room is used for music recording and film/video post-production. A full-function LCRS monitoring system is also available.

DUB A:

MIX-TO-PICTURE AND TV POST

Designed primarily for TV/video post-production, Dub A's control room measures 300 square feet, with a 60-square-foot voice-over booth. An AMS Logic 2 digital console is fitted with 20 four-layer channel strips and integral 16-output AudioFile Spectra Plus hard disk recorder/editor, plus LCRS monitoring. Dub A also offers various video playback formats, including Beta SP, U-Matic, S-VHS and one of the first installations of the new Pioneer VRP-1000P recordable laserdisc system. Other hardware includes a computer-based CD Jukebox sound effects library and Fostex D-20 time code DAT machines.

A sixth room, currently referred to as the "Prep Room," features a 32-channel AMS Logic 3 digital console with integral AudioFile hard disk recorder/editor. The area is used primarily for prelaying material from time code DAT to hard disk, prior to mix-to-picture sessions.

All monitor speakers throughout the new studio complex were designed by Air and Munro Acoustics, using Pioneer/TAD and Dynaudio speaker components. A mixture of Hill Audio Chameleon, Chorus and Crown amplification was specified, with both BSS analog and Yamaha digital crossover units. A variety of analog and digital multitracks are available in the machine rooms, including Sony PCM-3348 48-tracks and PCM-3324A 24-track DASH-format transports, Mitsubishi X-850 32-track PD-format decks, plus Studer A800 MkIII and Otari MTR-90 MkII units.

"Every studio has good and bad things about it," George Martin offers. "You think to yourself: 'If I designed and built a studio myself, then it's bound to be exactly what I want.'" When we built the first Air Studio in Oxford Circus, I was *very* pleased with the sound of Studio 1. At Lyndhurst, we've got the biggest, the most expensive and the most complicated—but also the most beautiful—studio I've ever had. It'll certainly be my last one; I won't do any more after this!" ■

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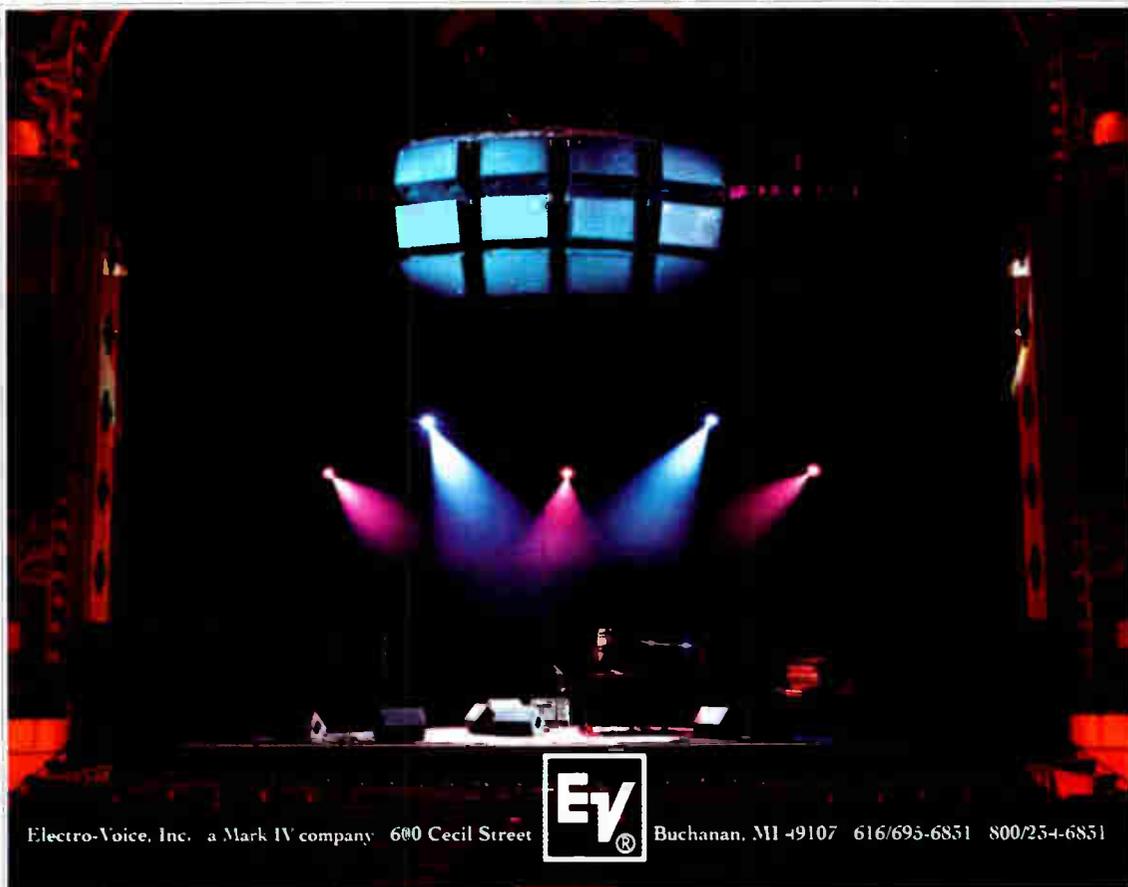
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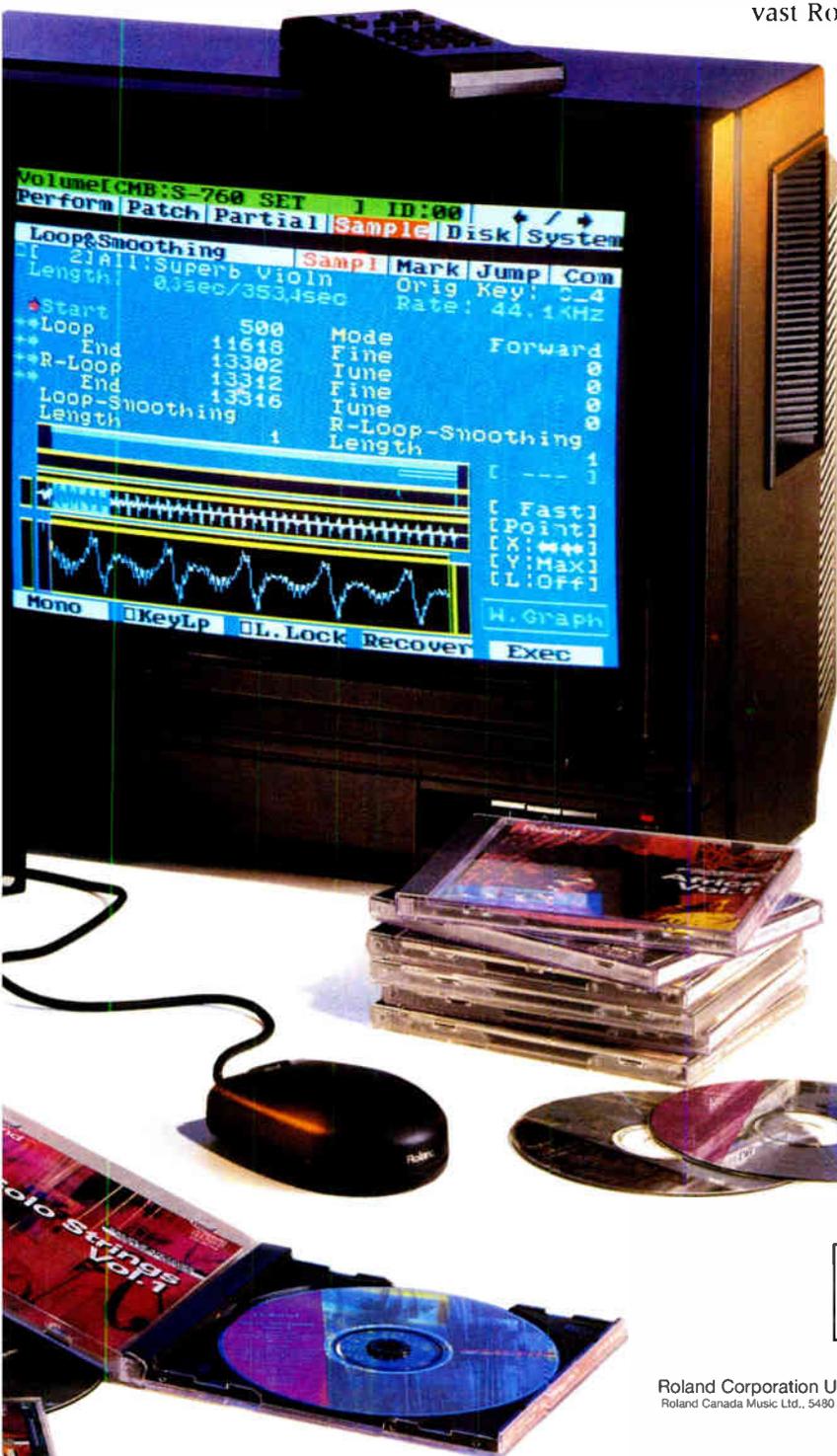
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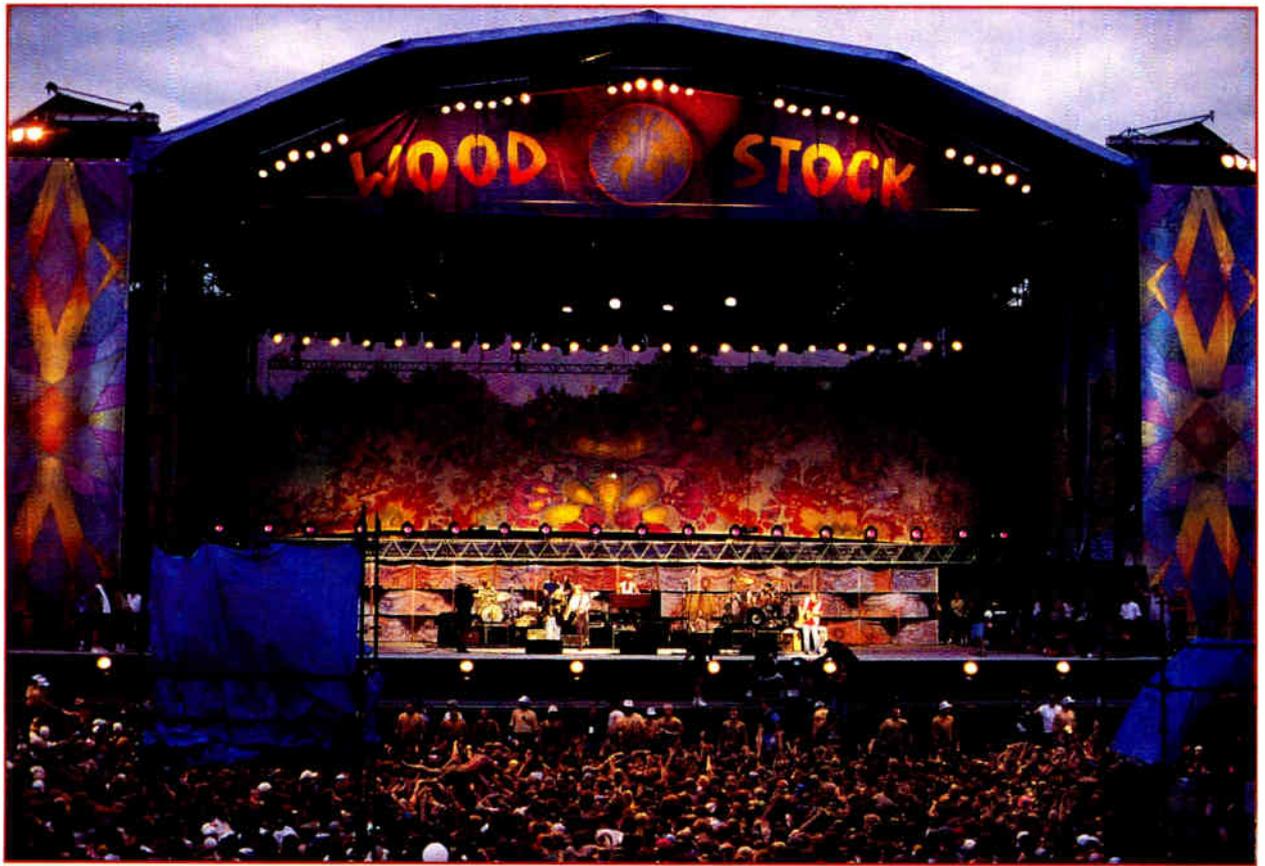
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The Recording of Woodstock '94

by Chris Stone

Stage Photos by Steve Jennings

Great music is the common element of Woodstock '69 and Woodstock '94, but that's where the similarities end. Back in 1969, it was basically just a weekend concert that exploded into 400,000 people arriving at Max Yasgur's farm near Woodstock, N.Y. No one was prepared for what would happen, and it took ten years for the promoters to break even.

It was decided only at the last minute to record the concert, and Michael Wadleigh was hired to film it. L.A. Johnson was chosen for film sound and, among others,

Eddie Kramer was brought in for recording because of his close friendship with many of the stars, such as Jimi Hendrix.

It was recorded dual 8-track in the back of the Hanley Sound trailer, with the most primitive of cabling and equipment, and there was no consideration for the heavy rains that caused short circuits and problems in the signal flow. Amplifiers sat in the rain with the potential for great danger to the performers.

Of the 400,000 people who came to Woodstock '69, 4,000

Above: On the main stage, Crosby, Stills & Nash

were treated for illness, injury and adverse drug reactions. Nearly the same number of folks arrived at Saugerties for Woodstock '94, with only minimal injury, a couple of non-festival-related deaths and a smattering of drug-related mishaps. The year of planning by Woodstock Ventures Incorporated and PolyGram Diversified Ventures really paid off.

Woodstock '94 had thousands of porta-potties, 25,000 feet of pipe

leading to drinking stations from three 1-million-gallon water tanks, more than ten miles of chain link fence and 740 acres of campsites. (In the spirit of the original festival, though, the infrastructure broke down under the crush of people: porta-potties overflowed, the fences were torn down, and an estimated 100,000 people attended the festival for free.)

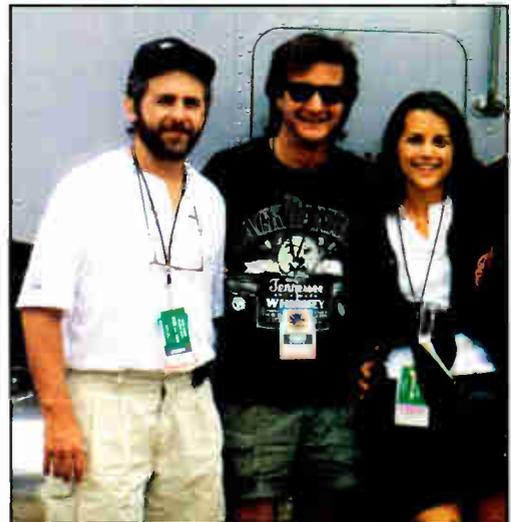
Four massive remote trucks were on hand to record an event that involved four scheduled stages and one surprise "Rene-gade Stage." Among the resources were eight 48-track digital machines, 500 rolls of 3M digital tape, a team of superstar engineers, and a 45-foot tour bus/field office with 12 bunks, four phone



Left: At night on the main stage, Aerosmith

lines and two large video monitors showing the pay-per-view broadcast. Eight miles away at Bearsville Studios were three studios, eleven 48-tracks (counting

three that came to us after the festival closed) and 40 bedrooms, a private caterer, three shuttle vehicles, more phone lines and fax machines.



Above: Outside the Remote Recording Services truck, (L to R) Chris Stone, Larry Hamby (VP of A&R, A&M Records), and Dave Hewitt, owner of Remote Recording Services. Above right: (L to R) Elliot Scheiner, Bob Clearmountain and Ann Lewis (Director of A&R Administration, A&M Records). Right: Inside the Remote Recording Services truck, (L to R) Ed Cherney, Dave Thoener, Elliot Scheiner. All photos by Dusty Hewitt.



Woodstock Redux: Noisy Neighbors Remix the Original Mud

by Dan Daley

Hey, I was there. No, really, I was. I was 15 and can only remember Sunday, after the hallucinogens had begun to subside. I came to gripping the chain link fence that served as the helipad perimeter as The Who played a medley from *Tommy* into the sunrise.

So it was nice to have portions of a lost weekend refreshed by Noisy Neighbors, a post-production project studio run by mixer Gary O. Coyote and self-described digital engineer Rob Arbittier. They were chosen to digitally refurbish the original three days of peace, love and music from 1969 for release on the 25th anniversary in a boxed CD set (on Atlantic Records) and for the re-edited director's cut of the documentary film.

"The tapes came in from all over the place and in several forms," recalls Arbittier, who had both an old 1-inch, 8-track deck and a 2-inch 24-track deck set up to receive them. Eight-track was the dominant format, the state-of-the-art at the time, and the tapes in many cases were showing their age. Even the 24-track safeties, such as the one from Pete Townshend of The Who's performance, were dicey.

All the cuts were immediately transferred to one of Noisy Neighbors' two Timeline DAW-80 8-track hard disk recording and editing systems. "They were cut mostly on old Scully machines," Arbittier recounts. "They used seven tracks for audio and one for a 60Hz pilot tone to sync the cameras to. At the time, the thinking was that these were going to be used in a documentary-style film, not a high-fidelity theatrical release. So there were a lot of technical problems on the tapes."

Edits and repairs done on the first DAW-80 were then mixed down to two tracks of the second workstation at the Los Angeles project studio. Ostensibly, the DAW-to-DAW transfers were used to help organize the 55 mixes they did over the course of four weeks. However, the digital process also helped keep mixes clean as Coyote and Arbittier applied some less-than-digital recording techniques to the project.

For instance, Arbittier says, the deteriorated condition of some tapes had a deleterious effect on guitar sounds. "They were mono and more distorted than they were when they were originally recorded," he remembers. "So we assembled a small collection of vintage guitar amps like Marshalls and Fenders and ran a line out from the guitar tracks on the workstation, passing them through the cranked amps during the mixing stage. It reinvigorated the guitar sounds. We did that on a Santana track after experimenting with mic placement to see if we could match the stage ambience from 1969."

The main issue during mixing was to give an au-

thentic and effective stereo image to what was originally intended as a mono mix. To address that concern, Arbittier and Coyote used a Spatializer and some non-real-time DAW capabilities. A conga track that opens Santana's "Soul Sacrifice" and functions as the pulsing heart of the performance was isolated and run through the Spatializer, splitting the low and high congas into right and left channels. "It sounds better that way than if you tried to autopan the track," Arbittier states. "You don't hear the movement of the pan pot because the channels are already assigned hard left and right. We did the same thing with drum kit toms fills. There were a lot of automation-style mixing



Noisy Neighbors: Gary Coyote (left) and Rob Arbittier

techniques used on the project that made it sound much more real."

As real as the noise sources that permeate the tapes. One in particular was the "boing" of spring reverbs from guitar amps left on as people danced on stage, setting off the primitive effects. "It's amazing that in three days of shows, no one noticed this sound getting all over the performances," says Arbittier, obviously forgetting that few people there were working with completely unclouded minds. The "boing" instances numbered in the hundreds and had to be isolated as waveforms on the DAW screen and scrubbed off. After a while, though, Arbittier says, he was able to do the procedure in his sleep, not even needing the screen. "Sometimes the boinging was louder than the vocal, and there was nothing you could do about it," he says.

But such intensive editing allowed some gems to come through. "You could hear Joe Cocker's vocals when the tracks were pulled down," Arbittier says. "For the first time, I think, someone could actually understand the words he was singing." The same went for Sly Stone's *sotto voce* mumblings. Roger Daltrey's microphone cable pyrotechnics produced an interesting sound effect when isolated: "An interesting sort of swirling 'whoosh' sound that came from him swinging the mic around on its cable. It would make a great sound effect for a library." ■

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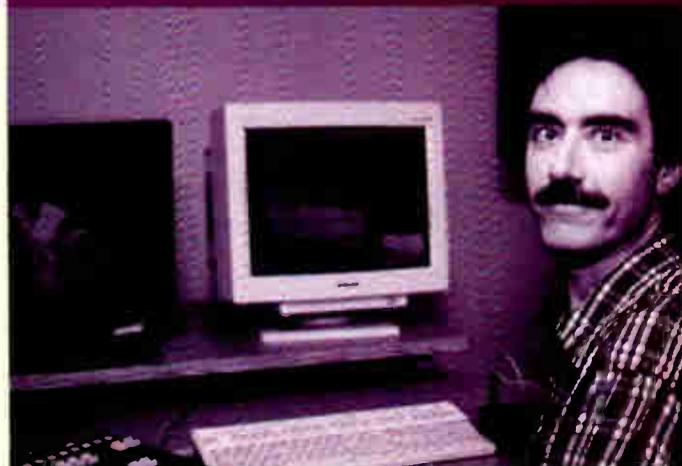
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My involvement in '69 was to supervise the early audio post-production functions at Record Plant for the film and the record. It took almost eight months of intensive work to correct all the tape problems and assemble the three-record set and soundtrack. Jump-cut to 1994 and the CDs are scheduled in the stores a mere 11 weeks after the event.

PRE-PRODUCTION

The World Studio Group was chosen in early April to provide audio facilities coordination for the festival by Larry Hamby, VP/A&R at A&M, who was designated as the executive producer of the CD set. The challenge was to coordinate 54 groups and record every second of live music, devising a massive operational plan and strategies with backups, sort of a model for future festivals of this magnitude. With the time constraints, the number of stages operating simultaneously, and the engineers and quantity of equipment needed to record this musical event, the initial projection was that our chances of successfully completing the mission were small indeed.

Hamby and I had dinner on the 6th of April, and he asked me if I would be interested in working with A&M for Woodstock '94. When he began to describe the enormity of the project, I became instantly aware that nothing this big had ever been done before. The planning phase began immediately, and we started working with other A&M executives to accomplish this feat. The prime consideration revolved around the time constraint, in order to have this album in the stores before Christmas. Hamby's order was simple: "Make it happen; do it efficiently; save time whenever possible."

After our first projections of the equipment and personnel necessary, we went to New York at the end of June to visit the site and meet with Mitch Maketansky, the audio director for pay-per-view broadcasting by PDE (Polygram Diversified Entertainment), the corporate entity presenting the event. Maketansky worked for Allen Newman, the PDE executive for the entire pay-per-view extravaganza. All quickly agreed that because of the two revolving stages and the possibility of additional stages, we needed a minimum of four remote trucks. We first went to WSG member Dave Hewitt and his

Remote Recording Services. Next was Kooster McAllister's Record Plant Remote for the South Stage, and the Effanel and Manhattan Center trucks for the North Stage. Ann Lewis, director of A&R administration at A&M, had also been recruited by Hamby to handle all the myriad administrative details concerning artists' contracts, music publishing and legal requirements for the label.

Hamby chose the team of engineers along with the PDE group to mix the live TV sound and multitrack recording. Bob Clearmountain, John Harris and Jay Vicari were assigned the North Stage, with Ed Cherney, Dave Thoener and Elliot Scheiner at the South Stage.

Nearby was Bearsville Studios, which seemed to be the ideal choice for the support facility. On June 28, Hamby called a meeting in NYC with myself, Ann Lewis, Maketansky, Mark McKenna, general manager at Bearsville, and Bob Clearmountain, who would become the lead audio engineer responsible for much of the mixing, plus editing and assembly of the project. We discussed our various roles and the amount of cooperation needed to make the recording of the festival a success. With these roles solidified, we began to realize the incredible amount of work that had to be completed prior to the festival.

We next negotiated with the four remote trucks, made an endorsement arrangement with 3M digital tape, and hired the multitrack recorders, with two provided gratis by Sony and two by Studer. The machines were supplied by Audio Affects in L.A. and New York rental companies Toy Specialists, Audio Force and Dreamhire. When we realized that we would have \$3.2 million worth of digital machines in our possession, liability policies were quickly taken out by A&M. We emptied the East Coast and a good portion of the West Coast for available 48-track machines, causing a tremor among producers who had to scramble for the remaining machines.

In what I believe to be a first, the tape path—from blank to finished master and clones—was totally standardized before the event. For each group, we allotted four rolls of one-hour-load digital multitrack tape, four cassettes and two DATS, all pre-labeled, including song order when available, which would be delivered prior to the festival. Our

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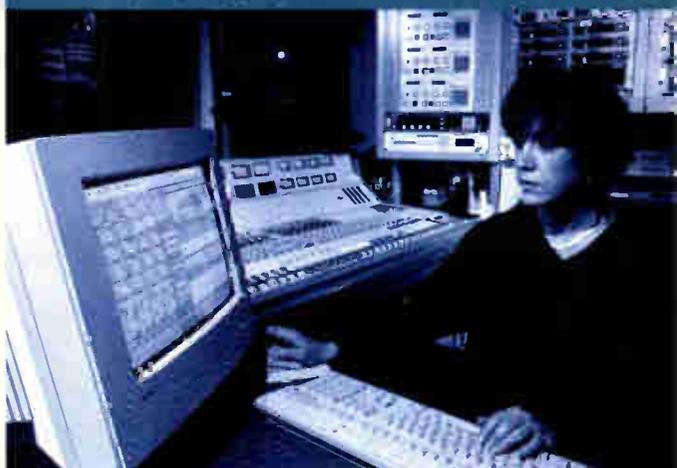
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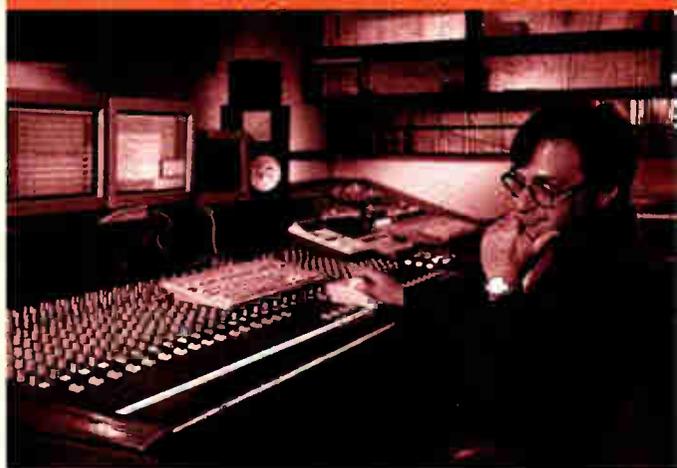
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biggest concern was that traffic problems and crowds would prevent us from reaching the site with the raw tape for recording. You only get one shot to record live, and if this plan had failed, everybody could have been looking for new employment! Individual cartons were prepared for each artist and stored in air-conditioned vaults on site, then delivered each morning to the trucks designated to record those performances.

ON-SITE AT WOODSTOCK

Monday, August 1, we arrived at the site, which was already a beehive of

activity with several thousand workers assembling the stages, pitching tents for food vendors, moving the porta-potties into position and digging trenches for distribution of drinking water. A small village of office trailers was assembled on the hill above the stages to house all of the Woodstock Ventures production-related functions. Each trailer was fitted with telephones; walkie-talkies were distributed; waste removal was coordinated; power was put in; and arrangements for catered meals were made to take place continuously during the event.

The 45-foot Eagle touring bus,

which had been acquired to serve as the A&R festival site office and 12-bunk hotel for the audio engineers, was then moved into position. The bus was put equidistant between the North and South stages, which were about 500 yards apart. The bus was equipped with four telephone lines, fax machines, its own generator and two "executive" porta-potties. This was the A&M site headquarters.

Bearsville, which was to provide the festival site with total facilities and backup, had a private caterer and provisions for transportation of personnel and supplies to and from the site. With music to go nearly around the clock, we wisely set up residences for all the hard-working A&M personnel and engineers. We had three studios, each with three 48-track machines, set up to manufacture the double clones of each performance master to provide a safety copy for A&M and another safety master for each artist. For communication between the tour bus, Bearsville and the shuttle vehicles, we had six cellular phones, walkie-talkies and four phones at each end.

On Monday, August 8, Larry Hamby, Ann Lewis and the A&M A&R crew designated as "Listeners" arrived at Bearsville. The responsibility of the six listeners—one for each truck with an additional two for shift changes—included making sure that tape supplies were adequate for each performance in their assigned truck, listening to and watching the performance of each act recorded by their assigned truck, and making sure that at the end of each performance there was immediate delivery of DATs and cassettes to the A&M site headquarters for distribution by Lewis to the artists or their representatives. At the conclusion of the recording of the festival, each listener would spend five days studying the assigned performances. The listeners' role was to suggest to Hamby which songs they thought were the best from each performance for possible inclusion in the forthcoming CD.

On Tuesday, the A&M staff received orientation, maps and schedules regarding Bearsville and the festival site. That evening, Hamby and A&M hosted a party at the Bear Cafe in Bearsville for all the Woodstock Ventures managers, the audio engineers who had arrived that afternoon and the remote truck crews who had

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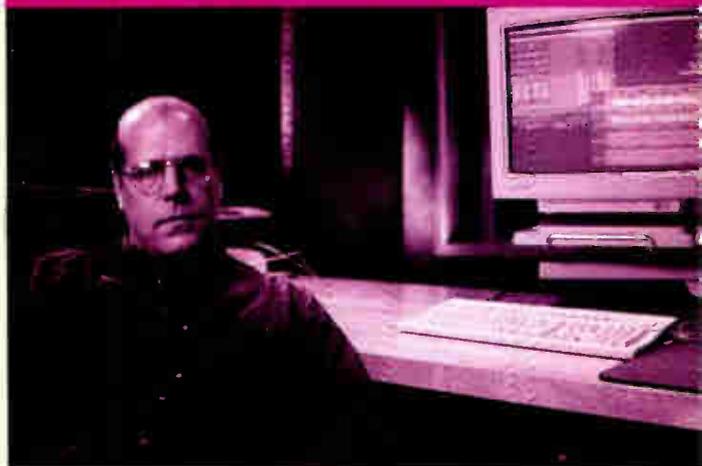
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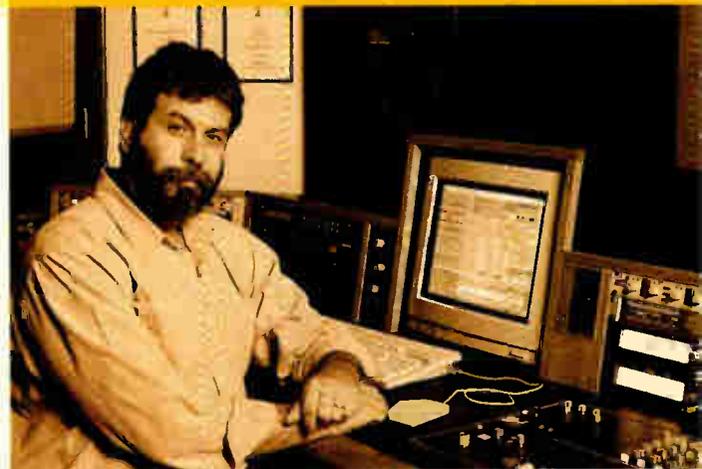
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parked and powered that morning at the site. Hamby correctly decided that this would be the last night anyone could relax in a friendly environment before the adrenaline took over. A good time was had by all, and a sort of battlefield bonding took place, creating a team spirit among the normally fiercely independent providers and personalities.

On Wednesday, the two remote trucks at each stage finished setup, the A&M personnel assembled the tape packages, and more detailed preparations took place before the impending arrival of the masses on Friday. Soundchecks began, stages

were revolved and checked, and all the 48-tracks were tested for integration into a complicated system of signal coming from the stage to the designated truck. The requirements called for simultaneous 48-track recording, a live stereo mix "on the fly" provided for the pay-per-view broadcast and live radio, plus lines to the DAT and cassette recorders in each truck.

On Thursday, the tension began to mount. We had last-minute "tweaking" in the trucks and onstage with Maketansky overseeing the final integration of the trucks to the stages. All the tape packages arrived

from Bearsville and were stored. Then there was a complete dress rehearsal for the A&M staff on site to get the wrinkles out of our procedures. This meant actual tapes being shuttled back and forth, testing communication, faxes, and making sure of constant phone support.

As part of the Bearsville strategy, we provided hotel facilities to A&M staff, engineers and producers. This meant waking them early in the morning, feeding them a healthy breakfast, shuttling them to the site, delivering a gourmet box lunch, refreshments during the day, a catered dinner, and either a shuttle back for sleep or accommodations in the A&M bus. We did our best to be a four-star hotel on the road, taking care of all their needs so the engineers could concentrate on their best creative efforts for the highest-quality recording.

THE FESTIVAL BEGINS

Friday morning everybody got up shaking because the downbeat of the festival was at 11 a.m. It was like going into battle—very detailed preparations had been made, and now we had to do it. All working personnel were delivered early to the site, as the first act was due to start that morning on the North Stage. Twenty acts followed, including unsigned local bands and a "rave," which began at midnight and continued until 6:30 a.m.

Maketansky had made it easier for the engineers to go from recording group to group by standardizing the microphone setup on each stage as much as possible. He chose the largest group, the Neville Brothers, and with few exceptions simply contracted or expanded that mic setup for each band, so the recording engineer assigned to each group knew how each instrument would be miked, which microphone would be used, and which lines would be feeding the signal to each fader in the truck consoles.

Meanwhile, back at Bearsville, our 24-hour-a-day cloning operation began at 4 p.m. when the first shuttle from the site returned with the master tapes from the first group of performing artists. Security guards were in place to protect these irreplaceable tapes, which were first logged in to the library, and reassigned to one of the three cloning stations for the manufacture of two simultaneous

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safety masters. As an additional provision, a four-camera line video shot of each performance, with SMPTE address, was furnished for the cloning engineers back at Bearsville (who had not seen the performance). They were responsible for the safety master and the artist's copy, and in this way they could check visually, making sure of editing each performance at precisely the right point during applause between tunes.

Each remote truck was recording with two machines running, staggered with the second machine starting five minutes into the performance, or at the end of the first song.

In this way, we had extra insurance, with nearly double recording as a margin of safety. Our fears of dropouts were unfounded, as the 3M 275 LE 1/2 9600 digital tape performed flawlessly throughout. The result of the cloning operation was two complete master copies of each performance from beginning to end. By 6 o'clock we had our first clones completed, and a cheer went up because our tape path system was proven successful. Hamby said from his on-site command post, "The Eagle has landed."

Saturday morning, with things running smoothly at Bearsville, I went to

the site to check their operations. Upon arrival at the bus, I was greeted by a very excited Hamby, who said, "Chris, they built a third stage during the night for a lot of the acts that play the local clubs, and they are about to begin performing. I'm calling it the 'Renegade Stage,' and my promise was that we would record every note at Woodstock—please make it happen."

In the next 20 minutes, I had borrowed McAllister's personal DAT machine, plus a makeshift set of adapters assembled by Paul Prestopino, the maintenance tech in the Record Plant truck. This would connect us with the P.A. system on the new stage, and Paul Wolff (president of API consoles at his day job, who also worked the stage for McAllister) ran over with me to install. Hamby chose his assistant, Jill Carrigan, to operate the tape machine and told her to "write everything down" because she was now producing her first album.

By Saturday afternoon, the rains had begun. At 8:30 p.m., Nine Inch Nails arrived, climbed out of their bus, rolled in the mud and jumped on stage to the cheers of the muddy masses. Shortly after midnight, as Aerosmith appeared, the heavens opened up on the downbeat, providing some divine staging. Because of the pre-planning and fears of the worst, there were no power shortages; no performers got wet unless they wanted to, and the festival recording continued without a hitch.

In the midst of it all, Ed Cherney remarked, "The best part of this is being together with my fellow engineers and seeing everybody subordinating their egos. When you do this for a living, making records is dog-eat-dog. But pulling together like this is a rush of adrenaline."

By Sunday morning, after a night of rain, dawn revealed the world's largest mud bath. Performances continued throughout the rainy day until the level of discomfort reached the point where people started heading back to their cars in droves. By about 3 p.m., the New York state troopers shut down all roads in the area and suspended all vehicle access permits. The roads were filled with departing festival-goers, shoulder to shoulder—one solid mass of flowing humanity. All of our shuttle vehicles were stranded. It took us almost two hours to arrange for the head of security at the festival to

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World Radio History

contact the individual troopers at check points to arrange for our vehicles to drive along the shoulder of the road, in order to deliver our tapes. Back at Bearsville, the clone factory had slowed down, which gave us some anxiety, but luckily the tapes soon started flowing again from the festival site.

The festival ended on the North Stage with Peter Gabriel in the early morning hours of Monday, at which point the final rave commenced on the South Stage, continuing until almost dawn.

POST-PRODUCTION

Monday morning dawned with the cloning operation in full swing. By approximately 7 a.m., we had all the tapes from the site and were able to project that we would complete our cloning operation by the end of the day on Wednesday. After recovering from the three days of almost constant recording, the A&M listeners appeared in the late afternoon for a meeting with Hamby and Lewis to begin their post-production performance documentation. By Friday, all of this had been written up and submitted to

Hamby. The team headed home, and the performance clones had been shipped to locations all over the world that had been designated by each artist. The original masters and safeties were on their way to A&M in Hollywood, to be cataloged under the guidance of Dave Abramson, A&M Records tape librarian.

After final creative agreements by Hamby and all of the performing artists, mixing was begun in the studios with the engineers chosen by each performer. Hamby chose the six on-site engineers because they represented expertise in all the genres of music planned for the festival. One reason he did this was in the hope that the majority of the artists who performed at the festival would feel comfortable with these engineers and stay with our team for the mixing phase of the project. The majority of artists agreed and chose the Woodstock engineers who had seen and recorded their performances to mix their potential contribution to this historic CD set. This greatly expedited the return of the final mixes to A&M and provided the crucial time for the sequencing, editing and assembly by

Larry Hamby, Bob Clearmountain and Mitch Maketansky.

"This was the largest live-recording event in history," Hamby said. "There was more music being recorded in the most precise manner than at any other time." By the following Monday, a week after the music stopped, all of us involved in this historic and overwhelming event were back to our normal everyday lives, somewhat missing the Woodstock rush of frenzied activity.

In retrospect, I realize that Woodstock '94 was a true test of the World Studio Group philosophy. From the initial meetings and continuing coordination by Samantha Stone from our L.A. offices, we acted as the "hub" of the recording wheel, interacting with the "spokes"—the trucks, engineers, Bearsville and A&M to deliver a quality product on time. Mastering and replication were going smoothly at press time, in preparation for the November release date. ■

Chris Stone is a former studio owner, a business consultant to the professional audio industry and president of the World Studio Group.

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Woodstock '94

THE SOUND REINFORCEMENT PERSPECTIVE

Here's Mud
In Your Eye

BY MARK FRINK

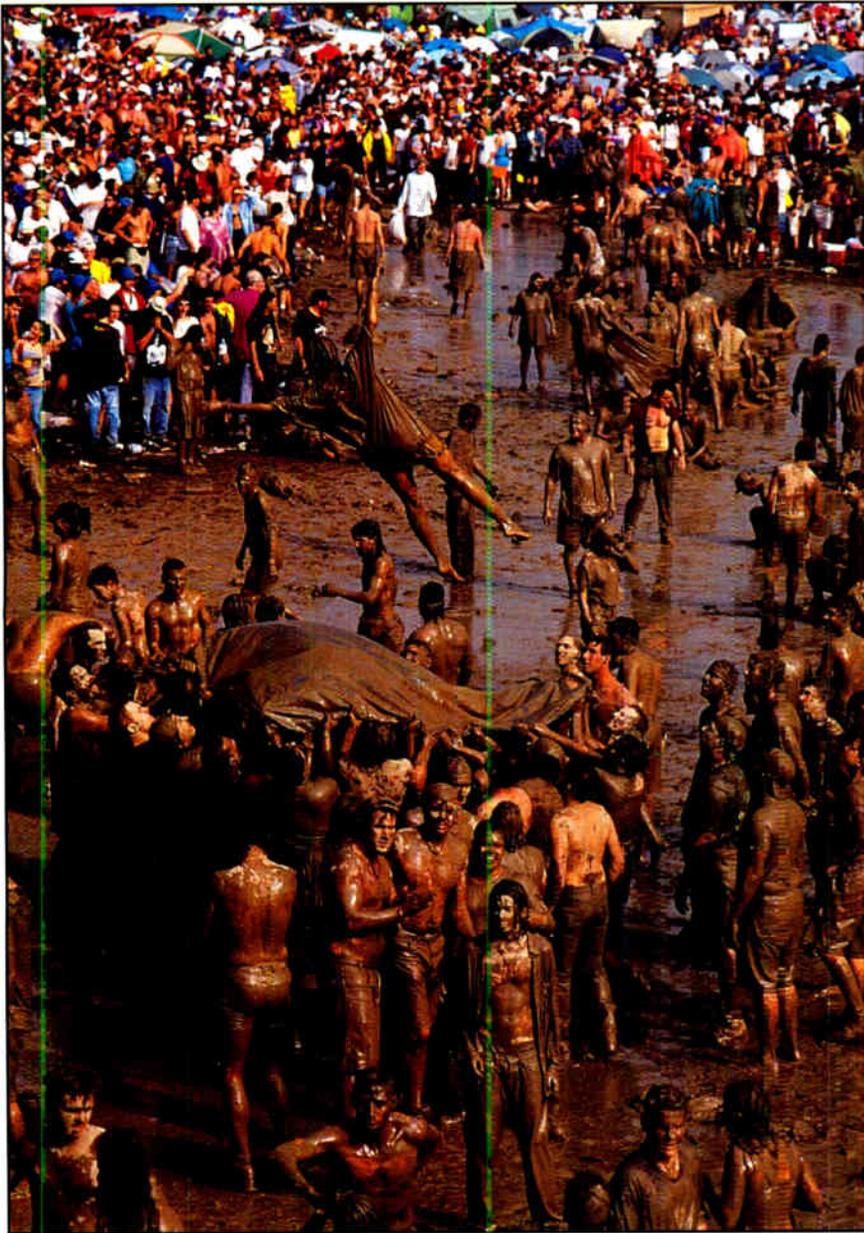
ALL PHOTOS BY STEVE JENNINGS

Exit 20 off of Interstate 87 in New York, usually remarkable merely for its proximity to several world-class studios and musicians' homes, was once again the gridlocked off-ramp to the music festival of the decade: Woodstock '94. Audio Analysts provided sound reinforcement for the North Stage at this 25th anniversary event, held in Saugerties, N.Y., on August 12-14, 1994. Early arrivals to the pristine country fields included many overnight campers, who staked their tents in a random fashion. By Saturday morning, the twisting trails around the tents had turned into dirt paths. Deteriorating weather conditions created a mud-bath obstacle course, which would eventually cause hundreds of bruised and broken ankles, as well as some memorable MTV footage.

At noon on Saturday, Joe Cocker was the show's first televised act. No

Top: the Red Hot Chili Peppers funk it up on the North Stage; right above: mix engineer Andrew Taylor; right: FOH system technician John Heidenreich





onstage monitor power was 62,000 watts, including wedges, drum fills and stereo side-fill enclosures.

Festival situations such as this, where everyone has the same pile of gear without the luxury of a tour or even a soundcheck to tweak it in, often separate the men from the boys (as well as the women from the girls). The award for excellence in engineering under festival conditions was informally presented by Analyst president Albert Leccese to CSN's monitor engineer Rance Caldwell. "In their initial request, they wanted to bring in a second 40-channel monitor desk, since that's what they were touring with," said Leccese, "but Caldwell looked at our situation when he arrived and said 'I'll make it work in 40 inputs.'"

This was a textbook example of how to run a large festival. The generic spec that made it all possible was written by Audio Coordinator Joe "U2" O'Herlihy, who developed the master plan after much consideration and in consultation with Randy Ezraty from Effanel. "The two of them came up with a strategy that would make the remote truck, P.A. and monitor guys all equally happy," Leccese explained. "Without O'Herlihy's good prep work, the guys from the sound company would have been way behind the eight-ball." Then Bob Clearmountain and John Harris went through the mic selection and came up with a generic mic list that would satisfy every band.

one who was there will forget the opening strains of "With a Little Help From My Friends," which instantly transported the audience back 25 years and became the slogan for festival personnel.

Audio Analysts' personnel are no strangers to that part of the country. The company moved from upstate New York only two years ago to Colorado Springs, Colo., to be more accessible to the touring business that they have been involved with for the past quarter-century. Six trucks delivered one of the more massive outdoor sound systems ever designed, with a capacity of more than 637,000 watts combined from the house right and left speaker enclosures, subwoofers, and the five 30-foot delay towers located throughout the site. The available

Above and right: the now infamous Woodstock Mud People; below: one of the five 30-foot delay towers, consisting of 16 Audio Analysts HD S-4 cabinets.



A Yamaha PM4000 24-channel console was used by FOH system technician John Heidenreich as the master control console, sending the show to the left and right, upper and lower main P.A., the near-fills, subs and the delay towers. Inputs to this console included the two full-sized PM4000 mix consoles, as well as cas-

sette decks, CD players, DAT machines and the announce and celebrity mics used between acts. The master control console fed into four "drive" racks. There were two identical stereo drive racks, one each for the stacked and hung P.A. control. Each of these two drive racks had a Klark-Teknik DN60 analyzer and a Behringer MDX 2000 compressor used as a stereo program limiter.

Four new TOA "DacSys" DP 0204 digital processors were used as system processors for the first time at a large show. TOA's John Murray was on hand with an IBM computer for

fine-tuning after visiting Colorado Springs the previous week to do the initial programming. A TOA Saori was also in each stereo mains rack as a backup. Three more Behringer compressors were used in stereo for high, mid and low system limiters on the crossover outputs. A third drive rack held the control electronics for the near-fill cabinets and the subwoofers. The stereo near-fills were driven with yet another Behringer compressor and a Klark-Teknik DN360 graphic feeding two JBL 7922s for near-fill delay and two BSS FDS 360 crossovers. Another compressor and delay fed a BSS FDS 320

for the sub-bass speakers.

All speakers at the show were powered by Crown Macrotech amplifiers. The main P.A. system consisted of a total of 264 speaker enclosures. The main left and right P.A. consisted of 72 HD S-4 cabinets per side, eight cabinets wide by nine cabinets high. Seven of the nine rows were flown using two-ton motors, and the bottom two rows of eight were stacked. There were 32 Audio Analysts HD sub enclosures under the downstage edge, four to an 8-foot "bay," spanning the center of the 96-foot-wide stage. Four pairs of Audio Analysts HD A-3 cabinets were stacked over these in alternating bays and angled in to cover the area in front of the stage.

A fourth FOH control rack, under the command of delay-master Paul Tillman, sent signal to the delay towers. This rack had three TC Electronic 1280 delays, five K-T DN27 graphics and five dbx 160x compressors used as line drivers for the long trip to the delay locations, where there was another Behringer and two BSS 360s. The five delay towers each consisted of 16 HD S-4 cabinets, with each tower flown as four displayed columns of four speakers high for a total of 80 delay speakers.

Also at the mix position platform was Analyst vice president Randy Wade, whose duties were expanded due to the lack of security supervision. "Mix platform left became an EMS 'MASH' unit for overdose patients, front of mix was press, policed with the help of two Polygram people, the right side of the mix platform was working crew access," Wade explained. The rear of the mix riser was the mud-people observation deck. "I was there to talk to each band's engineers, but it became apparent there was more need for total direction, and I was the only one available to do this."

The twin Yamaha PM4000 mix consoles, staffed by Andy Taylor and David McCullough, were equipped with 40 mono inputs and 12 stereo inputs. FOH effects for each console included a Lexicon 224 XL, 480L and PCM70, Eventide H3000, TC Electronic 2290, Roland SDE 3000, Yamaha REV5 and an SPX 90II. Twelve channels each of Behringer MDX 2000 compressor and Drawmer DS 201 gates were available as inserts as well as a Klark-Tek-

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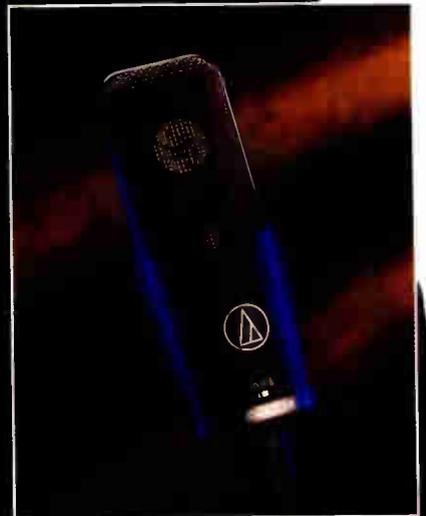
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**Alan Parsons and
the new AT4050/CM5**



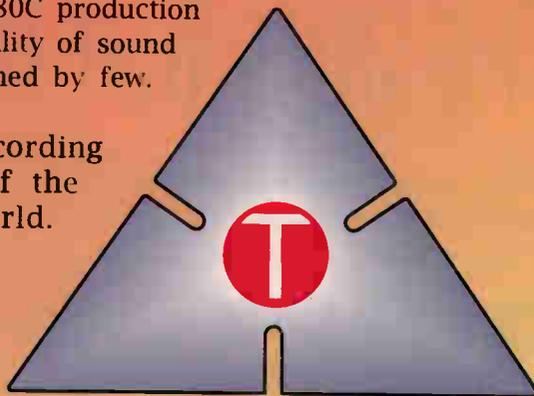
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nik DN360 stereo equalizer, which could be used for mains or inserted.

Microphones available to the performers included the Audix OM-5; Beyer M88; Shure Beta 58 and Beta 57, Shure SM91, SM98, SM57 and SM58; AKG 408, 414 and 460, AKG D-12 and D-112; Electro-Voice 408 and RE20; Sennheiser MD-421, MD-441 and MD-509; C-Ducer C-Tape; and the Countryman Type 85 DI Box.

Quick stage changes were made possible by the use of a refurbished UPS turntable-stage, a la Farm Aid, enlarged to 80 feet in diameter. Duplicate house mix control, snakes and monitor systems were provided for the event, with the back side of the turntable being struck, reset and line-checked while the front side was performing. It only stuck once, when both Metallica and Aerosmith had their band equipment on it. "It stripped a gear, and during the one-hour-and-fifteen-minute performance, they yanked the old one, spot-welded a new one, and the show went on without a hitch," Wade explained. The entire crew was prepared for anything, and to every-

Meanwhile, On the South Stage . . .

by Blair Jackson

Although the majority of the biggest acts at Woodstock '94 played on the North Stage, there was never a dull moment at the slightly smaller South Stage area, which featured an exciting and eclectic cross-section of artists, including a host of world music acts (Youssou N'dour, Jimmy Cliff, *et al*), The Band, Primus, the Neville Brothers, Santana and the now-infamous inciters of the mud riot, Green Day. Additionally, the South Stage hosted all-night raves on Friday and Saturday nights. Jimmy Cliff was quoted as saying the crowds were bigger at the North Stage, but there was more spirit at the South Stage; certainly there were more people dancing (and more room to dance) for the South

Stage acts.

Ultra Sound of San Rafael, Calif., was actually first approached about doing both stages, but according to company president Don Pearson, that was never a realistic proposition, so Ultra Sound happily provided gear for the South Stage, shuttling a slew of Meyer speakers and a couple of mixing consoles from the final show of the Grateful Dead's summer tour (which ended at Giants Stadium in New Jersey the week before Woodstock '94), and augmenting that with equipment trucked in from California.

The main stacks consisted of 96 Meyer MSL-3s, 48 to a side, and a complement of Meyer 650 subwoofers. Pearson notes that "in the original specs there were no delays, which we thought was a big mistake. Then Santana came in and was really upset

—CONTINUED ON PAGE 86

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one's credit the show went very smoothly considering what they were all up against. "Mr. Murphy was definitely waiting in the wings," Leccese said.

The twin monitor rigs, each with one Ramsa WRS840 console, were operated by Thomas Holmes and Chris Landers, who also had a K-T DN60 analyzer, 16 channels of K-T DN360 graphics and a Yamaha REV5 and SPX 90II. There were also eight channels of dbx 904 gates and eight channels of 903 compressors for inserts at each monitor console. Monitor speakers consisted of 40 Audio Analysts low-profile double-15 wedges, a 3,000-watt-per-side drum-monitor system and a 5,000-watt-per-side sidefill system.

Backstage worry-wart, technician, troubleshooter, de-bugger and de-buzzer was Albert Leccese, making sure that interfaces for various pieces of equipment were satisfactory for both the P.A. and the remote truck. "I also ran around with my meter to make sure there was no voltage potential between any microphone and any guitar," Leccese explained. "I had a particularly tense moment

when the Rollins Band came on. They were barefoot, and it started raining, and they were not wireless." Leccese also acted as liaison between production and the sound crew, answering questions like "Who are those people climbing on the P.A.? Why is everyone standing on my racks? Where's my food? How come it's taking three hours to get back to the hotel?" Another little-known mini-crisis occurred when the shuttle-bus drivers went on strike Saturday.

Bob Leonard, who was responsible for getting the input list to the remote truck and making sure the interface was together, was the "patch king" for the event, and there was not one mis-patch the entire event. Typical of shows in the rain, there were a few problems with active mics and DIs due to moisture. "All of these problems were found during the line-check," Leccese said. "When we were on the back-side of the turntable, that's when we did our troubleshooting. When it was time for the table to turn, we were ready. There were no holdups due to audio." Analyst technician Monty Carlo was patching

the drum risers. Bert West was responsible for the keyboards. "We had specific guys assigned to different instrument groups," Leccese commented. "That's the best way to do it." Andy Pichet worked on percussion and guitars, and Roger Keim handled the vocals.

Everybody on the crew had one IATSE stagehand to work with. "The IA guys onstage and out in the house were just wonderful," Leccese said. "They were competent, and they were with us right to the bitter end. Everybody still had smiles." Steve Iredale was the production manager, giving the audio crew the support they needed. Jeremy Thom and Joe Wersing were the stage managers for the "A" and "B" sides of the turntable, while Mike Esmonde cracked the whip to make sure the band gear got on- and off-stage. Analyst equipment manager Colin Beveridge came in at the end to supervise the load-out Monday morning, as parts of the system had to be turned around for a show at Red Rocks as well as a Billy Joel/Elton John stadium show in Detroit's Pontiac Silverdome that

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Wednesday.

Those who stuck it out saw a truly memorable performance by Peter Gabriel to close the festival the last night. At LaGuardia Airport the next day, I was standing beside one CEO who was wearing his new Woodstock logo-emblazoned T-shirt and explaining that he and his buddy had parked way down the road and paid some guy in a pickup truck five bucks to drop them at the gate, where they walked in for free, stopping for the day at the point when their styrofoam beer cooler broke to pieces. It was that kind of weekend. ■

—FROM PAGE 83, ON THE SOUTH STAGE

about that, and so we ended up with four sections of MSL-10s right behind the soundboard." Pearson says there was no problem with sound from one stage bleeding over into the other's area because the stages were three-quarters of a mile apart and pointed in different directions.

The FOH was equipped with three Gamble EX 56-input consoles and, like the North Stage, a huge selection of top-of-the-line outboard gear. "It was more than most people would ask for," Pear-

son says, "and, of course, a lot of the bands on our stage were not even familiar with some of the high-tech stuff—a 480L or the TC M5000s or that kind of thing. They wanted the simple Rolands and Yamahas because it's what they were used to, but we didn't have much of that. You give some of these people a \$12,000 reverb and they freak out."

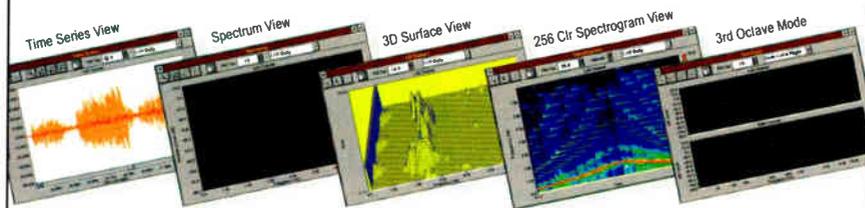
Not surprisingly, Pearson says, not every sound engineer was up to the task of mastering the state-of-the-art system: "Some people did really well, and some did horribly, feeding back for their entire set. But it was still the right idea to have everybody working with the same equipment. Most people sounded pretty good." Pearson adds, "The rave people—The Orb and all those people from England—had never experienced anything like this before—they'd never had a P.A. like that; they couldn't believe it." There were two monitor systems, "consisting mostly of Meyer USM-1 monitors, a few UM-1s and two of the Ramsa [WRS840] monitor boards," Pearson says.

Ultra Sound had ten employees on-site, doing everything from onstage cabling to making hourly sound measurements. There was not a lot of time for relaxation or enjoying a good meal. "Our stage was going constantly," Pearson says, "so we'd order food and four hours later a soggy kaiser roll with one slice of turkey and a few shreds of wilted lettuce would show up. So I became resourceful and found the caterers who were doing the private parties for people like Apple and Pepsi-Cola and scammed some decent food out of them."

In the end, there were no real problems to speak of, coordination with the recording trucks went smoothly, "and the breakdown was normal—three or four hours," Pearson says. "The biggest thing for us was getting the equipment home and then getting the mud off. We had to rent a pressure washer just to get the mud out of the snakes and things. That mud fight *was* pretty amazing." ■

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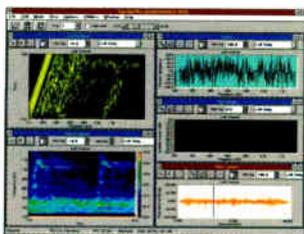
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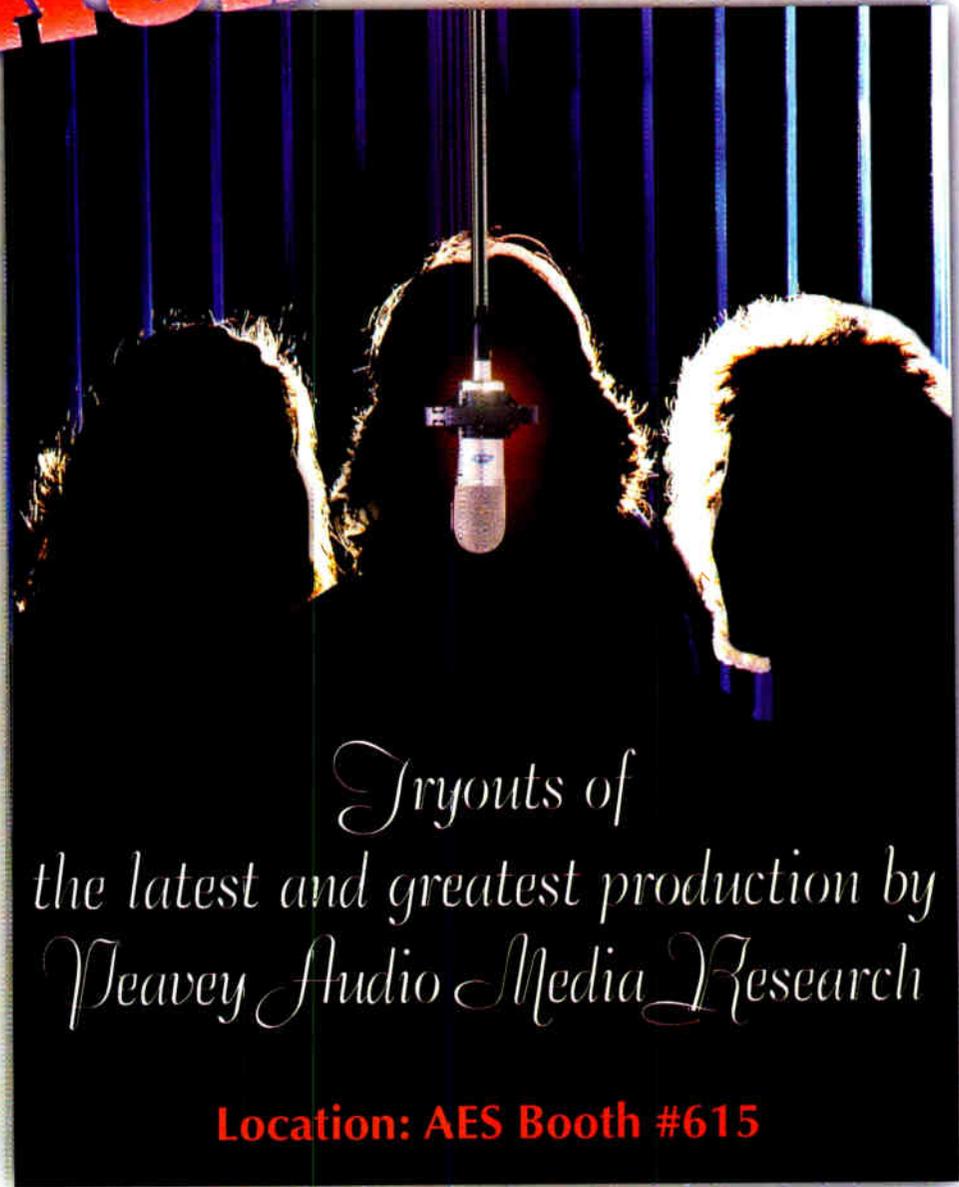
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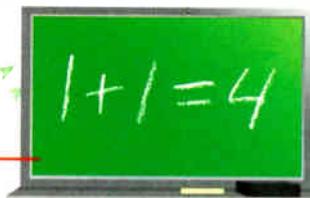
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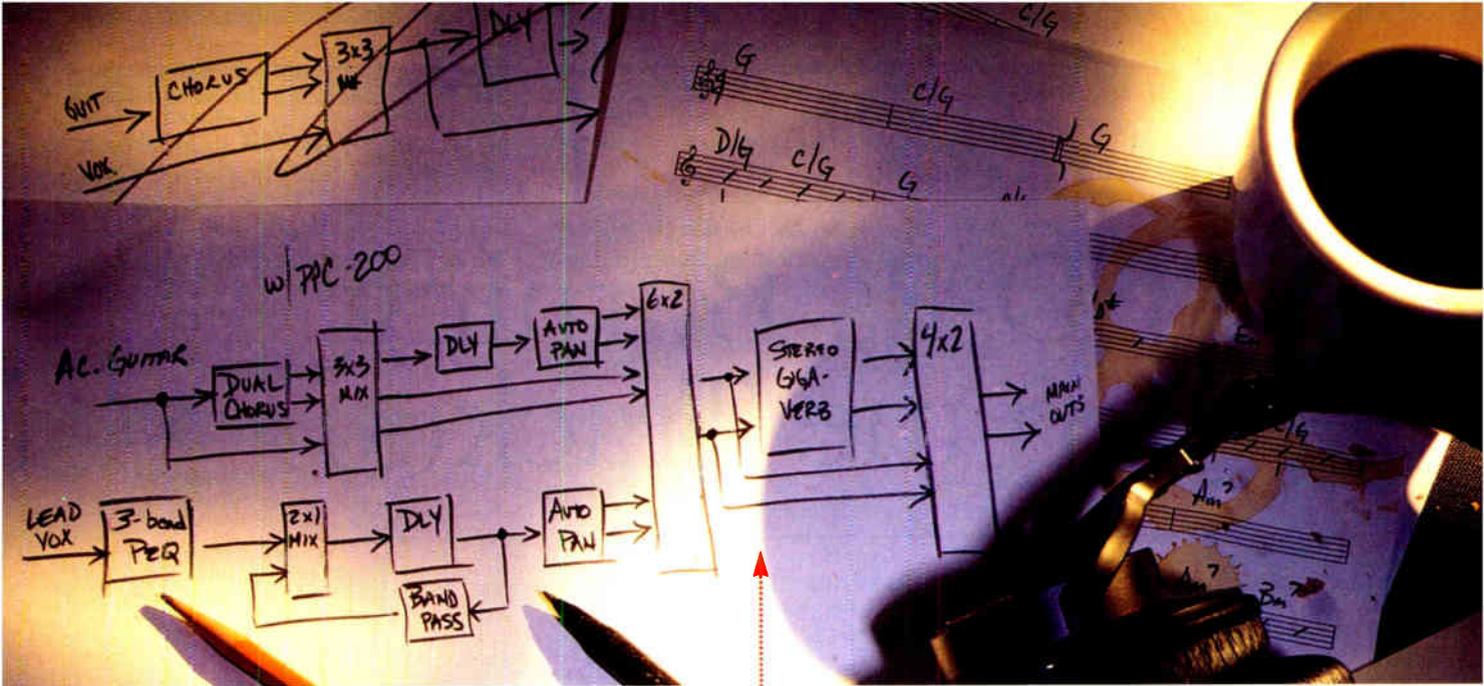
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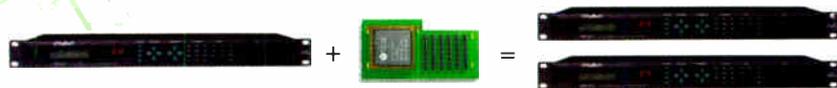
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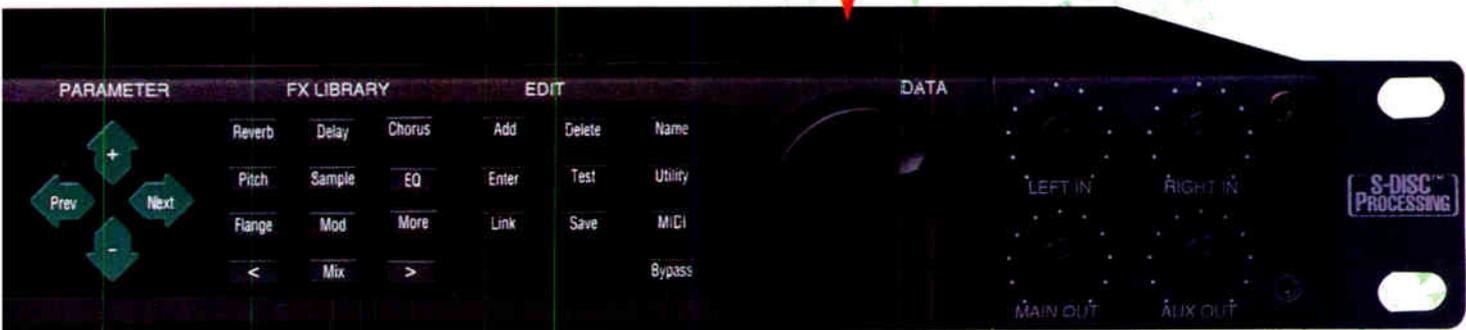
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World Radio History

photographic images on CD-ROM (see "Insider Audio," *Mix*, August 1993). The PCD Writer 200 was Kodak's hardware device designed to support the new format. This SCSI-based unit uses Kodak Writable CD media—as well as third-party standard 63- and 74-minute recordable media—to write and read digital data at twice real time. Kodak entered the digital age with special expertise in still images, but its PCD Writer 200 can write discs for playback on all standard CD devices, including CD-ROM, CD-I and CD-Audio players. It also supports multisession recording with appropriate software—an important feature for consumers who want to add more images to an existing PhotoCD disc. The unit's buffer size is 256k.

In September, Kodak unveiled an automated CD-writing station built around a new disc writer. The Kodak PCD Writer 600 records at six-times real time, making it possible to create a full 63-minute disc in about ten minutes. It features a 1MB buffer, expandable to 8 MB, and uses a dedi-

cated 1.2GB hard drive. Kodak software is currently available only for Sun workstations, but the company plans to port it to other platforms in the near future. Priced at \$28,995 for the stand-alone device, the PCD Writer 600 is available from Kodak. It is primarily sold through VARs with third-party software.

Also scheduled for September release: PCD Writer 225, an enhanced recorder with a 2MB RAM buffer (expandable to 32 MB), and both disc-at-once and track-at-once capabilities (see sidebar). The mechanism used in this system is the same as that used for the Philips CDD522.

PHILIPS/PLASMON

The Philips CDD521 CD Recorder is essentially the same unit as the Kodak PCD Writer 200, with some minor differences: Among them, the Kodak recorder includes a bar code reader for stamping unique IDs on the media. This bar code ID is recognized only by Kodak CD-ROM readers.

Philips recently brought out its CDD522 recorder, designed to replace the CDD521. New features include a 2MB buffer, expandable to

32 MB using standard SIMM chips. The CDD522 uses the SCSI-2 protocol and offers both 1x and 2x data transfer rates. Supported formats include CD-ROM [XA], CD Multisession, CD-I and Red Book Audio. Track-at-once and disc-at-once recording is supported. The CDD522 is priced at \$3,899.

The RF-4100 marks Plasmon Data Systems' (Milpitas, Calif.) entry into CD-R, although the company has been supplying VARs, dealers and system integrators with optical disc drives, software and media for 12 years. Priced at \$4,995, the RF-4100 is a modified Philips CDD522 drive that is sold by VARs with third-party software. The unit also incorporates a Flash EPROM, which makes it possible for end-users to perform firmware upgrades using software, rather than sending the unit back to the dealer. The latest version of firmware makes it possible to daisy-chain multiple recorders on a SCSI bus. Plasmon also manufactures its own blank recording media in 63- and 74-minute capacities.

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AUDIO & MULTIMEDIA

the RS-9200CD recorder, a single-speed device capable of writing all the common CD-ROM formats using track-at-once mode. The unit is bundled with third-party software through several vendors for a variety of platforms. A Ricoh spokesman said a double-speed device is expected to be announced at this month's Comdex show.

YAMAHA

The new Yamaha CD Expert (known as the CDE100 in its external configuration; CDR100 in an internal version) has been available for several months now, and its main drawback—at least from an audio production standpoint—has now been resolved. By the time you read this, the unit will also support disc-at-once mode, which gives third-party audio mastering applications (such as Digidesign's Mas-

Disc-at-once vs. Track-at-once

There are two ways to write data to a CD: disc-at-once and track-at-once. With disc-at-once, all information about the structure of the disc is passed to the recorder before any recording to the disc takes place. Then the lead-in, all tracks and the lead-out are written to the disc, without any pauses. (That is to say, the laser is never turned off.) Using this method to write an audio disc, audio gaps of any length can be specified, with the exception of the first track, which must contain a two-to-three-second gap.

In track-at-once mode, the recorder writes each track one at a time, stopping between each track. When all tracks are written, the recorder then writes the lead-in and lead-out. Although both methods can be used to write audio CD-Rs, the disadvantages of track-at-once are two-fold: 1) a gap of *exactly* two seconds is required between tracks; and 2) the fact that the laser turns off and then back on between tracks can cause bad data to be written to the disc. The resulting bad data can show up as errors when creating the glass master at the replicating plant.

A session is defined as lead-in (which includes the table of contents for that session), data and lead-out. Typically, a disc written using disc-at-once (regardless of data type) is a complete single session. In any event, it must always be a whole number of complete sessions. However, a recorder that uses track-at-once mode can also write single sessions.

The Orange Book specification allows for more than one session to be recorded to a CD-R disc. Multisession offers users the ability to write additional sessions—lead-in, data and lead-out (in that order)—to unused portions of a CD-R disc. Even though track-at-once gives you the ability to write multisession, some software that uses track-at-once mode (such as Digidesign's MasterListCD) will not let you remove a disc until it is finalized. (MasterListCD software uses disc-at-once when that option is offered on a given CD recorder.) Older CD-ROM drives—and all CD-Audio players—can read only the first session of a multisession disc. Widely used in PhotoCD and other CD-ROM applications, multisession has no relevance to recording Red Book Audio to CD-R.

Firmware—usually in the form of data written into a ROM chip inside a CD recorder—is what determines whether a recorder has the ability to perform disc-at-once and/or track-at-once recording. The Sony CDW-900E supports only disc-at-once, making it a good choice for professional audio mastering, but not ideal for CD-ROM purposes. Others, such as the JVC recorder, were originally designed to meet the needs of the much larger corporate computer market for CD-ROM, which demanded track-at-once and multisession capabilities. While it is possible to write code that supports both modes, market pressures often dictate when (or whether) both modes are in fact supported in a given CD-recording system.

—Paul Potyten

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HEAR AND THERE

Graphix Zone (Irvine, CA), producer of interactive CD-ROM titles, has signed an agreement with Columbia Records to produce an interactive music CD-ROM chronicling the music of Bob Dylan. The Interactive Music CD is slated to be released at the end of the year and will be sold through computer and music stores...The newest CD-ROM from **Opcode Interactive**, *Woodstock: 25th Anniversary*, is available for both Mac and MPC machines. The title, which features music, video and photos from the 1969 Woodstock festival, is being marketed and distributed by Time Warner Interactive...San Anselmo, CA-based **Red Hill Studios** has opened its doors. The facility offers a complete range of production services, including video digitizing, digital video editing, digital con-

version and CD-ROM prep. In addition to producing multimedia for educational and corporate clients, Red Hill is developing its first CD-ROM title, *Shoot Video Like a Pro...* **Music Annex Recording Studios** (Menlo Park, CA) has formed Media Services Group to meet the audio needs of the multimedia marketplace. The Media Services Group features a range of computer-based digital audio processing tools for conversion and optimization of files for Macintosh, DOS and Windows developers...**Silicon Graphics, Inc.** is hosting Silicon Studio '94: The Entertainment Authoring Conference, November 8-10, at the Westin Bonaventure Hotel in Los Angeles. The three-day conference will explore artistic challenges and techniques as well as new business opportunities in emerging media markets. Call (800) 685-2578 for more information...**Industrial Artists**, a production com-

pany with offices in New York, Los Angeles and Chicago, has begun a major expansion of its multimedia division with the completion of a New York facility capable of producing interactive CD-ROMs, virtual reality programs, interactive television projects and other products...**Sierra On-Line**, manufacturer of interactive video and computer games, has purchased a Sony Select System integrated video edit suite for use at its production facility in Oakhurst, CA...NYC-based **Digital Domain** has entered the interactive arena with its involvement in the production of a mixed-mode CD of the Vincent Herring Quartet. Another recent project at Digital Domain was the pressing of a promotional interactive CD-ROM for Dennis Hayes Associates of Manhattan. The facility also offers CD-ROM archiving of samples for the new Roland-compatible sampling systems. ■

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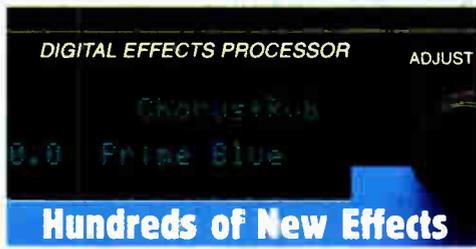
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AUDIO & MULTIMEDIA



The Playwrite 4000 from Microboards

terList(CD) much more flexibility in writing variable audio track pre-gap times. This unit is the first of the quad-speed recorders, and OEM developers have now had time to fine-tune their software solutions for this device, which is available only through those third-party outlets.

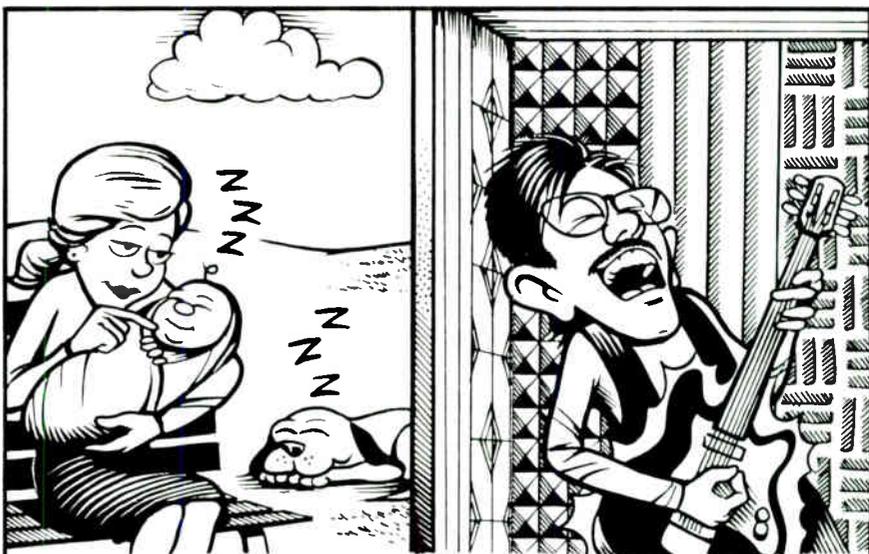
JVC/PINNACLE

JVC Information Systems makes two separate turnkey CD recording systems, and each is available for both Macintosh and PC. The Personal ROM maker is the more complete of the two, allowing the user to emulate the performance of CD-ROMs from a hard drive included in the system. Among the features is the ability to create mixed-mode discs. The Personal Archiver uses the identical single-speed 256KB buffered mechanism found in ROMmaker but does not include a hard drive. The software is much more basic and is designed primarily for archiving data.

The RCD-202 from Pinnacle Micro incorporates the JVC hardware but repackages it with Pinnacle software for Mac and Windows. The combination of software features, low price and full compatibility with Digi-design's MasterList(CD) make it a popular choice for audio professionals and multimedia developers.

As this article was being written, Pinnacle announced its next-generation CD recorder, the RCD-1000, with a 1MB cache buffer and double-speed capability. The unit, which ships with Pinnacle software, was expected to be available in September. The Macintosh version is priced at \$2,995; the Windows-based system retails for \$3,195. ■

Paul Potyem is a Mix associate editor.



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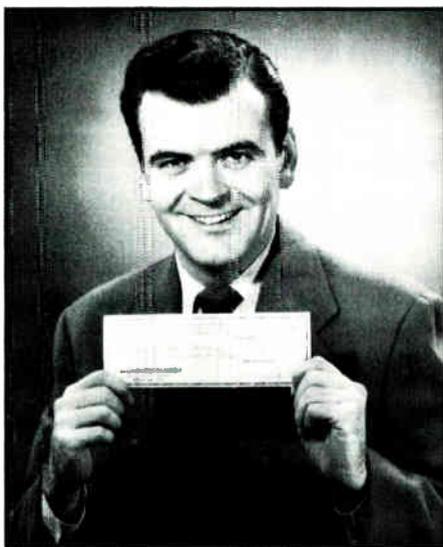
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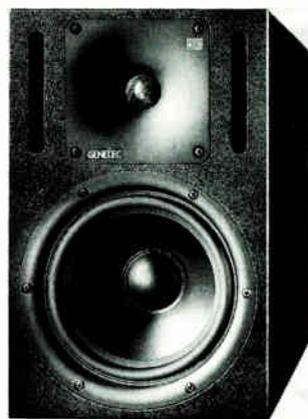


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by Dan Daley

PROJECT STUDIO RUMINATIONS

Trade shows provide that rare chance to take a breath, reflect and prognosticate, not only for professional audio types but for all trades, from *Embalmer's Quarterly* to *Byproducts Monthly*. Just as we use religious holidays as a center of meditation on ourselves and national holidays as the locus of thought on social and political issues, it's become a tradition to use trade gatherings as the crux for contemplation and speculation on the industry.

It's good that we do this, so that we can gauge our progress, or lack thereof. Last year around this time, the products that seemed the most significant for project studios were just that: products. I recall spending time on the Zoom Technologies box—basically a very well-designed latter-day Rockman—ascribing to it meaning and consequence that seemed out of proportion to a sound module, except when perceiving it as an interface. In a sense, this is what happens when we start calling janitors sanitary engineers—the rubric begins to obfuscate the basic definition. But applying significance to the right things lends perspective to a discussion. The key is to choose the right things.

Here is a brief but appropriate list and ruminations on a few trends—products and technologies—that are on the cusp of having a formidable and strategic impact on project studios. Some are not as prosaic as guitar boxes. All are, I believe, significant.

ISDN—THE FUTURE CALLING

Digital audio transmission via ISDN (Integrated Services Digital Network) is the preferred method in the UK for all types of studios, as I discovered

on a recent trip. The compact size of the country and its audio budgets make ISDN far preferable to using satellite links. But ISDN is perfectly suited for the scale that project studios work on, regardless of their location. It provides the ability to transmit 16-bit audio anywhere in the world as long as the receiving end has an ISDN interface. Interface costs

It's become a tradition to use trade gatherings as the crux for contemplation and speculation on the industry.

have come down—a fully duplexed system costs less than \$10,000, thanks to third-party manufacturing of codecs costing between \$5,000 and \$8,000, thousand-dollar terminal adaptors to manage the connection and a couple hundred dollars for an NT-1 telco terminator adaptor.

Local telco hookups vary. In Nashville, for instance, the installation fee is \$1,000, with monthly service charges between \$26 and \$66. Dave Immer is owner of Digifone, a company that consults on ISDN implementation. He says it was a serendipitous chain of events that allowed the development and market-

ing of less-expensive equipment to coincide with the expanded service offerings of regional telcos, at the same time that standards were being established. "All of this came together almost at the same time, and as a result, the ISDN technology is available to virtually everyone at an affordable price," he says.

ISDN ostensibly allows project studios to link themselves into a network on an ad hoc basis, taking advantage of talent pools beyond their immediate vicinity and letting them interface with clients across town or across the Atlantic. But there is a larger implication here, as well. With the proliferation of voice and other systems for home offices that, via a phone line, make it impossible to distinguish them from IBM or General Motors, project studios will likewise, via ISDN, be indistinguishable from larger facilities.

With digital information coming over a telco link, will it matter if the source has five DAW suites and 30 employees, or a computer with MIDI-based sound module and one

chief cook and bottle washer? Not to the client, who might never see either of them and whose only concern is an acceptable finished product at the agreed-upon price. Applications for project studios include post-production, broadcast post, direct transmission of music mixes to record labels and artists for approval, wider interface with commercial facilities...the list is as long as our imaginations. ISDN could be the most significant technology introduction for project studios since the affordable open-reel 4-track deck.

POWER TO THE PEOPLE?

The Power PC, Apple's next generation of computer, moves closer to a common platform with the IBM standard, reciprocating the Windows move of a couple of years ago that made PCs more accessible to point-and-click approaches. The Mac is the standard for music applications in the U.S. (Atari is still the main platform in the UK—a situation that's quickly changing), and although IBMs become more of a factor as the studios get larger, the Mac is clearly the champ for project studios.

As a result, the arrival of the Power Mac was anticipated with high hopes. Those hopes may have been initially dashed once it became clear that audio was not apparently a high priority for the Power Mac's developers. "It's very definitely weighted toward graphics, DTP and multimedia, not audio," observes David Biedny, a project studio owner and computer/multimedia commentator. "Most of the MIDI-related stuff has not been ported over, and all the native stuff is mostly business-related. They're not making any statements about making MIDI Manager native. The Quadra is still the best Apple platform for audio. It's a potentially wonderful platform for audio, but it looks like Apple perceived the DTP market as the initial market for the Power Mac." (Now, as most of you know, you can buy a Power Mac board for your Quadra. I tried for a Mac response, but Apple's music-marketing division did not return phone calls.)

What happens to the Mac as it relates to music and audio remains to be seen as the new platform shakes

—CONTINUED ON PAGE 105

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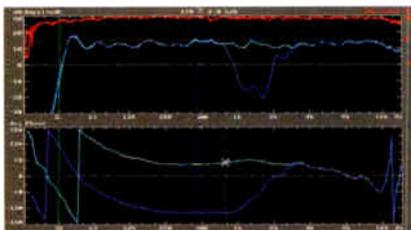
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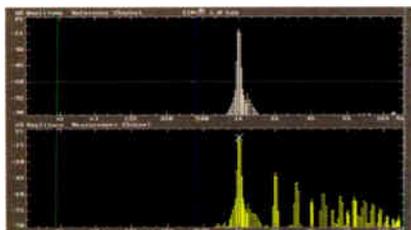
is vital to the success of every sound system. Polarity reversals can cause unequalizable holes in your system response and endanger your components. By viewing the system's phase response with SIM, an operator can quickly spot, and correct, unwanted polarity reversals.



Speaker response vs. same-speaker with polarity reversal.
Top: Amplitude response. Bottom: Phase response

Harmonic distortion

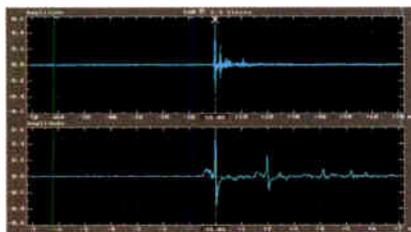
adds unwanted spectral coloration to your audio signal, and once introduced, is almost impossible to remove. Whether caused by component degradation or by gain structure mismanagement, SIM can detect and measure distortion in any system component, allowing an operator to quickly focus on and minimize the sources of distortion in the system.



Harmonic distortion in a loadspeaker:
Top: Input spectrum 1 kHz tone
Bottom: Output spectrum 1 kHz tone with distortion

Measuring delay times

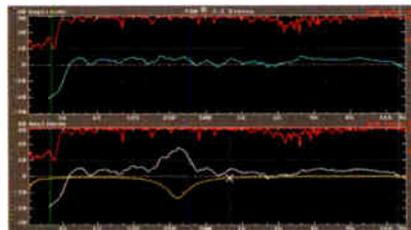
is impossible with most audio analyzers. More often than not, delay times end up being set through trial and error, and a whole lot of running around. SIM can measure the time offset between speakers and give you the delay times you need *within ±.02ms*. Moreover, the whole process typically takes less than 5 seconds.



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Lou Reed
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Celine Dion
Grishby Music
Guys & Dolls

Kiri Te Kanawa
Stage Sound/Audio Visual America, Inc.

Primus
Conway Recording
Bad Animals

Roy Thomson Hall
Wonderland Studios
Onken

Yuming Matsutoya
Fiesta Texas
Pro Media

Fantasy Studios
Digidesign
Holland America Cruise Lines

Twin Cam Audio
Bruce Cameron
Purdue University - Elliot Hall of Music

Radio Europa Nederland
The Fillmore
Texas Rangers Stadium

Best Audio
Walt Disney World

Ringling Brothers and Barnum & Bailey Circus

Jose Carreras
Walt Disney's World on Ice

Les Miserables
Pro Mix
Andrew Bruce

Miss Saigon
Autograph Sound & Recording

New York State Theater
Harris Sound
Abe Jacob

M.A.S. International
Tony Meola
Boston Symphony Hall

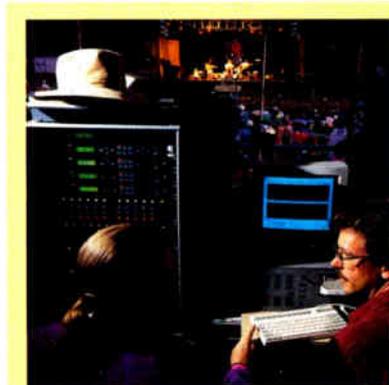
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Andrews Audio
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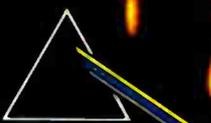
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World Radio History

—FROM PAGE 102, RUMINATIONS

itself out. And this shakeout will likely be led by project studio owners. Will Apple be able to track them and respond appropriately, quickly enough? Will third-party developers of music software have less incentive to remain loyal to the Mac platform? And what of John's unrequited love for Martha? We'll see.

BITS AND BOARDS

The remaining items are products, and they're both consoles. The Yamaha ProMix 01 digital console is a logical extension of that company's line of digital mixers. The price, though, is significant: \$1,999 for a multipage

ISDN could be the most significant technology introduction for project studios since the affordable open-reel 4-track deck.

display-type system—less than the \$4,000-range DMP Series consoles that came before. In a sense, this puts project users into two camps: those for whom a virtual world is a comfortable world in which real-time information can be hidden beneath layers of other information and processing can be transparent; and those for whom a tactile world is the only reliable one, with a dedicated hard knob for each function.

"I agree that there are two approaches to console structure, but not necessarily two types of people," observes Peter Chaikin, product manager at Yamaha. "They will adapt their working styles if they find something that might work better." Chaikin also says that people will move fairly fluidly between a number of working modes, from dedicated knobs to screen pages to point-and-click mouse moves. "It's unfair to really call any one approach a compromise, because each approach has its own benefits," Chaikin says. In short, technology is as eclectic as its

user wants it to be. (The converse of that axiom, though, is also true.)

I got a look at the Alesis X2 at a July demo at Manny's in Manhattan, and it takes the tactile approach. It's also the logical extension of the platform that Alesis pioneered with the ADAT, which was the most significant project studio development of 1991. ADAT and the systems that have followed created a new market for consoles. The response was led by Mackie, which perceived the market needs first. The Mackie (and others) handled the specific requirements of inputs, busing and price appropriately. What sets the X2 apart technically is its equalization, which approximates what would be expected on larger, more expensive boards. But equally significant is the fact that the X2 costs around \$8,000, more than 16 tracks of ADAT.

Finally, the past five years have seen a burgeoning delineation of the project studio market, between personal and commercial versions. "The home studio and commercial project studio are developing different needs," explains Dan Tinen, a technical applications specialist at Alesis. "The boundaries between the two different types of project studios are very fluid at this stage," but mostly from a manufacturer's point of view, he adds. From the perspective of the user, each niche is quite well—if subjectively—defined.

"As designers, we talk about overall markets," Tinen says. "But the people who are in those specific markets—broadcast, music, etc.—see them as more detailed. We're seeing a lot of cross-pollination. There are people running commercial project studios who learned engineering by themselves in their own personal studios; and there are former commercial-for-hire studio owners who decided they could make more money by having their own personal project studios."

Special mentions: I had to have one guitar item in here. The Lyrrus G-Vox Bridge transcribes directly from your picking into Windows-based sequencers and notational software.

Also, a company I discussed in detail a few months ago: RSP Technologies offers the first surround-type processing specifically designed for project studios. ■

Dan Daley is a Mix contributing editor.

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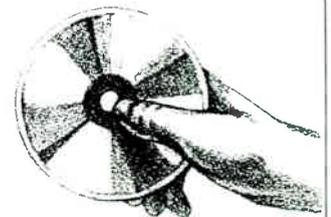
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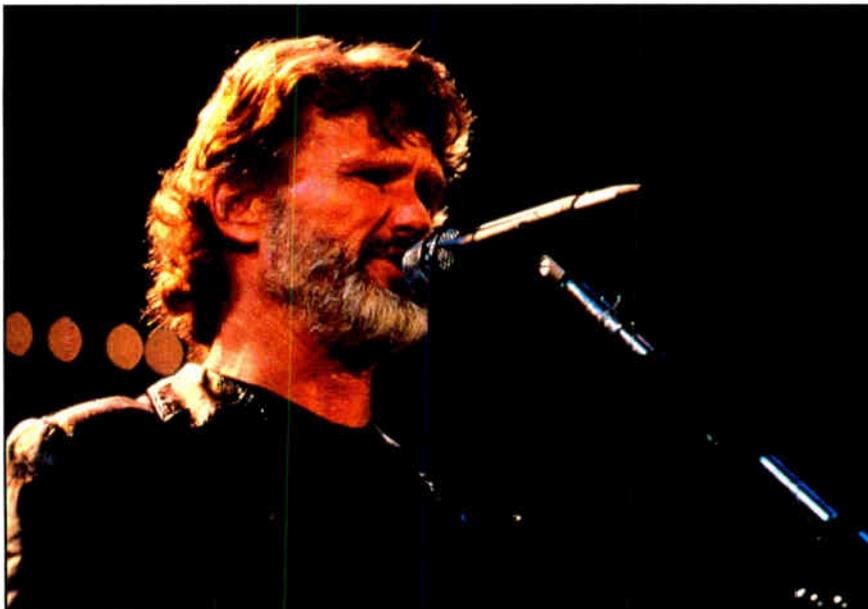
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by Mr. Bonzai



KRIS KRISTOFFERSON

ROAD SCHOLAR



When Ed Cherney told me he was mixing Kris Kristofferson's new album down at Brooklyn Recording, with Don Was producing, I immediately asked if I could drop by for "lunch." When I arrived, Cherney was working on a mix, so I settled back into the sofa and heard a riff fly by a few times while he made some final adjustments. The band was tight, the words were right and Kristofferson sounded confident, natural and never better.

Don Was, who must juggle a dozen records every day, was "running a little late." Kristofferson arrived, hands were shook all 'round, and Cherney unveiled the mix. Kristofferson hunkered down at the board, concentrating, nodding, then smiling, and finally just throwing his arms up and laughing with sheer joy.

Was sat down at the Neve 8078 and offered a few suggestions for bringing out a guitar. Cherney de-

scribed some frequency collision areas and together they worked on it a bit more, laid it down, popped it in a boom box just to make sure it was done, and Cherney set up for the next mix.



From left:
Vernon White
(Kristofferson's
manager),
Kris Kristofferson,
Don Was and
Ed Cherney (front).

Kristofferson was born in Brownsville, Texas, and moved to California in his teens. While in college, he was awarded the prestigious Rhodes Scholarship and continued his education at Oxford University during

the late '50s. It was here that he started writing songs, and he continued during his days as an Army pilot, eventually landing a job as "studio setup guy" in Nashville. Songs such as "Help Me Make It Through the Night," "Me and Bobby McGee," and "For the Good Times" established him as a major writer and launched his hard-working career as a performer, recording artist, actor and spokesman for human rights.

While the mixing continued, Kristofferson and I retired to the lounge for lunching...

Bonzai: What do you primarily think of yourself as—actor, performer, songwriter?

Kristofferson: Songwriter. I think that I can interpret my own material honestly and effectively, but I wouldn't be doing it if I didn't write it, because I haven't got the tools—for my ears—to sing something I didn't write.

Bonzai: I guess you wrote all the songs on this new album?

Kristofferson: Yeah, I've had about a dozen albums, and I wrote all the songs. I don't think that I would be making movies or anything else if I weren't a writer first. The songs on this one are a pretty strong set, the strongest hand since my first album, which had four real commercial songs—"Help Me Make It Through the Night," "Bobby McGee," "Sunday Morning Coming Down" and "For the Good Times."

Bonzai: How long were you writing songs for this new album?

Kristofferson: Some of the songs are older songs that I've been performing, and when I showed them to Don, he asked me to write some more verses. This is something I've never been asked to do and never imagined doing, any more than I would put a new arm on my kid, you know? The songs are finished. But Don was right in every case, and he radically improved five of the songs. The other ones have been written since my last album, which came out God knows when—one song went "Til the day we free Mandela, all the world will be in chains." It was awhile ago [Laughs].

Bonzai: Is there a political edge to this new album?

Kristofferson: Just a couple of songs—not consciously, and Don

never told me not to do this or that. In fact, he contacted me because he liked the last album. I don't know if you would call it political, because I hate politics, but it was about human rights and things that were going on. Every time I've put an album out, it's been like a time capsule of what I've been going through. It wasn't commercial at all and didn't sell in the United States. Most of the sales were in Europe.

Bonzai: Was the tracking pretty much done in a live setup?

Kristofferson: Well, we did 14 songs in four days, with Jimmy Keltner, Waddy Wachtel, Benmont Tench and my partner, Danny Timms—Danny and I go out on the road together. He plays keyboard, guitar, and we write together.

Bonzai: How did you meet Don Was?

Kristofferson: Well, he called me up. I think he was talking with Stephen Bruton, who was my guitar player a long time ago, before he played with Bonnie Raitt. They were talking about my *Third World Warrior*, and Don liked it and wondered what I was doing. He called me up and asked me if I was interested in making a record, and I said, "Is that a trick question?"

Bonzai: So you're on Don's new label?

Kristofferson: Yes, on Karambolage—and the best of luck to him! [Laughs] Don makes everything possible—the songs are presented the way they should be.

Bonzai: When we were listening to the mix of "Shipwrecked," you said that it sounded the way it should when you are performing at your best, but it never sounds that way in live stage recording.

Kristofferson: Right. When it hits the sober light of day, rarely does it sound good, because of the mix on the stage, or somebody was out of tune and you didn't know it, whatever.

Bonzai: So Ed Cherney is bringing the sonic elements together?

Kristofferson: I've lived with some of these songs for a long time and heard them recorded by different people, and I've done 'em on the road and never heard them as close to the way that I would do it if I had the talent as an engineer. He brings the voice somehow out—almost into a three-dimensional picture, which is very important when 90% of your attack is your words. In the past, I know I was so insecure about my

voice that I allowed myself to get buried. I even said to Don maybe we could pull my voice back a little bit, and he just said, "It sounds great out there" and dismissed me. What we've got sounds to me like a real good *closeup*. If your performance was right and somebody got it in a great closeup, that's where you do your serious work.

Bonzai: Let's look back a little. What happened when you moved to Nashville after college and your time in the service?

Kristofferson: Nashville saved my life. I deliberately went in on the bottom, to learn it from the bottom up. I didn't want to go in there and make it on any kind of a gimmick, like I was an Army officer. The position I found very easy to fit into was janitor. After about six months, I got a job at Columbia Recording Studios. It was a great job for me—Billy Swann got it for me. He had the job before me and wanted to quit—I guess the stress was too much [Laughs].

Bonzai: Isn't Billy a great guy?

Kristofferson: He's a beauty—Billy is one of the pure hearts on the planet. We used to call him "Lifemaster" Swann. He was with my band forever. He was a Texas Jewboy with Kinky Friedman for a while and then came back with me. Before he wrote "Lover Please, Please Come Back," he was a janitor and worked for Chet Atkins and those guys, schlepping their stuff around.

Bonzai: So you took over this great responsibility?

Kristofferson: The job title was "studio setup man," but I kept the studios cleaned up and supplied the engineers with all the stuff they needed. It could feed my wife and child and kept me in touch with the music part, not the business part, where I didn't have to use my brain. I got to hear Bob Dylan the first week I was there. They had police around; he was working on *Blonde on Blonde*. And Simon & Garfunkel, and then I got to know Johnny Cash.

Bonzai: Was Roger Miller the first major artist to record your work?

Kristofferson: Well, all of it happened at about the same time. I had a couple of country records, but Roger was kind of like having Bob Dylan tell your song, because Roger was the writer's king when I came to town. He won something like five Grammys one year, and he was such a good songwriter—to have him cut

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my song was a real statement.

Bonzai: Was that "Me and Bobby McGee?"

Kristofferson: Yes, but it wasn't a hit for him.

Bonzai: What was the big moment for you—Janis Joplin's version of that song?

Kristofferson: Well, things were kind of synchronized. We put the first album out, and Fred Foster was the one who believed in doin' it. We put it out like a big demo, and got other people to cut songs off it. I never had any illusions of being a singer; I never thought I'd end up performing as long as I did, or enjoying it.

As I remember it, things happened around John [Cash] cutting "Sunday Morning Coming Down," and I think it was song of the year in 1970. It was controversial, because people thought I was a weird-looking guy for Nashville. And then Ray Price cut "For the Good Times," and Sammy Smith had "Help Me Make It Through the Night." It seemed like everybody was cutting my songs in a matter of a month or two. It all happened when John had this television show that was real important, lifted country music to a different level back in 1969.

I had just left my job in the Gulf of Mexico, where I had worked for two years. I was flying helicopters to the offshore oil rigs, but my conflicting lifestyles were not meshing well near the end. I was at the bottom, didn't have a job anymore, and I came back to Nashville and Johnny Cash was doing his TV show. Mickey Newberry had called me and said, "C'mon up to the Ramada Inn, where this TV company is. I got a room here and there's two different shows, two different groups to pitch songs to." John was telling people that Mickey and I were two of the best songwriters in the world, and we were meeting people like Joni Mitchell, Bob Dylan, Buffy St. Marie, Graham Nash, Linda Ronstadt: people we would never normally see in Nashville. Roger was on the show and he did "Bobby McGee," but it seemed like everyone was cutting my songs.

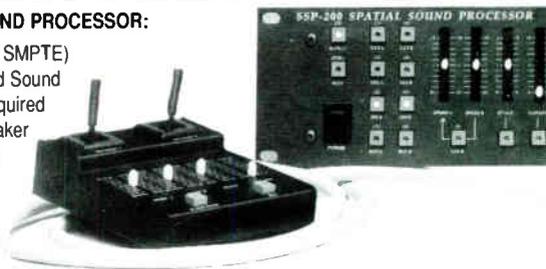
Bonzai: This must have been the writer's dream come true?

Kristofferson: It was. It was like from the depths of despair, because by this time I had separated from my family. I was fired from my job. I was sitting in a motel room in Lafayette,

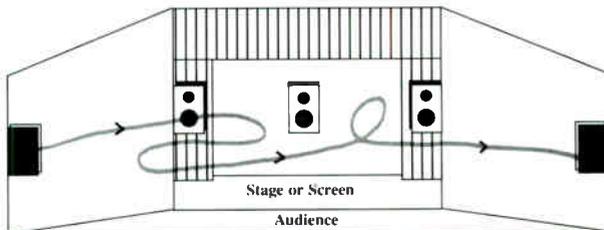
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Louisiana—it looked spooky, with a neon Jesus out front, no TV, nothing but a dirty floor. I knew I was going to get sent to jail for non-support or something because I owed \$500 a month to my wife. My kid was in the hospital with a bill that seemed astronomical at the time—\$10,000. I drove my Volkswagen to the airport, left it there, and I never went back.

I got to Nashville, met Newberry at the TV show and my publisher gave me enough advance to pay my child support, and to pay my insurance for the doctor bill. By the time they finished filming the show, about two months, I didn't have to work again ever. I never worked another lick in my life for anybody, unless I wanted to. I really came from a position of "freedom is just another word for nothin' left to lose."

Bonzai: Well, you said you wanted to pay your dues.

Kristofferson: Yeah, and looking back it wasn't that long—five years maybe. But the dues-paying is learning how to believe in yourself when all the evidence is to the contrary. [Laughs] And my peers were all ten years younger, because I took a longer time getting to the bottom. [Laughs]

Bonzai: So how did the '70s and '80s shape up?

Kristofferson: I started performing and doing films about the summer of 1970. I was at the Troubadour, and [*L.A. Times* music critic] Robert Hilburn wrote a great review and everybody started coming down to the show. And Harry Dean Stanton gave me a script. They were making a lot of movies back then, and also they were looking for new blood.

Bonzai: What was your first film?

Kristofferson: *Cisco Pike*. I turned down everything until Harry Dean gave me that script. He helped me go through the screen test, did a scene with me. I read it, and I felt like it was something I could do believably. Although it was about a drug dealer, I didn't even know how to roll a joint at the time. But I could certainly identify with the guy's problems, trying to deceive his old lady and having a lot of things coming down on him. It was interesting and it had good people in it: Gene Hackman, Karen Black.

Bonzai: Has the film experience enriched your life?

"WE PUT THE FIRST ALBUM OUT, LIKE A BIG DEMO, AND GOT OTHER PEOPLE TO CUT SONGS OFF IT. I NEVER HAD ANY ILLUSIONS OF BEING A SINGER; I NEVER THOUGHT I'D END UP PERFORMING AS LONG AS I DID, OR ENJOYING IT." ←

Kristofferson: Yeah, particularly back when I was working with some real interesting people like Sam Peckinpah, Martin Scorsese on *Alice Doesn't Live Here Anymore*. People that taught you stuff, like Paul Mazursky.

But I enjoy acting and performing now in a way I didn't when I first started. I think I was understandably terrified by the experience, and anesthetized myself through most of the live performances—either drinking or smoking, or whatever. Finally, just by hanging in at it, and going through it, working the clubs, I've gotten to the point where I figure if they didn't want me out there they would have thrown me off a long time ago. I really enjoy the performing art, you know? I enjoy watching good acting. I enjoy working with good people.

Bonzai: Was performing with The Highwaymen [Kris, Johnny Cash, Waylon Jennings and Willie Nelson] a high point of your performing experience?

Kristofferson: It was definitely one of them. When I look back on my life for some kind of perspective, it seems like something you would fantasize: seeing myself with Barbra Streisand [in *A Star Is Born*], and looking next to myself onstage and seeing people who were my absolute heroes. When I went to be a songwriter, I did it for the love and not for the money. I loved everything about it and admired the people who were good at it, and Johnny

Cash and Willie Nelson were right up there at the top. And Waylon is the closest to a hero.

To be up there with them and singing along on these songs that are such a part of your soul because you grew up with them—it's a wonderful thing. I'm sure it drives 'em crazy sometimes when I'm harmonizing. [Laughs] One time Johnny Cash said, "I don't think there's another person in the world who would have the nerve to sing harmony with me on 'Folsom Prison.'" And I didn't know how to take that! So, I didn't do it for the next show, and then I guess he got to feeling bad about it and told me to start singing harmony again.

Bonzai: What do you think of his new album?

Kristofferson: I think it's the best thing—it's real, a kick in the ass for John 'cause he's getting the attention and the respect that he deserves. When I went to Nashville, he was like Bob Dylan. In fact, they were friends and that had a lot to do with the clout that country got among young people. Bob Dylan was on his first TV show, and it gave country a legitimacy that wasn't there before. People thought that country music was embarrassing. People liked folk music, or blues, but country?

Bonzai: Do you think of yourself as best when you are collaborating?

Kristofferson: Not for creative writing, but sometimes. The kind of collaboration that I am responding to is one like with Don, where whatever your work is, it's being paid attention to, and listened to, and the possibilities of what to do with it are fully explored. What it's done for me with Don is to write more songs, and write some of my best. We just listened to the last one I wrote for the album, and it's one of the best ones I ever wrote. This was with Danny—"Moment of Forever." He worked with this beautiful melody that I heard over in Vienna.

So, I went in with Don, and this is what I mean about the possibilities: We were finished and ready to mix, and I walked in with this song. We already had too many, but I said this may be the best one. So, we listened—just me and Danny and Don. Later, he brought in the strings and we got a beautiful record.

Bonzai: Are you looking forward to taking this show on the road?

Kristofferson: Oh yeah. The last

—CONTINUED ON PAGE 283



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Think Of The Possibilities



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SUZANNE CIANI'S "DREAM SUITE"

FROM RUSSIA (AND ITALY) WITH LOVE

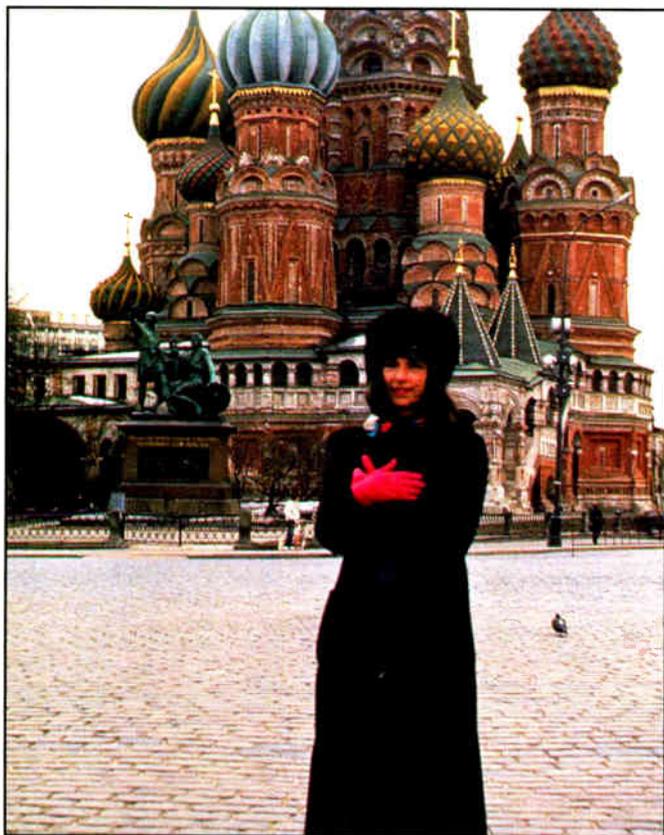


PHOTO: JOE ANDERSON

Left: Suzanne Ciani in Red Square. Right: On the Isle of Capri.

acoustic piano and orchestral journey that includes tributes to Mozart and Bach, and a passionate Spanish homage entitled "Andalusian Dream."

A graduate of Wellesley College, Ciani earned her master's degree in composition from UC Berkeley, studying with such explorers of electronic music as Max Matthews, John Chowning and Don Buchla. She then moved to New York, where she pioneered electronic sound design for television with her Ciani/Musica production company. From there, she branched out to scoring such films as Lily Tomlin's *The Incredible Shrinking Woman* and Ann and Jeanette Petrie's *Mother Teresa*. Over the past decade, her primary focus has been producing a collection of instrumental albums that have touched the hearts of listeners around the world.

Suzanne Ciani (pronounced "Chah-nee") is inventive, independent, savvy in business and the arts, and she laughs easily about recording on the road. "Taking electronic instruments around the world and finding the right interface is, well, a

Suzanne Ciani, the diva of the diode, ventured to Russia and Italy for the creation of her new *Dream Suite*. An album that explores her roots in both popular and classical forms, it is largely an

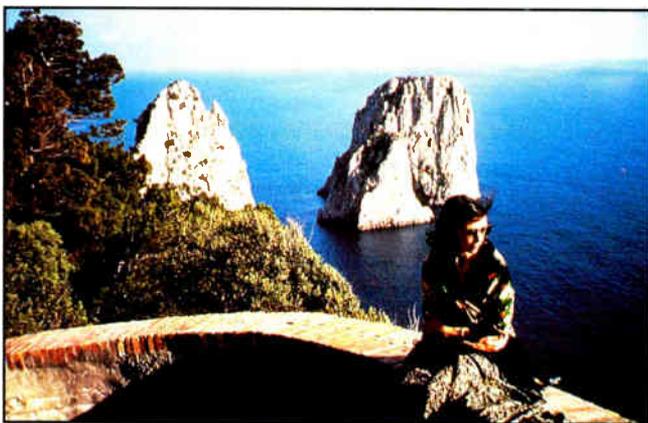


PHOTO: FOTOLIBERO CAPRI

The Opera House Lyon, France

Lyon's Opera House recently underwent extensive architectural and sound system redesign. Architect Jean Nouvel worked around portions of the exterior of the building that were designated historical landmarks and reworked the interior structure to create a five-story complex that includes two performance spaces (the 1,300-seat Great Hall and a smaller 200-seat amphitheater), two rehearsal stages and an informal restaurant.

Nouvel says that this project's greatest challenge concerned classical artists' negative attitude toward sound reinforcement in general. According to Nouvel, an opinion re-

mains among these performers that the visibility of the equipment undermines the tradition of their work. Therefore, Nouvel took special care that audio equipment should be concealed as well as possible.

The control room for the Great Hall is located on the second-balcony level and houses a Euphonix CS II mixing console fitted with 12 double channels and The Cube. The Cube provides seven matrix outputs for house reinforcement and one for a hearing-impaired system. Other equipment in use for the Great Hall includes a TC Electronic M5000 stereo reverb, Klark-Teknik noise gates, a Yamaha CD-R, a Sony DAT recorder and a Studer A730 CD player. An ASL ISM Series intercom system allows the control room engineers to communicate with people in the lighting and stage machinery control rooms.

The Great Hall's P.A. system is composed of EAW cabinets. The central cluster has two independent sections:

One cluster of six EAW SB 528 speakers is directed at the front of the theater, and the other cluster is aimed at the back of the hall. On-stage reference monitors comprise various EAW MS103 speakers set up around the stage frame, two meters apart. None of these components is visible from the audience. The P.A. is powered by Crest Pro Series amps. System equalization is provided by seven TC Electronic 1128 programmable EQs and delay by two Yamaha C20 digital processors.

Underground, the Opera House's smaller amphitheater, will host recitals, plays, chamber music concerts and before- and after-show press conferences. This space has a mobile control room, which features a Soundtracs Megas Mix 10/4/2 console, EAW mains powered by Crest amps, Neumann KM100 mics, delay units and reverb from TC Electronic, and a Studer A730 CD player.

The ballet rehearsal studios, on levels 4 and 5, contain the venue's other Soundtracs Megas Mix, fitted with stereo and mono channel input modules. Reinforcement in the rehearsal facilities is handled by two EAW MS 103 monitors with Crest Audio CC 301 amps. ■

—Barbara Schultz

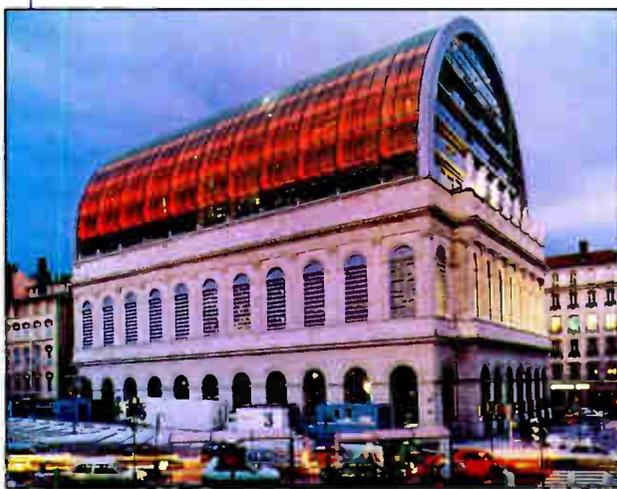


PHOTO: PHILIPPE RUAULT

real test of art in the '90s," she comments. Her reputation for technical brilliance and melodic soundscapes is renowned in contemporary music. Recently she celebrated the completion of her new album by getting married on the legendary Isle of Capri, with a gala reception at the recording studio, of course.

Dream Suite began in typical Ciani tradition with all compositions entered into the computer and pro-

grammed for electronic sequencers. Tempos were locked in, and an LED device called The Visual Conductor assured precision timing for her sessions with Moscow's 70-member Young Russia Orchestra.

"I chose to go to Russia," explains Ciani, "so that I could work with this amazing group of musicians ranging in age from 18 to 29. They are known not only for the high caliber of their musicianship, but more im-

portantly for their youthful energy and the distinctive edge they bring to performance. And this is their first album—you can feel the intensity and enthusiasm."

Central to the *Dream Suite* project was a collaboration on orchestrations with talented Indonesian arranger/conductor Addie MS of Jakarta's respected Twilight Orchestra. She collaborated with Walter Raim of New York City on additional orchestrations.

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The finale and mix of the album took Ciani back to the Isle of Capri, off the coast of Italy from Naples, where she'd lived for six months while recording her Grammy-nominated *Hotel Luna*. "It's a return to my spiritual home," she confides. "No other place inspires my heart like Italy."

At Capri, Ciani mixed the analog multitrack tapes recorded in Russia and combined acoustic MIDI piano with her unmistakable command of the synthesizer palette. *Dream Suite* marks the initial release on Ciani's Musica International label and a return to the self-produced independent albums that launched her career.

Following is a diary of the project recorded at Mosfilm and Capri Digital Studios.

MOSCOW

APRIL 5, 1994

After lunch at the elegant Palace Restaurant, we met Alex, our driver, downstairs at 1:30. He was guarding the gear—all the cables, the synthesizer modules, computer and power

paraphernalia that was destined for the studio. Having an extra 40 minutes before going on to Mosfilm, I asked about shopping for one of the fur hats all the men wear here.

Alex's car was in an unmaneuverable position in the chaos of cars everywhere, and he gestured and pointed, outlining the immediate neighborhood where Peter Kelsey—my engineer from Los Angeles—and I could shop. We cheerfully began our escapade, turning the corner to the main street. As I was photographing the smiling Peter in a picturesque setting, a band of about 20 children came up the street, looking like an eager group of students on an outing. We soon found that they were not headed for a museum but were on the prowl for tourist targets such as ourselves.

Within seconds, Peter and I were surrounded by the urchins who were suddenly grabbing and clawing at us like Hitchcock's Birds. In the first moment, I thought they just wanted to

touch us, an experience I had had in Mexico, Bali and other places around the world. But as they pressed in, disabling any movement of my arms and opening my purse, I realized that I was being mugged. What to do? As I was being forced to the ground, I started kicking at them with my boots. Then in fear and anger I screamed out, my voice the only weapon I had. With that, the crowd loosened, but my purse was still in enemy hands. Like a basketball player going for a free ball, I grabbed the bag, thinking, "You are not going to



Ciani at the Kremlin

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win this time—this is mine.” I pulled the bag away, and within seconds the children were off, running down the street. Peter and I gained our composure and took inventory. They had snagged nothing but a few papers from Peter’s pockets, but we were both quite shaken. I had lived in New York City for 19 years and had never been confronted like this. It was time to turn on my antennae again.

We canceled our shopping plans and opted instead for a swift shot of vodka. After reuniting with Alex, we told him our story and hopped back in the car, locking the doors. Moscow is dangerous for everyone, but especially dangerous for foreigners.

“Mosfilm?” Alex queried. “Mosfilm,” we confirmed. Time to get to the studio, where we belong.

The security at Mosfilm is serious. You cannot enter at all without an escort. Your car stays in the outer perimeter, and a studio van shuttles visitors through the heavily guarded gate. Mosfilm is a huge complex, a dinosaur from earlier days, a Russian Hollywood. It’s a small city in itself,

now showing some signs of decay and general emptiness. The casts of thousands are gone.

We went into a large building, the entrance seemingly abandoned. No lights, no “lobby” chairs, no receptionist—just dusty marble. A space without the aura of life. The studio was off to the right, through several doors. As I entered the control room, I knew that all was well. Here there was life. It’s a fine control room, and I knew instantly that I’d be happy there.

The room itself was designed by Tom Hidley. I recognized his touch from having been in Italy while he was building Capri Digital Studios, which was completed in 1991 just prior to Mosfilm. Since the second leg of my journey was to take me back to Capri, I felt fortunate with the mathematical constant.

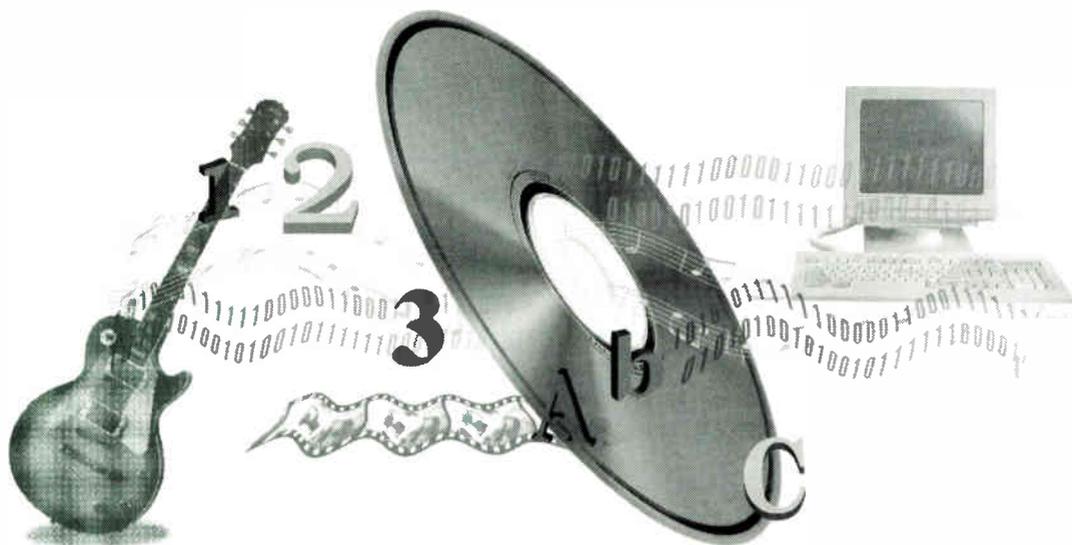
Because I was in Moscow to record the orchestral part of my new album, it was thrilling to see the enormous expanse of the studio itself. I listened to the warmth of the reverberated sound as I clapped my hands in conversation with the space. We would have our pre-production meeting today, so that all

could proceed smoothly tomorrow.

I excused myself to visit the “ladies room” before the meeting was to begin. Joel Spiegelman, my bilingual liaison with the orchestra, agreed to escort me, and thus began a journey of epic proportions as we wandered the labyrinth of long corridors, first in the basement, and then upstairs, looking for the restroom. We got a little giddy from the absurdity of the search—walking, walking, walking through what felt like miles of emptiness. At last, we found it, a small “W.C.” on the door.

Bathrooms in Moscow come in many forms, and except for those in the ritzy hotels, they do not resemble what we are accustomed to. More often than not, the cover of the tank has been lifted off, and to flush the toilet, you reach in like a plumber and push the ball down, or easier still, pull the little latch floating there. There is usually no toilet paper in the stall, only a communal roll hanging outside, and you must prepare before you enter. Here at Mosfilm, there is an interesting variation on the theme—instead of a roll of paper, there is a stack of old studio track sheets and

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paperwork piled on a table. You have the privilege of putting a production report or invoice to better use, a proper recycling method.

We all convened in a conference room—myself, Peter, Felix the studio manager, the assistant engineer, the technical engineer and representatives from the orchestra. Smoke. Russian. English. Smoke. Russian, etc. An hour later, our schedule was set. Many of my requests were addressed, some not. The orchestra will start at 1 p.m., not at 10 a.m. on the first day. In the States, the studio setup is done ahead of the booked time and is started as early as necessary to meet the downbeat. Here at Mosfilm, no one goes to work before 9 a.m., and they do not like to make exceptions. Perhaps it is a security measure.

APRIL 6

We've been at Mosfilm since 9 a.m., preparing for the arrival of the orchestra at 1 p.m., which is any minute now. Having anticipated every possible technical disaster that could happen in setting up my com-

puter and synthesizers, I am experiencing a sort of elation since everything has gone smoothly so far. No transformer is necessary, though this heavy item has been lugged from the U.S. By some miracle, the studio has 110 voltage, so plugging in my gear is as easy as pie.

The assistant engineers are examining cables and microphones, murmuring this and that in Russian. I'm glad I don't understand, because it makes me much calmer. The orchestral assistant has just presented me with one of the copied parts and it is extraordinary, as if monks who know the art of illuminated manuscript had crafted them in perfectly clear, hand-wrought notes. Peter, my engineer, is trying to explain that he needs to replace a nonworking microphone. I wish he spoke Russian, too—I'd rather not know.

In fact, the studio has a wonderful array of mics, and all the gear is technically very well-maintained. Vladimir, the assistant engineer, speaks English well and exudes the energy of a young man in love with his work. To my surprise, he seems to anticipate whatever is needed, and

setting up my portable MIDI studio is effortless.

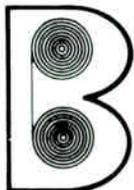
My computer sequences will be SMPTE-locked to the multitrack, so that I can provide the master tempi and a rough piano track [using the Kurzweil "MicroPiano" module], allowing for the piano to be overdubbed later in Italy. It is a slightly risky process since this orchestra has never played to "click" before. We are using a Studer A820 24-track analog recorder. The original equipment list from Mosfilm had indicated the existence of a Sony PCM-3324, but as it turned out, that machine had made only a brief visit to the studio as part of a Japanese session. I feel that is a blessing in disguise, since I might have been tempted to use the digital machine because of the ease in editing later. However, I think that the analog approach, coupled with Dolby SR, is ideal for this stage of the production.

Prior to coming here, I had been advised to bring my own tape. I was nervous about shipping it separately, since I'd had experiences in other countries with things disappearing in customs. Such a mishap had to be

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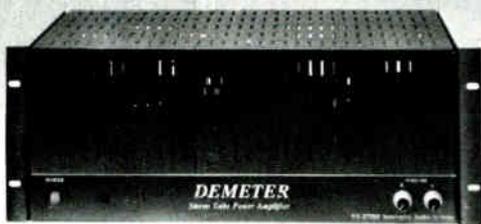
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avoided, so Peter and I brought the tape [Scotch 996] along as extra baggage. Thus the decision to record at 15 ips instead of 30 ips, to cut down the amount of tape to lug along. Another blessing in disguise, since I think the resultant additional bass response actually enhanced the sound of an already fine orchestra. (Beware the exorbitant costs of overweight! All in all, by the end of the adventure, it cost about \$1,000 just to transport the tape.) As it turned out, there was tape at Mosfilm: Ampex, and half as expensive.

APRIL 7

The recording is going extremely well. Five of the songs are done, more than twice what I expected. I suspect that they had rehearsed extensively (I sent the scores ahead of time to be copied and rehearsed). The strings are the best I've ever heard. The orchestra has discipline and spirit—which is often lost in large "hired" ensembles. They made music, not just notes, and brought charm, not attitude to the process. I am very happy.

Our lunch break in the studio cafeteria was remarkable in that there was hardly anything to eat, except for caviar. Wishing everyone at Mosfilm well, we packed up and headed out for our next destination.

CAPRI

APRIL 13-24

Arriving in Italy is like coming home for me. This would be the first time that I actually recorded at Capri Digital Studios, since the facility was not finished the last time I was here. But I watched the meticulous evolution of the project while it was being built, the dream child of Carloquinto Talamona, a man who exemplifies excellence in all that he does.

Our first job here was to edit the orchestral performances, which we did by locking the Moscow tapes on a Studer 820 to a Sony 3348. The process was rather painless using TimeLine Lynx modules integrated with the SSL automation system. Finding the splice points was made easier with the help of my PowerBook using Performer sequences, which were SMPTE-locked to the Sony as well. Each edit was rehearsed and fine-tuned.

The biggest problem we faced was



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In other words, this thing is so sophisticated, it can remember where you were, even if you can't.

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In short, just about everything you need to create a live mix with all the sophistication of a studio session.

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worry about getting too much or too little for your dollar, the M2000 is also available in 16, 24, 32 or 40 input channel models.



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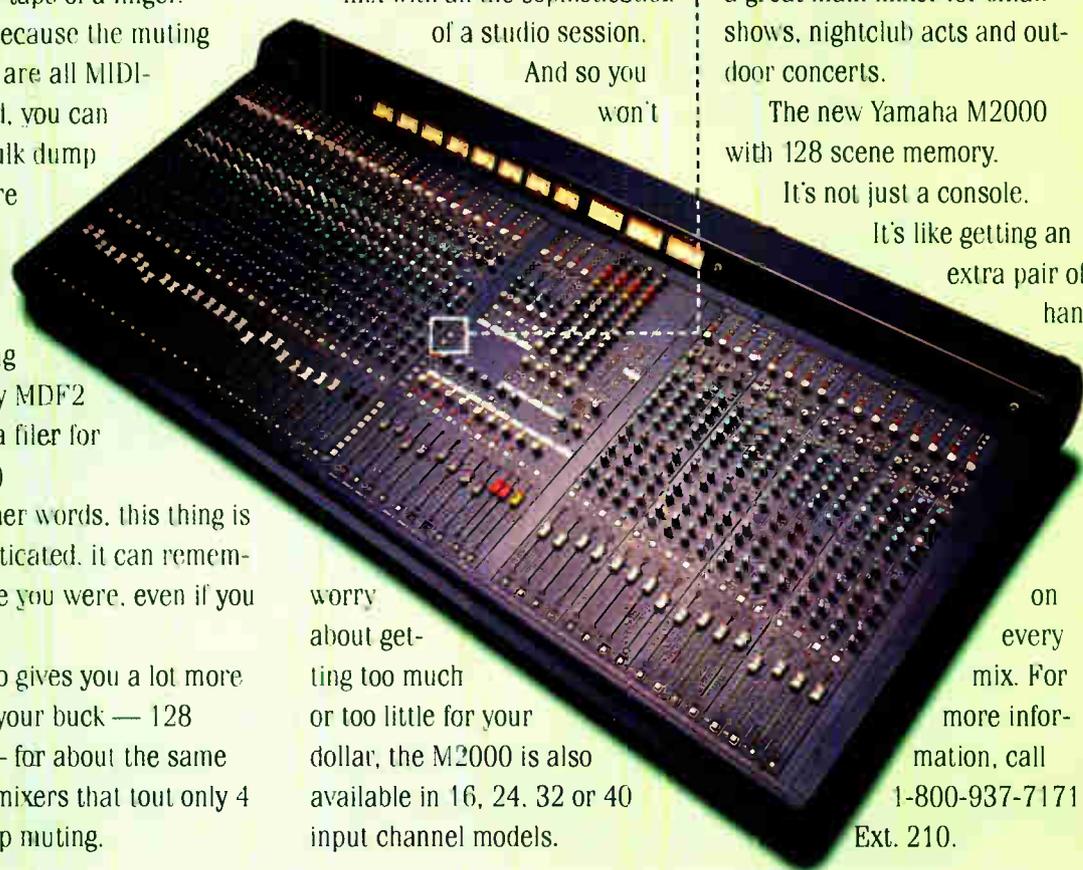
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with the tuning. Eastern European orchestras generally tune to A-442, and even though I had provided an A-440 piano at Mosfilm, the orchestra tended to play at 442 most of the time! At the end of this process, all ten pieces were ready for the piano overdubs, and there were plenty of new tracks available on the 48-track.

Peter and I had recorded my solo piano album, *Pianissimo*, a few years back, so a lot of our miking experimentation was done. In fact, we were using the same mics, Neumann KM140s, but in a slightly different placement, with Summit preamps to get the warmth of the tube sound. I kept my PowerBook beside me and simultaneously recorded the MIDI info from the Yamaha C3E piano so that I could later add an "aura" sound if desired. Having a portable computer was great, since I could just grab it and go into the control room whenever necessary. (There is a lot of running back and forth when you are producing yourself!)

I am a firm believer in the importance of environment to any creative

expression, and being able to walk out on the terrace and take in the natural beauty of Capri just before a piano performance was one of the reasons that I chose to work here. Gazing out on the Bay of Naples, standing near the villa of the Emperor Tiberius...

After the piano and synth tracks were recorded, we made a backup of the multitrack master. It was great working with Massimo Carolla, our assistant engineer, a local Neopolitan who always radiated a sense of well-being, calmness and good humor. I had learned from recording *Pianissimo* the importance of having a piano tuner on hand, and Thomas Godman was either in the studio or on-call for the duration of the piano recording—five days.

Mixing took an additional five days, mastering simultaneously to 30 ips analog with Dolby and to DAT through Apogee filers. Peter liked Genelec 1031As as near-field monitors since he is used to them and the



The mayor of Capri presents Ciani with a wedding bouquet.

amplification is built in, eliminating a variable.

It was great to be finishing a project without being exhausted. The good food, luxurious accommodations, fresh air, and healthful treks through the walkways of carless Capri may have accounted for the good energy—but it may also be the fact that my wedding was scheduled for the day after the project's completion. My fiancé, Joe Anderson, arrived from San Francisco, and from the cocoon of the studio where I was up until Saturday midnight, I molted into a bride on

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Sunday morning. I was joined by an entourage of Caprese folkloristic musicians as we made our way to the "Commune" City Hall, where Carloquinto was our witness, joined along the way by throngs of Italians on holiday.

Joe and I vowed "Si" in a splendid ceremony officiated by the Mayor himself, who made a fine speech about Capri's love of the arts. We then returned to the studio for our reception, with me riding a traditional marriage donkey, parading through the crowds gathered for Italian Independence Day. We heard "Auguri, Auguri" and "Tanti fili maschi" (May you have many sons) ringing through the air. ■

BITS AND PIECES

EUROPE

Premier SV, a leading Moscow advertising agency, purchased an SSL ScreenSound V5 digital audio editing system with Vision Track and SoundNet. Premier SV produces commercials for Russian advertisers and handles dubs/distribution for Western companies like Master Foods, Cadbury and Pepsi...Dutch TV broadcaster NOB (Hilversum) installed an SSL Scenaria in its audio and video post-production facilities. NOB's productions are seen on the three Dutch networks and on German TV channels...Switzerland's FM Acoustics reports amplifier sales to a number of European facilities: Cave Digital Productions in Milan, TTS Studios and RA-SH Studios in Gelsenkirchen, Germany, and Frankfurt's Jankovski Tonstudio...La Font Audio Labs (Paris) purchased a 32-channel Uptown 2000 motor fader system for film sound dubbing...Radio Roks, Russia's only satellite FM radio station, acquired a Soundtracs FMB broadcast console, supplied by Soundtracs' Russian distributor, MS Max. In addition to the music programming suggested by its name, Radio Roks broadcasts hourly news bulletins...Crest Audio Inc.'s Swedish distributor, HBL, reports sales of CA Series amplifiers to Kungstra Dgarden, a resort in Stockholm...The European Institute for the Media is sponsoring the Sixth European Television and Film

Forum, which will be held in Liege, Belgium, November 10-12; the theme of this conference is "Towards the digital revolution—European television and film between market and regulation." Phone (49) 211-901-040.

SOUTH AMERICA

The First Annual South American Pro Audio Expo took place in Buenos Aires, Argentina, in June. More than 40 manufacturers were represented. Studio Sound International, the organizer of the convention, was encouraged by the high level of interest and is planning two Expos for 1995: April in Chile and May in Buenos

Aires...Mosh Studios in Brazil took delivery of a 56-channel Uptown 2000 motor fader system in a DDA DCM console; this is the second DCM installation in this four-studio complex...Arbol Records (Quito, Ecuador) hired Marcelo Acuna to work in marketing and international sales. Recent projects at Arbol include recordings of four native folk groups: Salasakamanda, Renacer, Altiplano de Chile and Duchicela. ■

Please send your international news to Barbara Schultz at Mix magazine, 6400 Hollis St., Ste. 12, Emeryville, CA 94608; or fax (510) 653-5142.

The advertisement features a central image of a rack of audio equipment, including a rackmountable unit with a 'TEC' logo and '1994 NOMINEE' text. Below the rack are several promotional cards and brochures. One card says 'CLEAN UP YOUR TIME CODE!' and another says 'Please pass the Talk back'. A circular graphic on the right says 'Introducing the NEW SR-15+ DISTRIPLYZER Analyzes, Cleans and Distributes Code—now with built-in status report!'. At the bottom, the text reads 'BRAINSTORM TIME Intelligent Solutions'. Below this, there is a paragraph about the SR-15+ Distriplyzer and a list of distributors.

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Speaker Placement & Acoustic Environment Effects

On Close-Field Monitoring Systems

by Bob Hodas

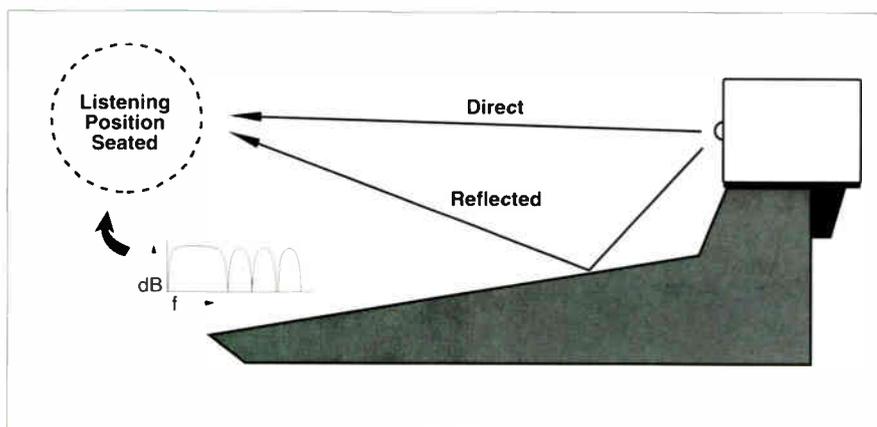
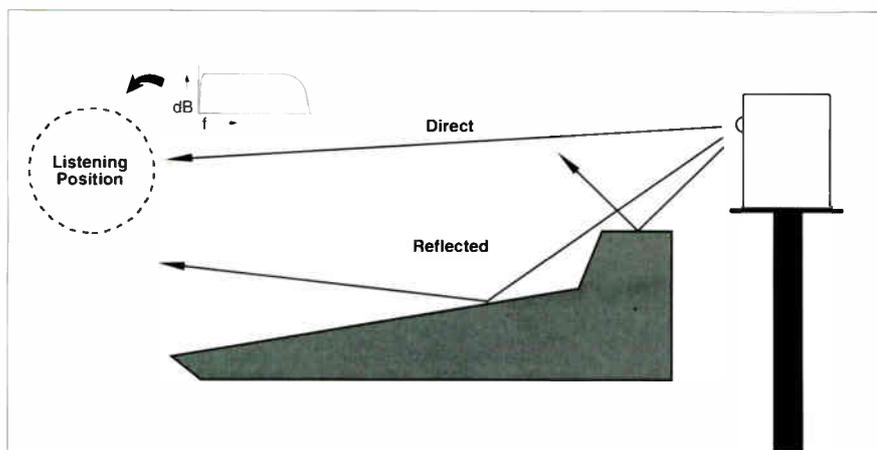


Figure 1: Cancellation pattern caused by monitor sitting horizontally on console bridge

Figure 2: Proposed solution to Fig. 1 reflections, speaker positioned vertically on stand a short distance behind console



As an independent recording engineer, I have been using Near-Field Monitors™ for the past 14 years. The decision to purchase my own near-fields was made in 1980 after a disastrous recording project in Japan. Studio selection was handled by the record company, and everything was set in stone when I walked off the plane. Three separate facilities were used for tracking, overdubs and mixing. All three sounded completely different because they had different monitors and acoustic designers. I brought along a tape I was familiar with and tried to get a reference in each room. Well, this turned out to be quite difficult, especially in the mix room.

All the staff engineers were quite proud of their rooms, and I was uncomfortable suggesting that there were acoustical problems. One studio's staff was absolutely beaming because they had not paid a design fee, even though this was obviously a room done by a well-known designer. They had taken the design drawn up for their European parent company and used it for their own room. The only problem was that the Japanese room was much smaller, and they had simply shrunk the design dimensions using a ratio (not to mention that they installed different monitors). I didn't have the heart

to tell them that it doesn't work that way. The *coup de grace* was at the mastering studio, whose dimensions were a perfect cube. Standing waves were a nightmare.

Upon my return, I purchased a set of speakers that was to become my reference standard no matter where I went. At this point, I would like to give credit where credit is due for those of you that don't know your audio Hall of Fame history. Ed Long's Calibration Systems in Oakland, Calif., holds the trademark for the term near-field monitors, as well as other industry-sweeping innovations such as Time Align™. Out of respect for Long, engineers should know that today the term "near-field" has become synonymous with close-field monitor systems just like Kleenex™ is synonymous with tissue paper.

Near-fields eventually became a standard in the industry, as staff engineer positions vanished and the independents roamed. Engineers found themselves fooled by in-house monitor systems that were in-

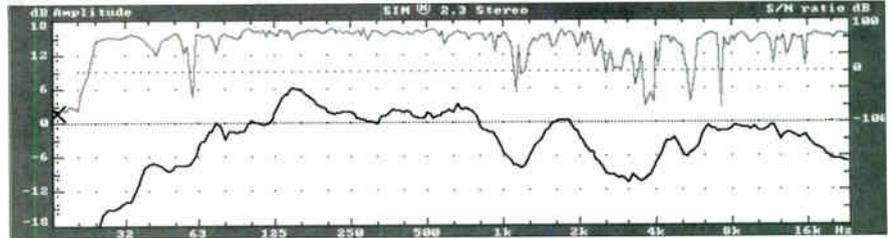


Chart 1: Response of speaker positioned horizontally on meter bridge

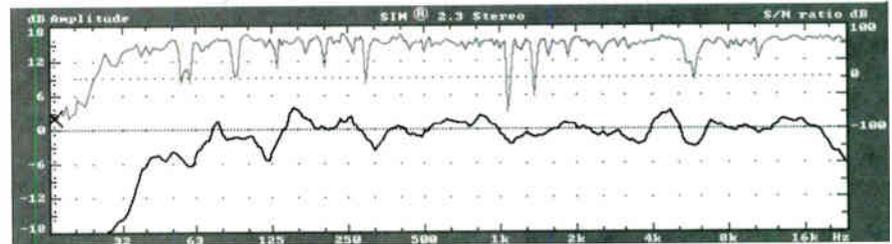


Chart 2: Response of speaker positioned vertically on stand eight inches behind console

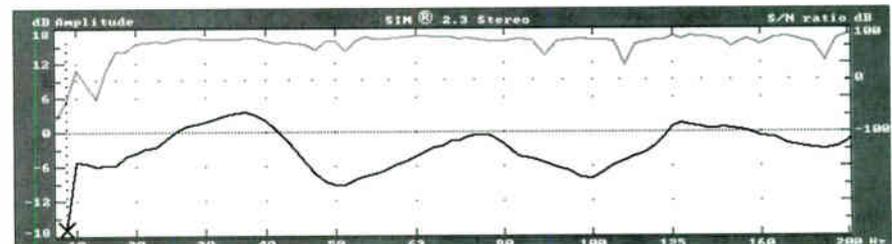


Chart 3: Low-end response of soffitt-mounted control room speaker

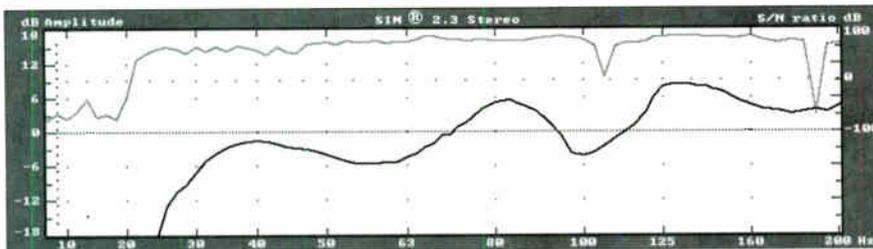


Chart 4: Low-end response of near-field monitor in same control room as chart 3

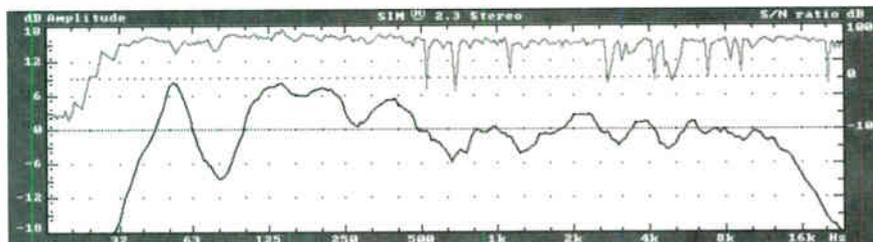


Chart 5: Response of a typical project studio

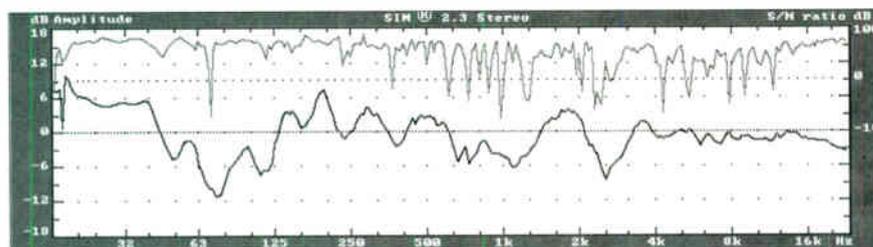


Chart 6: Response in studio's new low-cost mastering suite

accurate or not properly maintained. I must admit that having a standard helped me to make better records, but I still found that my speakers could sound different in a variety of studios. This history led me into the field of room measurement, as I had a desire to quantify exactly what I was hearing, all in the quest of making a better record.

I firmly believe in large room/transducer interface designs. Large soffitt-mounted monitors can sound fantastic and at the same time be more fun to work on than small speakers. If properly designed, they may also be more accurate than untuned console-top speakers. I have several room-voicing clients who are very fastidious and proud of their monitoring environments. They keep their rooms regularly voiced, and they recone woofers and replace diaphragms on a regular schedule.

There seems to be a pervasive belief that if you use a console-top speaker, you will not be affected by the control room acoustics and will get a more accurate frequency response. This line of thinking also has led many people to believe that

home studios can get away without acoustical planning or treatment because the speakers are in your face. In a word, WRONG. Close-field monitors can be accurate only if care is taken in the placement of the speakers and room issues are not ignored.

MEASUREMENT METHODOLOGY

The Meyer SIM™ System II, which I used for these tests, allows the gathering of large amounts of information in real time, which aids in diagnosing problems quickly. In one screen, a room response (pre- and post-EQ) is displayed, along with the EQ curve applied to the room and an analysis of the system coherence. Other screens display room and phase response in real time. Room reflections may be identified, and time alignment of components is clearly displayed ($\pm 20\mu\text{sec}$). The system gathers information at $\frac{1}{4}$ -octave resolution (245 frequencies, 8 Hz to 22 kHz), which provides the ability to look deep into a room. Test signals include impulses, tones, noise—even music may be used.

There are other parameters in addition to frequency response and

phase. One such parameter is Coherence, a 245-point signal-to-noise ratio (on a per-frequency basis) of the system under analysis. It compares the test signal source to the signal received at the microphone. This can show direct vs. reflected sound, as well as distortion in the system. The Delay Finder displays an impulse response that shows time alignment and room reflections.

The charts should tell most of the story, so I will spare you the long-winded descriptions. Also, for ease of interpretation in this tiny display size, these charts have been smoothed to $\frac{1}{3}$ octave. The frequency chart is scaled for 6 dB per division on the vertical and 20 to 20k Hz on the horizontal. The frequency response is the line in the middle of the chart. The line at the top is the coherence factor and is scaled into the top half of the chart (indicated on right side). In a good situation, this line would be fairly flat and nestled into the top quarter of the chart, occasionally dipping down as far as the 0 line. The lower the line, the worse the coherence, and wide dips indicate serious problems.

THE ANALYSIS

Now let's start with a look at a typical console-top-mounted speaker response. These charts do not represent isolated experiments in a single room with a specific brand of monitor, but they are typical of many of the rooms around the country that I have analyzed. Three different popular speakers are represented in these charts, all of which display fairly flat, free-field response.

Fig. 1 shows the theoretical problem of placing a monitor on its side on top of the console bridge. Reflected signals off the console surface can combine with the direct signal, creating a comb filter and canceling certain frequencies that correspond to the path length difference. Some low-frequency anomalies may also occur as the console bridge could act as a baffle for the woofer. So, can we prove this theory? You bet!

Chart 1 shows the response of an average studio near-field placed to replicate Fig. 1. Note the large holes in the response at about 1,150 Hz (-8 dB) and 3 kHz (-10 dB). Also note that the coherence at these frequencies is pretty bad, indicating reflec-

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That flexibility is another key to the collaboration that the DSP4000 forms with its owner. The DSP4000 works like you do. Today you're tracking—the DSP4000 is a pitch corrector and subtle de-tuner. Tomorrow, you're mixing—the DSP4000 is a reverb with pitch shift on track one, a parametric EQ with compression on track nine. Try doing all that with any other effects processor.

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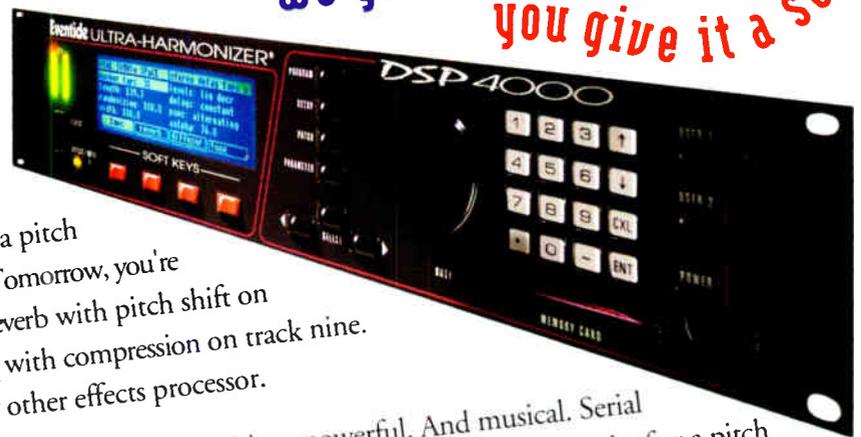
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tions. If we were to look at the delay-finder charts, we would see the reflections within the first few milliseconds that are associated with those holes. Also note that there is a +6dB bump at 150 Hz, most likely a result of console baffling. Looks pretty bad, doesn't it! But don't despair. Let's see if we can correct the problem.

Fig. 2 shows the theoretical solution of placing the monitor on a stand a short distance behind the console and standing it up vertically (the way it was designed, incidentally). This should change the reflection angles so that the critical frequencies are below the listening position. We would also hope to eliminate the console baffle. Does this solve the problem? Chart 2 shows the same speaker as chart 1, positioned vertically, eight inches behind the console on a stand. A respectable difference, eh Watson? The holes have filled in, and the coherence is dramatically improved. The bump at 150 Hz is gone, and the bottom-end response (38 to 60 Hz) has even improved by several dB. This looks like a desirable solution to me.

Now it's time to address the low-end interaction of near-fields in the

control room environment. Measurements were taken in a different studio from that used previously. Chart 3 represents a soffit-mounted main speaker system. Note that the chart scale only displays 10 to 200 Hz. In this control room, modes cause cancellations of about -10 dB at 50 Hz and -8 dB at 100 Hz. A look at the near-field response in Chart 4 demonstrates that the room modes are also affecting our reference. The near-field is affected by cancellations at 58 Hz and 100 Hz and has some major bumps up at 82 Hz and 135 Hz, as well.

Near-fields will not always display the exact same problems as the soffit-mounted speakers. Position in the room can make a big difference. I have solved certain problems by moving speakers a mere six inches. The important point is that the room acoustics do affect the near-fields, and you cannot expect to avoid a room problem just by putting a speaker up close to your face.

These low-end anomalies are usually related to the dimensions of the room, but sometimes they can be diaphragmatic as well. One example of

a diaphragmatic problem is an unreinforced wall that vibrates at a specific frequency and cancels that frequency out of the room. What are the solutions to these problems? There are two ways to go about it. I often recommend contacting an acoustician once the problem has been identified. You need an expert to give you cost-effective solutions. Solutions may include such things as bass traps, resonators, diffusers, or even moving walls. Some dimensional problems and placement loading problems may also be cost-effectively solved using a minimum-phase parametric equalizer. You need a minimum-phase EQ because the room problems described here are minimum-phase phenomena and must be corrected as such. These solutions are also not necessarily mutually exclusive. The combination of acoustic solutions combined with judicious use of a high-quality, minimum-phase EQ can produce stellar results.

Commercial studios often address their low-end problems with acoustics and EQ. Many still have some problems, but the majority of significant problems I have seen have been in

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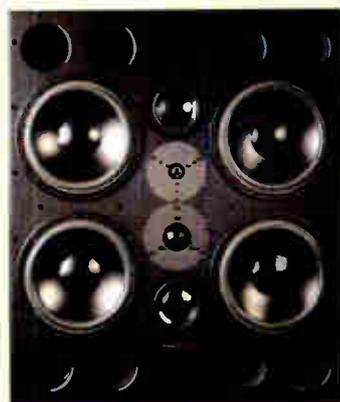
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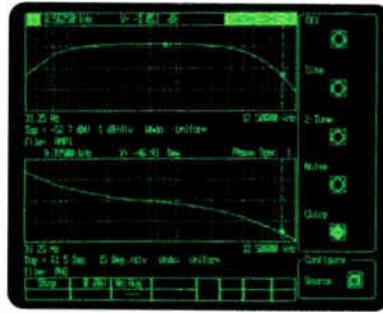
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project studios. Because project studios are often in homes, they share certain dimensional restrictions, such as an 8-foot ceiling height. Chart 5 demonstrates a response that represents problems often found in the project studio. Looking at the upper midrange, we see that this room exhibits some mild coherence problems. Cancellations that are present at those frequencies are the product of a combination of console, ceiling and wall reflections in the listening position. The large, broad bump in the low, mid and upper bass regions is typical of speakers being positioned too close to a wall or corner ($\frac{1}{4}$ or $\frac{1}{2}$ space loading). Many small rooms suffer from an abundance of 150 to 300 Hz. The main signature that seems to proliferate in the project studio is modes that make the low end look like the Alps. In this room, the peak is at 58 Hz, with a dip at 80 Hz.

What about adding home stereo subwoofers to near-fields with the expectation that all low-end problems will be solved? Chart 6 demonstrates what happens when an improperly placed subwoofer combines with the floor/ceiling mode to create a gaping hole in the low-end response. I have also seen several subwoofers where the crossover point does not meet the manufacturer's specification. This can cause some significant problems. Can you believe that chart 6 is someone's idea of a mastering room? I certainly hope none of my records get mastered there! Aside from the 70Hz crater, sidewall, ceiling and tabletop reflections create severe midrange holes. Coherence in this room is very poor.

Pardon my soapbox, but don't think you can open a mastering room just because you can buy cheap digital mastering programs—especially if you don't pay attention to room response! There is a lot to be said for relying on an expert's ears and abilities in a room where many records have been mastered.

Care and attention need to be taken when setting up any listening environment, whether it is an existing professional control room or a new project studio. I hope the information above will dispell some myths and help you to make better records. ■

Bob Hodas can be found during AES with his SIM System II at the studio bau:ton booth.

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Lifting the Grounding Enigma

Grounding noise is one of the most common complaints from audio engineers, but it's difficult to explain noise and grounding problems without addressing power.



NOISE MAY BE THE MOST MISUNDERSTOOD PROBLEM in any professional audio or video facility. Today's recording technology offers unsurpassed quality and accuracy, yet grounding system noise still baffles the experts.

Grounding noise is one of the most common complaints from audio engineers, but it's difficult to explain noise and grounding problems without addressing power. Grounding noise is closely linked to AC power under a variety of impedance load conditions. At first glance, the causes of noise can seem mysterious and perplexing. But in fairness to the experts, remember that conventional power standards were adopted long before we had sensitive electronics. Eighty years ago, no one predicted the repercussions of industrial load effects on power integrity.

More relevant to today's studio is locally generated noise from power supplies and other impedance-type loads. Most people don't understand the relationship between AC power phase, distortion and objectionable RF program-signal noise. Conventional beliefs state that the causes of noise stem from the way a studio is grounded; however, the problem is deeply rooted in the background of the electrical industry and industrial power distribution.

A BRIEF HISTORY...

In 1882, Thomas Edison wired the town of Sunbury, Penn., using shared-common, three-wire DC distribution. The cost of copper wire

BY MARTIN GLASBAND

was an important factor, so Edison's engineers devised a way to distribute two circuits using only three wires. The forerunner to modern power distribution, DC and AC versions of the "Edison Circuit," are still widely used.

Beginning with the Niagara Falls power project initiated by George Westinghouse and supervised by Nicolai Tesla, AC distribution overtook DC and became the primary power system. With mostly lights and electric heaters loaded on the power grid, there was never much concern for voltage phase beyond what was considered to be "distribution convenience" for the utility. And from almost the very beginning, 120-volt AC wiring has been conveniently unbalanced—a "split" off half of a 240-volt, single-phase grid.

Eventually, three-phase power was developed as a standard to suit heavy industrial users. Little was known at that time about harmonic distortion or other adverse effects on power systems created by impedance loads. Meanwhile, single-phase took a back seat to bulk three-phase power distribution because of the huge demand created by the efficient three-phase industrial motor. The three-wire Edison circuit was expanded another phase: 120/208 and 277/480-volt three-phase "wye" systems allowed for running three circuits using only four wires.

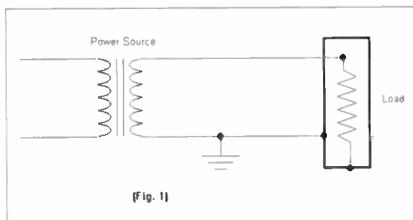
In electrical parlance, this multiple-circuit wiring method is called a "Round Robin." The three-phase wye design enables singlephase fluorescent lighting, three-phase air conditioning and other three-phase motor loads (e.g., elevators) to be fed by one power distribution grid with the load current evenly distributed across the system—ideal for commercial use.

But this system has one glaring fault. The level of interference created when a three-phase wye system is split up and used as three single-phase circuits is truly something to behold. For example, as much as 20% (or more) of the power used by fluorescent ballasts is repelled back onto the power grid in the form of reactive or harmonic currents—now that's a lot of distortion. In the early 1970s, a 40-plus-story office building in Los Angeles actually burst into

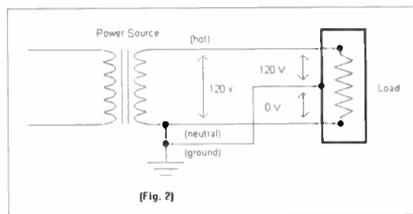
flames because of these reactive currents. Incredibly, the origin of the fire was determined to be from excessive harmonic distortion in fluorescent lighting circuits, which created a high-frequency current overload and literally a meltdown of the electrical wiring system. The First In-

terstate Bank fire in L.A. in May 1988 was the event dubbed by the media as "the towering inferno," *à la* the Hollywood movie. Codes were adapted to remedy the fire danger, but the noise problem was never resolved.

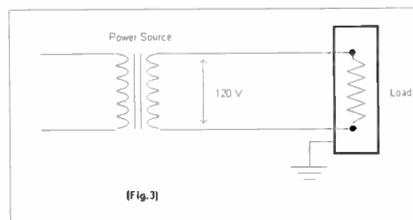
Three-phase power nonetheless



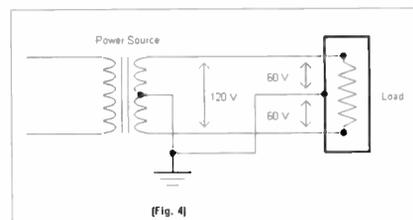
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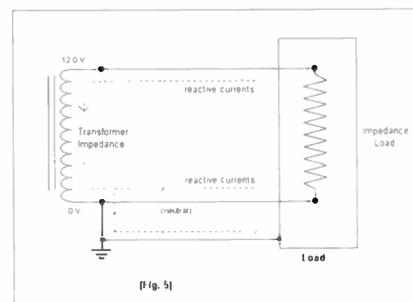
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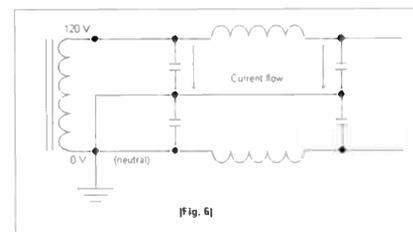
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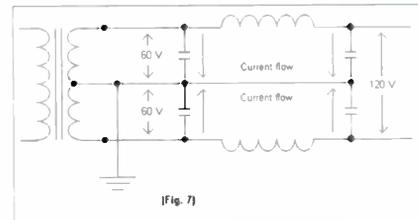
(Fig. 4)



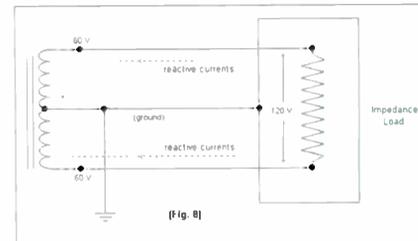
(Fig. 5)



(Fig. 6)



(Fig. 7)



(Fig. 8)

Figure 1: Power (or any modulation) applied to a load in Direct mode

Figure 2: 120V/60Hz power applied to load in (standard) Differential mode

Figure 3: 120V/60Hz power applied to load in Transverse mode

Figure 4: 120V/60Hz power applied to load in Common mode

Figure 5: Impedance load connected to power creates reactive currents that load up on the grounding system and neutral in proportion to the transformer's output impedance.

Figure 6: Standard 120V AC applied to an RFI filter causes capacitive leakage into ground.

Figure 7: Balanced power applied to an RFI filter causes balanced capacitive leakage to null.

Figure 8: Balanced power applied to impedance load creates balanced reactive currents, which sum to zero (null) at transformer ground instead of build as more gear is turned on.

remains the bulk power of choice for utilities. When a utility furnishes single-phase service to an area, the standard procedure is for the utility to derive single-phase power by using one or two of the distribution grid's three-phase elements. So even single-phase power is linked to the distorted three-phase grid. Typically, electrical power furnished by utilities contains 3% to 5% harmonic distortion. Single-phase service remains "split" into two 120-volt circuits, as per Edison's original wiring design. In one form or another, these standards have been adopted and put into use around the world.

MEANWHILE, IN THE AUDIO INDUSTRY...

The post-World War II era brought a revolution in electronics. Among these developments was the balanced circuit. The result was a quieter, more stable signal circuit that was less prone to interference. The technique might have been extended to power applications but wasn't. Power was regarded as something altogether different from RF or audio signals, perhaps more as a sort of fuel. Bulk power generation and distribution standards were etched in stone. Today, data loss and common signal-circuit malfunctions attributable to background noise and power distortion are cited as critical issues in audio and other high-tech electronics.

A century after Edison, one might assume definitive answers to common problems would be self-evident truths found in any engineering textbook. Not so. In facilities with noise problems, there seem to be as many suggestions as engineers. Although volumes of theory have been written on electrical interference and noise problems, there are few standards that genuinely address the issues.

FIPS 94, for example, is a federal government publication that attempts to answer grounding noise problems in data-processing facilities. Having limited options, electrical engineers often apply this engineering material to online video and recording studios. Thousands of dollars worth of copper busing and expensive labor notwithstanding, an active and very expensive power-conditioning system is often prescribed to compensate for a signal reference grid that somehow failed to sink hum noise as expected.

FIPS 94 is hailed as the authoritative source in electrical engineering circles, but it fails to adequately cover all of the ways (right and wrong) for phasing and referencing a power signal for an intended load application. It is a mistake to provide a power system that is not properly configured to operate sensitive electronics. Industrial motors required a new and unique three-phase power design some 80 years ago. Now is an appropriate time for the electrical industry to do the same for high-tech electronics.

Unfortunately, even the cleanest power signal available and the most linear and low-impedance grounding system still yield AC noise in audio and video circuits. How could noise still affect a video production facility with top-of-the-line active power conditioning and a professionally engineered linear signal-reference?

FOCUSING ON THE PROBLEM

It all boils down to eliminating noise problems. What, for example, needs to be done to completely rid a production facility of video hum bars. Can the problem of AC noise common in Class A tube amps be addressed? How about noisy guitar amps? Many other stubborn noise problems have endured the test of time but have failed to yield sub-

stantial solutions.

Are RF engineers right in saying that the best thing to do with an AC ground is to avoid it? From an RF perspective, it certainly makes good sense. But how safe is applying separate RF and AC grounding systems—with a high-amplitude potential—just a matter of inches apart and potentially anywhere within reach? What happens when the AC ground fails to provide a fault current path if there's a short circuit? What happens if a power supply burns up? Will circuit breakers still work? Will rubber gloves and boots work? The practice is brilliantly effective but extremely dangerous.

Is the problem in the power itself? Certainly, there is room for power to be cleaned up. Conventionally, this is done in two ways: improving its level of signal purity, or improving a grounding system's linearity and lowering the impedance. Unfortunately, even the cleanest power signal available and the most linear and low-impedance grounding system still yield AC noise in audio and video circuits. How could noise still affect a video production facility with top-of-the-line active power conditioning and a professionally engineered linear signal-reference? The reason is that power-conditioning systems don't address all aspects of the noise problem. For that matter, the most damaging form of noise (reactive current in the ground) is left untouched. Low-impedance grounding has little effect on reactive current, so the problem persists. Clearly, a different approach is needed.

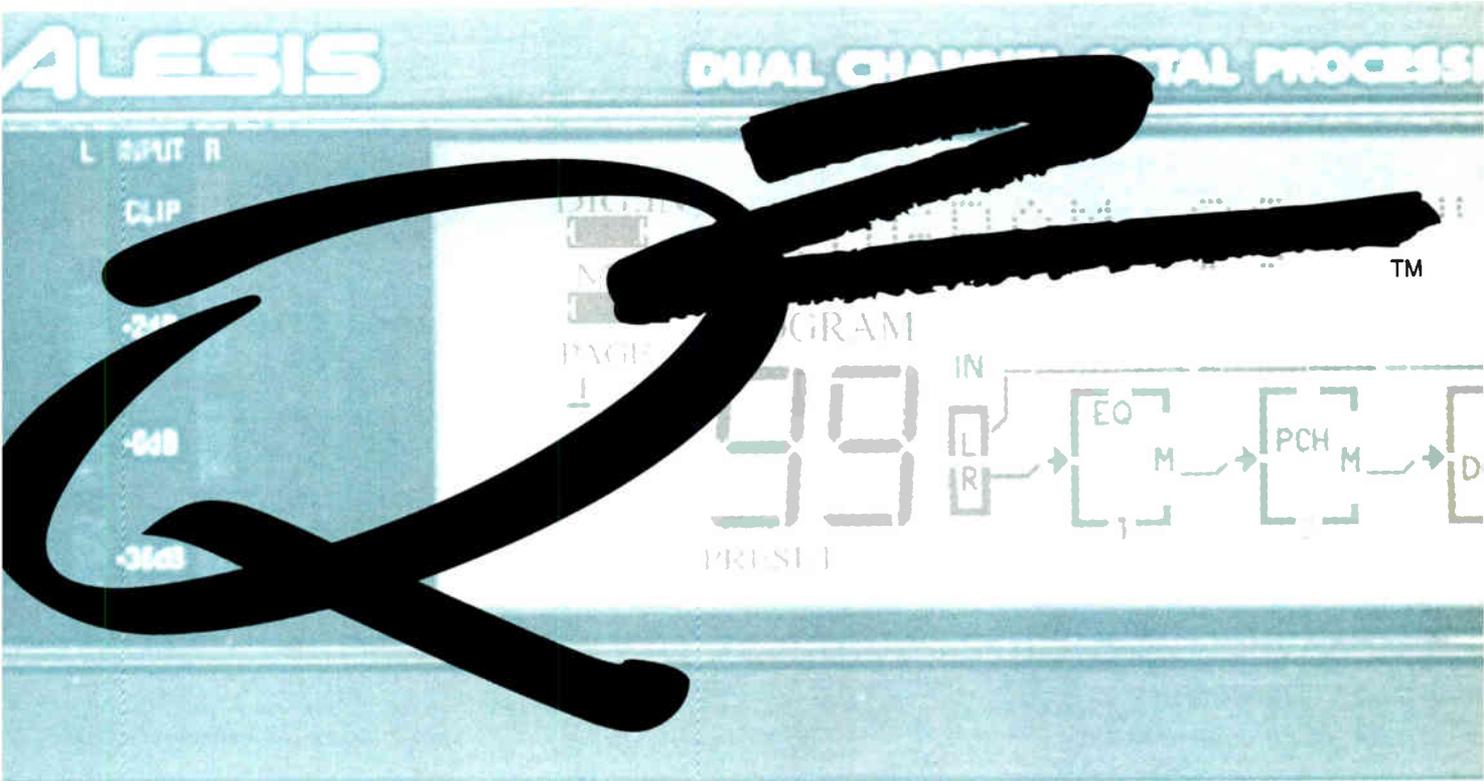
The answer is preventing reactive currents from propagating in the grounding system. This can be accomplished by rephasing the power source. To get a clearer picture of this theory, one needs to look at the load, the ground reference and the voltage phase in the power wires. For some reason, the simple truth has been overlooked for years.

BACK TO BASICS

First, let's look at some basic electrical theory that has somehow escaped the view of the majority of the engineering community. To understand the solutions to noise problems presented here, it must first be understood how the power phase can be both referenced to ground and applied to a load. This area of electrical theory is poorly taught and

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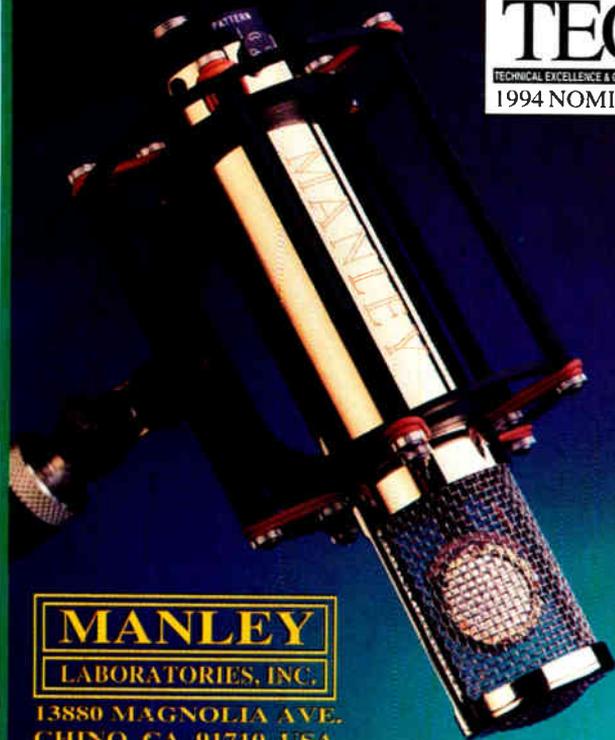
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narrowly applied. Except for filtering, a few multiphase industrial uses and some critical safety applications, the importance of voltage phase orientation to a reference source is generally ignored. Here are four examples of what is meant by the term "Mode."

Fig. 1 shows an alternating current signal in Direct mode (sometimes called Normal mode). One wire carries a voltage potential, the other wire is a ground conductor in which modulating current flows when a load (or signal pickup) is connected to complete the circuit. This mode is often used in low-power, unbalanced or high-impedance applications such as antennae, video feeds, data networks and test equipment circuits.

Fig. 2 is an example of a similar mode, but a third wire is added to provide a safety ground that is not part of the circuit's normal current path. This is a much safer way to apply a high-amplitude signal such as feeding 120-volt AC power to a refrigerator or washing machine. When an appliance is grounded in this manner, the chassis of the appliance isn't part of the normal current path and has no potential unless there's an internal short circuit. This is the standard 120-volt power circuit configuration used in the United States. The two AC power conductors have unequal or different potentials with respect to ground. One wire is hot, the other is neutral. This single-phase power configuration is called Differential mode.

If one were to omit a ground reference altogether and simply apply a 120-volt signal to two wires from a source system such as a single-phase transformer or generator, the only voltage potential is across the two circuit wires (Fig. 3). One conductor is referenced to the other and vice versa. No portion of the power circuit is referenced to ground. There is no current flow or significant voltage potential anywhere other than between the two circuit wires. This configuration of applied signal is called Transverse mode. The signal transverses two circuit wires without a grounding reference source. X-ray equipment in hospitals is one example of a Transverse mode power application.

A fourth variation is Common mode. The transverse voltage potential across a circuit is referenced to

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its own zero crossing point (Fig. 4). The power resembles a balanced audio circuit or an XLR input from an unbalanced to balanced audio transformer. In this configuration, a center tap (ground) is placed on the transformer output winding, which divides the output into two 60-volt-to-ground potentials. But transversing the system's two current carrying output terminals, the usual 120 volts is present. At the center tap, the voltage potential to each side of the power source is the same.

THE CULPRIT IS EXPOSED

Let's look at some of the problems created by standard (Differential mode) 120-volt circuits when one applies power to a typical impedance load:

Fig. 5 demonstrates how noise invades a grounding system through the AC neutral. Here, a load is applied transversely to a Differential mode power source—the usual case. Note how the grounding reference of the system loads up with harmonic currents and voltage potentials. These are commonly manifest as a sort of "voltage signature" in the grounding system, different with every piece of audio equipment. As more gear is turned on, more of these signatures appear. This is perhaps one of the trickiest of all noise problems to handle from both a power and grounding perspective.

If one opts to use a low-impedance transformer as a power source, some noise will be attenuated. However, the trade-off here is an increased danger of power spikes and voltage variations. In a low-impedance system, voltage variations and transient surges can be considerably greater than normal. This means that the possibility of damage to electronics is also considerably greater than normal. Protecting one's equipment from this exaggerated danger requires installation of an \$800 facility transient voltage surge suppressor and a \$2,000 line reactor—a lot to pay for 2 dB to 3 dB of background silence. Radial or star grounding may somewhat lessen the effect, but as with most known remedies, it's no better than a patch.

Before continuing, let's look at a problem that is very disruptive to an audio grounding reference. This occurs when a Differential mode (unbalanced) power signal is applied to a balanced circuit, for example an

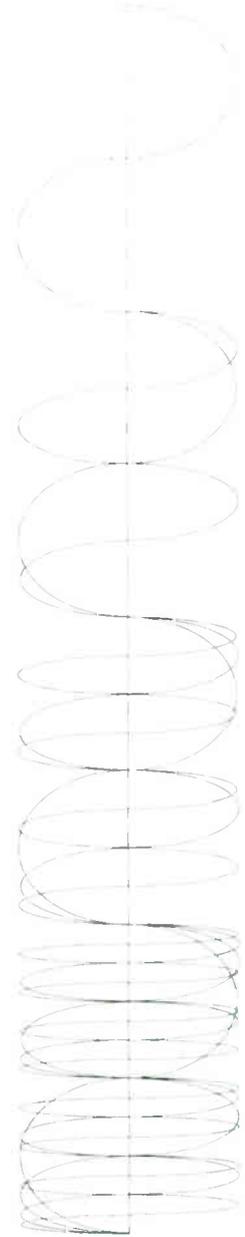
RF filter. Fig. 6 shows how capacitors leak current into the grounding system. This very reactive, nonlinear, half-pulse-width, leading current is perhaps the most stubborn, engineer-resistant type of AC interference (hum). Switching power supplies in digital gear and similarly reactive nonlinear loads shunt noise to ground in a similar fashion. Class A tube amplifiers are particularly vulnerable to this capacitive noise phenomenon, as are balanced microphone preamp inputs and other high-gain inductive circuits where low-level signals are critically referenced to ground.

Together, Figs. 5 and 6 illustrate the source and the creation of almost all grounding noise (with the exception of interference originating elsewhere in a building's power or grounding grid, unmatched or defective components in audio circuits, substandard audio grounding schemes and occasional magnetic aberrations). A few chassis power supplies can also be included under aberrations. But most of these are rare, and when they do appear, they are easy to identify. The important thing to recognize is that the source of most grounding noise is linked directly to unbalanced power.

THE SOLUTION

Let's apply a balanced (common mode) 120-volt power signal to the same RFI filter and to the same impedance load:

Figs. 7 and 8 are illustrations of a balanced power application. In both cases, inversely phased power elements meet at the common ground. The effect on the grounding system is also observable in the power grid, with a near-total absence of locally generated noise under the balanced power/load condition. Note that when balanced power is applied, peak and inverse peak voltages are equally present with respect to ground. This means reactive currents generated by the impedance load are also perfectly balanced. (In the electrical industry, the term "Counter E.M.F." is sometimes used to describe these power artifacts.) Counter power elements that are balanced will null (sum to zero) in a balanced system at the ground or center tap, an obvious benefit in sensitive audio and video production facilities where overall noise floor and dynamic headroom are di-



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rectly affected by grounding noise levels.

However, in a three-phase power system, there are no inverse phase relationships between power wires. Power wires are phased 120 degrees apart, so there is never a point in time where the system is completely off (common zero crossing voltage) as in single-phase systems. Consequently, reactive currents instead of nulling begin to "stack up," in a manner of speaking, end to end at very well-ordered intervals on both the neutral and ground wires. As each phase peaks, a pulse of reactive current is released onto the

common wire or neutral. This occurs at a rate of 60 times per second per phase. All three phases sum together in this way on the neutral, equaling 180 Hz, the third harmonic. On-line video facilities powered by a three-phase (120/208V) grid are typically beset with noise problems. When three-phase-based, 120-volt power is used directly for audio or video electronics, one can be assured of more interference than other types of 120-volt systems.

SUBSTANDARD STANDARDS

One issue remains: What's wrong with grounding? The answer is sim-

ple. As a rule, the grounding circuit is not meant to carry any type of current except during a short-circuit, and then only momentarily. However, Underwriters Laboratories has been somewhat lax in this respect. "Objectionable ground current" is loosely defined in every area except hospital operating rooms. Outside of hospitals, "objectionable ground current" is gauged more closely to shock hazard levels (about 3.5 milliamps). It seems that this standard has backfired. Data corruption, disk crashes and simple hum noise cost time and money. Clearly, UL standards that define "objectionable ground current" are inadequate by today's standards. On the other hand, UL is not responsible for re-engineering audio equipment and AC systems. Normally, performance standards are left up to manufacturers and the marketplace.

The basic problem is that, when loaded, all Differential mode 120-volt AC circuits create noise in the ground reference. Noise problems occur in audio signal circuits due to unclean ground. The old Edison circuit (where a 240-volt circuit is split into two 120-volt circuits) is still used today as a standard means of 120-volt power distribution. Standard power is unbalanced. Even when a high-quality 120-volt isolation transformer is installed, one side is grounded (made neutral), which isn't much different at all. The way that AC voltage is referenced and carried by the circuit has everything to do with electrical interference in a grounding system. If any aspect of the circuit is applied or loaded in an unbalanced manner, noise will appear in the ground.

SUCCESS, AT LAST

Understandably, such a simple explanation of noise problems can invoke a kind of knee-jerk skepticism or denial. But, requiring proof is not an unreasonable demand. In locations using symmetrical 120-volt power systems, the results speak for themselves. When balanced power is applied systemwide, the results are often quite dramatic. On the average, a 16dB improvement in background noise has been noted. Where audio and video wiring is properly installed, in no known case has balanced AC failed to substantially lower the noise floor. In high-end systems utilizing 24-bit digital

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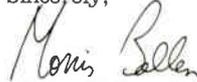
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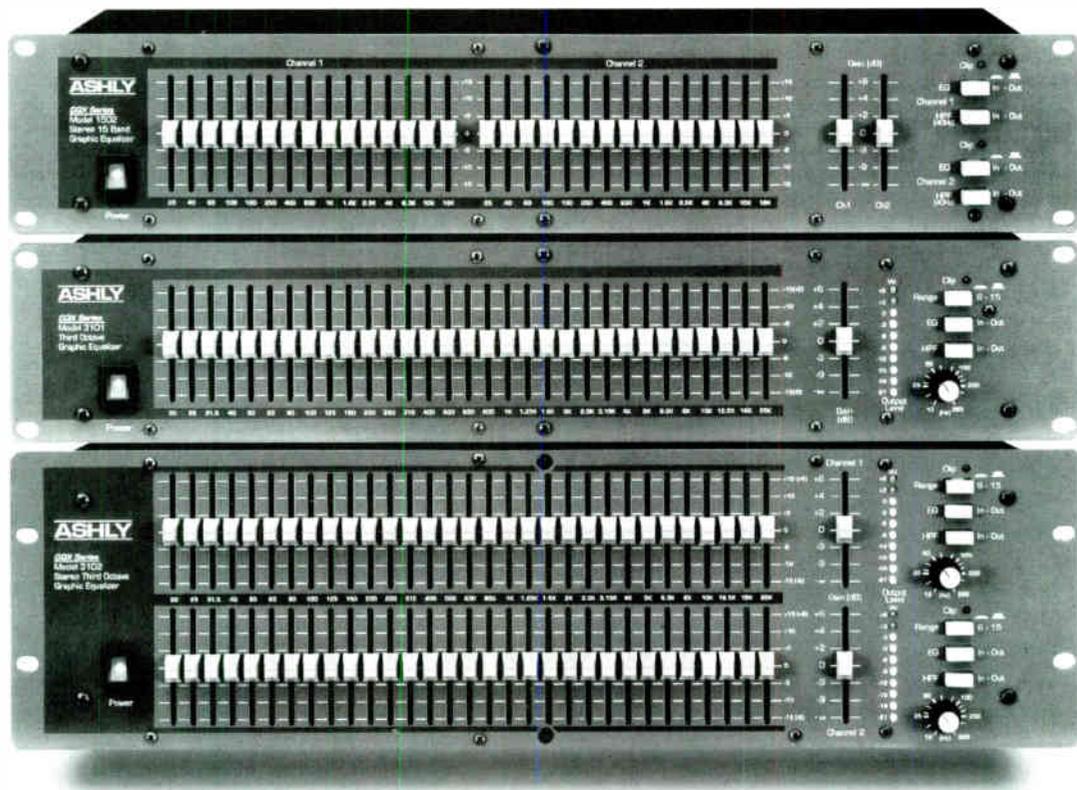
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equipment, peripheral gear needs balanced power to approach the noise floor capabilities of the digital system.

A year ago, an audio dealer was checking some Class A tube gear before shipping the exhibit to the Audio Engineering Society convention. With several amps on the bench, he was resigned to spending six hours changing capacitors to clean up some hum problems. As fate would have it, a delivery arrived with two prototype 120-volt symmetrical power systems he had ordered for the show. Predictably, and nonetheless miraculously, the balanced 120-volt power systems rendered the hum inaudible, saving the fellow some capacitors and hours of work.

Few, if any, modifications to electronic equipment are ever needed. However, in cases where a device is supplied with a two-prong AC line cord, it has been found that retrofitting the unit with a standard three-wire grounded cord further reduces noise. With rare exceptions (extremely substandard internal grounding schemes), ground lifters should not be used. Notably, audio wiring is also much easier to configure, as is the case when connecting unbalanced outputs to balanced inputs. Audio isolation transformers are rarely required to eliminate noise. Another reason for grounding is to shunt RF away from grounded shields and chassis. A clean ground reference for attaching RF shields eliminates many problems. Such pleasantries are too numerous to mention. When balanced power is used, the general rule is: "If in doubt, ground everything and lift nothing." Grounding essentially works the way it was taught in school.

When symmetrical AC power is used, grounding tends to be more forgiving. Recently, a studio owner needed some consultation and assistance installing a 120-volt symmetrical power system for his home studio, a 24-bit digital facility that also included a fair amount of Class A tube gear. Despite careful planning, there was a miscommunication over some of the particulars regarding radial (star) grounding for the outlets. Consequently, the electrician, unfamiliar with studio AC wiring systems, looped entire strings of outlets together using only one #12 gauge ground wire. In spite of the mishap, the system performed perfectly—quietly. This episode would indicate

that unbalanced power is the true cause of noise, not a poor grounding design. The system was full of ground loops, but grounding currents and chassis potentials were nowhere to be found. This is how it should be. Star grounding and linear signal reference grids are nothing more than Band-Aids that, at best, can only marginally mask some of the noise. To be free of noise problems, grounding circuits must remain clean—that's all there is to it. If not, a hundred ground rods won't help.

The symmetrical 120-volt system is unique in that it deals specifically with balancing all power and load elements with respect to a single-point grounding reference. This is the only prescription for maintaining a clean ground regardless of how big the facility or how much gear is turned on. A specially wound isolation transformer with a center-tapped 120-volt output, shown in Fig. 4 and again in Figs. 7 and 8, is basically the heart of the system. Both the load and the power signal are balanced with respect to the common output terminal (center tap) on the transformer. Here is the true single-point grounding reference for a recording studio. The Earth ground now functions only as a reference for electrical safety and for shields, as it should be, not as an ineffective sink-hole for reactive current.

Every professional audio/video production facility that has tried a symmetrical power system has demonstrated a significantly lowered noise floor. Particularly, in cases where meticulous attention has been paid to selecting high-quality, balanced audio equipment and well-designed audio wiring, the difference can be astonishing.

Interestingly, the most common "complaint" about symmetrical power comes from guitar players, who interpret hum as a sign of reassurance that the amp is turned on and up to speed. It seems that the silence is an annoying distraction to them. That's too bad. They'll get used to it. ■

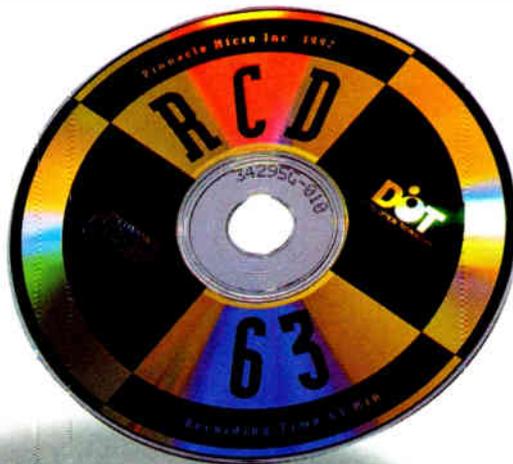
Martin Glasband is the director of engineering and product development at Equi-Tech Corp., Selma, Ore. Formerly an electrical contractor and consultant, he designed electrical systems for KCET-TV, the Post Complex in Studio City, ABC Radio Network, Baby'O Records and New World Pictures.

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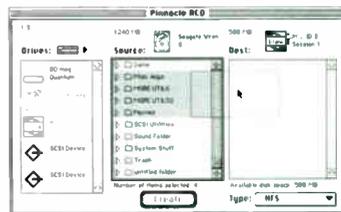
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BY MANNY LACARRUBBA
ILLUSTRATION BY JACK DAVIS

Picture this. They've just called for the first-class passengers on your vacation flight to Tahiti, and your row in the back of the plane is sure to be called next. Suddenly, you hear your name being paged! The white courtesy phone gives you the number of the studio. Uh-oh! The receptionist comes on the line: "Thank God, you haven't left. Johnny Grunge and the Flammers are due in 20 minutes. The lights just got really dim, and there's a funny noise coming from the mains in Studio A. What should I do?"

"Aaagghhhhh!" Anything bad that can happen will happen.

Don't let this happen to you. Knowing what to do when Murphy comes for a visit (and he *will* come) or—better yet—knowing how to keep him from doing any harm is what good maintenance practices are all about. Seasoned techs probably already know all this stuff, but those new to the biz, or smallish one-room studio/owner/manager/engineer/musician/occasional audio technician types might save a lot of grief by following a few of the simple tips accumulated here. Good basic maintenance doesn't require a degree in electronics, just an understanding of the toys that we put into our studios.

You, or somebody you work for, have plunked down a sizable amount on the tools of our trade: consoles, tape decks, microphones, computers, synths and the like. Absolutely the most important rule of good maintenance is to make sure equipment is installed properly. Moving stuff from room to room, moving cabling around, constantly dragging gear out of the closet and crawling around behind your equipment trying to make the cable reach what-

Knowing what to do when Murphy comes for a visit (and he *will* come) or—better yet—knowing how to keep him from doing any harm, is what good maintenance practices are all about.

ever it is you want to use is the fast track to malfunction and frustration. Put everything in a rack, and plan on twice as much rackspace as you think you need. It's important to keep your gear out of harm's way.

CLEAN, COOL, COMFORTABLE

I asked some tech friends what they would stress if they were writing this, and two suggestions came up repeatedly:

1. Keep it cool.
2. Keep it clean.

Excess heat stresses all types of electronic components, shortening their lives. Make sure your racks are well-ventilated. Leave at least half-a-rackspace between everything—more if you have things that run particularly hot. Take special note of the amplifiers you may have stashed on the floor and stacked more stuff on. Adequate air conditioning is a must. I can't stress this point enough: Keep things cool.

CLEANING CONSOLES

Vacuum the surface frequently. It keeps dust from working its way into pots and switches. Don't cover a console with the power on; this violates the keep-it-cool rule. Exercise pots and switches. Most crackles and intermittents can be worked out. If that doesn't work, flush them out well with whatever your local electronics store is selling as a replacement for Freon. If that doesn't work, replace it. A note of caution: Some of these new cleaners should not be used when devices are powered-up; so check the label. Older consoles should occasionally have their



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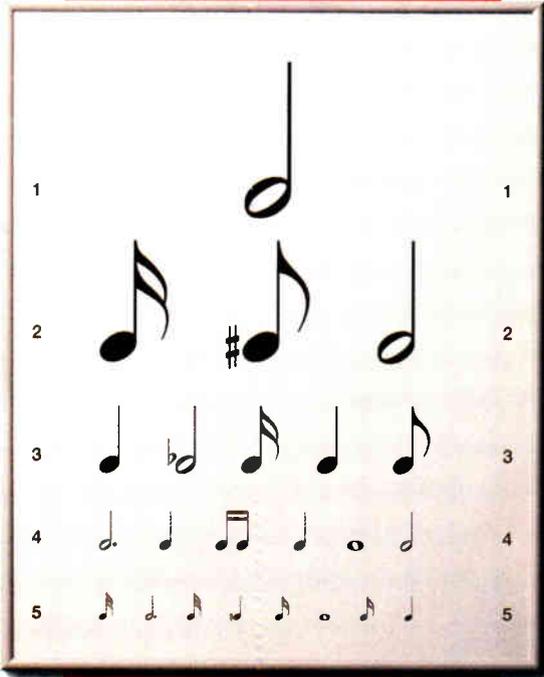
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Picasso had his paint and canvas. Shakespeare had his pen and paper. You have your

modules pulled, vacuumed out and have all of the connectors cleaned.

Here's a procedure that can be used with virtually any type of connector: The female connector should get flushed with a spray-cleaner, then use a spare mating connector with some Cramolin Red on it (Cramolin is made by Caig Laboratories of Escondido, Calif.), insert it a few times, then wipe the male end completely with a dry cloth. Insert it a few more times and wipe. Repeat until you think the sockets are clean. Remember, only apply the Cramolin the first time. Always wipe or spray clean off the Cramolin after it's been applied.

Clean the edge connectors with a good, soft gum eraser if they're really dirty, then—and this applies to most male connectors—spray them with cleaner and wipe them down with a little Cramolin Red. Wipe again with a dry cloth, and then wipe it down with a little Cramolin Blue or Tweek and allow to dry. "Little" is the key word here, or dirt will stick to the "wet" connector. But what do you wipe with? Texwipe TX604 Technicloth wipers from the Texwipe company of Upper Saddle River, N.J., are my personal faves. Cotton swabs will do in a pinch or if you're working in tight spaces.

By the way, don't hot-plug electronics cards of any sort unless the manufacturer says it's okay. Blow faders out with compressed gas (nitrogen is cheap and harmless). Problem faders can be flushed out with an electronics cleaner that is guaranteed not to harm plastic, rubber or paint and leaves no residue. Once again, don't cheap-out: Get the good stuff.

TAPE MACHINES

Tape heads can be cleaned whenever the mood strikes. Clean the entire tape path with 99% isopropyl alcohol except for rubber or polyurethane rollers. Although alcohol is okay for rollers, I highly recommend polyurethane cleaning solution from Athan Corporation of South San Francisco, Calif. This stuff keeps the rollers from drying out, greatly extending their useful life. Be careful with the alcohol. Don't let it run down the shaft of your machine's capstan motor or the alcohol will remove the lubricant from the bearings. Clean the electronics card connectors with the above procedure. Also, don't forget to demag the tape

path after every couple of hundred hours of use.

At the risk of alienating the fine folks who relap tape heads for a living, I recommend that you *not* relap until you've reached the 50% expected life mark. If you are noticing a significant drop in performance or a trapezoidal wear pattern, you should deal with it immediately.

When you're troubleshooting, assume nothing. Make sure the problem really is where you think it is. If possible, run two different tests to confirm a finding. Be very exact when relaying the circumstances of a malfunction to somebody else. Take note of the things that continue to work, as well as the things that don't.

Tape machines have moving parts that wear out. Motor brushes should be checked after 7,000 to 10,000 hours, because brushes are much cheaper to replace than motors. When bearings get noisy, sloppy or sticky, replace them with the original manufacturer's part, if at all possible. Rubber or polyurethane rollers should be replaced when they get shiny and hard, or have a sort of glazed look. Transport calibrations are generally not as scary as you might think. Follow the manual carefully, use the right tools and double-check your work. May the force be with you.

THE LITTLE THINGS...

Clean your patch cords regularly; it makes a difference. The newer nickel-plated patch cords are hip because they don't tarnish like the brass ones. Vacuum and blow-out your patch bays frequently, then flush each patch point with spray cleaner. Use a burnishing tool on problem patch points only and *don't overuse it*. Very old patch bays sometimes, sadly, need to be pulled and put into an ul-

trasonic bath or replaced.

Don't forget to wash out those little filters that keep cooling fans from sucking dirt into the device they're trying to keep cool. Equipment without such filters will need to be blown-out from time to time. This includes the power supplies nestled inside your tape machines. Air conditioning units have filters, too. I once saw a kilobuck compressor smoked because a \$2 filter was not changed. For video transports—including DAT recorders and modular digital multitracks—follow the manufacturers' instructions. [For more info on MDM maintenance/troubleshooting, see page 158—Ed.]

Many problems you are likely to encounter will be directly related to wire and connectors. If you're building a studio, make the cable troughs absolutely cavernous. Trust me on this one, you'll end up with more wire than you thought. If you have an existing facility, the cable troughs are probably too small, and you know what I'm talking about.

Service loops—extra lengths of cable placed behind racks—let you easily move gear in and out of your racks without straining connections. Label *all* your cables and connectors, and your troubleshooting will be much easier. Be careful not to make unbalanced cable runs too long or you'll start to lose high frequencies. Don't put speaker cables in the bundle with your mic cables or you'll get the funniest little feedback ya ever did hear. Keep your cables neat, very neat, so they take up less room and are easier to trace.

Strain-relief all cables to something sturdy. This is a very important point. Don't let the weight of a cable bundle be supported by the one wire or connector on the end of the fan out. The first thing to check when something doesn't work is the wire and connections. Now, I know this seems obvious, but somewhere today someone is pulling their hair out because one side of their ZX-2000 Time Inverting Digital Polyphasic effects box is dead, and it's because a wire broke inside an XLR jack. Meanwhile, someone else is pulling their ZX-2000 out of their rack because they fried it. 'Nuff said.

If you are planning to do any kind of installation or maintenance work, learn how to prep wires and solder properly. If you're not sure you're doing this right, don't be

THINK ABOUT IT..

If microphone placement is a critical aspect of recording, why do engineers often settle for the first position they try? Because microphone positioning is guesswork. You're in the studio moving the microphone, but the sound is changing in the control room. You can't have your hands in the studio and your ears in the control room, can you?



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bashful, get someone to show you. Or, at least, examine some ready-made cables to see what they should look like. Do not twist wires together and tape them. Don't reuse old worn XLRs. Be careful not to overheat the wire (this can melt the insulation and cause intermittent shorts), and please don't use hot glue instead of heat shrink (yes, it's been done). In cases where you have a choice, put a little thought into the type of connectors you use.

Once upon a time, in a very famous New York studio, a large tracking session was trying to begin. Problem was that every time the bass player hit a note, it was audible on every channel of the console; there was bass *everywhere*. Console modules were swapped, tape machines unhooked, outboard gear pulled, patches checked and rechecked. In the end, it was discovered that the bass player's cue system had been plugged into a mic input out in the studio—utterly saturating the console's input transformer and creating the feedback loop of doom. This little story is brought to you by the guy who thought it would be okay to use 3-pin XLRs for the cue system. The moral here is to build out potential mistakes before they can happen.

Always keep this in mind when you're putting things together. Conversely, you can also build in some convenience. Multipin connectors in carefully thought-out locations (perhaps using the pinout standard of your favorite local rental company) can make wheeling in that second 24-track a snap. If you're in a facility that you put together before you read this wonderful article, start changing things; Make it right, *before* Murphy strikes.

THANKS, AC!

What about electricity, that magical force that breathes life into our beloved audio circuitry? For starters, if you're not comfortable enough, or qualified, to install AC wiring, don't do it. Second, remember that power problems can also take life away from our beloved audio circuitry. A discussion of proper electrical wiring for studios is beyond the scope of this article, but a few quick tips on how to protect your gear isn't.

You've heard it before, but uninterruptible power supplies (UPS's) or, at the very least, high-quality

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—D&R ORION REVIEW, MIX MAGAZINE

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surge protectors (the \$20 Radio Shack models don't cut it) are an absolute must for computers and disk drives. Don't put it off any longer: just get 'em. Check out *Consumer Reports* for the skinny on which are the cool ones for your particular application. But what can you do if confronted with a major brownout like in my story at the beginning of this article? Well, not much if you're at the airport. That's why God created UPS's.

However, everyone who spends time in your facility should know where the circuit breakers are so that they can run over and flip them off at the first sign of trouble. Make sure you have those cool emergency-type flashlights that are always plugged in and turn themselves on when the power dies. In one particularly nasty outage experienced, the power went on and off several times in quick succession in the middle of an overdub on a digital tape machine. The manufacturer swears it's not possible, but everyone in the room saw all the red lights come on. When the dust had settled, there was about a half-second of missing audio and control track.

Here's a few things you can do to help cut down on induced AC hum: Keep AC wires in metal conduit and away from audio cables. (I know, you knew that.) Keep power supplies, UPS's and video monitors away from audio cables, tape machines, patch bays and consoles. Use real variable transformers for lighting dimmers—not the cheapo kind in the hardware store made for residential use.

Also, it's my personal advice (and I know there are those who may disagree) to leave the gear that you use most turned on all the time. This keeps the circuitry safe from constant power on/off spikes and from going through thermal cycles. The exception is anything with a motor that spins whenever the power is on like most cassette decks, CD players and hard disks. I also turn off tube gear if I know that I'm not likely to use it for the next week or so. This rule of thumb has worked very well for me.

One of the best bits of preventive maintenance I can think of is to make sure there are small tables, stools and counter space available in areas where there is no audio gear.

This provides ample space for the client's coffee, beer, sodas, mustard, soy sauce packets and everything else that disagrees with electronic devices. But what can you do when the producer's boyfriend spills coffee into the ZX-2000?

1) Turn the device off as quickly as possible and unplug it.

2) Later, pull it apart and give the affected boards (or the whole unit if necessary) a bath or shower in hot water; preferably before the coffee or Coke dries.

3) Shake it out to remove most of the water and blow dry.

4) Place it under some heat lamps overnight. Don't let the temperature exceed about 150° F on the surface of your electronics.

5) Don't plug it in again until you're sure it's completely dry.

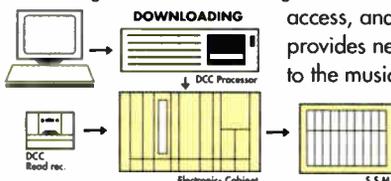
Speakers are moving parts, too. Recone every year or two. For in-ner-face reference monitors, replace woofers every ten to 14 months, depending on how brutal your clients are. They'll last for years, if you never run them hard. I'm a proponent of fuse protection for loudspeakers, and the presence of a

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properly installed fuse is not audible in the least. A small investment in 1.5-amp, fast-blow fuses has saved many an NS-10 tweeter around here, and none of our resident or guest Golden Ears questions them.

Microphones are perhaps the most delicate tools of the trade. Take extra good care of them, and you will be rewarded with great-sounding tapes. A few quick tips to keep them in shape. Mics that see moderate to heavy use should be sent back to their manufacturer (or to one of the very few highly qualified people out there who work on mics) for a cleaning and proof of performance check. This should happen every three to five years. Always use pop filters when recording vocals to keep spit off the diaphragms. Store them in a clean, dry, safe place.

If you have a nice foam-lined box or cabinet, make sure that little bits of foam aren't sticking to your capsules. We store our favorite expensive large-diaphragm condensers in plastic Ziploc bags. I have the assistants slip the bags over them after each session while they're in use, so dust will not be attracted to the cap-

sules. It drives me wild to see people putting mics on the floor while they're setting up. Aside from the dust and dirt, they will get stepped on. Remember, stop the accident before it can happen.

We're nearing the end of class. Here are a couple more pointers:

Know the signal flow of your studio cold. (Can you draw an accurate signal flow chart for your entire studio and console? Can you quickly locate every wire and connector you've drawn? Try it; it's hard.) I promise you, problems will seem to disappear once you have a good grasp of signal flow. Become familiar with your manuals, you're certain to learn a bunch. At the very least, it keeps you from sounding like an idiot when you're on the phone with a manufacturer's tech-support department.

When you're troubleshooting, assume nothing. Make sure the problem really is where you think it is. If possible, run two different tests to confirm a finding. Be very exact when relaying the circumstances of a malfunction to somebody else. Take note of the things that continue to work, as well as the things that

don't. Above all, keep in mind that freaking out will definitely not help. If something seems not to be going right, DON'T PANIC.

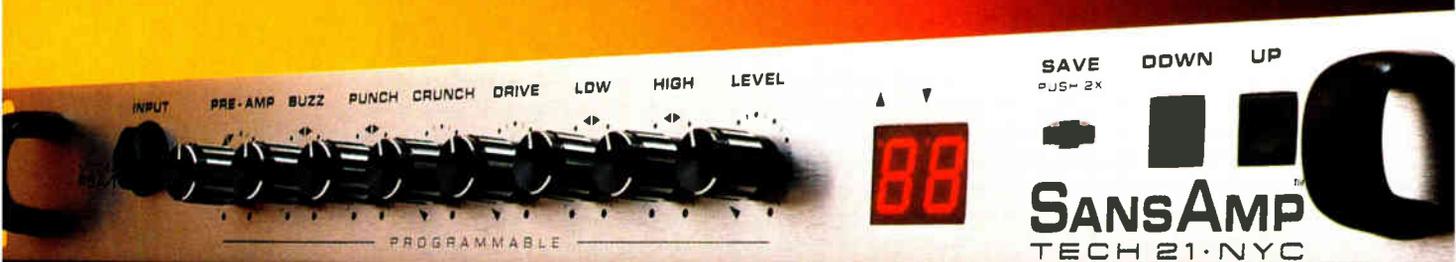
Which brings me to one final thing I'd like to mention, bedside manner. If you're the person clients turn to when something goes wrong, be confident and sound knowledgeable even when you don't know what the hell you're doing. Do something intelligent, and don't run around in circles. My strategy is to find a way around the problem if I can't fix it in 15 minutes. Whatever you do, give the client some options and make them feel like they are being taken care of.

In summation—install it right, keep it cool and clean, and let the clients know you care. It won't turn you into Super Tech, but I hope it helps some of you at least a little. And remember, if you fool around with a thing for very long, you'll screw it up. Good luck. ■

Manny LaCarrubba, chief engineer at The Plant Studios, located in Sausalito, Calif., thanks all those who assisted with this article.

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"...in a price/performance comparison, the DR4d would be hard to beat. Thumbs up on this one." George Petersen, MIX Magazine



"...great sound, useful features, and friendly operation... technology that is sure to set a new standard in affordable recording" David Frangioni, EQ Magazine

Ah, decisions, decisions. You want to buy a new multitrack recorder, and you want to go digital so that you'll get the best possible sound quality. And you'd like to buy a hard disk recorder, rather than tape, so you can get random access editing power. And finally, it's got to be something you can really afford. But there's a problem.... don't all hard disk systems require expensive add-in hardware and software, to already expensive computers? Not anymore!



after the power is turned off and on again! Imagine it. Do it. It's that simple.

You can instantly move to 108 memorized locations at the touch of a button, and these locate points may be entered manually or on-the-fly. It's also simple to set up **seamlessly looping** repeat sections, so it's easy to jam over tracks. No more wasting time on rewinding tape!

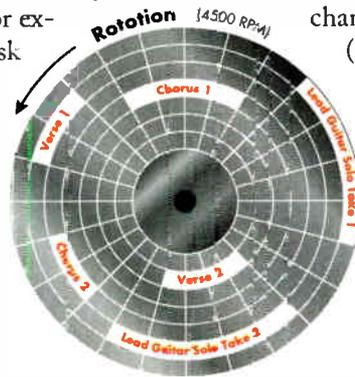
The DR4d is the solution for those looking for an alternative to expensive, complex computer-based systems, or the limitations and mechanical uncertainty of tape recorders. It offers a perfect combination of hard disk recording benefits with an easy-to-use interface.

The DR4d can record up to four tracks simultaneously to standard SCSI hard disks, either internal or external drives. An optional 213MB internal disk offers 40 track minutes of recording (44.1k-Hz) right out of the box. To expand your recording time, simply connect external drives to the DR4d's supplied SCSI port.

With standard tape machine-style controls the DR4d is by far the easiest hard disk recorder to operate, which means that you can get to work immediately creating music rather than setting up and operating a computer system. Punch ins/outs can be performed manually or automatically from the front panel, or by footswitch, naturally.

Now you can start to take advantage of random access editing. You can cut, copy, and paste sections of audio with ease. Our Jog/Shuttle wheel lets you scrub through the audio at various speeds, forwards or backwards. Try out different arrangements. Create perfect tracks by combining the best sections from multiple takes. And you can edit with confidence, because if you change your mind you can instantly Undo your last edit - even

Of course, how the DR4d sounds is as important as how it works. Advanced 18-bit oversampling A/D and D/A converters insure crystal clear sound, and with a full 96dB dynamic range, the DR4d offers no-compromise specs. The four balanced 1/4" input and output jacks are switchable between -10 and +4 operation, and 2-channel digital I/O is included standard (AES-EBU and SPDIF) with two additional digital ports optional.



On a spinning hard disk, the sections of music can be accessed almost instantaneously by the moving heads of the drive mechanism. This allows you to seamlessly output parts: regardless of their location on the disk. Also, music can be easily rearranged in ways not possible with tape.

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On tape, the sections of music are physically located far from each other, separated by many feet of the tape itself. Since you have to move all that tape past the heads to get where you want to go, it's impossible to jump instantly from one section to another. It wastes time, and limits creativity!

DR4d

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MAINTAINING AND TROUBLESHOOTING

THE ALESIS ADAT, FOSTEX RD-8 AND TASCAM DA-88

IN ANY STUDIO

downtime is a fact of life, and modular digital multitrack systems are not immune to the rule, although in contrast to earlier digital systems, MDM reliability looks pretty good. The first 3M digital 32-tracks were usually accompanied by a full-time maintenance tech—just to keep them running! Early Sony and Mitsubishi digital multitracks also had a tendency to break down, despite the high price tag.

However, if you're prepared for

the eventuality that your MDM system will someday "go south," you're way ahead of the game. Fortunately, with a multi-MDM rig, if one module goes out, you can remove the bad module and continue the session. And the Tascam DA-88 brings new meaning to the phrase "*modular* digital multitrack," as its electronics are mounted on modular, slide-out cards, which should simplify servicing—or at least board-swap repairs.

An ounce of prevention is worth a pound of cure, or so the old saying goes. Doing some obvious things, such as using high-quality tapes, keeping your MDMs in a clean, dust-free environment and plugging the AC lines into a power conditioner—or at least a spike/surge suppressor strip—will go a long way toward keeping your recorders happy.

You should keep a maintenance log on *all* the gear in your studio. I keep mine in a three-ring binder, with one sheet for each piece of gear. On it, I list the name of the unit, its serial number, date of purchase, software version and any per-

inent info, such as dates when software was upgraded, heads cleaned, date and description of any repairs or modifications, etc. If anything ever goes wrong, it's nice to have this information handy.

THIS DOESN'T WORK...

Check the easy things first. Cables have a peculiar tendency to become loose at inopportune times, and this is a frequent cause of MDM problems, particularly when those tiny screws on the D-sub intermachine sync cables aren't tightened all the way. Even the removable IEC power cables can find a way to wiggle out of the socket, and an intermittent connection here can cause all kinds of unexplained maladies.

Having made hundreds of recordings on all types of MDM systems (Akai, Alesis, Fostex, Tascam, Yamaha and a custom 4-track system I've used for more than a decade), I can conclusively state that tape is an important factor. Experiment a little; find a brand that works, and stick to it. But no matter what brand you

BY GEORGE PETERSEN



ILLUSTRATION: TIM GLEASON

use, be aware that tapes will occasionally fail, jam or simply disintegrate. Backup tapes are a part of life in the digital world, and if you care about your work, then you should take the time to make safety copies. If you're having strange symptoms, such as a continuous or flashing error light, try playing another tape before you call the service department or start dismantling your recorder.

TAPE HEADS

One thing to keep in mind is the fact that the rotating heads used in the videotape-based digital recorders usually need replacing after 1,500 to 2,000 hours of use (typically less than one year at a busy studio)—“your mileage may vary.” Tape-head life can be extended well beyond that 2,000-hour figure by avoiding dusty conditions, using good-quality tape and cleaning the tape heads and pathway on a regular basis.

Unlike the heads on analog decks, MDM tape heads are extremely fragile. Unless you are thor-

oughly trained in the methods of cleaning rotary head assemblies, you'd better forget about popping the top on an MDM to do head cleanings. Besides, there are a couple of other issues to consider:

- Dismantling an MDM will void your warranty.

- The insides of such devices carry potentially lethal voltages.

- And worse yet—inexperienced hands mucking around in complicated electromechanical devices can seriously damage the equipment.

The first two points should be obvious, but it's all too easy to trash an

The Numbers Game

Number your machines! Put a small number (using one of the adhesive numbers included with a videotape's label page) on some corner of your deck's front panel. With a studio full of MDMs (meaning two or more), you can easily become confused as to which recorder is which. Referring to the stick-on number, you can easily keep track of the age, software version or minor eccentricities that recorders seem to devel-

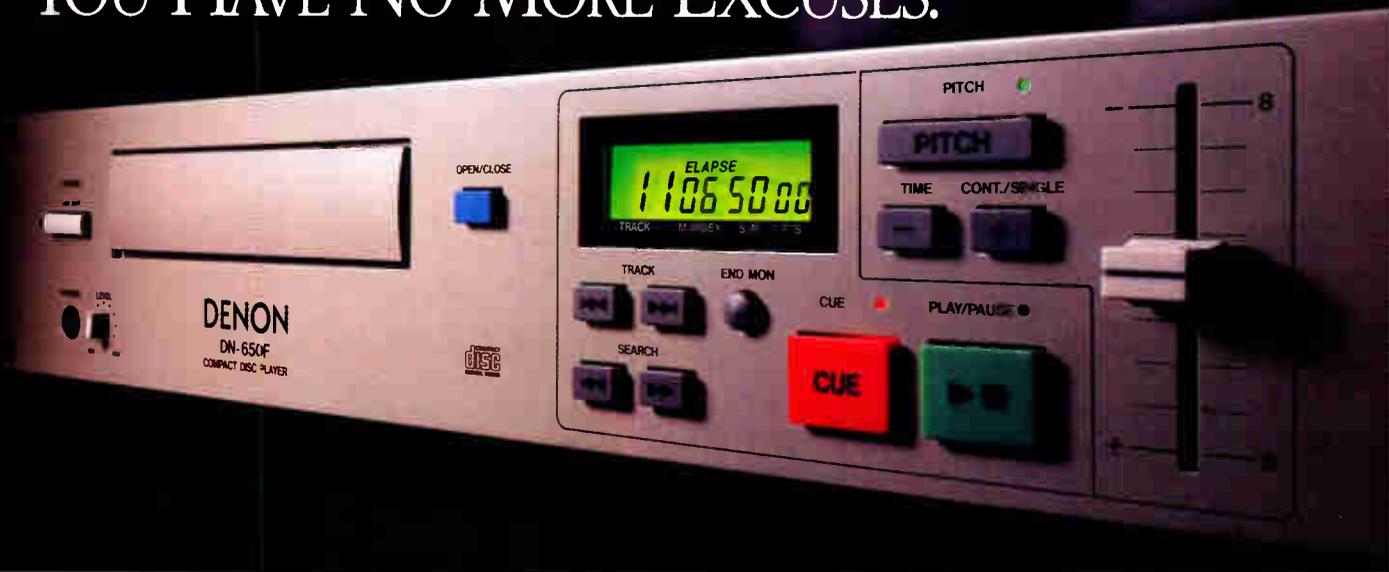
op over time.

And once the machines are numbered, you should develop a regular schedule of rotating the transports. If you have three decks in a rack, the top deck (tracks 1 to 8) will get more use than the second, and that deck gets more than the third, etc. Occasionally rotate the decks, and all the machines will get the same use, so at the end of the year, you may end up with three decks with 1,000 hours each, rather than one with 2,500 hours, one with 400 hours and one with 100 hours.

—GP

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Common DA-88 Error Displays

■ **E.CLOC:** No clock data is coming in, or the clock switch is set incorrectly. This could also indicate a mismatch in the Machine ID numbers and/or the order in which the extra transports are connected.

■ **E. t. cut:** Tape is broken.

■ **E. d io:** Digital I/O error—check to see if cable is connected properly.

■ **E. dE:** Dew sensor has detected condensation on head drum. This sometimes occurs when a DA-88 is moved from a cold area to a warm one, such as from a car trunk in winter to a heated studio environment. Leave the deck powered up, and let the machine heat up gradually.

■ **E.HI-8.t:** Tape inserted is not Hi-8mm.

■ **E.thin.t:** Tape inserted is too thin—use 120- or 90-minute tapes.

The DA-88's dynamic servo checking system uses a binary 4-bit code to indicate many different conditions from a few parameters. Servo errors are indicated by a code such as "S-Err-01," where "S" refers to Servo, "Err" is error and "01" is the specific error number:

■ **S-Err-01:** Mechanical problem—tape path, guide, drum, motor, etc.

■ **S-Err-02:** Irregular drum rotation speed.

■ **S-Err-03:** Combo of Errors 1 & 2.

■ **S-Err-04:** Capstan motor problem.

■ **S-Err-05:** Combo of Errors 1 & 4.

■ **S-Err-06:** Combo of Errors 2 & 4.

■ **S-Err-07:** Combo of Errors 1, 2 & 4.

■ **S-Err-08:** Reel (take-up or supply) problem.

■ **S-Err-09:** Combo of Errors 1 & 8.

■ **S-Err-10:** Combo of Errors 2 & 8.

■ **S-Err-11:** Combo of Errors 1, 2 & 8.

■ **S-Err-12:** Combo of Errors 4 & 8.

■ **S-Err-13:** Combo of Errors 1, 4 & 8.

■ **S-Err-14:** Combo of Errors 2, 4 & 8.

■ **S-Err-15:** Combo of Errors 1, 2, 4 & 8.

As you can probably figure out, there isn't much the user can do if such errors are indicated. After a servo error is displayed, the user should power the DA-88 down, wait a minute or so and then turn the power switch back on. If a normal display reappears, the self-reset feature cured the problem. However, the DA-88 refuses to allow tapes to be ejected while a servo-check error is displayed. This is for the protection of the user's master tape. For example, if the servo check shut the deck down because of an S-Err-05 capstan motor problem, then attempting an eject without correcting the error could damage the tape, and in this case, the cassette should be *manually* removed by a competent technician. —GP

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tions later in this article.

THE GERIATRIC MDM

The Alesis ADAT, Fostex RD-8 and Tascam DA-88 all store operational data—such as autolocation information, crossfade times and pitch-shift settings—in battery-backed memory, even when the units are switched off or unplugged. This useful feature operates thanks to a built-in lithium cell, which constantly supplies power to the onboard RAM. In my experience, such batteries typically last at least five years (usually eight or more), so around the turn of the century, if you encounter a senile-acting MDM, the problem may be no more serious than a dead battery.

AUTODIAGNOSTIC ROUTINES AND QUICK FIXES

All MDM designs include autodiagnostic circuits that display various error code messages to inform the user of a potential problem. Should these appear on your machine, it's best to call the manufacturer's service department and get their advice. Unfortunately, many problems occur on weekends, late at night, holidays

and other times when such phone help is simply unavailable.

Later in the article, I've included some of these messages, along with what problems they might indicate. However, if an error code tells you that the carburetor in your MDM has an improper air/fuel mixture or that one of the Venturi is blocked, should you head in with a soldering gun and an air hammer? Probably not, but sometimes an error code message may indicate something that you *can* fix, such as replacing a defective tape or checking sync cables and I/O connections. At 3:00 a.m., it's reassuring to know whether an error signals a major breakdown that should stop the session or merely an inconvenience that can be worked around until morning.

ALESIS ADAT/FOSTEX RD-8 TROUBLESHOOTING

These two machines share a common tape format and display similar error messages. Many simple problems can be remedied by running the reinitializing procedure, which is similar to rebooting a computer.

To reinitialize:

Turn the machine power off, then hold the "play" and "record" buttons simultaneously while powering up; release after five seconds. In a multi-machine and/or BRC system, reinitialize all components in this order: BRC first, then ADAT 1, 2, 3, etc.

If head cleaning is required, Alesis recommends the 3M VHS-HC Black Watch, a "dry" formulation video-cleaning cassette that can be used every 800 hours or so. The cleaning cassette need only run for a few seconds. Alesis does not recommend any other cleaning methods: particularly, do NOT use the "wet" style cleaners, which typically involve putting a few drops of some cleaning liquid into a VHS-sized cleaning mechanism. Such methods may permanently damage the ADAT heads.

The Alesis ADATs have a tiny light, known as the Advanced Information Indicator, located at the lower right-hand corner of the "seconds" indicator on the time display. It's a green LED that looks a lot like an additional decimal point, as shown by the open dot here: **40.00**. This LED lights whenever the error

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correction circuitry is active and may blink occasionally when a tape is playing. However, if it stays on for long periods of time, or appears repeatedly, then the tape heads may need cleaning. This condition can also be caused by a poor-quality or defective tape, so before you blame the problem on dirty heads, play a different tape and watch the Advanced Information Indicator. If it stays on repeatedly, then dirty tape heads are probably at fault (unless both of your tapes were defective). If it returns to normal, then the first tape may have been bad.

You can check the number of

hours on an ADAT by pressing the "set locate" and "stop" buttons simultaneously. This will momentarily display the total number of elapsed hours of head drum operation on the time counter display. This hour display is useful for scheduling routine service and for checking the "odometer" when you're surveying a used ADAT.

BRC PROBLEMS/CURES

The BRC functions only with ADATs that are software Version 3.03 or higher. With this in mind, Alesis can update pre-3.03 ADATs with the latest software; call the company for

details. You can determine an ADAT's software version by pressing the "set locate" and "fast forward" buttons simultaneously; the number of the software version will be shown on the LED display.

Also, in a multi-ADAT system controlled by a BRC, the ADAT with the *oldest* software version should be the master deck, so if you have three decks—V3.03, V3.04 and V3.05—then the master should be the 3.03 ADAT. You should be aware of this if you occasionally borrow or rent extra machines.

THE RD-8 DIFFERENCE

In addition to displaying the same error codes (listed in the sidebar) as the Alesis, the Fostex RD-8 offers other useful autodiagnostic information. The Advanced Information Indicator LED on the RD-8 is a small dot between the numerical frame and subframe displays and, like the Alesis ADAT, will glow steadily whenever error-correction action exceeds nominal tolerances.

However, the RD-8's hippest autodiagnostic function is a real-time error rate counter. Found by switching to page 9 of the main menu, the LCD will display a count of the number of sync block errors occurring over 14 revolutions of the head drum (or every 280 milliseconds). With 30 sync blocks per sector, eight sectors per track and two tracks per revolution, the maximum number of errors is 6,720. If you want to monitor the RD-8's error rate performance, or if you are simply bored during a droll session, switch in the Error Rate Display and party down!

But what does this really mean? Error rates in the 0 to 7 range are typical, and errors in the 20 range can indicate worn tapes or dirty heads. However, if your error count is approximately 100 or more, either the heads are gummed or the tape is shedding. If you get a high error rate, try a different tape; if that tape also has a high error count, then the problem is probably dirty or worn heads. If the second tape has a low error count, then the first tape is bad.

By the way, the RD-8's error display is only active during record or playback operations—all other times, it reads "0000."

Another feature available on the main menu is the ability to display the software version of the RD-8. The current software version is 1.04;

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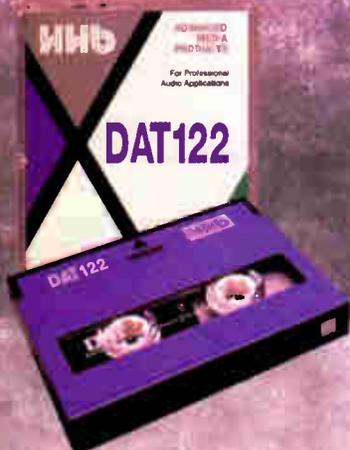
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if you are having problems with your RD-8, they may simply be software-related. Version 1.02 was particularly problematic and filled with bugs that were fixed with versions 1.03 and 1.04. Fostex has offered free software updates to registered users. Just one more reason to return that warranty card!

CARE AND FEEDING OF THE TASCAM DA-88

If your DA-88 is acting erratically, replacing your transport with another deck may solve the elusive mystery of whether the problem is being caused by your recorder or by some peripheral device in the chain, such as a MIDI or SMPTE synchronizer. And as the DA-88 electronics are mounted on easily interchangeable pull-out cards, diagnosing problems within the deck becomes a matter of combining a logical series of board swaps with a simple process of elimination, assuming that you have access to a second (or third) deck.

According to Tascam, the DA-88 heads require cleaning approximately every 50 hours, or whenever the front panel error LED lights excessively. A *dry* cleaning tape, designed specifically for Hi-8mm video transports, should be used, and those made by Sony and TDK are recommended. Normally, the DA-88 automatically ejects tapes that are not recordable—such as cleaning tapes, regular 8mm formulations or tapes longer than 120 minutes—so the machine must be put into a special cleaning mode before the cleaning tape is used. Here's how this is done:

1. Eject any tape in the machine and turn the DA-88 off.
2. Press the arrow up/down keys simultaneously and turn the DA-88 power switch on. The display will read "CLEAning" to indicate that the machine is in cleaning mode.
3. Insert the dry cleaning tape. Cleaning will start automatically. After 15 seconds, the process is completed: The cleaning tape is automatically ejected, and the DA-88 exits the cleaning mode and is ready for normal operations.

Tascam recommends bringing the machine to an authorized service center every 500 hours for routine maintenance.

To display the number of hours on the head drum, hold the "play" and "stop" buttons while powering

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up. The number of hours that the deck has been operated in the shuttle mode can be determined by pressing the "stop" and "fast forward" buttons while powering up.

TAPE WON'T FORMAT OR RECORD

If your DA-88 won't record or refuses to format a tape, the problem may be simple to correct, and it may not cost you a nickel! If you've never used an 8mm videotape system (audio or video), you should know that the erase protect tab on the back of such tapes (Hi8 or standard) must be slid into the *open* position to allow recording, which is the op-

posite of the way that floppy disks, DATs, analog cassettes, VHS tapes and everything else on the planet operates. This is obviously a minor point, but it takes a bit of getting used to. Just slide the tab to the "open" position and get to work.

One interesting bit of trivia is that tapes previously recorded with video information cannot be formatted for DA-88 use. So you'd better forget about trying to track over your camcorder tapes of little Jimmy's birthday party when you're out of tapes and need to put down some killer licks in the middle of the night.

GETTING INTO SYNC

Up to 16 DA-88s can be interlocked for multimachine operation—without the need for any external synchronizing equipment. It's really a simple plug-and-play operation. However, there are a few things to remember:

While the DA-88 uses 15-pin D-sub connectors for sync, an off-the-shelf computer cable will NOT work in this application and may damage the equipment. You can either get the optional Tascam PW88S sync cable (\$85) or make one by connecting all pins *except* 12 and 13. After rolling my own, it occurred to me that I could have just bought a ready-made computer cable and cut or removed pins 12 and 13, an inexpensive, no-hassle alternative.

Machine lockup is easy, but if your DA-88s won't sync, check the Machine ID switches and make sure they're set properly. A tiny rotary switch on the rear of each machine selects the Machine ID (sort of like a SCSI ID number): ID #0 for master, #1 for the first slave, #2 for the second, etc. Power the machines down and reset the IDs. Then power up, load your tapes, push the "chase" button on the slave deck(s), and the slave(s) faithfully follow the master transport.

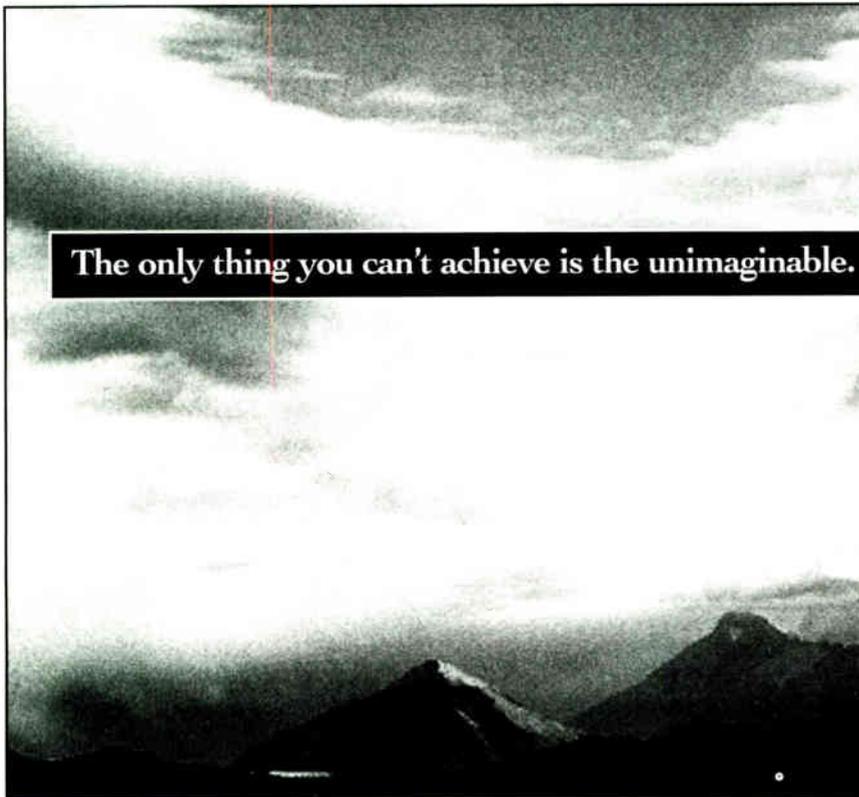
DA-88 AUTODIAGNOSTICS

The DA-88 has numerous error codes and autodiagnostic messages (see sidebar). On power up—in that period when the machine flashes all of the LEDs and provides the groovy "Tascam" light show—the DA-88 is actually running a self-test/self-reset routine. So, if a problem occurs on the DA-88, the first thing to try is to power the unit off, wait a minute or so and then power it back up.

THE FINAL WORD

Hopefully, the information presented here will keep you and your (growing) collection of MDM decks safe, healthy and happy. By applying these tips, a little common sense and an occasional call to the manufacturer's service department, your budget digital system will stay running well into the 21st century—just remember to check on those lithium batteries around 2001 or so. ■

This article is adapted from George Petersen's Modular Digital Multi-tracks: The Power User's Guide, available through Mix Bookshelf.



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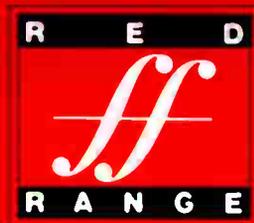
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by Patrick Feehan and Rolfe Wyer

YAMAHA ProMix 01

I recently visited my brother-in-law in Florida, who told me about the guy who has to deal with the occasional alligators that show up in somebody's yard. It's not exactly most people's idea of a dream job. But it's probably comparable to being the guy who has to come and take this mixer away from me and my partner, Rolfe Wyer, once this article is complete. We're not normally violent, but in this case, we're willing to make an exception. We're not letting this mixer go.

As a long-awaited step up (more like a giant leap) from Yamaha's small family of low-cost, fully automated digital mixers (DMP7 and DMP11), the ProMix 01 offers much more and, proportionally, costs much less than either of its elders. The ProMix 01 has 16 channels (twice as many as the DMPs), is considerably more user-friendly, has improved EQ, has better internal effects, has superior MIDI implementation, is quieter and, without a doubt, sounds much better. And we know of what we speak; between us, we own six DMPs. Or, owned...

Lest we drool on our keyboard, we'll start with some dry facts. First of all, credit Yamaha with listening to its customers and coming up with a manual that is usable *and* understandable. (Remember the DX7 manual? What a nightmare!) We had few problems getting around this mixer right away, and any questions we had were quickly answered in the manual. The tutorial will be very helpful for those new to Yamaha's mixing idioms.

As mentioned, there are 16 inputs, each with gain-level control and a 20dB pad. Inputs one through eight have balanced XLR connectors with a switchable 48-volt phantom power supply; inputs nine through 16 have TRS ¼-inch mic/line connectors that are usable with balanced or unbal-



anced plugs. Other than the choice of input jack and phantom power, all 16 inputs are identical, and with appropriate connectors they each can be used for either mic or line sources; however, you are limited to eight inputs of phantom power.

The ProMix 01 has other inputs as well: a 2-track input to monitor your tape deck, and another very cool stereo return, which can be used to return effects, or—dare we say it—to bring in the stereo outputs of one's second ProMix 01, which, given the price, isn't so farfetched. Incidentally, this stereo input has its own fader and it can be run through EQ, onboard effects, and onboard dynamics processing. Mercy!

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We found the user interface quite easy to understand, even having worked with it for only a short time. Midway down the left side of the 01 is a group of keypad buttons that control the heart of the mixer's internal functions: panning, dynamics processing, effects, metering, cue, MIDI functions and more.

Let's discuss some of these, beginning with EQ. Each channel has a three-band, fully parametric EQ with variable Q, frequency, gain and bypass functions. The highs and lows can be configured as either shelving- or peaking-type; mids are peak-only. We've seen more powerful EQ sections on very expensive boards, but to say that this system is adequate vastly understates the case. In fact, we found the versatility and subtlety available here a joy, and the sound to be likewise. But wait, there's more: A large LCD readout provides the user with a graphic representation of the EQ dialed in (both a curve and the parameter information are visible), giving your eyes and ears the ability to work together to fine-tune sounds. But be careful—seeing the EQ curves and parameters can become addictive.

There is also a library of EQs within the internal memory of the mixer, providing 20 locations to store those magical settings you worked on for hours. Once you've gotten that perfect piano sound, or that killer guitar tone, you can store it for next time. If, next time, it doesn't sound quite as good as you remember, you've certainly got a great place from which to begin adjusting. And for those whose abilities to tweak EQs are lacking—or for anybody in a hurry—Yamaha has thoughtfully provided 30 preset equalization settings, which are also usable as starting points for creating your own sounds.

The two onboard stereo effects processors are similar to Yamaha's SPX Series. The 30 presets cover the effects you'd expect: various reverbs, chorusing, flanging, delay, pitch change, auto-panning, tremolo and, of course, the soon-to-be-renowned "Karaoke Echo." If your career is somehow sailing along nicely without owning the "Karaoke Echo" effect, well, you can tweak it—or any other preset, for that matter—into something more suited to your taste,

and store it for posterity in one of the ten user preset locations (we wish there were more). These effects, some of which are combinations (delay/chorus; flange/reverb), are politely quiet, thank you very much. At the risk of repeating ourselves, we've heard higher-quality effects, but, again, given the price of the unit, we're more than satisfied with what's offered.

The dynamics processing section includes compression, limiting, gating and ducking. There are ten presets and ten more user locations. You can create three settings, either pre- or post-fader, and use one per channel, including the stereo-input channel. On each channel, you can use one or both internal effects processors (sends one and two), a dynamics processor, as well as the two external effects sends (three and four), which can be grouped as one stereo send or used separately as two mono sends.

On to some fun stuff: pairing, grouping and automation. Pairing is used for stereo inputs; obvious examples would be a stereo keyboard or a stereo effects return where you would want to control both channels with one fader or one MIDI control message. Several parameters other than level are linked when using pairing: phase, EQ, dynamics processing, sends one through four, cue and channel on/off. When you send a change of parameter for any of the above to one channel of a pair, the change occurs on the other channel simultaneously. When you're used to handling your pairs of stereo inputs a module at a time, the pairing function provides a significant savings of time and trouble.

The next level is grouping, allowing the assignment of two to 17 faders in a group (channels one through 16 plus the stereo-in fader). Grouping is strictly for the faders; none of the extra parameters sent by the pairings applies here. Four groupings are available at a time, and each channel can be assigned to only one of the four. Pairings can be part of a group as well. When you move one of the faders in a group, all other assigned faders physically move as well, and despite our incessant wiggling, the faders felt like they could hold up well.

The MIDI implementation used to automate this mixer is another way Yamaha has upgraded its DMP Series and, in this case, significantly so.

Originally, there were 112 control messages to which DMPs would respond. ProMix 01 responds to 530 messages, such as channel on/off, channel level, panning, send levels in and out, all EQ parameters, effects parameters, dynamic processor parameters, stereo out on/off and level; we could go on and on. Certainly Yamaha went beyond the call of duty in this regard.

As a long-awaited step up (more like a giant leap) from Yamaha's small family of low-cost, fully automated digital mixers, the ProMix 01 offers much more and, proportionally, costs much less than its elders.

If you wanted to spend the time and the effort, you could set up a mix using your sequencer and tweak the mix down to a gnat's eyelash. For example, it's possible to fine-tune changes such as the stereo placement of a guitar, its level, its reverb time, its chorus settings and its EQ during an instrumental bridge. An artist can completely change the attitude and environment of the instrument for one section of the song, and then change it all back again for the verse. And remember, if you're processing stereo tracks, you need only send instructions to one channel, and the pairing function assures that both channels respond together.

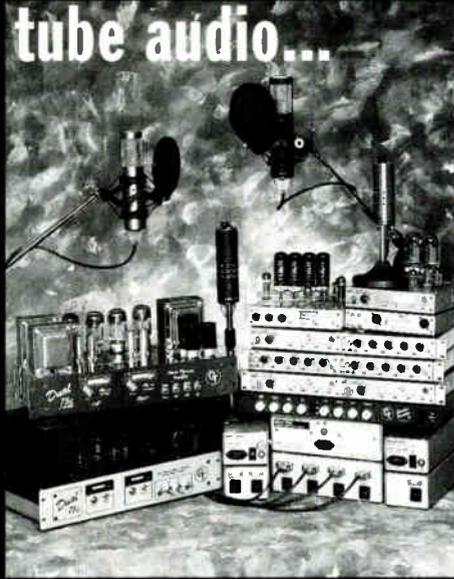
If you want to add slapback delay to the vocals only on the last word in the chorus before the solo section, just send the appropriate MIDI message, and it's done. If you are not using a sequencer, you can still take snapshots and store them into the 50 available locations, then call them up either manually or with a MIDI program change command. Opcode has already shown its Galaxy librarian module for the ProMix; and Emagic, Mark of the Unicorn, Steinberg and others are also developing software.

A couple minor points are worth

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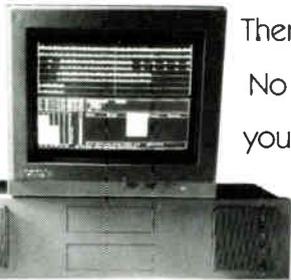
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mentioning: The 240x64-dot, backlit LCD provides a significant visual aid for editing all accessible parameters, metering (other than stereo output, which is handled by a separate 12-segment LED) and, as mentioned, EQ. A parameter wheel is used to input parameter changes. Four cursor buttons and an "enter" button likewise adorn the front panel, as do monitor and headphone level knobs. All normal monitoring needs are covered on this mixer, from what Yamaha calls stereo fix mode, where identical mixes are sent to the monitor section and the stereo output, to a cue mix, where a vocalist who wants less drums and more piano can be accommodated. Solo is available; mute is provided via each input's "channel on" switch. And certainly we should mention that there are stereo analog outputs as well as S/PDIF digital outs, a breakthrough in a mixer at this level (record right to DAT, sports fans).

Our complaints about the ProMix 01 are few but worth noting. The sampling rate is locked to 48 kHz, so those who expect to go directly to CD are going to need one of those pesky sample rate converters. We assume Yamaha was going for the highest sample rate for the best sound and left off the 44.1kHz rate as a money-saving measure. Also, the digital-cascade connection of the DMP era has been retired. We would have loved the rack ears. And last, but certainly least, the color scheme left us less than enthused.

But, hey, for under two grand, we'll live with the color and buy the rack ears if we need them so darn much. And our guess is that many thousands of other people will also live with the color. This mixer is going to sell like...well, if you're interested, you'd better get on a waiting list right now.

Gotta go. We're going into training for the upcoming tussle with that guy who wants our demo model back. Don't bet on him winning.

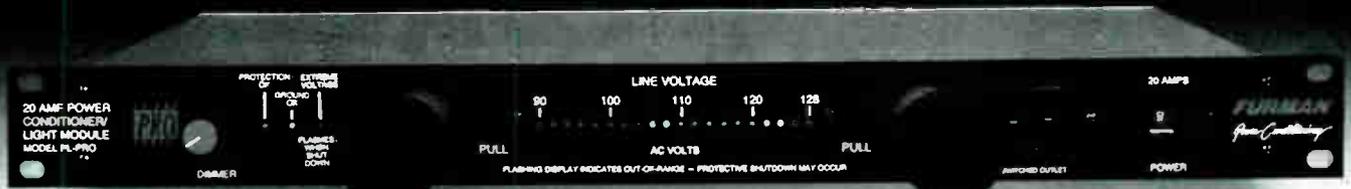
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Patrick Feeban and Rolfe Wyer compose music in the San Francisco Bay Area; their recent projects include producing the music for the opening ceremonies for soccer's World Cup.

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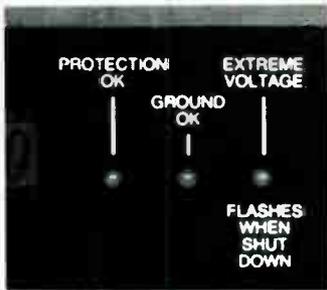
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by Mark Frink

AUDIX OM-5 MICROPHONE

Over the past several years, Audix has quietly established a cult following for its unique line of dynamic vocal mics. Previously released products include the OM-3xb and the OM-7 transformerless dynamic microphones, with list prices of \$279 and \$359. The top-of-the-line OM-7 was designed with lower output for use in high-SPL applications without needing pads and has been popular with artists from Springsteen to Pearl Jam. Both of these mics exhibit an extremely flat, natural sound, with a distinctive lack of proximity effect. In live situations, vocalists and engineers have come to expect certain artifacts with the various popular dynamic models. The *absence* of coloration—peaks and proximity bumps—in previous Audix models may have proven disconcerting to many.

The new OM-5, with a list of \$329, fits price-wise between the other two Audix dynamic vocal mics. Its hypercardioid pattern exhibits the same impressive gain before feedback but offers a round pop filter and a subtle proximity boost at 125 Hz, giving it some of the advantages of the classic Beyer M88 without the accompanying boominess at adjacent frequencies.

I have long been a fan of the M88. Sun Sound's Fred Mueller started me using it with Suzanne Vega and Eric Clapton shortly after Phil Collins began popularizing it. The exaggerated proximity effect also made the M88 a fashionable kick drum mic, but that wide low-frequency boost proved too much for most vocal applications without

major tweaking on the lows and mids, and the use of a highpass filter. The more subtle proximity effect in the OM-5 works along with its gentle high-frequency boost to create a smooth "loudness" (Fletcher-Munson) response at the extremes of the vocal range. I found it is possible to use the microphone in many situations with no EQ, and sometimes no highpass filter, where other mics required a bump or a tweak.



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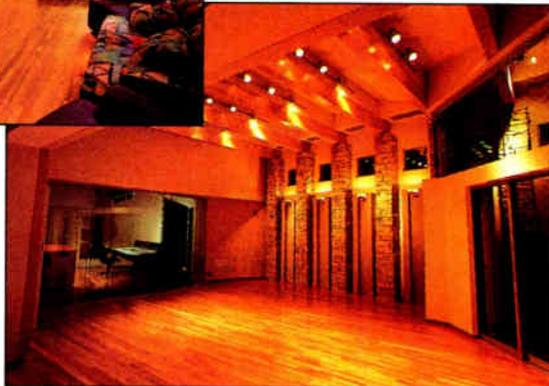
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The OM-5 has the same extended, smooth high end as the other Audix mics, with a rise from around 5 kHz to about 10 kHz, giving it a condenser-like quality. The mic's overall sound quality benefits from the low-mass design of the capsule's diaphragm. Most dynamics have a distinctive "hang" in the low midrange as a result of the resonance of the moving mass. By minimizing this, Audix has produced yet another microphone with an uncolored, transparent sound. The previous hypercardioids from Audix have angular pop filters, which are flattened on the end. I know that there are very good reasons for this, but there is something aesthetically pleasing about a round microphone that will appeal to many artists on a subconscious level.

I used the mic with a P.A.S. SW-2, time-aligned, coaxial floor monitor. This box has a JBL 2450 on the horn, which is fairly smooth. I devised a five-way test, using my four favorite dynamics: a Sennheiser MD-431, Shure Beta 58, Beyer M88 and an EV N/DYM 857, using no graphic in-line. Gainwise, the OM-5 fell below only the N/DYM but outperformed it and the other three for gain-before-feedback. It was by far the smoothest, falling somewhere between the 58 and the 88 in terms of tonal balance, with pleasant midrange like the 431.

Let's face it, the ubiquitous Shure SM58 and Beta 58 are the benchmarks against which all other vocal mics are measured. In spite of a slightly higher output level than a Beta 58, I found the OM-5 a perfect mic to carry in situations where the sound system has already been set up with 58s, either Beta or regular, due to its superior feedback rejection. I used it many times in clubs and at festivals where I was able to simply unplug the front line of vocal mics and replace them with OM-5s to get a smoother, warmer sound at a higher gain with no feedback.

The mic's sound quality made it easier for the singers to hear themselves, both in the house mix and in their monitors, as they rushed up to tell me after the first show. My lead singer wanted to go out and buy one of his own. The OM-5 is a good investment for artists serious about their vocal sound.

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by George Petersen

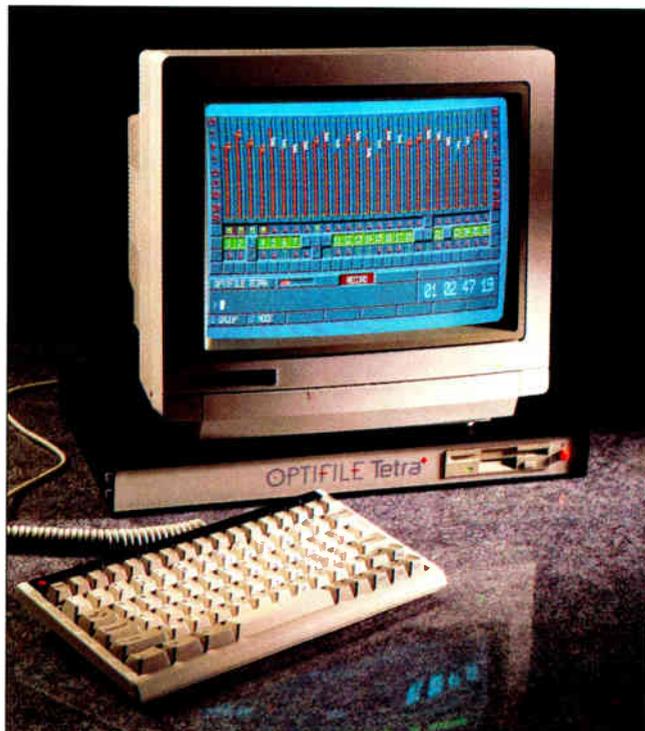
OPTIFILE TETRA AUTOMATION

Console automation can be a wonderful thing, freeing the engineer from the limitations of having only ten fingers. Studio owners also love console automation systems, especially when clients spend a little (or a lot) more time to ensure that every detail in the mix is scrupulously right. Everybody's happy. And with the current trend of increasingly complex mixes, console automation is becoming more of a necessity than a luxury.

If the console you have (or are planning to buy) doesn't include an automation package, several options are available. The top-of-the-line choice would be a moving fader system, offering high performance and ease of use, although at a premium price that typically exceeds the cost of most mid-priced consoles. At the other end of the cost spectrum are VCA systems, available in a variety of prices and configurations, ranging from MIDI-based outboard devices to in-console packages.

Tetra is the fourth generation of Optifile automation from French manufacturer AD Systeme. It combines the affordability of VCA technology with many of the advantages of moving faders, all in a SMPTE-driven environment with high-resolution computer graphics and an innovative auto-nulling fader function. Other features include disk-based mix storage, individual channel or group muting, the ability to assign any fader as a group master, up to 64 channels of fader and mute changes scanned during each frame, and 512-step fader resolution.

A basic Tetra system consists of a 40-channel capacity, rack-mount CPU with computer keyboard and six optional add-on modules, which include a 64-channel expansion card, extended software with cue list and



offline mixing functions, and RS-232/RS-422 transport control.

Tetra Automation CPU with mini keyboard

INSTALLATION

The most dreaded of studio conditions is downtime, and the installation of most console automation systems can be tedious and time-consuming. However, this is not the case with Tetra. Sascom Marketing (Optifile's importer) has techs available throughout North America to handle all the details. I participated (meaning, mostly watched) in a 40-channel installation that took approximately ten hours, from walking through the front door to testing and final check-out. The system is based around "motherboards" that go into the console pan using adhesive stand-offs. Each motherboard supports up to eight faders, and pre-cut, prefabricated ribbon

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The Studio 5000 takes its predecessor, the amazing DHP-55, a step further. With new features and programs crafted by studio pros, the Studio 5000 is sure to stir your creative urges. Here's what the people who make their living in the studio have to say about it.



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KIM BULLARD

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John Ross, President of LA's Digital Sound and Picture needs quality pitch shifting for Foley without the artifacts of competitor's products: "... the 5000 sounds natural, just like 2 inch tape at half speed. We require high quality products for simple applications. The Studio 5000 fits in very well indeed." Digital Sound and Picture is an advanced facility using a Lan-based digital audio network and multiple digital audio workstations.

Sweeten Mixes, Add Depth

Five time Emmy award winning composer and producer Dominic Messinger says the Studio 5000 "makes the normal exotic". He uses it to sweeten mixes by using the regenerative pitch shifting Mix Imager programs. On drums he adds depth with detuning and dynamic filtering effects.



"It's like getting a whole new set of presets for your instrument"

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5 TIME EMMY AWARD-
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Creative Control

Clif Brigden, engineer for Thomas Dolby uses the Studio 5000 on Dolby's upcoming album and interactive video projects. "It sounds wicked right out of the box but lets you get to and change every parameter to make your own unique noises."

Leading Edge Special Effects

The Studio 5000 adds a futuristic edge to new animated series 'Phantom 2040'. Producer/composer Gerald O'Brien explains: "The 5000's Lush Chord Shifting algorithm is used on the main theme vocals

"It will be an indispensable product for musicians and engineers."

DHP-55 review
SOUND AND
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while guitar and bass tracks get cabinet emulation and special effects. The robot voices are created using combinations of pitch shifting, flange and chorus." Gerald has scored over 22 shows including the successful



"Imagine what music will sound like in 40 years - that's what we're working to create."

GERALD O'BRIEN

Cobra series. His songwriting clients include Manhattan Transfer, Hall and Oates and Deborah Harry.

Guitar Effects

"They asked for a Jimi Hendrix type cue to go with a 60's acid experience... I quickly called up the Voodoo Wah program... and they loved it!" Larry Brown, TV composer, producer and Emmy winner uses the Studio 5000 to closely emulate guitars with his synthesizers.

Fast

"I have to write a lot of music in a short period of time and the Studio 5000 really helps me to achieve that" says Kim Bullard, writer, producer and session musician. He's using the Studio 5000 to help create the soundtrack for the upcoming film, 'Taxandria.'



"Sounds so deep, I'm still looking for the bottom."

CLIF BRIGDEN
ENGINEER FOR
THOMAS DOLBY

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connectors tether each fader assembly to the motherboard, which connects to the external power supply and CPU, both housed in single-rack-space boxes.

The time-intensive aspect of the install is pulling the modules and removing the faders from the channel strips. Tetra uses your console's faders and mute switches, so desoldering the fader and mute connections (and replacing the wires with push-on connectors) is the bulk of the installation. Tetra's VCA fader boards use surface-mount components, and the compact dimensions allow the boards to piggyback onto the fader itself, so the system installs easily even in boards with shallow pans, such as certain Trident and Soundcraft models.

According to company representative Louis Austin, more than 500 Optifile automation systems have been installed worldwide, in almost every brand of console, including Allen & Heath, Amek, DDA, D&R, Harrison, Helios, Lafont, MCI, Malcolm Toft Associates, Neotek, Neve, Otari, Peavey, Raindirk, Ramsa, Soundtracs, Soundcraft, Sound Workshop, TAC, Tascam and Trident.

Older consoles are not forgotten. AD Systeme also offers a retrofit automation board for owners of MCI 500 and 600 Series (as well as some Sound Workshop and Amek 2520 consoles). The interface replaces the ARMS digitizer boards via a simple board swap (one board for each 16 channels) and installs in a matter of hours. This should be good news for owners of problematic vintage automation systems and may put new life into old boards.

Once installation is complete, all that's required is plugging in an analog RGB monitor (several Sony models meet the spec), connecting the time code input to a balanced -10dBm XLR source and running a setup program that calibrates the faders to the VCAs, sets the desired time code (24 fps, 25 fps, 30-drop frame, 30-non-drop) and handles other one-time setup chores.

HARDWARE

A few basics are necessary to fully understand Tetra. The system uses a custom CPU based on a 16MHz, 68000 processor, and mixes are stored on DOS-formatted, 720K, 3.5-

inch floppy disks. No hard disk is provided or optional; AD Systeme's philosophy regarding this is twofold:

1) Floppy disks are convenient, inexpensive, *removable* and easily backed up. Once a mix is in RAM, multiple copies of the data can be downloaded to preformatted floppies and stored with the master tapes.

2) Each floppy provides the ability to store approximately 40 to 50 versions of a typical song mix, with onboard storage of *up to 90 minutes* of live mixes in RAM.

WITH THE CURRENT TREND OF INCREASINGLY COMPLEX MIXES, CONSOLE AUTOMATION IS BECOMING MORE OF A NECESSITY THAN A LUXURY.

The latter point requires a bit of explanation, as the amount of available memory on complex mixes is substantially less than those figures. And this storage capacity in memory-intensive applications—such as a post-production mix with hundreds or thousands of mute and fader cues—would likely end up in the half-hour range. Although short of the 90-minute figure mentioned in the Tetra literature, this amount would still be more than adequate when working on 1,000-foot (11-minute) feature film reels or broadcast TV segments, which, with commercial breaks, are well under a half-hour.

Memory capacity is a trade-off between total program time, fader resolution and scan speed. As for me, I'd vote for the system's fade-resolution (Tetra's is 9-bit, for 512 steps) and 64-fader and mute-per-frame scan speed, which seems to be the ideal compromise. A 12-bit A/D converter increases the perception of Tetra's fader resolution by setting 0.19dB steps from 0 to -30 dB; 0.38dB steps from -30 to -50 dB; and 0.76dB steps from -50 dB to infinity. Thus, the fader moves are smoothest in the range where hearing's sensitivity to volume change is most critical. It works.

Based on critical listening, the dbx VCAs in the Tetra system are very good. In fact, I arranged several impromptu blind listening tests, and no one could consistently identify the difference between signals run

through the VCA circuit and bypassed signals. Zipper noise was nonexistent, and in all cases, mute switching was inaudible.

An appreciated touch on the Tetra system are relays on each mute and fader module that automatically bypass the automation in the case of power failure or other problems. Better still, if someone unfamiliar with the automation works in your studio, the system reverts to standard console operation whenever the automation power supply is turned off.

Onscreen displays are extensive. The screen can show the fader, mute and status of up to 26 channels simultaneously, and the display toggles quickly to any of the other 64 faders. System memory is displayed in an onscreen "gas gauge" style meter, which gives the user an idea of the amount of available RAM at a glance.

The SMPTE display is large and legible, with numerical hours/minutes/seconds/frames figures and a bright red outline around the SMPTE window to indicate that the incoming time code is okay. If the outline flashes, then the code doesn't match the preselected time code format; if the outline disappears, then the time code may be invalid, corrupted or discontinuous. Tetra doesn't include a time code generator. I guess AD Systeme assumes that most studios have the resources to do this. I'm not sure that is entirely correct. However, there are numerous low-cost ways to do this, such as reference CDs recorded with SMPTE time code or affordable time code reader/generators.

MIX OPERATIONS

Two keyboards are available: a mini QWERTY computer keyboard with 16 function keys for triggering various operations, and an optional "Power Keyboard." A compact controller about the size of a Lexicon LARC, the Power Keyboard has more dedicated keys for selecting functions, along with a 27-key QWERTY keypad, a ten-key section for numeric entry, and a five-key transport control (ff/d/rwd/play/stop/record). Use of the latter requires the optional machine control interface (\$1,695).

Access to functions or specialized features is provided via a menu-driven arrangement, with single key-strokes bringing the user into the submenu. For example, pressing the letter "T" brings the title menu for loading and copying mixes; "C" ac-

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FIELD TEST

cesses the console page, which shows the fader movements and console status; "Q" calls up the Cue List menu; and "G" recalls the group setup page, for the creation of up to nine groups. Other functions, such as Keep, Undo and eXecute, are similarly accessed.

Tetra provides a multi-status system that allows the user a choice of several working methods. "Isolate" disengages any number of faders from the computer, allowing experimentation without writing the fader moves to the buffer. "Absolute" writes moves as they happen, whether doing a first pass or rewriting a section to erase previous moves. When punching into a mix in Absolute mode, any fader you want to change must be nulled (set to the previous position) for a smooth transition. The fader icons on Tetra's screen display automatically change color, from white to red, when the faders are nulled.

As with Absolute, the Update mode allows changes from the mix currently in RAM. However, in Update mode, the faders do not have to be nulled—as soon as any fader is touched, the automation begins changing the level relative to the null point. Let's say the null point is +1.5 dB, and the physical position of the fader is -3 dB; if the fader is moved down by 2 dB in Update mode, the new automation level will be -0.5 dB. The Safe mode is fairly obvious, and when channels are in Safe mode, physical movements of the faders have no affect on the playback.

Tetra's most interesting and powerful mode is Move, which is designed to emulate the operation of moving fader systems. Once the Move function is selected, there is no need to null faders before a punch-in point, and any fader selected only becomes active when you begin moving it. The Move mode offers numerous advantages—if you come back to a previous mix and only want to make a few changes after all the faders have been moved, you don't have to reset everything.

Additionally, before entering Move mode, the user can set the faders to any desired position before mixing. For example, if you want to insert a fairly long fade on a channel that's at the -20dB point, you may only have 1.5 inches of fader travel available,

making the fade difficult. By entering Move mode with that fader set at 0 dB, the automation would still begin the fade from the -20dB start point, although the engineer would have a longer fader throw in which to complete the fade smoothly.

Best of all, Tetra allows the user to select any way of working that suits the project or personal preferences. If the engineer wants to operate with the mutes in Absolute, some faders in Move and other faders in Update, it's no problem.

Other features include an on-screen track list page, a handy place to store track name assignments or notes on the mix. The information is stored on disk, along with the automation data; however, there is no way to print out the track list to provide a hard copy. Tetra provides only one level of instantaneous keep/undo of changes, although obviously, multiple versions of mixes can be saved to disk. By using the "drop" function in the Rehearse mode, users can toggle between two different mixes, which is useful.

Operationally, the system is intuitive and straightforward. The main control page is simple and uncluttered, yet provides complete information at a glance, including current and previous fader positions, group and mute data, SMPTE in/out registers and, of course, the current SMPTE location. Speaking of SMPTE, I found Tetra to be quite forgiving of less-than-perfect time code, and the system tracked off-speed time code accurately.

U.S. pricing for a base Tetra system, including CPU, power supply, VCAs, software, PC-style keyboard and video monitor cable (less monitor), ranges from \$7,995 for an 8-channel system to \$15,595 for a 64-channel system. Obviously, the larger the system, the more cost-effective Tetra becomes (i.e., a 40-channel version is only \$4,000 more than an 8-channel setup), and numerous options are available. Whether you're looking for automation for a new console or looking to put new life into an older board, Optifile Tetra offers a powerful, affordable alternative to moving fader systems.

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RENOVATION DELUXE

■

THE COMPLETE OVERHAUL OF WARNER BROS.¹ STUDIO FACILITIES

by
**Maureen
Droney**

Beautiful downtown Burbank, in the old days the butt of nightly Johnny Carson jokes. Carson, who taped his shows at NBC's Burbank studios, made the city his symbol for the quintessential Hicksville, sort of a country-bumpkin cousin to hip Hollywood. Well, things have changed, and for some time now Burbank has been giving Hollywood a major run for the money. New facilities have opened right and left, and numerous independent production houses now make their homes in Burbank, along with the big guns: Disney, NBC and Warner Bros.

Warners, home to film, television and music, has always been the flagship. Now, determined to keep out in front of the pack and in a move to recapture the post work that has moved from the major studios to independents over the past two decades, Warner Bros. has committed to a major renovation of its

film and television studios. The company is intent on bringing in outside business as well as streamlining in-house projects. The goal is to save time and money without compromising high standards.

On my first tour of the under-construction audio post sound studios, the ex-



Left: Tour guide/engineer Robert Budd in the machine room of the present



citement was palpable, and the youthful enthusiasm of my tour guide, senior VP Don Rogers (a 41-year industry vet), was contagious. Rogers is supervising the renovation and seemed calm and unflappable amid dust, heavy machinery and masses of coiled cable.

"Because we chose to close down our rooms and renovate the entire facility at once," he says, "we have estab-

ALL PHOTOS EXCEPT THE SOUNDSTAGE ARE BY MAUREEN DRONEY.



Top: the custom SSL 9000 in one of the two feature film dub stages

lished incredible continuity between the different areas. All of the stages are integrated with each other, and the two new film dubbing stages are identically designed—they are clones of each other. Our downstairs dubbing rooms 3 and 4, the television rooms, are 4-channel stereo rooms and have the capability of doing a small feature. We can also use them to predub effects or dialog for a feature. Our goal was maximum flexibility. And we've geared this facility toward our present clientele but with an eye on future development and growth. As part of that future plan, we've made long-term relationships with our equip-



Left: the dynamic duo of Barry Snyder and Don Rogers; below: the Foley stage, complete with rear projection and car door.



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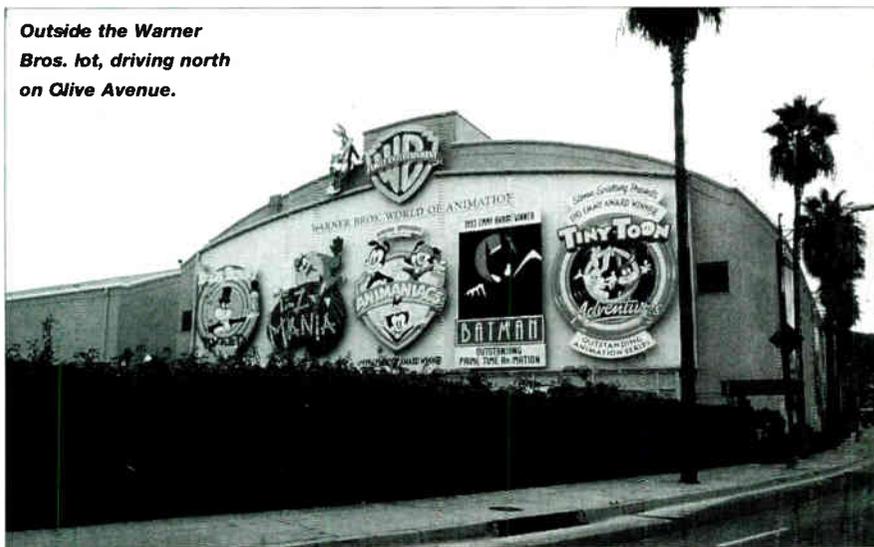
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ment manufacturers to mutually design and develop future products for use at our facility and in the entire post industry."

Rogers, a boating aficionado, continues, "However, in order for our 'boat' to be sound, it must have a strong engine and crew. Personnel and service are paramount. We now offer many of the studio lot services that give us the 'boutique' feel that all clients desire and seek out. And we've assembled a creative staff of mixers, editors, Foley artists and support crews that rival any staff in town."

Among those coming onboard for the opening of the new facility are film re-recording mixers John Reitz, Gregg Rudloff and David Campbell. The team joins WBSF (Warner Bros. Studio Facilities) after successful stints at Buena Vista Sound (Disney) and Lion's Gate Studios. Also added to the staff are sound supervisors George Watters and Alan Murray, with more than 40 years of post sound experience between them. Watters' credits include *Top Gun*, *Patriot Games* and *Hunt for Red October*, while Murray has worked on *Unforgiven*, *Fried Green Tomatoes* and *Lethal Weapon II*, among others. Foley artists Kevin Bartnof and Catherine Rowe arrive with credits between them of *Last of the Mohicans*, *Schindler's List*, *Speed*, *Ace Ventura—Pet Detective* and *Beauty and the Beast*.

Vice president of post-production services Barry Snyder, who works closely with Rogers, says, "Service and competitive pricing are what will make people want to be here. It's not just the technology, it's a whole package: service, follow-up—

really, treating everyone like an outside client. Even though we are a studio, with a lot of in-house people, we have to treat them like they are the out-of-house people, because they can go anywhere and do their work. We have to be cost-effective, high-quality and convenient. Of course, for in-house clients, we are very convenient, because we are right here. But by the same token, for out-of-house clients, we have to have the same pieces of the puzzle. We have to make it pleasant to be here and easy to get on and off the lot. We still have a family attitude at the studio, but it's more of a free-lance mentality these days, where clients come in and they can choose. Even the in-house clients can choose who they want to work with. You need to have a well-rounded staff with a lot of different kinds of personalities so that you can offer choices and options to clients."

About the actual construction Snyder says, "One of the hardest parts was trying to fit what we wanted into the existing space—it almost might have been easier to build a new building. We gutted it back to the walls and went on to fit in what we knew we had to have. I can't tell you how many different ways we had those rooms laid out. As far as the technical engineering, Claus Wiedemann is the most meticulous and best chief engineer in town. He has a real talent for getting people what they need to do their job and then letting them run with it. You get a lot more from people that way. And in a facility like this, where we have such incredible resources and staff, it really pays off."

Adds Rogers, "This job was so

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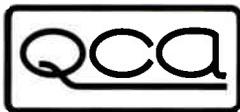
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big, and so much had to be done at once to get it up—we've got over 30 wiremen on this job, six days a week, 12 hours a day. Not many places in town have undertaken this type of a project all at one time—it can be pretty overwhelming."

And indeed, with construction everywhere, cranes and new buildings rising, the 42,000-square-foot facility was a bit overwhelming. It took a second trip to the studios, combined with a walk-through by project engineer Robert Budd, to begin to break it down into bite-size pieces. And on visit two, I began to appreciate the myriad challenges that had to be surmounted to create a project of this size.

FIRST STOP: DIGITAL EDITING

Let's start with something (relatively) simple—a quick look at the new prelay rooms, digital sound editorial bays stocked with TimeLine DAW-80s. System integration is important here, and all 25 rooms are connected to the dedicated prelay machine room, which will hold multitracks, individual hard drives and magneto-optical drives. When planning began, Warner engineers quickly realized the problems inherent in running bulky remote cables from all the edit bays to the Otari 24-track recorders housed in the machine room. Using in-house design and programming, the team created their own slender fiber-optic cable interfaces to streamline the installation.

NEXT UP, FOLEY

The new Foley Stage is the first ever at Warners to be built from the ground up. Prominent Foley artists and recordists were consulted to garner suggestions about their pet peeves and wish lists. The result is a large studio that features numerous floor coverings, along with a super-large dirt pit. It was a treat to walk on the floor coverings and hear the (sometimes subtle) differences—parquet vs. wood strips, asphalt, brick, slate, metal sidewalk grating, vinyl and ceramic tile. And for the comfort of those *Free Willy*-types who spend hours in the tub creating splashing sounds, a 150-gallon water heater! There's a storeroom for props and gadgets (including a car door, a bank of different light switches and an antique stationary bicycle). The studio noise floor tests out at NC5. States tour guide Budd, "It's the qui-

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etest room on this lot. With the doors shut, about all you hear is the blood rushing in your ears.”

All this is nice, and as comfortable and accommodating as can be, but the really special thing about the room is the rear projection system that allows the Foley artists to work right next to the screen. Rear projection eliminates shadows that can obscure the image that walkers are timing themselves to. With film or video projected from the front, a walker can get only so close and then his or her own shadow blocks the projector and the picture. In many Foley stages, the shadow problem has been dealt with by building the pits a long enough distance from the screen so that when the walkers are working, their heads cast no shadow. In Warners’ new room, the problem is eliminated completely and the walkers can press their noses up against the screen if need be. In use is a rear projection system featuring a 7.5x10-foot lenticular screen with a Barco 5000 projector.

Equipment in the control room includes Tannoy speakers and a Sound Workshop console made in

coordination with the Lartec control system. The Lartec covers the software for the overall system and monitor control, and a JSK (Jim Ketchum) system takes care of transport and motion control. The control room will feature high-quality outboard mic preamps. The room design also allows for incorporating a digital workstation.

It was in building the Foley studio that Warners’ engineers discovered some of the major difficulties that arise when upgrading an existing facility. The machine room is upstairs from the control room because the new Foley studio was previously a screening theater, and the new machine room occupies the space of the former projection booth. The projection booth was solid concrete, because it was built in the days of nitrate film and carbon arc projectors (this building goes back a long way); all projection booths at that time had to have concrete walls to contain the explosion that might occur if the film caught fire. Tour guide Budd says, “The walls are one-foot-thick concrete. You just don’t go deciding that you’re going

to demolish them. So we wound up with an elevated machine room. It’s actually a concrete bunker, because the roof is concrete, too; they couldn’t just build concrete walls without a concrete ceiling. So we had to work around it, and we made the machine room upstairs. Of course, we did have to make handicap access and cut through the floor in some places.”

THE BOTTOM LINE: POWER

A basic problem in the old facility was power. Warners buys raw power from the City of Burbank and handles its own power control. Depending on what’s happening on the lot—say, in summertime with heavy air-conditioning demands—the power can vary. Also, because of all the different projects going on, the power may not be all that clean. When a film goes into production, there are huge power demands. So the decision was made to put in a dedicated power station, starting from high-voltage, just for the new sound facility. There is now a three-phase, 2,500-amp power station. Even starting from their own high-

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voltage, the engineers still felt the need to go one more step to keep the power clean. They added a conditioner for the Foley building, one for the film-dubbing rooms, one for the TV-dubbing rooms and one for the film and multitrack machine rooms. All in all, the new facility has approximately 350 kilowatts of ground-isolated, regulated power.

Says our tour guide, "That may seem like a ludicrous amount, but one of the things the engineers discovered along the way is that the power makes a big difference in the performance of the equipment. The system in the original building went

back to the '30s. It started as a very small power system, and then they dragged in another trunk and put in another power system. Then, they needed more yet, so they grabbed some from the building next door. All the different grounds were tied together and no one was left who knew where! The power would come in from one transformer, but things would be so interconnected that it probably went back by a different path. The staff was always fighting hums and ground loops, so a decision was made to start from clean absolute zero. Basically, the post-production sound studios are

independent. We decided if we were going to do this, then we had to do it right."

**PIECE DE RESISTANCE:
FEATURE FILM DUBBING THEATERS**

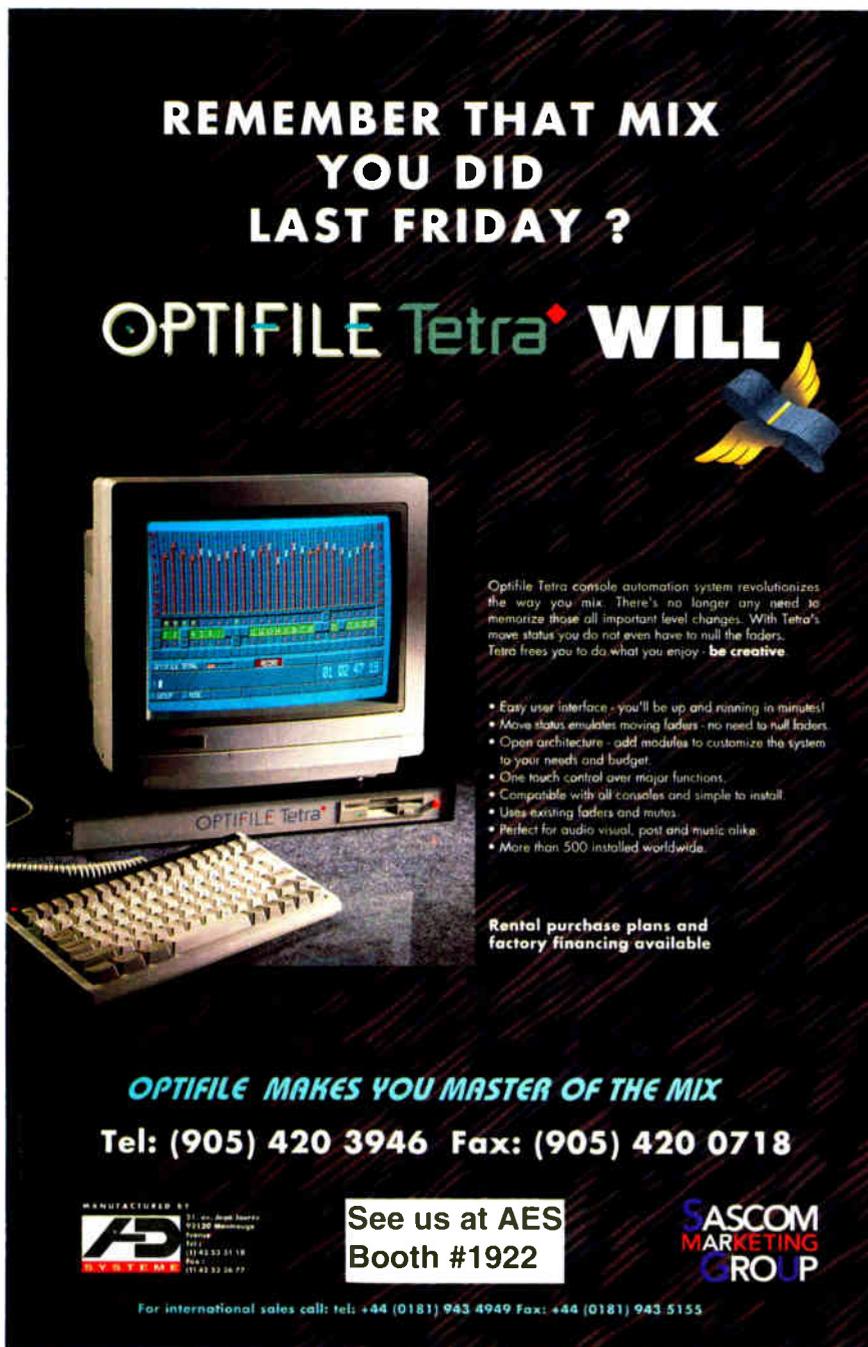
The two new film dubbing rooms are identical in design and equipment installation. The consoles, Solid State Logic SL8000 Series (80-in with E Series EQ and Ultimatum), have been modified by SSL to fulfill Warners' requirements. Warners' chief engineer Claus Wiedemann worked with SSL's Steve Drummond in London and Phil Wagner and Danny Mundhenk in L.A., to accomplish the mods, with the goal being ultimate flexibility in routing while maintaining short cable runs. Comprising 8000 Series channel strips and three 5000 Series center sections, many of the features are standard but with different configurations. The desks also feature automated graphic equalizers and programmable joystick panners, which enable surround sound panning to be automated against picture. Custom to this project, the channel modules have four line inputs, with selectable input choices on both small and large faders. The center sections each have three additional inserts to the main bus to facilitate primary effects processing.

Also new for this project, SSL designed 48-in, 8-out predub mixers consisting of eight modules, each having six line inputs. The eight modules can each be assigned via thumbwheels to master faders on the mainframe console, so any selected master fader can control groups of 6-track inputs. Switches on the console assign the outputs of the predub units to the 8-channel mix bus or to the monitors. There is a predub mixer for each center section, bringing the consoles to a total of 304 inputs. According to Wiedemann, it's possible to pull two print masters at the same time, or to dub in a foreign language at the same time.

Another unique feature in the film dubbing rooms are TelePrompters (see-thru monitors) for automation data and streamers. Unlike the old TV camera-style prompters, a mixer can look straight at them for information or straight through them to watch the film screen or the eight large video VU monitors. The software for those video monitors is another Warner Bros. design. Budd

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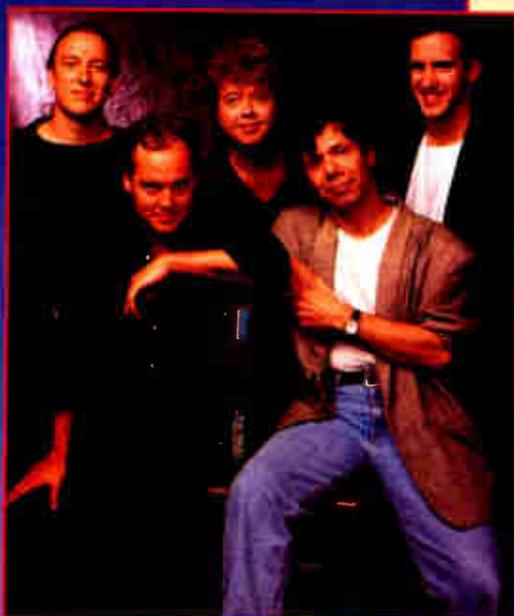


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tells us, "We have developed our own video-based bank of eight under-the-screen metering monitors. They display VU meters or peak—generally one per 25-inch monitor screen. Since with this console the mixes would generally fold down into eight composite recording buses, we have eight meters across there. Eight so they can do a 6-track mix with a couple of wild tracks. We had developed this metering system for other purposes and adapted it for use in these rooms."

Of course, the speaker systems in the film dubbing suites are in surround. The front speaker system is designed to be larger than what normally goes into a motion picture dubbing theater to enhance the capacity for digital soundtracks. And the sound system is three-way instead of the standard two-way. Each of the screen speakers is full-range, going from what you would normally think of as subwoofer territory all the way up to the highs. There are additional speakers that can be used as subwoofers, but each of the three front speaker systems goes from 20 cycles to as high as they will go with the film curve. The theory is that a powerful flat system will help eliminate some of the problems that arise as the film is played in theaters, when subwoofs are used to fill in the normal bottom. The low frequencies are handled by Turbosounds from England, with horn-loaded 24-inch drivers—ten for each room's system. The mids are Community Light & Sound M4s, and the rest are JBL 2445 high-frequency drivers.

The surrounds are set up for stereo, and either the left or right is capable of competing against the front. The surround speakers have 14-inch low-frequency drivers and were specifically selected to match capabilities up front. The implication is that they are "serious" speakers as opposed to the concept of putting speakers up for surround that provide a nice ambience ("Ooh crickets!" or, "Is the surround on?"). Says Budd, "When you crank these speakers up, it's in your face. Now that we are going to digital format for stereo surround, we can take full advantage of the dynamics. An example would be—it's been real easy in the past to do a flyover—where you hear a jet screaming from behind and it flies over. When it gets to the screen, you really hear the

sound come up, and you can kick in the afterburners. Well, in these rooms, we can make that jet fly the other way, and when it goes behind you, we can get you the afterburners with the low frequencies. Why should you be limited? We've only been limited because in previous film formats, the surround was an inferior channel. Now with digital formats, and stereo surround, there's no reason to consider it inferior."

**DOWNSTAIRS:
THE TELEVISION DUBBING STAGES**

The two identical television stages have been given a facelift, with new

walls, ceilings, doors and carpet. New Barco video projectors have been installed, but the existing Quad 8 consoles were kept, with the addition of two of the same SSL predub mixers installed in the film rooms, giving the 53-input consoles another 96 inputs. The current consoles have been updated numerous times through the years and feature GML automation. The speakers are a standard theatrical system, two-way JBLs with surround. The Quad 8s, originally built as one big console that all mixed to the same buses, have now been split and can address three separate recorders.

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For now, all of the recording equipment that will support the feature film dubbing rooms is in the downstairs machine room. But there is also a prewired machine room of the future ready for the arrival of new technologies, and it's tied to the existing machine room. Preparing for the future doubled the wiring and interconnects because everything had to pass through the future room on its way to the working machine room. This setup makes testing new technology simple, as it can be brought in and hooked up without disturbing the present system.

A highlight of the machine room is the film scanner, a prism-based telecine system. Warners' Foley, ADR and video-mixing rooms don't have 35mm film projection, so they have incorporated a film scanner to the video projectors in these rooms. Film can be shown as video, and the visuals can go back and forth, with rock and roll, just as if they were on film. This will come in handy for mixing television that was shot on film or for quick temp dubs of a feature. It is synched to video by means of Lynx systems and allows the complex to service all four dubbing rooms with both film and tape.

Also in the machine rooms are a dozen 24-tracks and four 4-tracks for playback—all Dolby SR-capable. The film dubbing recorders are Albrecht 6-tracks, capstan-driven recorders that use sprockets just for reading. The capstan drives the film, and the sprocket keeps track of the sprocket holes. There is a film synchronization system—bi-phase or quadrature—tied into the Lynx systems, along with JSK controllers, so anything can chase, i.e., the system can be run time code-based or film sync-based. In fact, either one can drive or chase the other. There are 88 playback machines, each capable of running six tracks apiece, so in effect, this machine room is capable of running 500 channels synchronously. All these dubbers could, if necessary, be synchronized to one room. Then, of course, comes the question of a console with 300-some inputs, which they have, too. That's more than 500 channels on film reproducers, along with more than 250 channels of multitrack.

Concludes Snyder, "The 'studio mentality' is a phrase people like to

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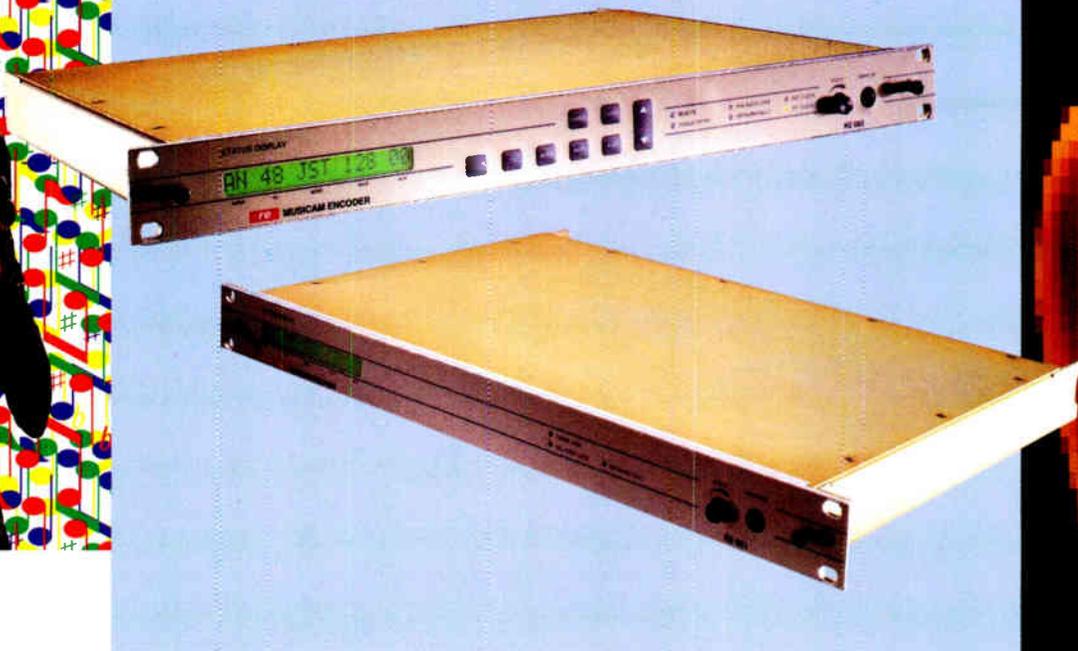
throw around, meaning 'you can't do this, you can't do that.' But the studios are getting away from that kind of image. They are adapting, and adopting a more service-, client-oriented, freelance hustling image. In some cases, it may not be a conscious effort, but it's just happening. In order to do the upgrades, they have to justify the cost. To do that, they have to do market research, and when they do that, they have to be competitive and cost-effective. I believe, and we're proving it here at WBSF, that if you've got the right tools, the right people, and you've got the right management support and technical stuff put together...if you build it they will come."

Well, it seems they are coming to Warner Bros. The new dubbing stages have been busy from opening day August 29 and booked through the spring of '95 with *The Specialist*, a Warner Bros. release, starring Sylvester Stallone and Sharon Stone; *Richie Rich*, produced by Joel Silver and starring Macaulay Culkin; *Stars on Henrietta*, executive-produced by Clint Eastwood and starring Robert Duvall; *Outbreak*, directed by Wolfgang Peterson, produced by Arnold Koppelman and starring Dustin Hoffman, Rene Russo and Morgan Freeman; *Just Cause*, starring Sean Connery and directed by Arnie Glimcher; *Bridges of Madison County*, directed by Clint Eastwood and starring Clint and Meryl Streep; and the family films *Little Panda* and *Willy II: The Adventure Home*.



You probably have some of the feeling by now of the hustle-bustle over at WBSF. But we haven't mentioned the on-site museum, the 500-seat theater and the daily tours. That's right, 12 to 15 people traveling through several times a day on the real life Warner Bros. Studio Tour, checking out the works-in-progress (unless a closed session sign is posted). But we'll leave that for another day. The second half of the renovation is scheduled to be complete in the summer of 1995, with another SSL dubbing stage, a second ADR stage and the renovation of the historic scoring stage. ■

Maureen Dronney is Mix's L.A. editor. You can find her at her regular table at Spago... Or was that Tail O' the Pup?



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SOUND FOR FILM

"I'm Still Here," Part Three: Re-Recording

by Larry Blake

This is part three of a four-part column dealing with how all of us in film sound—that is, production

mixers, sound editors, re-recording mixers and theater personnel—create more work for ourselves when it would be best to keep everything simple. As a result, things get screwed up. "I'm still here" is my catch phrase for the way we do things to let the director and the audience know that we are "still there."

In my last column I was perhaps a bit unfair to my sound editing brothers and sisters for "over"-preparing tracks for the mix. Because the director can always say "use everything" (unlikely) or say "thanks for giving me all the right options" (equally improbable), there's really no harm in covering

—CONTINUED ON PAGE 209



FACILITY SPOTLIGHT

Russian Hill Recording

Like many Bay Area recording facilities, Russian Hill does a little bit of everything—music, commercials, video, film. In March, Studio B was remodeled (design and construction by D.P. Stearns of San Rafael, Calif.) and refurbished to accommodate the increase in audio post-production work, especial-

ly commercial spots. The centerpiece of the room is a new 24-input (on a 32-input frame) Euphonix CSI console, with two banks of independent faders for 48 total inputs. "It's a sweet-sounding desk with an all-analog audio path," says engineer Jeff Kliment. "We needed a board with a small footprint, but one that was able to work in feature films and television, as well as commercials. The automation and architecture—really, the whole philosophy

of a digital control surface—means that we can do more with fewer inputs. I was up and doing sessions a day after reading the manual." Studio B also includes a dedicated Studer Dyaxis II workstation and Meyer 833 monitors, to go with full video-lock capabilities. Recent projects include the new *Gumby* video release, episodes of Saturday morning's *Garfield and Friends* and director's narration for the laserdisc release of *Mrs. Doubtfire*. ■

Clockwise from top: Studio C, the "dining room," and Studio A, with Soundtracs Solo Logic console; Bumpy and Squishington; Studio B, the "living room," with Tascam M-312 console; Studio A's patching and racks; the machine room, a.k.a. the coat closet; the Wave Group Sound creatives (left to right): sound assistant Al Anderson, sound designer James Allen, editor/author Larry the O.



ROOM & PEOPLE PHOTO: MICHAEL GIBLERTY PHOTOGRAPHY

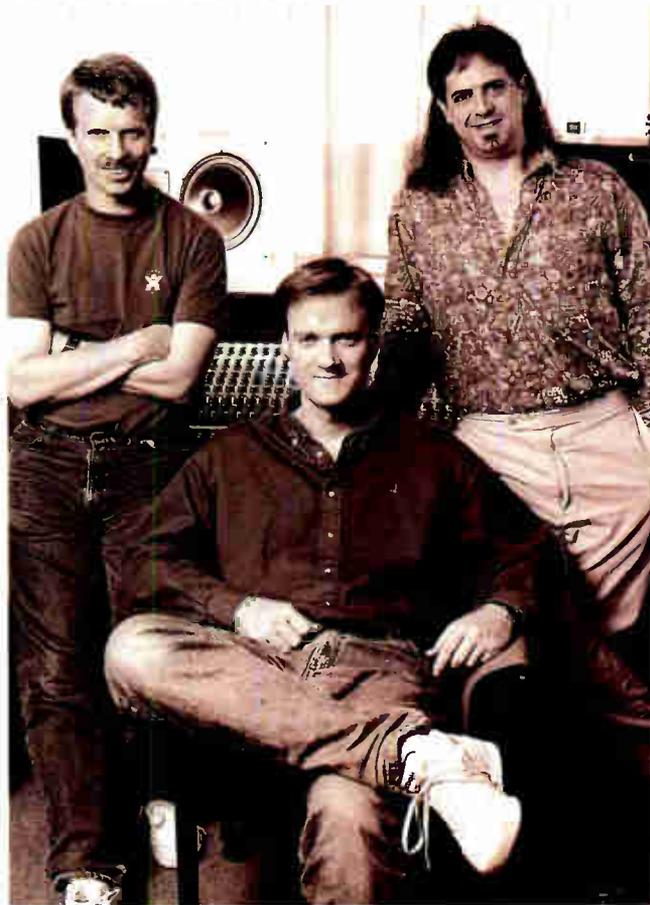


PHOTO: CREATIVITY GROUP PRODUCTIONS



Saturday Morning Sound Design at Wave Group Sound

by Larry the O
RZZZZZP!!

It probably started life as the zipper on somebody's motorcycle jacket, or perhaps an overnight bag. Several mutations later, however, it is the quizzically craning neck of a manic, happy-go-lucky, wart-covered green monster with a voice that would do Tom Waits or even Wolfman Jack proud. He has an insatiable appetite for dirty socks and snotty tissues, and a cluttered nest filled with same, among other various and sundry junk, situated beneath a young boy's bed. Welcome to Wave Group Sound, where the sonic

world of Mr. Bumpy, the star of the new ABC stop-motion animation series, *Bump in the Night*, is being crafted.

Wave Group Sound, an independent sound design firm, is the brainchild of sound designer/mixer James Allen. Allen met Ken Pontac and David Bleiman, *Bump in the Night* creators, in 1988 during production of the

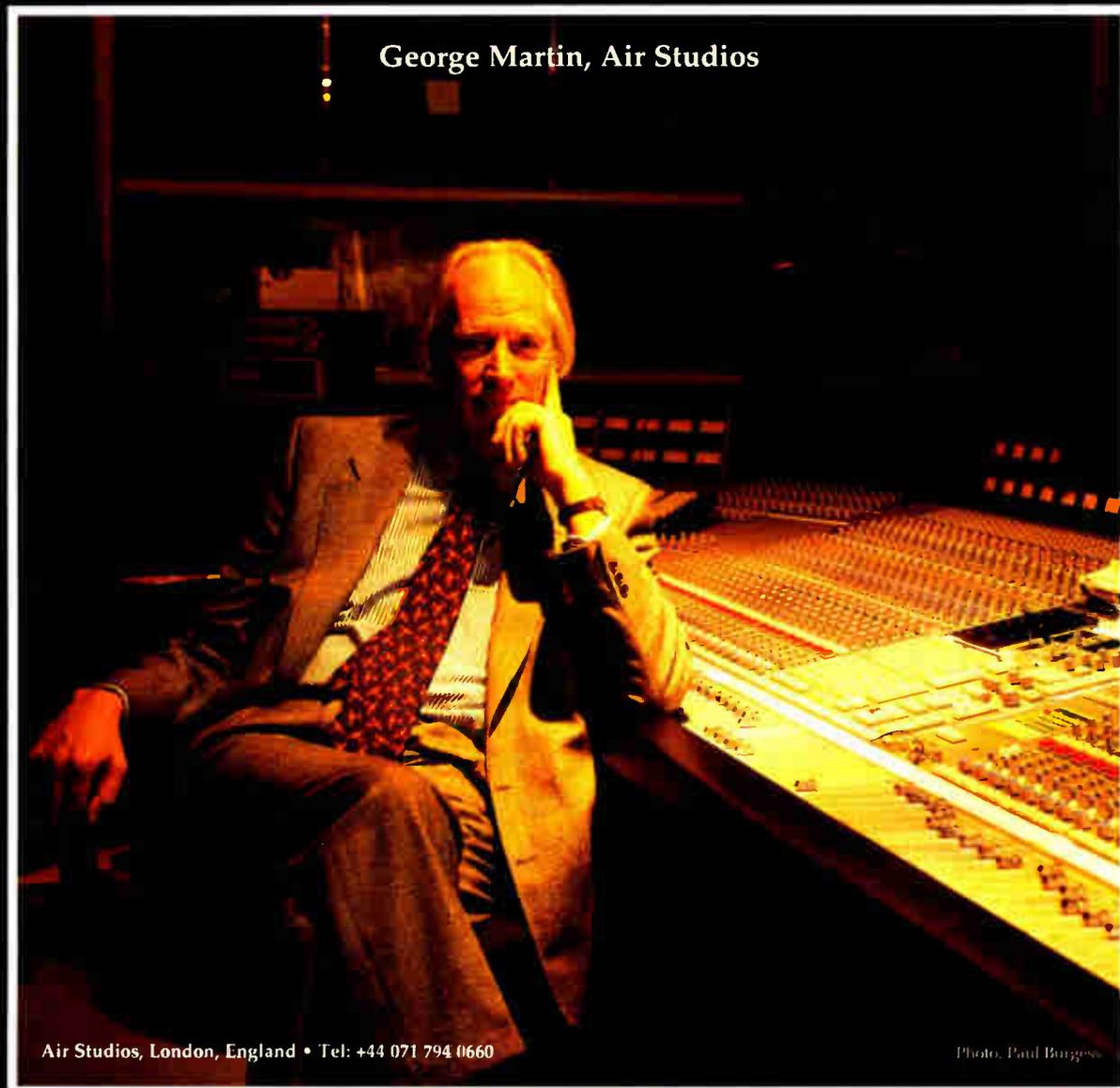
Gumby TV show. Pontac and Bleiman were the *Gumby* art director and line producer, respectively, and Allen led the audio post-production team.

With *BITN*, Pontac and Bleiman wanted to make a new show with a distinct identity, in contrast to many of the action cartoons currently inhabiting Saturday morning. *BITN*

—CONTINUED ON PAGE 210

"The Sound Quality is Marvellous"

George Martin, Air Studios



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quality of the new console is marvellous.

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EDNet Today

by Tom Kenny

Buried amid all the health care infighting of the Clinton administration, the Federal Communications Commission last Spring reached perhaps its most important and far-reaching decision of the superhighway age. In short, the FCC said that cable companies and phone companies could compete on each other's turf in delivering digital information into the home.

Suddenly (well, not so suddenly—it has been happening for years in anticipation of such a decision), long-distance carriers, cable conglomerates and entertainment com-

When Ron Howard wanted to preview final mixes for his film *Backdraft*, he stayed in L.A., and the mixers at Skywalker Sound North locked up projectors and transmitted 2-channel audio down south for approval. No satellite uplink/downlink, no FedExing of tapes. That was the birth of Entertainment Digital Network.

panies were involved in major mergers and acquisitions, Paramount/Viacom/QVC being the most high-profile example. It seems to be simply a high-tech example of a single entity owning the means to produce software, deliver it and play it back (many of these companies are hardware makers, as well), just as the film studios did in the '30s when there were Fox, MGM and Paramount theaters across the country.

At the same time, fiber-optic cable connections began reaching beyond city centers and major markets, and the long-distance companies began installing higher-capacity switching systems, allowing for the transfer of massive amounts of data. In the late-1980s, Tom Kobayashi and Tom Scott, both Lucasfilm engineers, sensed an opportunity to pro-

vide professional music, audio post and production facilities with a means of exchanging digital data over the phone lines. Under the Lucasfilm banner, and making use of Dolby's AC-2 compression algorithm, they developed a system that used T-1 phone lines to exchange audio and machine-control data between their Northern California and Santa Monica facilities. When Ron Howard wanted to preview final mixes for his film *Backdraft*, he stayed in L.A., and the mixers at Skywalker Sound North locked up projectors and transmitted 2-channel audio down south for approval. No satellite uplink/downlink, no FedExing of tapes. That was the birth of Entertainment Digital Network.

Kobayashi and Scott left Lucasfilm in 1992 to pursue EDNet full-time. The company now supports a 2- to 12-channel, bi-directional audio service called Digital Multichannel System, operating from 20 to 20k Hz on T-1 and ISDN fiber optic lines; a mono or stereo bi-directional system used primarily for voice-over work called Digital Patch System (established by Waves Sound Recorders in L.A. in 1991 and merged with EDNet in 1993), operating on Switched 56 and ISDN connections; and two video services—the T-1- or ISDN-based EDVideo (T-1) and the International Videofax Network Service (Switched 56 and ISDN).

Today, two years later, EDNet has six employees. Although growth has been somewhat limited by financial resources, a number of key installations and high-profile sessions—including producer Phil Ramone with Frank Sinatra (*Duets*) and Gloria Estefan, as well as intercontinental ADR sessions with Julia Roberts and Nick Nolte for *I Love Trouble*—auger well for the future.

"We're over 100 facilities at the moment, and there's a couple more each week," says Scott, vice president of engineering. "Recently, our international expansion has been very important to us. Sonodi Studios in Paris just completed the French-language version of Oliver Stone's *Natural Born Killers* and sent an approval copy over EDNet to Skywalker South (now Todd-AO West) for the director's comments and corrections. Skywalker received the locked transfer directly to 35mm full-coat mag, so the audio could be screened

—CONTINUED ON PAGE 216

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NOVEMBER 1994, MIX 207

Two ways to eliminate audio hum...



Fig. 1 Sledgehammer

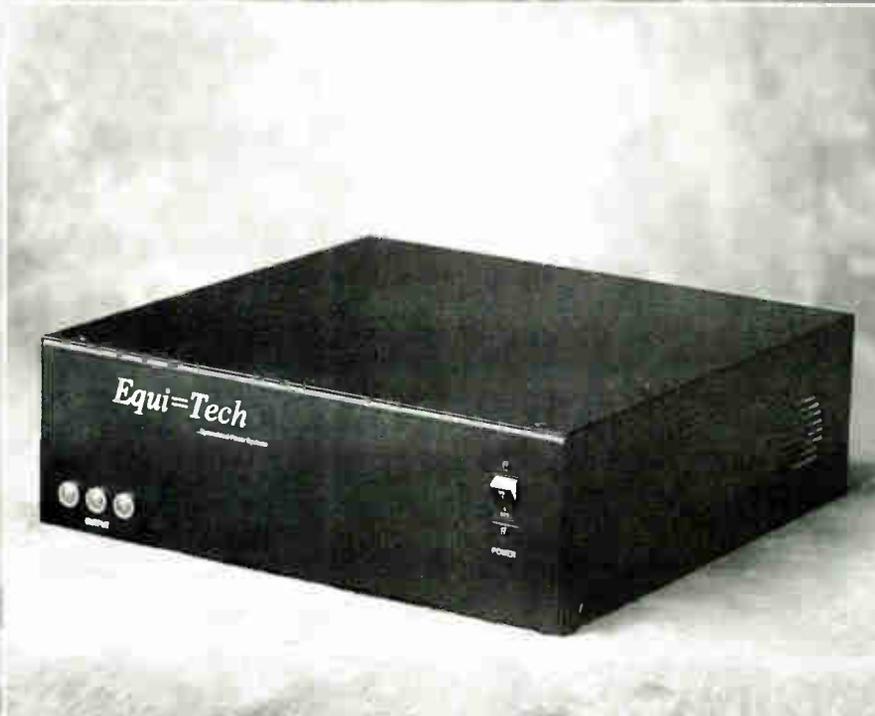


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everything five ways from Sunday.

However, decisions made at the final mix are indeed final; this is what the public will hear. As I was told by cynical re-recording mixers in the late '70s when I came to L.A. to write a book on the history of film sound, "It all happens here." (To visualize this, you have to imagine a crusty old fart leaning back while simultaneously sucking his teeth and hitching up his crotch in a gesture of sublime satisfaction.) Although directors can veto anything that the mixers do just as easily as they site-broom unwanted effects, there's something about the re-recording process that's intimidating to some. Many directors view it strictly as a technical process run by guys who used to run the A/V classes in high school, so it's up to us to give them perspective as to how to use the knobs and buttons to best present the drama of the film.

A big beef I have with my fellow re-recording mixers is how dialog is handled. Too many mixers are noise-obsessed, stripping the life out of a track and making actors sound like astronauts speaking from a space shuttle. Of course, this complaint assumes that there was something to play with on the production track in the first place, and I have to repeat my plea to production mixers: Leave the track flat! Rolling off the low end (or any other "creative" EQ or gating) in a high-noise situation does not reduce the noise; it reduces *actors*. All we ask for in post is the highest voice-to-noise ratio that you can achieve with microphone placement. Beyond that, let the background noise fall where it may.

Rolling off the low end is bad enough, but reducing the signal itself to reduce the noise is the most grisly misconception of all. Let me explain: A mixer will hear some undesirable noise on the set (like rain on a quonset hut roof), and, realizing that the rain noise virtually went away when the mic gain was lowered, reduces the signal going to tape. Well, you guessed it. The voice disappears beneath tape noise along with the rain-on-roof sounds. I know I digress and should have brought this up when I talked about production sound in the September issue, but delivering a human-sounding voice to theaters is a big deal with

me, and the quality that can be achieved in post is only as good as the tape that leaves the set.

Back to post-production and noise reduction, I'm shocked at the widespread use of the Dolby Cat 43/430 single-ended noise reduction units. Yeah, they're fast to use, but I think that they are often overused at great detriment to the voices, muffling them and taking out the snap and life. The big problem with background noise, inasmuch as it affects the viewing of a movie, is when it bumps in and out, a problem that is easily cured by grade-A dialog editing. Then, with nice long (room

tone) handles, a talented re-recording mixer can weave it all into one nice, seamless piece.

On to music: I am constantly amazed at how some films will have the music playing loud *all the time*. No matter if nothing of any real importance is happening in a scene, no matter if this is the fourth cue in the reel, some films just never let up. To me, it's a sure sign that the filmmakers are insecure about the film and have deluded themselves into thinking that loud, rich, beautifully recorded music will play an emotional game of three-card monte with the audience; they temporarily

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forget that the script, directing and acting are all in the toilet.

Note that I said "the filmmakers," because if the director insists on keeping the music in the red, there's only so many times that the mixer can voice a protest before he's out of a job. I feel strongly that we should talk to directors on their own terms and let them know that playing music really loud early on commits the film sound version of crying wolf. When they will need to really make a point later in the movie, the audience just won't believe them because they will have heard it many times before. The answer to this is time-tested: Everyone needs to agree on what the loudest points in the film should be, and the dynamics of everything else can be adjusted accordingly.

Of course, loudness is not only a problem with music, what with mixers continuing to play this "mine is louder than yours" game that is not only dramatically wrong most of the time, but also results in theaters turning the faders down. And while I'm aware that projectionists have been doing this since the birth of stereo

films in the '50s, it's only gotten worse. Add to this the proliferation of digital playback in multiplexes, with 20 dB of headroom (per channel!) above the 85dB operating level...well, the situation is close to being out of hand.

It gets worse from there. In the process of making the music and sound effects loud, the dialog suffers because everybody on the dub stage has heard the words hundreds of times, and they have no idea that it has stayed at pre-mix levels while everything else has become louder and louder.

One of the more egregious "I'm still here" mixing problems concerns the overuse of surrounds, especially stereo surrounds. I recently made a point of seeing what I had a hunch would be a bad movie (and it was) in a digital format because it was mixed by some good people and I wanted to check out this theater in Manhattan. Big mistake. I was appalled by how much of the film involved discrete, loud, ping-pongy effects happening in the stereo surrounds that served no function other than to show off what the re-record-

ing mixers had gotten for Christmas. I'm sure it was a lot of fun to mix, but their fun came at the expense, I believe, of the audience being dragged out of the film subconsciously.

Next month I'll take on the final estate: the world of post post-production: theater alignment and projection, plus a nod to the burgeoning world of home theater. Please send along your comments directly to PO Box 24609, New Orleans LA 70184, Fax (504) 488-5139. ■

Larry Blake is a sound editor/re-recording mixer who lives in New Orleans for reasons too numerous to mention, although having people genuinely mean it when they say "You live there? That's a great city!" would be a good start.

—FROM PAGE 205, WAVE GROUP SOUND
reflects their long-standing love of the sensibilities of the Golden Age of cartoons, with a decidedly modern bent. Modern production techniques were definitely part of the plan.

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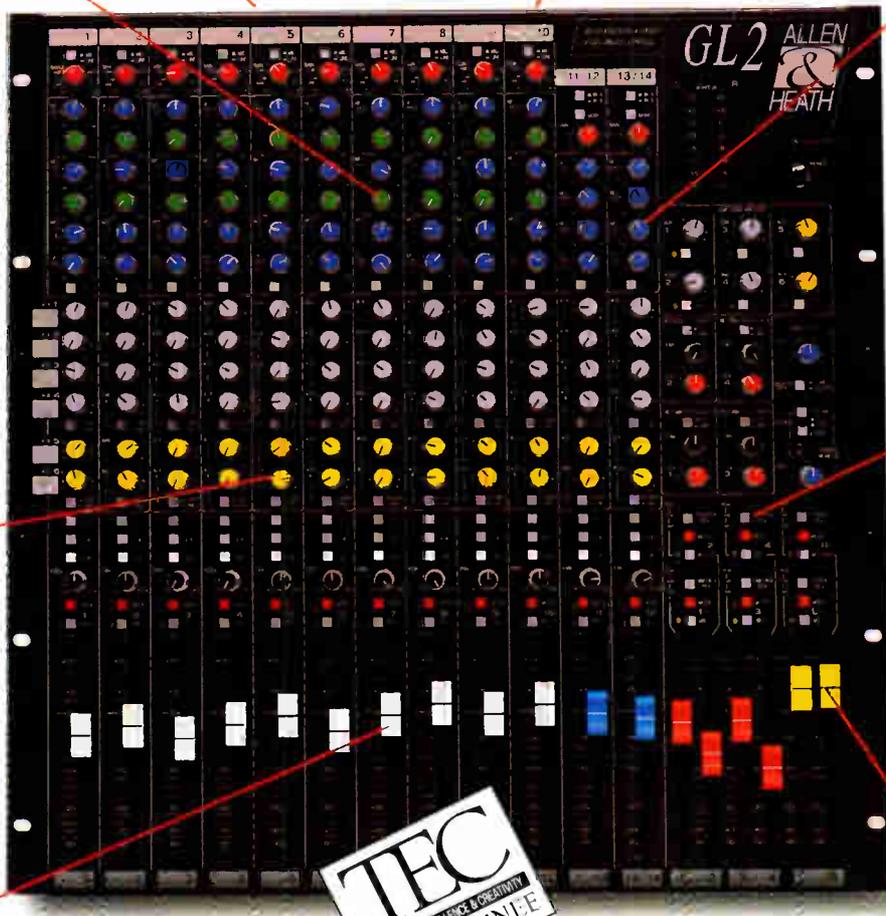
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(a blue, blobular sort who resides in the commode), Molly (a comfort doll), the dreaded and ferocious Closet Monster (all right, so the Closet Monster isn't much of a pal), and others. Mr. Bumpy brings Saturday morning into the '90s. At San Francisco's Danger Productions, where Pontac and Bleiman direct Bumpy's antics, the animators use foam, rather than clay, for its greater ease in handling and reuse. The old-fashioned, one-frame-at-a-time, stop-motion animation techniques are enhanced with motion-controlled camera work and custom video frame grabbers for previewing shots. The animation, computer graphics and live action are edited on an Avid Media Composer.

Naturally, the sound for the series had to similarly achieve this synthesis of classic sensibilities and state-of-the-art production. Allen, presented with the offer of a 26-episode network cartoon show, left his position at George Lucas' Skywalker Sound North—where he had worked on the soundtracks for such blockbusters as *Terminator 2* and *Jurassic Park*—and formed Wave Group to provide the sound for *BITN*, as well as other TV and independent-film productions. At Wave Group, Allen is responsible for principal sound design, mixing and SFX editing. I handle dialog and the remainder of the SFX, and Al Anderson does the music and peripheral SFX.

THE STUDIO

Recording and editing at Wave Group Sound are performed on three Digidesign-based digital audio workstations: an 8-track Pro Tools system, designated Mix A; a 4-track Pro Tools system designated Mix B (both systems built on Quadra 650 computers); and an Audiomedia system, designated Mix C (built on a Quadra 700). Mix A and C are physically located in Allen's "dining room," while Mix B is in the adjacent "living room." The computers and peripherals, along with all tape machines and other accessories, are in the front-hall coat closet. The entire studio was wired by David Carroll Electronics, a rather expensive proposition for a "home" studio, but there have been absolutely no grounding, crosstalk or other cabling-related problems. DCE also installed a digital audio patch bay using data-capable TRS 1/2-inch phone cables.

The computers are networked via

Ethernet, which is used for passing audio files, documentation and e-mail, and for backup. The Macs' internal hard disks are used for applications and non-audio data, while audio is stored on external drives. Each computer also is equipped with a MaxOptix 1GB MO drive, a synchronizable VHS video deck, a DAT deck and a professional CD player (with digital output). A Sony SDT-5000-based data DAT system connected to Mix B is used for backup of all the computers and drives. Labels and track media are generated on a Macintosh SE.

A variety of software is used for recording, editing, sound design and processing, including Pro Tools, Sound Designer II, Turbosynth and Sample Cell from Digidesign, OSC's Deck 2.1, E-Magic Logic Audio, Arboretum's Hyperprism, and assorted utilities.

Edited audio is laid back by locking up the Pro Tools systems to time code and printing to 24 tracks of ADAT, with another eight tracks being used for submixing. (Currently, this layback is done in the analog domain; however, we are evaluating the new Pro Tools/ADAT interface from Digidesign, which would allow digital layback of eight tracks at a time.) The ADATs are usually under control of an Alesis/TimeLine AI-2 synchronizer controller, although BRC control is available. As the AI-2 and BRC are not seamlessly integrated, a custom switch box allows us to go back and forth.

A TimeLine Vista MicroLynx is the studio master, providing house sync reference, control of the Mix A VCR, AI-2 and Sony 7030 time-code DAT, as well as feeding Pro Tools a Genlocked sample clock and MIDI Time Code (fed directly into the Mac modem port). Mix B gets MTC by feeding time code from the VCR through a Mark of the Unicorn Video TimePiece, then to a MIDI TimePiece 2 and on into the Mac. A Digidesign Video Slavedriver provides Mix B a true Genlocked sample clock. Mix C uses a JL Cooper PPS-1 to generate MTC, which is then fed to an Opcode Professional Plus interface. Mix B is currently the only workstation that can use VITC as well as LTC. Unfortunately, the MicroLynx can read VITC but cannot output it (as MTC or anything else).

Mixing is performed through the 32-input Soundtracs automated Solo

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Logic console in Mix A and monitored over Genelec 1032 powered monitors. A small but choice selection of outboard processing includes GML mic preamps, GML EQ, Lexicon PCM-70, Eventide H3500SE, Ensoniq DP-4, dbx 165a and 166, Aphex Dominator 2 and Type C Exciter, and Yamaha SPX-90. Mix A also houses a MIDI setup that includes a Korg M1, Ensoniq ASR-10, Yamaha DX-7, and Roland D-50, along with an Opcode Studio 3 interface and a Digital Music Corp. MX-8 MIDI switcher. Mix B uses a Tascam M-312 console and requires no outboard processing.

Because dialog and music source material (which is produced in Los Angeles) for *BITN* arrives on DAT, audio does not pass through a mixing console until the mix occurs; the consoles are used primarily for monitoring. This keeps the audio quality extremely high.

ORGANIZATION

It was clear from the beginning that everyone's ability to function and move quickly would depend on managing the copious quantities of

media and information involved, a task that typically takes up more people-hours than are available. Sound effects on CD and DAT, 32-track sets of ADAT tapes, final mix DATs, dialog and music DATs, data-backup DATs and video workprints are only some of Wave Group Sound's media libraries. Spotting reports, picture changes, and cue sheets also needed to be generated. The Wave Group staff has attempted to computerize as much of this library maintenance and documentation as possible with a family of custom databases.

Wave Group Sound actually has two databases for its extensive sound effects library. The library, about 50,000 effects strong, consists of most of the standard CD libraries and 300 to 400 DATs of effects, all of which reside in a Panorama database designed by Allen, Steve Slanec and Kevin Sellers shortly before Allen started Wave Group. One of Anderson's duties has been to extract a selection of key sound effects from the library, transfer them into Sound Designer II-format files, and organize them onto 20 MO disks, divided into

categories consistent with the master database. Currently, this "sub-library" consists of upward of 9,000 effects, cataloged by DiskRanger, an automatic cataloging program, then imported to a Panorama database that massages the data for quick and easy searches.

When a client requests a different explosion or an editor needs to find an effect, the optical cartridge containing explosions is slammed into a drive. Thirty or 40 different explosions can be instantaneously auditioned using Sound Designer's "Open File" dialog and, when a suitable one is found, it can be immediately imported to the appropriate Pro Tools session. This all but eliminates time-consuming effects searches.

The spotting database allows Anderson to specify the start and end (or duration) times, character name, effects group, type of effect and comments. Completed spotting reports can be printed out, with 15 to 30 seconds of time represented on each page and each effects group sorted into its own column. Picture changes are entered into another database, which performs conver-



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sion from feet/frames values supplied by the picture editor into the SMPTE values that we use. A link between these two databases will allow the spotting report to be automatically changed, or "rippled," on command by the picture change database.

Since there is no off-the-shelf cue sheet program that meets the needs of this kind of project, Wave Group is creating a custom program that will import a dump from Digidesign's Session Lister utility and generate cue sheets from it. Generally, the limitation in commercial products is the amount of time that can be represented on a single page: anything less than a 15-second block on a page leads to an unwieldy number of sheets, even for an 11-minute cartoon segment.

APPROACH

At Wave Group, sound effects are divided into several groups, as is common in feature films: AMB (ambience), AFX, BFX, CFX and, if necessary, DFX and EFX. AFX is mostly Foley-type and character-oriented effects, while BFX and CFX cover explosions, object (non-character) sounds, etc. Effects groups are laid back to assigned ADAT tracks, then submixed down to five tracks on the last ADAT (mono dialog, stereo effects, stereo music). Grouping effects in this fashion makes it much easier to accommodate changes the directors might request. Rather than needing to do a complete remix of all tracks, only the submixes need be patched and remixed.

In contrast to the work done on most cartoons, Wave Group provides a sound for virtually anything that moves. In the real world, someone crooking a finger or swinging an arm does not make a sound, but in cartoons, it can be a significant part of how the character is defined. Bumpy has lots of creaks and zips, while Squishy has gooshes and sloshes. To facilitate the large quantity of characteristic sounds, a small sub-library was created.

For a feature film, up to 200 tracks of effects might be mounted on mag dubbers. At Wave Group, 24 tracks are available to accommodate dialog, music and effects. Consequently, the tracks are densely packed. Console automation helps to maintain control of the large number of effects on the small number

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of tracks. The Solo Logic's automation does a good job in this regard.

BITN's combination of stop-motion animation, computer graphics and live action engenders a situation where a large number of segments are simultaneously in progress at various stages of completion. Disk space being finite, the staff is constantly loading and dumping sessions between hard disks and the data DAT backup. Retrospect software and a Sony SDT-5000 DAT drive are used to reliably manage this critical task. Again, comprehensive tracking systems have been created to ensure that backup and re-

store operations (as well as making safeties of the ADAT multitrack masters) occur regularly and so that things do not slip through the cracks.

Since this article was originally written, air date for Mr. Bumpy has drawn near, and that, combined with the arrival of additional projects, forced Wave Group to relocate to a less disruptive site for the night shift (i.e., not Allen's house). Consequently, the entire studio was moved, mostly without disassembly, to two rooms (plus a machine room) built in the rear of the 37,000-square-foot warehouse that houses Danger

Productions. The entire move took a little more than three days from first teardown through full functionality in the new location.

Wave Group Sound epitomizes the current state of the industry, where network television can be produced in a small, home space by just a few people. However, it is clear that professional equipment competently installed, and, especially, a level of organization that comes only from experience, are still necessary components. ■

Larry the O is a Bay Area musician, engineer and writer, and a frequent contributor to Mix.

—FROM PAGE 207, EDNET TODAY

at the director's convenience. No first-class tickets, no hotels and no per diem required."

Another area that has seen quite a bit of growth is the commercial voice-over market, which unlike the motion picture and television projects that take advantage of the AC-2 compression scheme developed by Dolby, makes use of the MUSICAM algorithm. At AES, EDNet will be demonstrating a new software package called WheelerDialer (named after software developer and technical services manager John Wheeler), which enables member studios to make automatic direct-dial connections from a resident database and point-and-click procedure. Previously, facilities had to make two phone calls to make the ISDN connection—one for Port 0 and one for Port 1—and wait for lockup to hold a DPS session. (The two ISDN data channels are combined to get full-bandwidth 20 to 20k Hz.) The software is currently being beta-tested at Green Street, Music Annex's audio post facility in San Francisco.

"Before, we had to look up, say CRC in Chicago, on our piece-of-paper list to find the two numbers, punch them in and wait for the connection," says Roger Wiersema, chief engineer at Green Street. "Now with the auto-dialer, we scroll through a database, find CRC, hit Return, and it asks: 'Do you want the studio information? Do you want to call this studio? Or do you want to disconnect the phone?' Then you arrow-down to dial the studio and hit Return. It calls on both lines automatically. Point and click. Less than 30 seconds.

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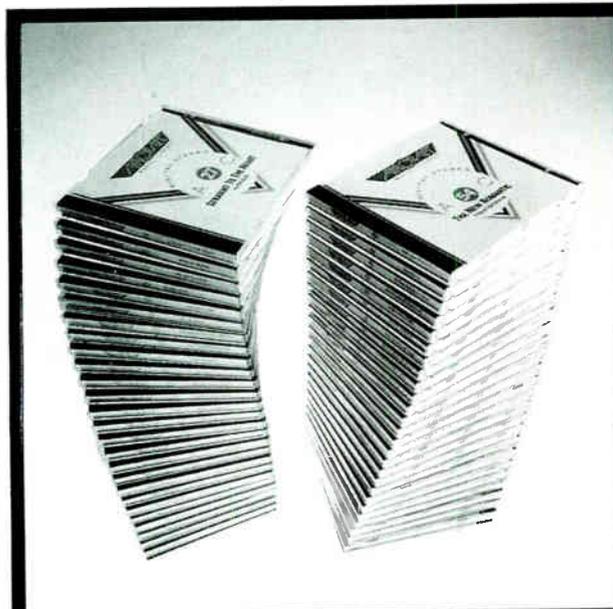
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World Radio History

"There are about 90 studios on the system," he adds, "and it lists DMS facilities as well. So if you need to do an EDLink session (from DPS site to DMS site), it calls EDNet for you and links to the T-1 system. We do that regularly; we just finished one with National Video in New York.

"Right now, we use DPS primarily for voice talent," Wiersema explains, "although we used it to call London for the most recent series of Levi's ads, where they had music from Art of Noise. Art of Noise was mixing at Joe and Co. in London on a Sunday, and they needed to post the spot here on Monday morning. Monday morning, the Levi's people show up, and Art of Noise plays the spot for them, and they say, 'Well, we love it, but we want you to change this and this and this.' So Art of Noise goes back to the studio, recalls us in the afternoon with the fixes, and we essentially record the music on our end, and they post the finished spot that afternoon. That was DPS, stereo."

The hardware for EDNet is relatively inexpensive to install—somewhere in the neighborhood of

\$10,000 to \$15,000 for multichannel audio. Costs for a session range from \$1.00 to \$2.50 per minute, domestic U.S. Those costs will come down as the long-distance carriers further refine and develop the infrastructure. The four majors—AT&T, Sprint, MCI and LDDS (which just purchased EDNet competitor IDB)—will provide the means, and EDNet will provide the expertise.

When asked about potential competition from the long-distance carriers, Scott says, "We have deals with practically every major carrier of any kind of signal—from satellite to ISDN to DS-3s and T-1s," Scott says. "Any company that is doing this sort of long-distance connection, we would think of as a supplier. They are supplying us the wholesale raw materials that we turn into our product. And as we get more studios online, we should have greater bargaining power, which will eventually force rates down.

"We believe there are special applications," he continues, "and what we do is a variation of standard telecommunications. Telephone companies will certainly supply the

connections cross-country. But when you are tying together technology applications of, say, a recording studio, advertising agency, video editor or any number of professional entertainment industry pieces of equipment, the phone companies are not going to be able to supply the information, guidance and handholding required. That is our area of expertise."

Education, to be sure, is a lot of what Scott does each day. Technical people must learn the intricacies of the system, business people must understand potential applications (and, in fact, the reverse is also true: Scott says he is constantly learning of new applications from engineers and facility owners) and often the phone company technicians have to be told how their own systems can be used to make EDNet and systems like it function.

As the long-distance infrastructure falls into place, dozens of competing transmission alternatives are likely to emerge, especially in the consumer market. For professional audio engineers and studio owners, EDNet is available today. ■

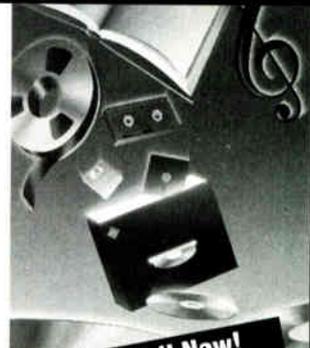
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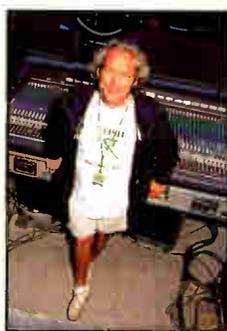
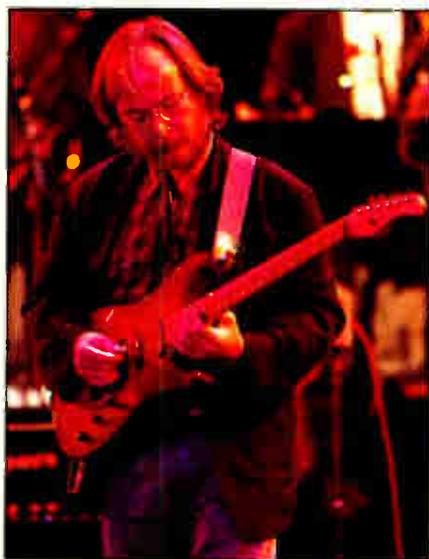
by Dave Stevens

We keep hearing about "computer-controlled" systems, now commonplace in modern cars,

planes, homes and all kinds of appliances in addition to industrial and manufacturing processes. Computer control of sound systems has been a hot topic recently, and the term can

refer to one device, to a whole class of devices or even (someday) to an entire system of components. While MIDI control of certain pieces has existed for ten

—CONTINUED ON PAGE 225

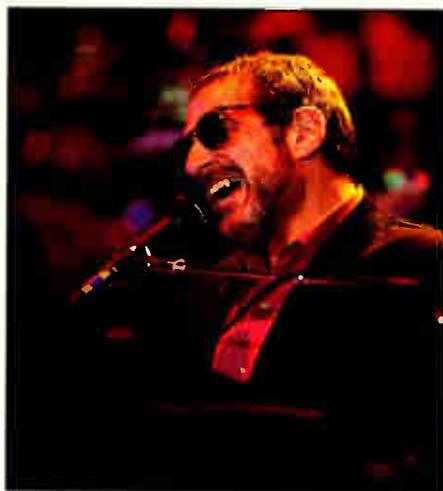


PHOTOS: STEVE JENNINGS

ENGINEER SPOTLIGHT

TRIP KHALAF ON STEELY DAN

BY GEORGE PETERSEN



Clockwise from bottom:
Donald Fagen, Walter
Becker and Trip Khalaf

One of the senior engineers at Clair Brothers, Trip Khalaf is a seasoned veteran who has logged hundreds of thousands of miles during his 20-year career as a touring mixer. Widely respected among his peers, Khalaf's clients include Madonna and Michael Jackson. Earlier this year, Khalaf went out to mix the Japanese leg of Steely Dan's reunion tour and returned this summer to handle the band's 1994 reprise.

I caught up with the Dan tour at Shoreline Amphitheatre in Mountain View, Calif. This 20,000-capacity shed is housed under a huge canvas structure, and has a reputation as a sonically difficult venue. I have seen many concerts at Shore-

line, but this time, I was genuinely impressed with the absolute clarity, punch and sparkle of the audio.

The main system was Clair's usual shed complement of 48 JBL-loaded, Clair S4 Series IIs on the mains and a Yamaha PM4000 FOH console. Backstage, a Ramsa monitor board fed Walter Becker's and Donald Fagen's in-ear monitors and a slew of Clair 12AM stage slants,

The Ramsa's preamp outputs were routed directly to a Sony 48-track digital recorder manned by Roger Nichols. No recording trucks on this gig—just one track for each stage input. I can't say when the live Steely Dan release is due, but

I can say that Khalaf's house mix was flawless. We talked after the show about his career and his most recent tour:

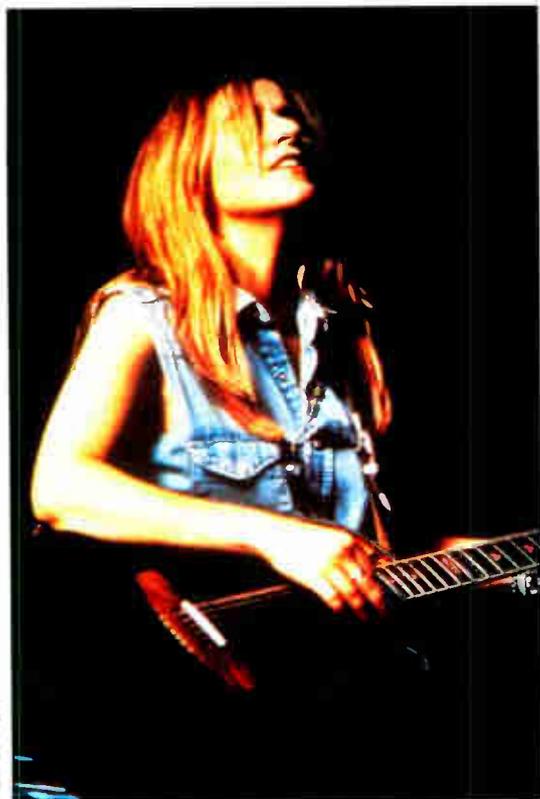
How did you become involved with Steely Dan?

"Steely Dan has always been my favorite band, and the opportunity came up to do [Fagen's] New York Rock & Soul Revue at the Beacon The-

—CONTINUED ON PAGE 242

Melissa Etheridge's "Yes I Am" Tour

BY ELIZABETH WYATT



extended from its original end in December '94 to the spring of '95. Opening for both Sting and The Eagles earlier this year, Etheridge triumphed at Woodstock '94 in August. South America and Puerto Rico are scheduled for spring, and then it's back to Europe, where, according to Steve Folsom, her sound man of five years, "Melissa is just huge—much bigger than in the United States—especially in Germany. For two years in a row we've played The Ahoy in Rotterdam, Holland, which seats 11,000 people; both years it has sold out."

Folsom's association with Etheridge started

with a phone call. "In June of 1989, Audio Analysts (then based out of Montreal, Quebec) called and said, 'We've got this woman who's doing three weeks across Canada,'" he recalls of Etheridge's first tour as a headliner with a full band and crew. "And she's kept me around ever since." Folsom first hooked up with Audio Analysts while mixing Face to Face as an opening act on an Alarm tour.

He notes that several factors make Etheridge different to work for, her famous dynamics being one of them. "The thing that's always been hard to get across to sound companies when I'm abroad doing one-offs is people think of Melissa as a folksy act," he explains, "so they think we don't really need a lot of speakers. I've found I need more speakers with her than with any other act I've used because of

—CONTINUED ON PAGE 223

Sound Company: U.S./
Sound Image.

San Marcos, Calif.;
Europe/Roadstar P.A.,
Sheffield, England

FOH Engineer: Steve Folsom

Monitor Engineer: Bob Delson

House Tech/Support Act

Engineer: Chris Schutz

With three Grammy nominations and one Gold Gramophone on her shelf, Melissa Etheridge took off on her whirlwind "Yes I Am" tour, which has been

Engineer Steve Folsom at the 40-input Ramsa WRS852 FOH console



PHOTO: GROUP ONE LTD



Tom Long and Ethan Orlovitz at the Crest Century GT 40 console

Tramps, NYC

BY MARK FRINK

Tramps, located on 21st Street between 5th and 6th Avenues in Manhattan for the past 14 years, has hosted performances for the New Music Seminar for three years. With a capacity of 900, the club is set up in typical cabaret-style with the stage facing toward the bar. The mix position is on the right side of the club, about 25 feet from the 3-foot-high, 25x15 stage. The sound system was recently upgraded with the help of Tom Long from Musicians Express of Philadelphia.

The new house console is a Crest Century GT 40. Tramps' house engineer is Baker Lee,

who uses the mono output to send to the two-way fill speakers back over the bar, putting them on a 42-millisecond delay. Filling in for Lee, who was on leave during July and August working at the Summer Stage festival in Central Park, was Ethan Orlovitz, shown in the photo with Long getting ready for an NMS performance by Portastic from Chapel Hill, N.C.

Other FOH auxiliary gear includes a BSS FCS-960 stereo equalizer, Yamaha D-2040 digital processor, Drawmer 404 quad gate, five channels of dbx compressors, a Lexicon PCM 42 and two Yamaha SPX 9011s. The proprietary FOH speaker system, designed by Jack Weisberg, consists of six three-way flying

boxes powered by two Crest 7001s and a 6001, and six sub-bass boxes powered by a Crest 8001. The monitors are mixed on the ubiquitous Yamaha 2408. The single-15 wedges are powered by eight Crest 4001 and 6001 amplifiers and use BSS FDS 310 crossovers and FCS 960 equalizers, with a double-15 box for the drum mix. The microphone inventory includes the standard complement of Shure SM-57s and Beta 58s, Sennheiser 421s, EV RE-20s, an AKG D-12 and Countryman DIs.

"Since we put in the new sound system," Tramps owner Terry Dunne says, "everyone who's come into the club has raved about it—especially the musicians." ■

—FROM PAGE 221. MELISSA ETHERIDGE her dynamics. That whispery, subtle, breathy thing she does when she gets way down, needs to be in your face—*big!*"

Working with Sound Image has been a wonderful experience for Folsom because of their attitude, willingness to modify things for him and the quality of their gear. "I have always used their five-way system with Melissa, which for me is the perfect theater box," he says. "It is a two-box system with a 4x18-inch sub cabinet. The high box is loaded with two 15s, two 12s, two 2-inch horns and two compression tweeters. They make a half-size high-box with two 12s and two tweeters that I stand up on end for balcony fills."

Folsom also uses four of the company's single-12-inch boxes with 2-inch horns in a center-cluster configuration for vocal fill in those first few rows, flown off the lighting truss.

Folsom uses a 40-input Ramsa WRS852 FOH console, "although I've never seen 852 stenciled on one," he says jokingly. "It always says 840, which is the monitor console. They're laid out very similar, except I have eight aux sends and there are 18 on the monitor console."

About the time the Ramsa board came out, Yamaha had just released the PM3000, which was the more popular console at the time. "I chose the Ramsa over the Yamaha because I really liked the EQ better, and that was more important to me than mute groups and VCAs," Folsom says, "although almost every time we've gone to Europe, the Yamaha is what we've had." With this system, he is pushing just under 80,000 watts through QSC amps. In the mains, Folsom uses all 3800s and 3350s, with MX2000s and 3350s on the monitors.

Miking is where Folsom has his fun. "I've been using Shure mics exclusively for about five years now. They have really been there for me when I needed them," he explains. "The mic I use for the overhead is probably my favorite new trick.

I kind of get tired of the old 'snare-that-makes-you-blink-every-shot' that has been popular for so long." Instead he uses a Shure VP88 in the MS stereo position for left, center and right imaging. He positions the mic three to four feet straight over the snare drum.

"I prefer that to close-miking the snare and having to add reverb to make it sound ambient," he notes. That leaves the left and right channels open for cymbals and other percussion. "Basically, the microphone hears

exactly what the drummer is hearing. It lets the drummer control the dynamics of his kit." Folsom uses just the kick drum and the overhead microphones on most songs. For the kick he uses an SM-91, then a traditional setup on the rest of the kit: SM-57 on the snare, SM-81 on the hi-hats and SM-98s on the percussion areas and all the toms. "So, on songs like 'Bring Me Some Water' and 'Like the Way I Do,' [traditional rock songs]," he says, "I can just back down the overhead and crank up the real ones. I can

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get two different drum kit sounds and still be a purist."

For the electric guitars, Folsom uses "some old '70s microphones on old '70s guitar amps." On guitarist John Shanks' Fender Deluxe Reverb and Etheridge's Vox Cambridge (offstage and miked up), he uses SM-53s: "They don't have the high-end that mics do today, which is good because guitar amps just don't want it. This way, I don't have to go chasing all the high end and roll it off. I just let the mics do it for me." On Shanks' Matchless 2x12 amp, which is redesigned after the old Vox, he uses the Beta 57.

Etheridge's main guitar, an Ovation Adamas II, has drawn a lot of interest. "A lot of people say, 'God, can't you talk her into using a Martin?' But that's one subject that has never been up for debate," Folsom says. "The good thing is, she has never asked me to make it sound like a Martin. Melissa has a wonderful picking technique, and she



PHOTO: DAN HOWELL

just lays right into it when the chorus comes, and I'm usually fighting for room with the hi-hat.

"I take her right out of her wireless," he continues. "She uses the Nady 950 Series. She's the only one who goes wireless. I take her signal direct and 'Y' split it into two channels of a Drawmer 1960 tube compressor mic preamp. The Drawmer helps to warm it up a bit and smooth out the really wild stuff. I return the signal to two channels of my console and pan the guitar about 10 and 2 o'clock to let her vocal come straight down the center."

Etheridge's vocals are covered with Beta 87s, both wired and wireless. "She doesn't like anything on her guitars, and she really doesn't like any effect on her voice. Her voice is so strong and pure that anything I've ever tried to sneak on it takes away from the voice," Folsom continues. "For a couple of vocal reverbs, I pretty much turn them up so you can hear them and then turn them down—maybe a two-second reverb—depending on the room and the night. In 'Silent Legacy,' she holds a note, and I swamp it up a little with a Roland SDE300—a simple 530ms digital delay with 40% regeneration on it. She holds the note for a really long time, and I hold it longer. She backs off the mic, and it just dissolves. It's kind of an interesting fade-out.

"Probably, my favorite new thing this year is the Yamaha 2040 digital system controller," he says about the four-way crossover with eight bands of parametric EQ, compression on any band, and time alignment by components.

Sound Image built a custom waveguide-technology monitor for Etheridge's vocal and guitar wedges. Etheridge uses three wedges in front of her: the center for her guitar mix, and the two outside for her vocal mix. Drum monitors are double 15-inch wedges with a 2-inch conical horn, while bass and guitar use single 15s with a 2-inch horn. Sidefills are the only non-Sound Image box—a pair of EAW KP-850s, which monitor engineer Bob Delson has used since he did monitors for Harry Belafonte. Delson also uses a Ramsa 840 monitor board, Klark-Teknik EQs, Behringer Autocombs and Intelligates, and Brooke-Siren crossovers. The amps are from QSC, but for the low end they use the new MX2000 Series.

"All the backward-facing monitors are run out-of-phase, so that all stage sound is moving



Melissa Etheridge and band onstage

in the same direction as the P.A.," Folsom notes. The only problem they run into is with the increase in low-end when Etheridge's Ovation wants to feed back. "So, we have to throw her guitar channel out-of-phase."

Folsom's favorite venues are in Atlanta and St. Louis: "They're both called The Fox Theatre. [See Oct. '94 *Mix* for more on the Atlanta Fox.] I could spend the rest of my life in theaters. They just sound so great. Sheds and arenas are tough—definitely not as musical and not as creative as theaters. [In sheds], it's more about featuring what's important at that particular moment and always keeping the vocal out front, because it's still got to be Melissa Etheridge."

Once he has his hands on the console and the show starts, Folsom has to keep his ears open and be on his toes: "I always feel like I have to be part of it. [Since] I don't even take a copy of the set list, I have to totally concentrate—I can tell by the guitar that John throws on or by how Melissa strums her guitar, or I hear one note, and I know what song it's going to be. She throws different things in depending on her mood and the crowd, and the band just loves to vamp things out." Folsom says it feels good to stretch out and take off in new directions. "That keeps it fun and interesting." ■

Elizabeth Wyatt is Mix's computer guru, a veteran audio engineer and a solo performer. She recently recorded a track for Vambo Rools: A Tribute to The Sensational Alex Harvey Band.

—FROM PAGE 220, COMPUTER CONTROL years, the current debate centers around several manufacturers' proprietary systems. [For more on computer control concepts, see Rudy Trubitt's and Bob Moses' articles on the topic, which appeared in Mix occasionally from September '91 to March '94—Eds.]

Normally, amplifiers are located away from the sound system operator. They are also subject to more severe duty cycle requirements than other components. Connecting all the amplifiers to a convenient panel relieves the sound technician of the need to physically inspect and adjust them at their racks. This was the origin of the currently available systems for controlling and monitoring amplifiers. Furthermore, the sound system's functionality is enhanced with a central control point. System-wide settings can be rapidly enacted, and changes can be monitored from the operator's position.

Although not every live sound system needs or could even benefit from computer control, large-scale, complex systems that tour with the same act every night or operate in the same room every night are prime candidates. These users additionally need to store equalizer settings, trigger equalizer or effects changes and channel mutes via MIDI, as well as have real-time monitoring for amplifiers' performance parameters. The user can observe and interact in such a way as to be able to respond quickly to changes in the demands of the event or to anticipate and fix failures. Elaborate setups can be replicated with a few commands. The proper design and implementation enhances the usability and reliability. Intelligent appliances, with the right control software, eventually will be able to react to each other's information and requests, and even manipulate each other rapidly and precisely without the need for human involve-

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ment every step of the way.

Many successful artists' engineers have taken computer-control technology on the road in the form of MIDI for controlling effects, rather than for amps. The mix engineer's world at FOH uses many devices borrowed from the recording studio. The establishment of MIDI as a standard, despite its limitations, provided a platform upon which different manufacturers could co-operatively build pieces that could interact. Many touring mixers regularly use MIDI librarians to store a multitude of effects presets, and MIDI program changes are used to control the various devices required for today's effects-intensive, high-performance touring. Many options are available, including Ear Level Engineering's Hyper Midi and Opcode's MAX devel-

opment environment.

Most amplifier applications have been designed for installed systems, and the designers and managers who have the budgets and mandates necessary to build turnkey, powerful, flexible control systems have embraced the technology. Individual manufacturers have been developing systems and components for that specific market. Installed system designers have taken the benefits of the technology and implemented and packaged it in ways that offer enhanced usability and flexibility in their systems. Designers saw they could use the technology to reduce mundane tasks and increase reliability with preprogrammed system setups. Systems also could be controlled by other, non-audio-related events, like switches or contacts. These systems are truly more functional than previous systems.

QUICKTIPS

Jason Suit of Seattle writes in to say that anyone using a Mackie 8-bus board for live shows should keep in mind that it has a couple of minor differences from what you might expect in a live console. First, you may want to "mod" all pre-fader aux sends from post-EQ to pre-EQ, so that when you use it as a monitor send, dramatic EQ in the main P.A. mix will not push the stage monitors into feedback. This is done by cutting a trace and soldering a jumper at a spot marked "PRE/POST" on the PC board inside the mixer for each channel. But be warned: This might put your warranty in jeopardy.

You do, however, have a pre-EQ stereo mix available in the form of the "B-mix" bus (if you're not already using it for your "quadraphonic" speakers). The B-mix bus *is* affected by the highpass filter, and you can "borrow" the bass (80 Hz) and treble (12 kHz) EQ from the main mix on a channel-by-channel basis if you need, leaving all six auxiliaries for effects. The bummer is that the B-mix output jacks, unlike aux 1+2, are unbalanced. On the other hand, you can now use aux 1+2 in "post" to rebalance a mix for the tape deck, compensating for anyone who has his Marshall on "11" (usually the dude who cares most about the board mix). Your live mix "moves" will be heard on tape, and if you bring the FX back on faders, you can remix them hotter so they print to tape better.

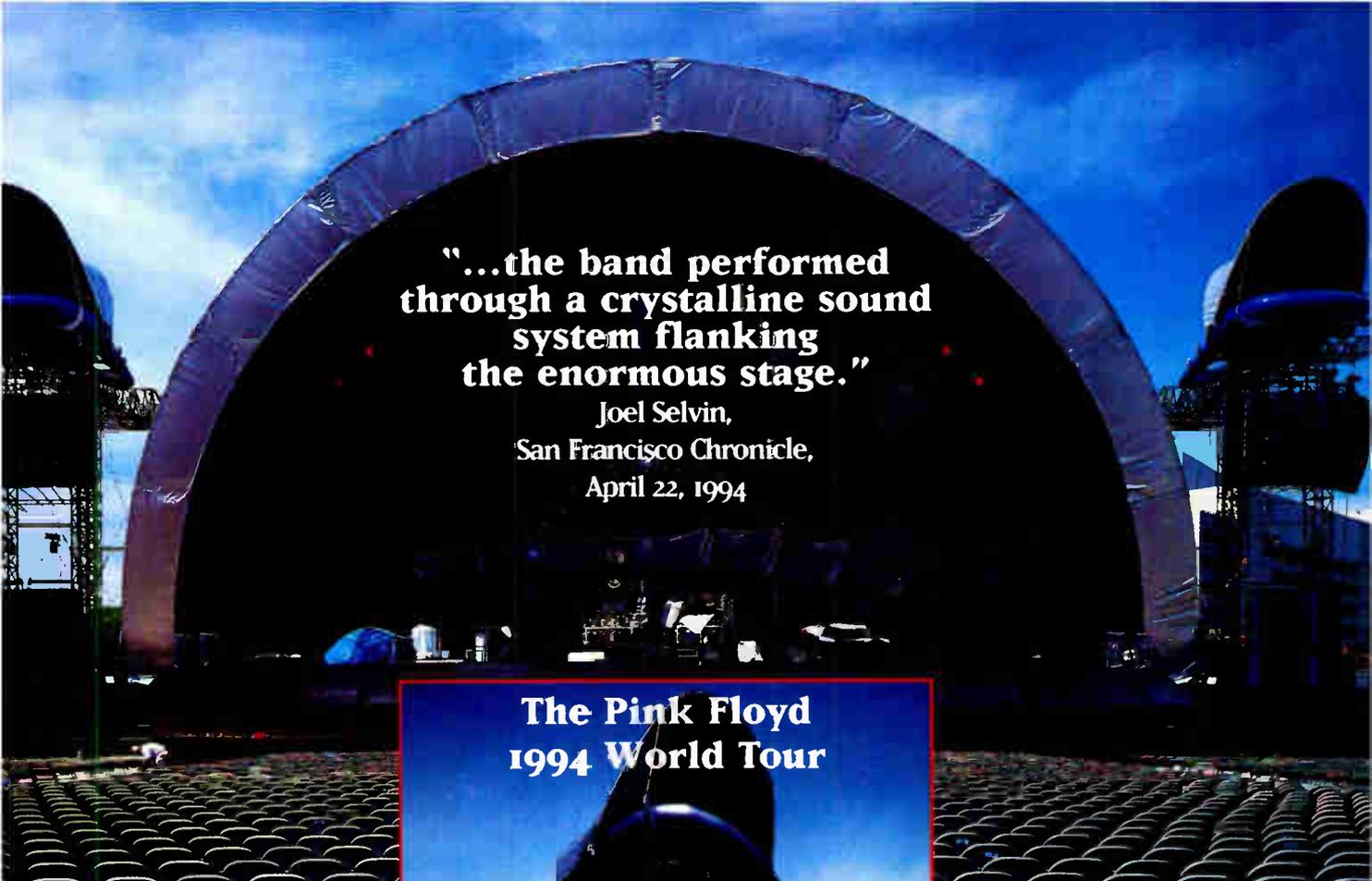
The other mod to check out for live sound changes the solo bus from post-fader and post-mute to pre/pre. Without it, you can only check channels that are "on and up" in the mix, which might not be a problem for some. All the mods are discussed in the back of the manual, if you make it that far. Rock on. ■

Got any good tips about how to save hassles and generally keep it cool at the gig? Write to: Mark Frink, 4050 Admiral Way #305, West Seattle, WA 98116.

In other areas, such as amplifier and speaker development, touring, testing and innovation have led to further price/performance benchmarks. This hasn't been the case with computer control. Touring demands of computer control differ from installed systems, requiring MIDI compatibility, modular construction, ease of setup and rock-solid reliability to stand up to the rigors of the road. Some manufacturers seem to realize the difference, but few products specific to touring equipment control are making it to market. Within the next few years, touring mixers may see some of the benefits that their installed counterparts enjoy now. Microprocessor-controlled, recallable dynamics devices, consoles and system-wide control will be a regular offering on the road in the not-so-distant future, but only if there is some consensus to drive it as there was with MIDI.

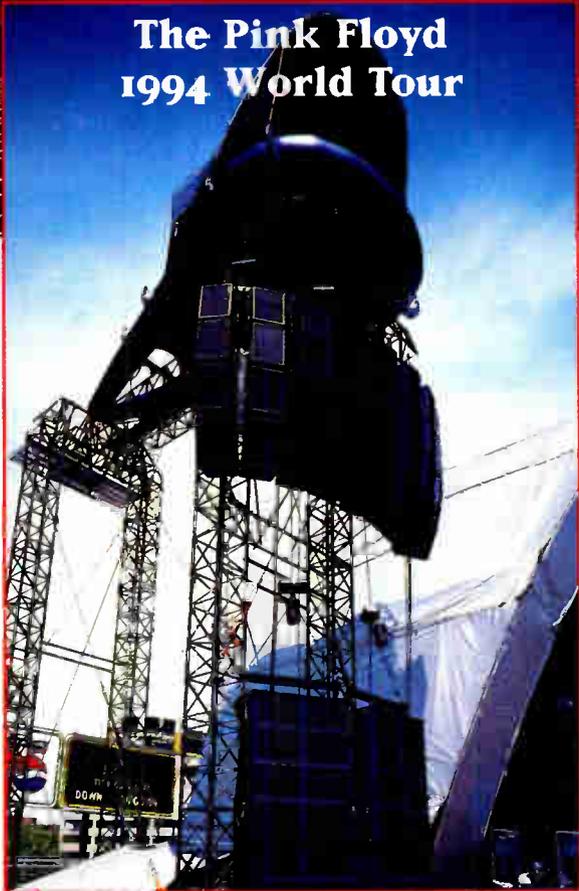
Under the different manufacturers' currently available systems, fundamental control and monitoring of individual power amps is basically the same. It seems that the type of control system you have is determined by the brand of power amp you use. We wanted to investigate the differences between each system. The three control software environments we looked at—Crown IQ, Lone Wolf VNOS, Crest NexSys—are roughly similar in that they each control and monitor major power amp functions, such as mute, temperature, polarity and signal level. All three can run on Intel-based machines (IBM-clones), with a recommended 80486 microprocessor. The similarities end there.

Each has a unique software front-end. NexSys and VNOS for Windows require Windows 3.1, while Crown Turbo IQ is written for DOS or can be run in a Windows DOS session. VNOS and IQ have Macintosh versions. While the VNOS Mac version is nearly identical to VNOS Windows, Crown IQ Turbo (IBM-compatible) and Crown IQ2000 Mac (Versions 1.4 and 2.0) are dramatically different. Turbo has



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San Francisco Chronicle,
April 22, 1994



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Pittsburgh Tribune Review,
June 1, 1994

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Craig Marine,
San Francisco Examiner,
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Joel Selvin,
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April 22, 1994

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your living room."

Michael Norman,
Cleveland Plain Dealer,
May 27, 1994

Photos: On May 8, 1994, Pink Floyd played to a sold-out audience of nearly 50,000 at Vanderbilt Stadium, Nashville, TN. With Britannia Row & Turbosound, there wasn't a bad seat in the house.

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some advanced features, which make it attractive to installers and contractors.

Although I am an admitted Mac-enthusiast, I'm equally familiar with either computer platform and can be found hanging on the CompuServe MIDI Vendor B forum and the Internet. One good thing about the Macintosh is that it's a plug-and-play platform—anyone can quickly put together a machine with its system software and know that it will work. Here at Proshow, a decidedly Macintosh company, we've been involved with Crown for some time both touring and in installations.

VNOS allows multiple controlling computers on the same system, and it is the one system that can be called a network. This obviously is an avenue for those who want to know what happens when the computer breaks. The VNOS user can even mix computer platform types on the same network. As a testament to

the cross-compatibility of Macintosh software and hardware, we were able to simultaneously run Crown IQ Mac Version 1.4 and VNOS Mac Version 1.5.1 on the same computer, with both networks fully operational. None of the Windows/DOS versions would run with any other control program, including MIDI interface cards in the PC. Both VNOS Mac and IQ Mac would run along with other MIDI software controllers, both fully functional.

Currently Mac users must choose between VNOS and Crown's IQ2000 Version 2.0, but it doesn't make much sense to choose a control platform based on the type of computer already owned, given the cost of the other pieces you need to buy and the process. The computer is just another thousand-dollar box, with the real expenses being the other hardware, the learning curve and the opportunity cost of choosing one system over the others. Crown's Mac Version 2.0 has somewhat fewer

features than Version 1.4, which is no longer being distributed. Version 3.0, still in beta, will add some of these missing features back in. LoneWolf's VNOS Version 1.5.1 will have been replaced by 1.5.2 by the time you read this, and it's important to realize that much of this technology is still evolving. Both NexSys and IQ allow users to sequence system-wide scenes, and IQ Turbo allows for the execution of timed events.

Looking at the hardware, each of the three systems' topology is as unique as its software. Lone Wolf's MediaLink, which VNOS runs on, uses fiber-optic transmission. Crown and Crest use copper cable, with greatly different cabling schemes. MediaLink and IQ house control electronics on subassemblies, inserted into expansion slots on the amplifier, while the Crest amps have a module that plugs into the octal socket and a companion electronics card, which lives in a separate Supervisor frame in the amp rack.

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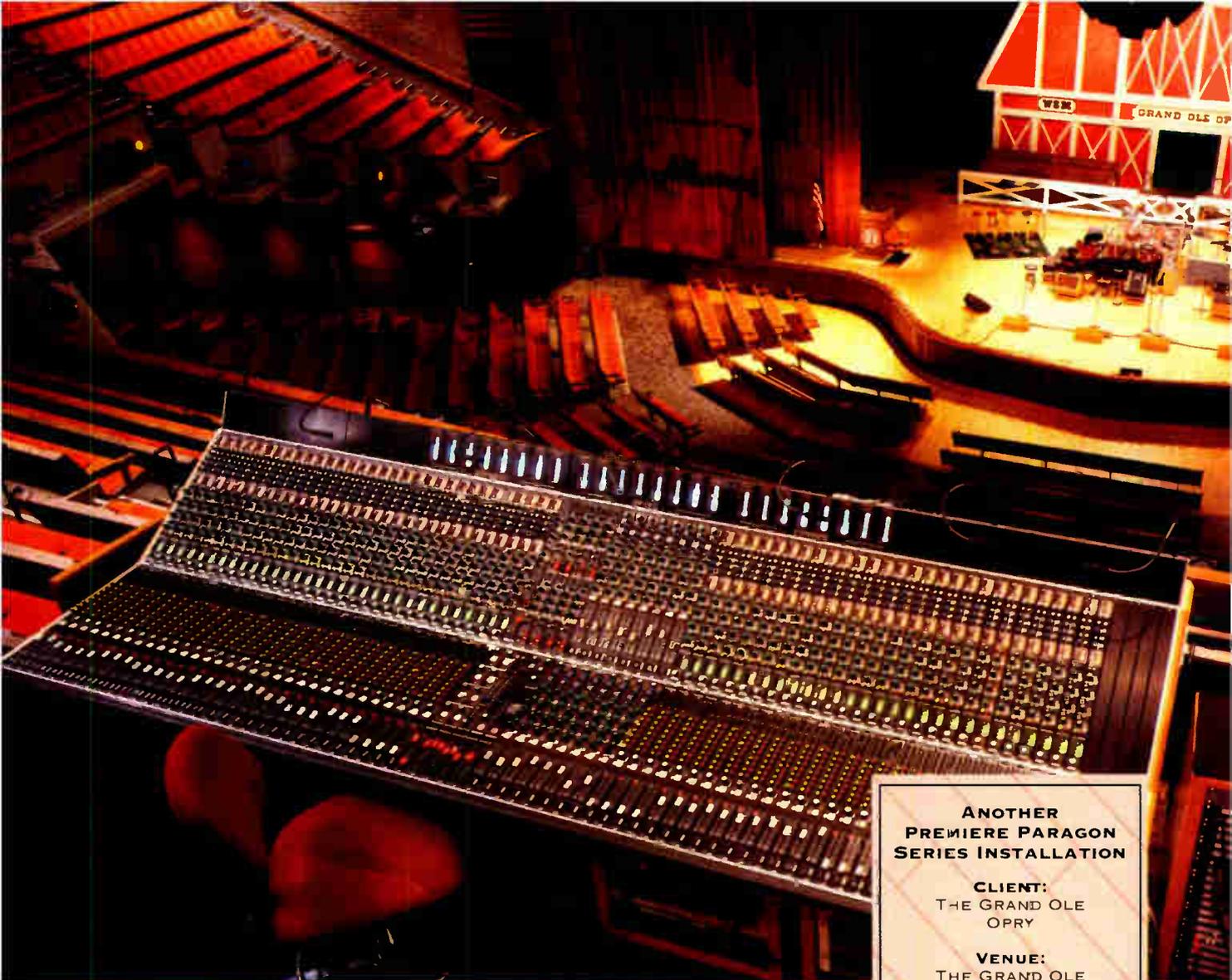
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The Crown IQ-INT interface connects the computer to the IQ amps and other IQ devices. It uses up to eight twisted-pair data "loops" that originate at the interface, going in series to each amp in the loop and returning to the interface. Each loop is limited to a total length of from one to 3,000 feet round-trip, with longer lengths achievable by using low capacitance (<20 pF/ft) twisted-pair wire. Using higher-capacitance audio snake pairs, while not recommended, works over the length of typical touring snakes. Data is passed around the loop from one amp to the next via the P.I.P. modules installed in them. Each module must have a "scaling" resistor installed whose value depends on the amp model, and each must have a unique bus address (1-250) set via DIP switches on the module.

Other Crown IQ devices include the Drone, AMX and SMX. The Drone is an intelligent piece of hardware and takes the place of the computer. The AMX is a 6x2 mic/line mixer whose knobs are only in the software. The SMX is a 6x2 mixer with the added benefit of being able to program multiple dynamics algorithms onto each channel, including gates, compressors, ducking and output limiters.

Crest NexSys differs in that the amplifiers are not directly connected to the data bus. NexSys uses a bi-directional data bus that connects the Bus Server, which resides in the expansion slot of an IBM-compatible computer, to one or more Supervisors. There is a card in the two-rack-space Supervisor Mainframe for each amp that connects to an Amplifier Control Module specific to that amp model, which plugs into the two sockets on the back of the amp. Much of the control electronics for each amplifier are located in the Supervisor, which lives in the rack and can control up to 12 amps.

The NexSys data bus is a linear data transmission line with no branches or loops; a terminating resistor is required at each

end. NexSys has Event Reporting, which can log hardware and performance-related fault warnings and system software control changes. With the optional Load Monitor frame installed, which handles up to 12 amps, NexSys allows the user to plot the impedance of the load on individual channels, by disabling the normal input and running a tone sweep through the channel.

The MediaLink system connects the computer to the network through the Bridge, a 230 rackspace device that is con-

nected to a serial port of either a Mac or IBM computer. The Bridge, like all MediaLink devices, has two pairs of optical connections for fiber-optic cables and converts the VNOS information to and from the light pulses, which are how data travel to the amps and other devices. Fiber-optic cables, rather than wires, are the data bus on the MediaLink system, with two types of fiber available. Plastic fiber can transmit about 300 feet, and the more expensive glass fiber can transmit more than ten times that far.

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TESTING SOFTWARE

IQ Turbo Version 1.2
 IQ Mac Version 1.4
 NexSys Version 2.9
 VNOS Macintosh Version 1.5.1
 VNOS Windows Version 1.5.1
 Macintosh System 7.1.1
 MS DOS 6.22/MS Windows 3.1

TESTING HARDWARE

80386 AMD 40 MHz; 8 MB
 RAM/40 MB hard drive
 VGA display with Orchid
 accelerator, 16550 UART
 33/66 MHz Compaq Prolinea
 80486 DX2
 16MB RAM/210 MB hard drive
 SVGA display, noninterlaced
 (2) Macintosh SE/30
 5MB RAM/ 80MB hard drive
 Internal compact display
 512x386, monochrome

Custom systems can be manufactured using wire, but the fiber offers much higher data throughput than is possible with wire, allowing users to be prepared for one advantage of the MediaLink

technology: the ability to ship other digital datastreams on the same network when it finally becomes available. MediaLink, although proprietary, is an open technology scheme, which anyone can sign up on as a licensee. As such, there have been three different companies that have had products available and shipping all year. Rane has had its NEQ equalizer for some time now. QSC and Vega have bought the technology and repackaged it as QSCControl and VegaNet, respectively, although it is the same package of code with some cosmetic changes. Just out in time for this review was the new TOA amplifier, with Carver's amp just weeks behind and other products somewhere on the horizon.

NexSys and MediaLink both have MIDI interfaces, allowing engineers to implement MIDI control along with system control from within the software. As the number of MIDI-programmable consoles increases, mixers will

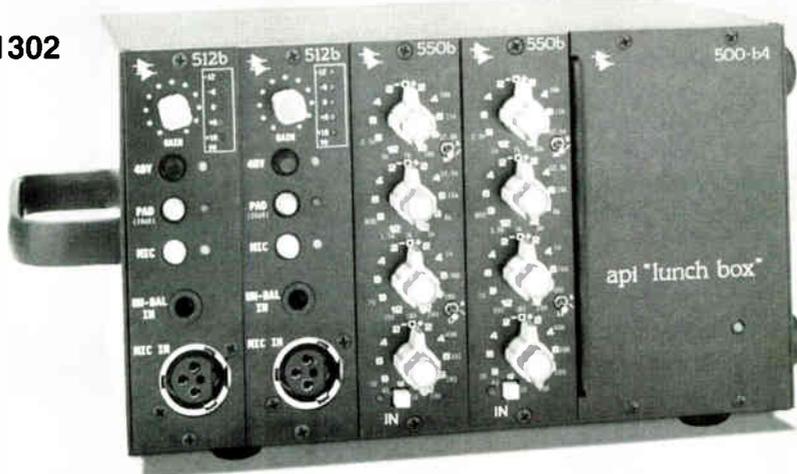
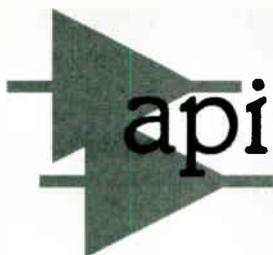
start using these features in controlled systems. Perhaps in the next few years, users and manufacturers can unite the various systems, by either a truly used and recognized standard, or by providing gateways and bridges to each others' communication schemes. With the amplifier business as competitive as it is and so much having been invested in the existing technologies, it seems that neither is likely to happen soon.

A new industry standard could bring control and monitoring of sound equipment into its golden age, incorporating control of amplifiers and extending coverage to the entire sound system. The best hope for the consumer might be the adoption of a unified communication technology for pro audio so that we can get back to issues like "how good does it sound?" The largest sound reinforcement companies have yet to wholly embrace the technology for touring. Many have tested it but are waiting to

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see if a standard takes hold. Large companies have a tremendous investment in equipment, much of which is not compatible or easily upgraded.

Companies whose inventories have been based on QSC EX Series, Crown Macrotech, or Crest Professional Series amplifiers already have a built-in path to easily implement their manufacturers' present control schemes. For several hundred dollars per amp, these sound companies can try one of the three types of currently available technology. In some sense, this is a discount, because the research and development that has gone into each of these is far greater than implied by the prices on the parts list to implement control. If you own these amps, you've already paid for some of the cost of a computer-controlled system.

There may be a significant after-market for those users who either still have a few years to go on their current amplifier lease or are heavily invested in older amp models. A possible retrofit product might be a one- or two-rackspace device with through connections for control of the line-level signal with a high-quality VCA, possibly with high-level connections to facilitate load monitoring, as well as a local connection to a computer's serial port. As user acceptability and demand builds, larger touring companies will offer computer control.

A laptop computer is preferred for touring, due to portability and the economy of having a machine to use when not operating the sound system. The computer can be used for many other show-related tasks such as input sheets and stage plots. When you look at the price of any computer or software, keep in mind that a hidden cost is the time it takes to learn and get comfortable with it. The majority of MIDI software, however, runs on Macintosh. Recently, more software publishers have been releasing versions of their product for Windows, but they generally run slower if there are sig-

nificant graphics involved.

There are some other disadvantages to using an Intel-based PC. NexSys and IQ Turbo PC-based control programs require special driver cards, or high-speed serial ports, not currently found on PC laptops. These systems must use a dedicated desktop computer, making it impractical for use other than to control the sound system. Though there were timing problems due to battery conservation schemes with early Powerbooks, Mac versions of the software might oper-

ate on later models that have buffered serial ports. ■

Dave Stevens works with ProSbow, a Seattle-based sound reinforcement company.

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out new pro audio products, the fall AES show in San Francisco will be held November 10th through the 13th...Speaker manufacturer Apogee Sound will be announcing a new amplifier series at the AES show, with many improvements over its previous amplifier line. This series is the first amplifier product to be released that has been designed from the ground up for computer control, rather than reverse-engineered from existing product designs, and as such is

the first real MediaLink product. The front panel LCD shows attenuation with 0.5dB resolution, as well as temperature expressed as a percentage of maximum-output voltage and wattage as a percentage before clipping, impedance of the speaker load, and AC mains voltage as a percentage of the voltage at which the amplifier is intended to work. The attenuator controls can be locked out; when used with a computer, this feature can be toggled remotely. Attenuation of both channels can

be linked at either identical settings or at an offset, and this, too, can be reset via remote computer...On the last morning of the show—Sunday, November 13, from 9 a.m. to noon—there will be a workshop on the topic of "Touring with Computer Controlled Sound Systems," which explores the interface between personal computers and touring systems, addressing questions of functionality, availability and future development. It offers the opportunity for discussions with a panel of working engineers who have been on the road with these technologies, setting them up on a daily basis. This event should be particularly helpful for manufacturers just getting involved with the issues surrounding computer control. It is hoped that one outcome of the event will be suggestions and ideas concerning what these technologies will need to embrace to succeed...New from Yamaha is the PM3500, a souped-up PM3000 for about \$2,000 more—with EQ, busing and summing schemes borrowed from the 4000. There is a 128-scene MIDI muting system, and it comes in 40 or 48 inputs. With eight aux sends and eight VCA groups, it's laid out like a 3000, but with stereo matrices and improved metering. There also will be a monitor version. If you weren't at the summer NAMM in Nashville, you may have missed the new \$1,499-list, single-rack-space, Yamaha D-5000 multitap delay. Its "auto-load" sampling feature continuously downloads audio to the unused RAM so that the user can store and capture the signal...TAC/Amek sold its first 40-channel Recall console to Andrews Audio of New York City. The Theater of the Performing Arts in Redondo Beach, Calif., also bought a 56-channel TAC/Amek console. The new 501 console is being shown at AES. The board is a Recall console running the same software but stripped back to eight auxiliaries, four VCAs and eight audio groups with a 10-in, 4-out matrix. The dynamics package, standard

—CONTINUED ON PAGE 242



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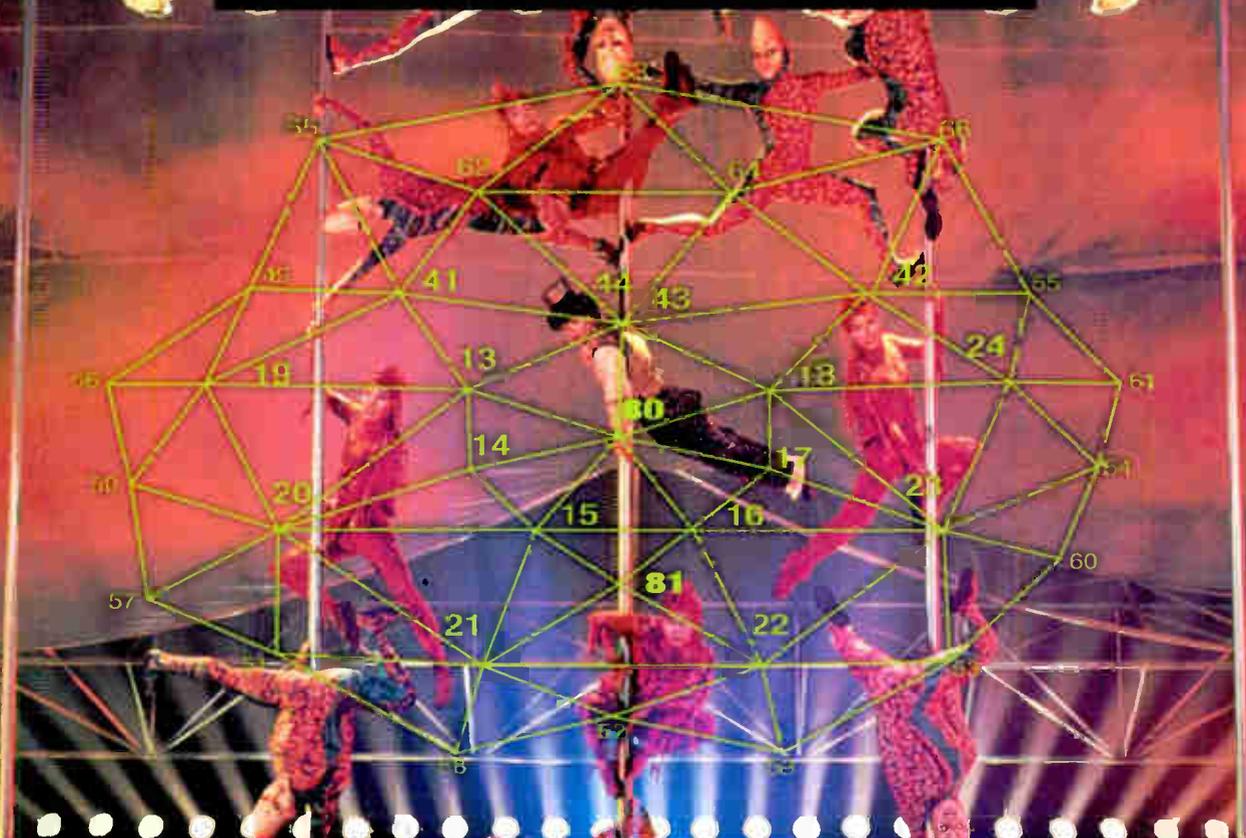
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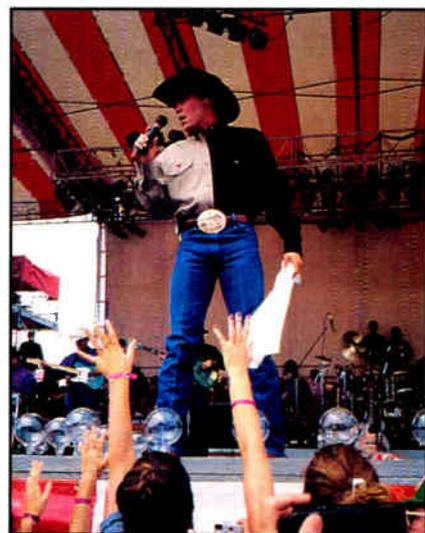
LCS level control systems

FAN FAIR '94

article and photos by Rick Clark

Every June, the Nashville country music industry trots out its finest recording artists for thousands of avid country fans from around the world. The event that draws these people is known as the International Country Music Fan Fair, a four-day festival that takes place at the Tennessee State Fairgrounds.

Fan Fair, which began in 1972 at Nashville's Municipal Auditorium, attracts over 24,000 people who willingly stand in lines at Fairground exhibition buildings for hours collecting artist autographs, taking pictures and buying countless souvenirs. It's not uncommon to catch hundreds of fans (for some mysterious reason known by locals as "gherms") engaged in some mind-boggling body crush as they attempt to glimpse or touch the garment of stars like Alan Jackson, Travis Tritt or Billy Ray



Clay Walker onstage

Cyrus, each of whom performed at Fan Fair this year.

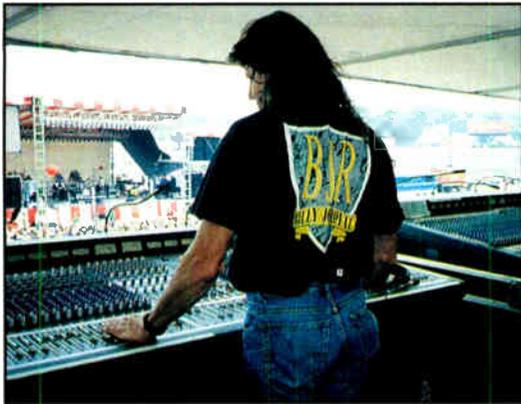
Other artists who performed at the 1994 Fan Fair included David Ball, John Michael Montgomery, Waylon Jennings, Faith Hill, John Anderson, Trisha Yearwood, Rodney Crowell, Hal Ketchum, Kathy Mattea and many more. The labels represented were Curb, Mercury/Polydor, MCA, Liberty, Warner/Reprise, RCA, Atlantic, Arista, Columbia/Epic, BNA, Giant and Asylum. Each label is allotted a two- to two-and-a-half hour



slot to showcase its roster.

The concept of Fan Fair was created as a response to the thousands of country fans who come to Nashville in hopes of seeing the stars at the annual Country Music DJ convention in October. It became apparent that the fans needed their own party, instead of crashing an industry function. Central to the event are the live shows, which are put on by the Country Music Association and the Grand Ole Opry; and just as country music has evolved, so has the level of production.

What originally was a single-stage show has now expanded into a huge dual-stage setup (by Jason Promo-



Part of the stage

tions of Hendersonville, Tenn.) featuring high-quality sound (provided by Maryland Sound Inc.), lighting and precision set changes. Will Byrd, producer for the Arista, Atlantic, BNA, Mercury/Polydor and Sony shows, has been with Fan Fair since the late '70s, when the event was still at the Municipal Auditorium.

"I think the last year Fan Fair was at Municipal Auditorium was 1978 or 1979. Back then, it was a much smaller event," recalls Byrd of his initiation to the country music event. "For an intro, there was an artist there who said, 'Here's a song you might have heard on the old electric radio.' I thought that was pretty stupid, not to be compared to the old gas-powered radio that we so commonly like to use these days.

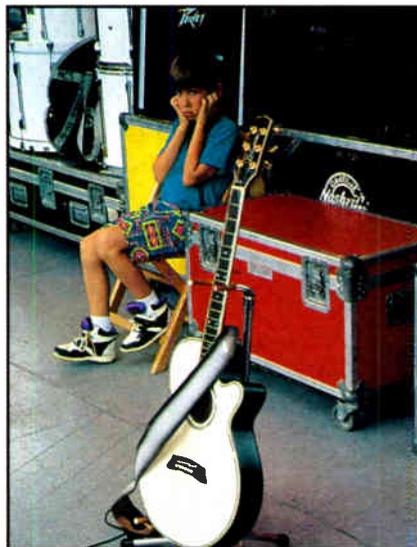
"When we first moved out to the fairgrounds, it was still the one-stage philosophy," Byrd continues. "You did as many acts as you could in your two-hour period and frantically did set changes in a five-minute period or less. I remember Chet Atkins was my host the first year we

were at the Fairgrounds. He said to me, 'You know, I'm not much of a talker, so I'll do what I do best, which is play.' I would walk behind him and go, 'Keep playing.' He would give me a look like, 'Oh God. What's going on here?'" laughs Byrd.

By the mid-'80s, Fan Fair made the transition to the current, custom dual-stage setup. TNN (The Nashville Network) art director Jim Stanley (who also functions as Fan Fair's art director) was part of the brain-storming process that led to the stage's design, which also features a large center-stage video screen.

"Fan Fair had continued to grow, and one of the weak areas we had was the delay between acts. We felt we couldn't have the number of performances we wanted, as quickly as we wanted," Stanley explains. "Several of us got together and decided the best solution was to have two stages that were connected. While a performance would be going on one stage, we could be setting up the other group on the other stage."

"With the two-stage concept, we can actually end a set on one stage and have the other stage ready to go in five seconds. It can move that quick," echoes Byrd. One of the elements that makes Fan Fair's setup so



Kids and loud country music



Monitor position

expedient is the use of fax machines between stages and house and monitor crews.

"We use fax machines, and that is how everyone finds out what is going on. We get the information in progress, usually, during the show, and use our fax machine to make copies for the stage guys," says Maryland Sound monitor engineer Greg "Fish" Salmon. "The stage guys are supplied by TNN and The Grand Ole Opry. They do the set changes, so they get a couple of copies of what's going to happen in the next 20 minutes, and then they fax a copy out to the house setup, letting them know what is coming down their lines. Someone with a radio intercom will go around to all of the inputs, just prior to going to the house guy. On-stage, we find them ourselves and mark where all the vocals are and where they are going to go and we pre-dial. Then we go out and listen and see if it sounds just like it looked and move on.

"I've had a lot of guys come up to me after their set and say, 'Hey, it's the best sound we've had all tour.' You've got to wonder what it has been like for them those last months to say that," laughs Salmon, whose credits include Dan Fogelberg, Neil Young, Yes, and Crosby, Stills & Nash. Salmon is quick to add that he and Maryland Sound have great respect and appreciation for TNN's Conrad Jones, the senior director at Fan Fair in charge of overseeing the sound production.

Most of the production people have worked at each Fan Fair for years. Nashville Network audio engineer Jamie Shankland, who has always worked the monitor position on one of the stages, is one of them. The familiarity of the stage process makes for a smooth-running event where

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everyone knows their role. "Load-in happens early Sunday morning, and the system is put up and tapped out, but it won't be tuned or cued until Monday morning," Shankland explains. "At 7:00 p.m. Monday, there is a bluegrass show. It's a basic setup with five vocal mics and five instrument mics. There is a bass direct line and a bass mic line. It is almost like the Opry—they run the acts in and run them off."

One function of having the bluegrass show first is the chance it gives engineers to work out any bugs before Tuesday's major-label shows. Each record label assigns a person to

Leroy. Everything was able to tie in together, and Leroy was able to play on some of the things that Alan had. The act that played before Leroy was Blackhawk, and we ended up doing the same thing with them.

"One of the things that you do is you make sure you let everybody, for lack of a better phrase, have their say in court," Byrd continues. "They get to say exactly what they need. Then you start to tear back a little bit and say, 'Can you work with this or can you work with that?' Even with all the preparation, things change on a day-to-day basis. I cannot tell you how many times somebody has come up

and fired three members of their band and was in rehearsals the night before. This happens constantly."

Randy Siegmester, production manager for Maryland Sound, points out that Fan Fair's front-of-house system features the MSI MS-12 system. The different MSI cabinet configurations, which mainly use EV components, are designated as High Packs, Low Packs and subwoofers. The MS-12 High Pack has a 2-inch compression driver and four 12-inch speakers, while the Low Pack (the MS-12B) has four 15-inches. The subwoofer MS-18 cabinets are double 18-inch. All told, there were 32 cabinets per side, for a

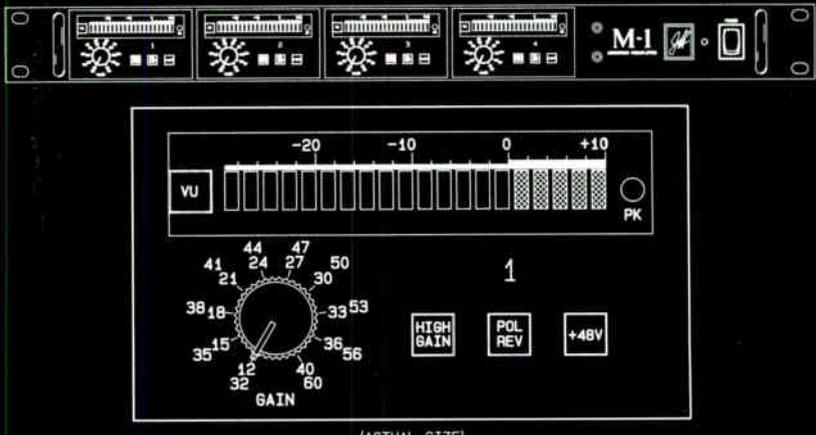
IT'S NOT UNCOMMON TO CATCH HUNDREDS OF FANS (FOR SOME MYSTERIOUS REASON KNOWN BY LOCALS AS "GHERMS") ENGAGED IN SOME MIND-BOGGLING BODY CRUSH AS THEY ATTEMPT TO GLIMPSE OR TOUCH THE GARMENT OF STARS.

produce their segment. If a label wants to feature six artists in its block of time, the producer will try to match groups with similar setups, or who can be easily maneuvered themselves into overlaying stage positions.

Producer Will Byrd explains a typical Fan Fair stage strategy by outlining a dynamic on this year's Arista show: "Alan Jackson likes to use all of his own equipment. We provide drums and the bass, and, basically, Alan's guys use the rest of their stuff. The act that played on the stage before Alan was Leroy Parnell. I had Alan's guy check in on the stage left side at noon, before the show, and then I had Leroy's guy check in. I got the two together to talk and start to deplete the actual amount of equipment we needed to bring up for

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total of 64 cabinets, plus the subs. Breakdown per side was 16 High Packs, 16 Low Packs, plus six subs—12 subs in all. The center cluster had four pairs of High and four pairs of Low pack, with no middle subs.

For Fan Fair '94, Salmon felt that the monitor setup had been significantly improved. "The biggest advancement we had this year was our new MSI DP-1 wedges. They are a ported single 12-inch with a 2-inch horn that sound better than our double 12-inch monitors and weigh less than half of the old 12-inches. That means a lot when you are doing 30 set changes a day," says Salmon of the EV-loaded monitors. "We had ten per stage, and we also had old two-way Northwest Sound sidefills. For the drummer, we were using our wedges with two 15-inch EVs and a 2-inch TAD."

The dual-monitor mixing stations had two Midas XL-3s, configured 40 mono. The monitor system used 16 Klark-Teknik DN-300s. Each insert rack at each monitor console housed two SPX900s, two dbx 160Xs and two BSS 502 gates. The front of house had two duplicate consoles and an inset

rack containing ten dbx 160Xs, one DSS DPR-402 DSR and three Aphex 610 gates. The effects racks that accompanied each console setup came equipped with a Roland SD-330, two Lexicon PCM-70s, two Yamaha SPX900s and one Lexicon 200.

Since the advent of the current stage setup, Fan Fair has had to further adapt to the increasing sophistication of the artist's production requirements. "The groups have gotten very sophisticated, and there is more setup involved. It isn't like it used to be, when you walked out, plugged in and took off," Stanley states. "Everybody has got their own setup, which you can understand."

Besides an increasing amount of artists requiring headphone mix systems (which MSI doesn't supply), more and more bands are bringing special amps and instrumentation. Although it certainly helps with the presentation of the artist's show, backstage space has nearly disappeared.

"I don't have anything against somebody doing what they need to do to give the audience their best performance," Byrd says. "The problem is that if you are stacking three

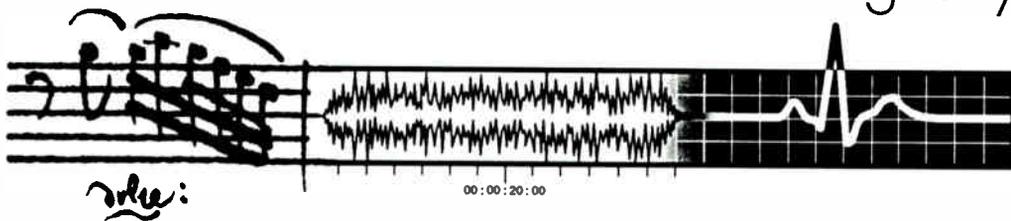
acts in front of each other on each side of the stage, you find yourself climbing over monitors, storage cases and over the top of the drum riser to get from one side of the stage to the other."

Although Byrd feels that the dual-stage setup is ideal, he is looking forward to the completion of the new Nashville arena in a couple of years. At that time, Fan Fair will have eliminated one of its most unpredictable situations—the weather. Anyone who has ever done a live show in the South knows that thunderstorms are common. Byrd has lived through many at Fan Fair, but one stuck out in his mind as being exceptional.

"In 1993," he recalls, "we had one of those famous monster Southern summertime storms blow through at about 2:15 p.m., right before the 2:30 Arista show. The rain was horizontal, and the lightning was so intense that we all knew we were going to die. This is one of those storms where everyone was calling for Auntie Em. We lowered the roof down to about 12 feet, covered everything and hung on for dear life. I got a bull horn and started to announce that I wanted

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everybody off of the stage. While all this was going on, 20,000 germs stood right there in their seats. It was one of the weirdest things I have ever seen.

"As the storm subsided," Byrd continues, "I asked all of the sound guys, 'When do you think we can get this up?' Granted, everything had been pulled up, and all of the cable had been pulled out of the way. They said, 'Give us 20 minutes, and we can do it.' I'll be damned if they didn't have everything perfect within 20 minutes. Everybody worked together, because they knew what to do and how to work together. This storm would've canceled any other normal show. I got all of the Arista acts to cut one song out of their sets, and we had an absolutely fantastic show."

From watching the music at Fan Fair, it is fascinating to see the devotion of the fans and their connection with the artists. The success of Fan Fair may be due to the popularity of country music, but it is also a testament to the ongoing professionalism of those who help make it happen at TNN, Maryland Sound, Jason Promotions, The Grand Ole Opry and the Nashville musicians and stage hands unions.

"There is nothing quite like Fan Fair. It's kind of funky and strange, but there is something special about the gig," Salmon concludes. "The interesting thing about Fan Fair is that there are roughly 20,000 people there per show, and they turn it three times a day. It's very interesting, and we take a lot of pride in being involved with it." ■

Rick Clark is a musician, producer and writer based in Memphis, Tenn.

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—FROM PAGE 234, NEWS FLASHES

on the Recall, is an option on the 501. The 40-channel board will list for under \$37,000, and the 24-channel lists for under \$28,000...Conspicuously absent from the fall AES show is the Bose large-format speaker product (formerly of U.S. Sound and purchased from Carver last winter). Now called the "Panarray LT" Series, the models are the 3202, 4402 and the 1802.

See you at the AES! ■

—FROM PAGE 220, STEELY DAN

atre for two nights. I mixed the house, David Hewitt provided the truck, and Elliot Scheiner mixed the album. Last year, when Steely Dan went out, I really wanted to do the tour, but I was on the road mixing Madonna. This time, I jumped at the chance."

Did you have complete control over choosing outboard gear and other equipment?

"Yes. Absolutely. The band does an instrumental overture—without Donald and Walter—before the

show, and during the sound-checks, I asked them to do that last, so the faders would be set to where they needed to be for the show's start. Donald and Walter came out and liked what they heard, and if they like what you're doing, they leave you alone."

Were you using anything out of the ordinary?

"No. I'm constantly reviewing things and looking at new products, but there wasn't anything unusual on this tour. I used some Summit compressors on the bass and horns, a dbx 900 rack of compressors on the vocals, and I use Aphex gates because they sound better than anything else. I used an Eventide 3500 Ultra Harmonizer in a modified version of the Layered Shift setting, to fatten up the backing vocals. I also threw a little doubling on Donald's vocals, with just a hint of delay."

Was there anything difficult about the tour?

"It was a joy—one of the most rewarding, nicest things I've done. The Dan tours only last a month, and it's not like being out on the road for 17 months. I've done that too many times. All but two of the shows were in sheds, which are always a problem—those tin roofs! And every one of them has its own little acoustic footprint that drives you crazy. I don't understand how they can build these designed-for-music buildings and have them sound so hideous."

Do you have a philosophy about live mixing?

"Sound mixers have a responsibility to the audience. Once in a while, in my brief sojourns into heavy metal, I hear mixers refer to the crowd as 'the vermin.' I've got news for them: Those people in the seats pay our paychecks. These days, it's tough to get people to come to see the shows, with the ticket prices as high as they are. Meanwhile, there are 64 channels of music videos, constantly telling you to never go out of your house. We have to do the best job we can to please our audiences." ■

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RECORDING SESSIONS

Off the Beaten Track

THERE'S LIFE AWAY FROM THE TOP OF THE CHARTS

By Blair Jackson

Call me crazy, call me out of touch, but probably three-quarters of the albums that I listen to a lot fail to make a dent on the *Billboard* charts. What can I say? Ace of Base and Tim McGraw just don't do it for me. What follows are ten fairly recent albums—some obscure, some weird, some both—that did catch my ear and then begged me to play them over and over again. For all but one, I contacted the engineer or producer of the album to gather some nuggets

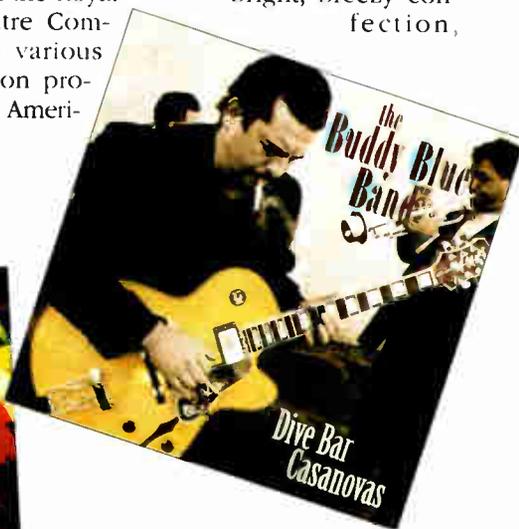
about how the recordings were done.

Rebecca Pidgeon: *The Raven* (Chesky Records). "We're not into making records," says David Chesky, co-founder (with his brother Norman) of the audiophile label that bears his name and co-producer (with Joel Diamond) of Rebecca Pidgeon's fine debut album. "We're into taking aural photographs, documenting performers in time. We don't do overdubs. We treat a pop performer like a string quartet—you go to a concert of a string quartet, and a certain moment in time is captured in your head. That's what we wanted to do with Rebecca."

So far, Rebecca Pidgeon is better known as an actress than a singer. She grew up in Scotland and enrolled in London's Royal Academy of Dramatic Art at the age of 18. She worked extensively with the Royal National Theatre Company and in various BBC television productions. In Ameri-

ca, she became an overnight sensation a couple of years ago, starring in the hit Broadway drama *Oleanna*, written by her husband, the gifted playwright David Mamet.

Although music was formerly a secondary pursuit for her, she managed to put out two records in Britain as a member of a group called Ruby Blue before moving to the United States in 1990. A demo of her songs caught the ear of the Chesky brothers, who were looking to expand their reach beyond the jazz, classical and Latin artists that have dominated their releases. David Chesky hooked Pidgeon up with arranger/pianist Joel Diamond, and then, with the label's principal engineer, Bob Katz, went into the big room at Master-Sound Astoria studios in Queens, N.Y., for the live sessions. The result is a bright, breezy confection,



with a bit of the feel of both early Joni Mitchell and the Indigo Girls, coupled with the obvious influence of British and Scottish folk music. The instrumentation is almost entirely acoustic (including subtle live strings here and there), dominated by strumming guitars and Diamond's piano. Pigeon's songs (some co-written with Mamet) range from soul-searching explorations of the psyche to relatively simple love songs, with an exquisite version of the oft-covered "Spanish Harlem" thrown in for good measure.

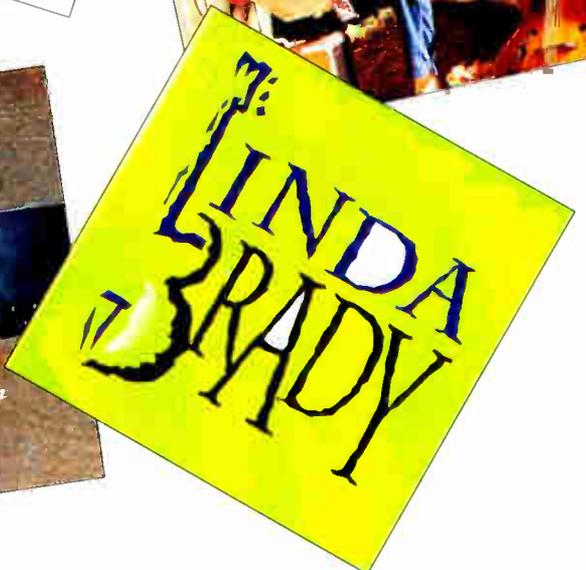
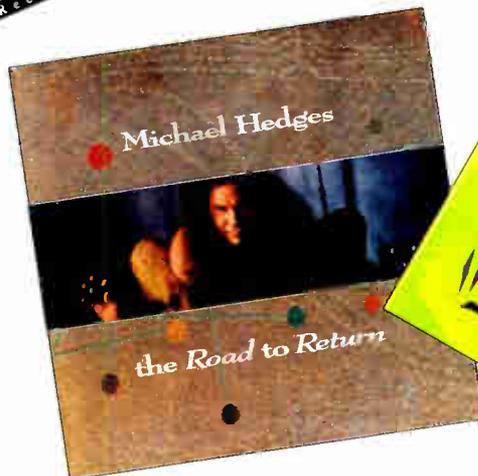
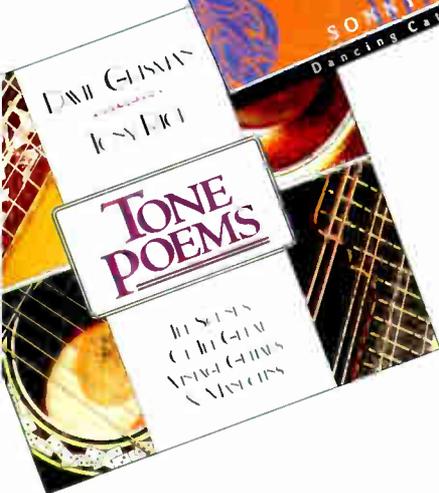
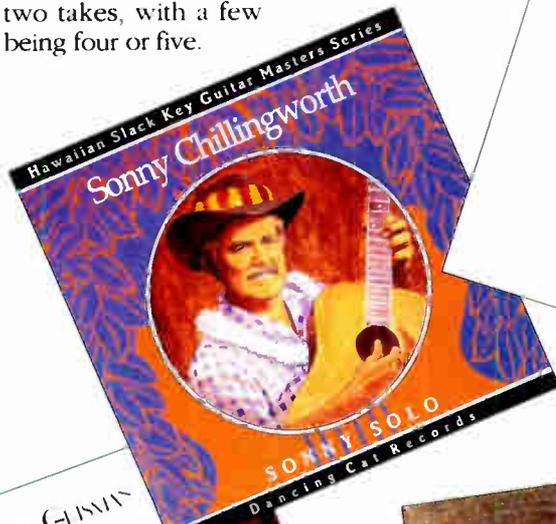
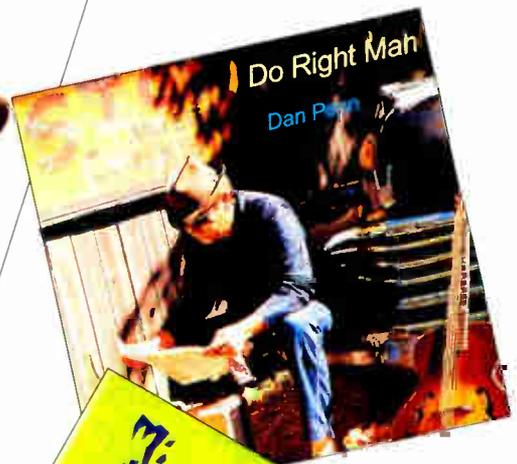
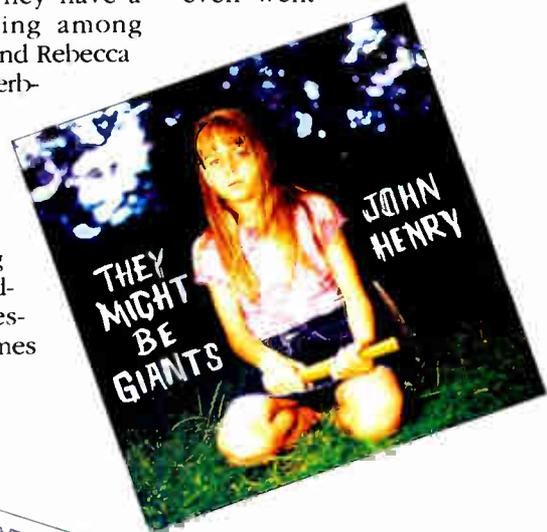
"Obviously there was a lot of pre-production because it's all live," David Chesky says of the Pigeon sessions. "Most songs were two takes, with a few being four or five.

There was some editing, but not much. We believe in minimal miking on all our projects; we're not into multimiking. We build all our own microphones. What we do is we take old capsules and then put our own electronics in them. In fact, everything we use is custom-made. We don't use any traditional consoles, either. We have our own that we built."

Chesky Records' literature claims that in 1988 the company built the first practical 20-bit A-to-D converter, which runs at 128 times the standard 44.1kHz sampling rate. Further, they say that with

high-resolution dither, they are able to present the entire 20-bit dynamic range of their converter on a 16-bit CD. Clearly, the Chesky brothers are doing something right: They have a rabid following among audiophiles, and Rebecca Pidgeon's superb-sounding chamber-folk album will surely widen the label's following even more. Pidgeon and Chesky—both names to watch for.

They Might Be Giants: John Henry (Elektra). TMBG are probably the most popular artists among these ten (their most recent album even went



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World Radio History

Gold), but they are still way left-of-mainstream. *John Henry* (I have no idea what the title has to do with the album) is nearly 60 minutes of very quirky rock 'n' roll filled with the sort of inspired craziness TMBG's large cult has come to expect from the duo of John Flansburgh and John Linnell. This time out they have something of a real band supporting them, including a punchy horn section that dominates many tracks. Over the course of 20 songs, there are oddball melodies that stop and start and transmogrify with scant warning, plenty of neat production tricks that give the disc an interesting sonic patina, memorable hooks galore, and some of the strangest lyric themes this side of a Jonathan Richman album. How about this nugget from "Sleeping With Flowers"—"I got a crush/Copy shop clerk/But she won't look up at me/Don't want to be known as the freak who just comes to catch her eye/We could be sleeping in flowers/Or shop all afternoon." Or a personal favorite, "Meet James Ensor"—"Meet James Ensor/Belgium's most famous painter/Dig him up and shake his hand/Appreciate the man." This album is not for everyone, to be sure, but it has an undeniable eccentric charm. It's sort of like XTC meets the strangest songs on the Beach Boys' *Smiley Smile* in a British music hall. Pretty weird for two guys from Brooklyn.

And speaking of XTC, the album was recorded by the same team that cut their excellent *Oranges and Lemons* LP, producer Paul Fox and engineer Ed Thacker. Thacker, whose credits include albums by 10,000 Maniacs, Victoria Williams, Bruce Hornsby, Sugarcubes and Phish, says, "The record company likes to give Paul [Fox] and me the bands they think are difficult to record, but we had a great time making this one. The two Johns are such a complement to each other, and they're both very bright, intelligent guys who have a real vision of how they want their music to sound."

There was extensive pre-production work done by Fox and the band, and then, according to Thacker, "We cut the basics up at Bearsville [in the country two hours north of Manhattan], which is a studio I've worked in a lot and like a lot. Being from Brooklyn, they wanted to work in their own neck of the woods if possible, but we wanted to get out of the city, so we went up there in the snow and ice in

January and froze our asses off—this New York winter was unbelievable! But we had a lot of fun and everything went smoothly. We tracked totally live except for the vocals. Then we went back [to NYC's] Skyline for the vocals and overdubs."

In a fairly unusual move, the horns on about half the tracks were cut live with the band at Bearsville. "The room there is huge, and it's really good for that sort of thing," Thacker says. "We'd put up some glass gobos to get a little isolation, but frankly we wanted the leakage; we wanted that sound. You can't create that kind of natural leakage."

"We did a lot of experimenting on this record with ribbon mics," he continues, "mainly old RCA 44s and 77s. We wanted to keep it as warm and round as we could. Ribbon mics are very rich-sounding, but they don't have a lot of top end like condenser microphones, so they're great on horns. We also used them on several vocals to fatten them up and warm it up."

Experimentation is the norm with TMBG, and Thacker, for one, was delighted to get the opportunity to try a few old and new tricks: There's the classic whirring sound of tape flange suffusing "Self Called Nowhere"; a Themin-like line on "AKA Driver" (actually an old Moog compressed *in extremis*); vocals pitched up and down steps with a Harmonizer 3500 here and there; and even a bit of tape-cutting legerdemain. On "Subliminal," Thacker says, "Right before the end I cut the tape at a certain note, I copied the end twice and then at another note I cut it again, flipped it around and stuck it back together so it has this weird backward effect. It sounds a lot more impressive than it was to do," he laughs.

"This record had all the extremes," Thacker concludes. "The Johns really wanted to rock with the big guitars, drums and bass, but they also wanted to do the machine-quirkier side of things."

Sonny Chillingworth: *Sonny Solo* (Dancing Cat). Three cheers for George Winston! Yes, the same George Winston whose warm, melodic solo piano records helped put Windham Hill Records on the map and spawned a thousand lesser imitations ('twas ever thus). Turns out of George is, like me, a fan of Hawaiian folk music—so much so that his

Dancing Cat label (distributed by Windham Hill) is releasing a series of Hawaiian slack-key guitar records from the genre's acknowledged masters. (Alas, the best-known purveyor of the style, Gabby Pahinui, died years ago; but his talented son Cyril has made a record for the label.)

This is traditional Hawaiian music at its best, with shimmering steel-stringed guitars in various exotic tunings, and songs filled with images (in English, Hawaiian and even Portuguese) of endless beaches, deep moonlight, broken hearts and the promise of love. The first two records in the series feature two of the best on the Islands: Raymond Kane and Sonny Chillingworth. Kane (pronounced Kah-nay) is the better known of the two, having made several forays onto the mainland in recent years. But Sonny ("Chillingworth" sounds much too formal for a musician this informal and inviting) is a Honolulu mainstay who has fronted a number of popular bands. His Dancing Cat album showcases him without a band, and it ends up being quite a revelation. Need an aural vacation? This is the ticket. The guitars sparkle, and his strong, resonant voice is as warm as the white Hawaiian sands.

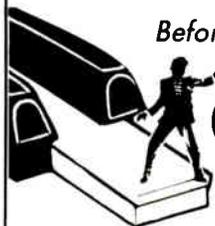
"I probably have over 100 songs recorded [by Sonny]," says Howard Johnston, the San Francisco Bay Area-based engineer who is working with Winston on the series. "Not all of them are good enough to use, but there are certainly three or four albums worth of stuff. Especially with the older artists, like Raymond [Kane] and Sonny, we wanted to get as much of their repertoire down on tape as we could, and after we did that, we branched out to other things. Then we sat down with them and figured out what the first album would be."

In the case of Sonny's album, Johnston says, "We recorded it at Audio Resource in Honolulu, which was in the old Sound of Hawaii Studio—and occasionally he would come over to San Francisco and record here at Different Fur [which is co-owned by Johnston]. Anything that's just plain acoustic guitar was recorded direct to DAT, and anything that had vocals was done to multitrack."

What's the secret for capturing the slack-key style? "What I usually do," Johnston says, "is take three microphones, make them left, center and

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right, and mix them that way. I'll take a microphone and put it down by the bridge, put another one by the neck [these two mics are usually Klaus Heyne-modified Neumann KM84s], and then I'll take a larger-diaphragm mic and put it higher over the soundhole to sort of catch the air. It's a very clean way to work. I record it with no reverb at all. When we do the multi-track, I'll record at least five or six tracks—direct, three guitar tracks and one vocal track, with maybe a little vocal overdubbing if it needs it."

Johnston says that Audio Resource is equipped with an old Neve board and MCI recorders, but "I bring it back to Different Fur with the SSL [and Studer recorder], and we mix it there, adding a little reverb as needed, and EQ. I use a fair number of different [reverb] units—EMT plates, a [Lexicon] 480, AMS, PCM 70s—but not much of any of them. I set them at different lengths and have different sounds on them, and then I think of them as one unit. I try to put together long ones and short ones."

As for mixing the guitar-only cuts directly to DAT, Johnston stresses, "It's not the machine that matters so much [he generally uses a Panasonic 3700], it's the Apogee converters, because they take away any sound of the DAT machine.

"With guys like Ray and Sonny, you don't want the technology to get in the way of the performance," Johnston concludes. "We were trying to capture Sonny's soul and make sure we didn't mess with it."

Manu Dibango: *Wakafrika* (Giant). The Paris-based Cameroonian musician Manu Dibango has long been one of the most popular African performers in the world, but with the exception of "Soul Makossa" in 1972, he has had a relatively low profile in the United States. That should change with the release of his exceptional new album (and his first-ever tour of parts of the U.S.), which masterfully blends myriad African styles into a joyous celebration of that very musical continent. Dibango has been bending genres throughout his career—playing Africanized jazz and reggae, among other styles—but *Wakafrika* feels like a career culmination of sorts for the 60-year-old sax and keyboard man.

The album credits read like a virtual who's who of contemporary African music: King Sunny Ade, Yous-

sou N'Dour, Ray Lema, Ray Phiri (from Paul Simon's band), Ladysmith Black Mambazo, Geoffrey Oryema, Angelique Kidjo, Salif Keida, Papa Wemba, Manu Katche and Toure Kunda all make spirited appearances. Peter Gabriel and Sinéad O'Connor are on hand for vocal support on a couple of tunes, too. The song list is impressive, as well, with a spunky dance reworking of "Soul Makossa," imaginative and stirring covers of Gabriel's "Biko" and Paul Simon's "Homeless," a take on Babatundé Olatunji's immortal "Jingo," and lots more. From West African Highlife to South African Township Jive, the record easily traverses the continent, and it's a trip well worth taking.

The album was recorded primarily in Paris by the team of producer George Acogny (himself a Senegalese expatriate) and British engineer Rod Beale. The record took nearly two years to complete, with the bulk of it being laid down at Bastille Studio in Paris, and additional work at Guillaume Tell, Studio Davout and Ferber studios in Paris, Metropolis in London, and Hit Factory in New York. "Guillaume Tell is considered by most people to be the top studio in Paris," engineer Beale says, "and Bastille would be considered a budget place, but it still has very good equipment, like a Mitsubishi 32-track and an excellent DDA desk. It worked very well for our purposes."

According to Beale, "The original concept was for Manu to be like an ambassador for African music, because he has successfully crossed over in all the different countries and different styles through the years. He picked the singers and players so you could hear all the different influences."

The way the album was constructed, Beale says, was "Manu would usually put down a pre-production idea arrangement for the song, which was Manu on a Korg M1 playing a left-handed bass, chords with the right hand and a drum machine to define the rhythm somewhat. Then we'd go in and use 12 to 15 tracks to put down the basic arrangement with other players. It wasn't always done in a linear fashion, but the drums were usually done next. We did two days at Davout with Manu Katche and the bass player, cutting three tracks a day. And then we kept layering from there—adding percussion, various

African instruments, guitars, the vocals and everything else.

"We took a couple of weeks where Manu came into the control room [at Bastille] with me and Christian [Echaib, assistant engineer], and we recorded all the sax that way, with Manu there with the headphones on. We had a mic set up all the time, rolling DAT [in addition to the multitrack] because he's so good you never know what might come out. He has an excellent arrangement sense and is obviously very good at layering his horn parts—all those horn parts are Manu."

Beale says that with African pop music, "the drums should take a back seat and just provide the time base, whereas the percussion should be made as bold as possible. I like to use mics from behind and underneath to get that attack from the djembe and talking drum and so on. I'll use dynamic mics, like 57s, an RE20 behind and underneath and maybe a condenser like a KM100 to pick up the high-end stuff from a bit further back." Aside from various African drums, the sessions also used such unusual African instru-

ments as the kora, the balafon and a little fretless guitar called the ngany.

"George [Acogny] was quite upfront that he wanted the record to be somewhat experimental; he didn't want just another African record. He wanted a bit more production, using effects, but he was trying to stay away from some of the artificial things that French engineers like to use on African records—samples, drum machines and big reverbs."

Acogny and Beale mixed the record at Scream Studio in Los Angeles (during the big L.A. earthquake in January '94), using a minimum of effects "because we wanted to keep it more up-front and raw," Beale says. "In the mixes, we were just going for what sounded good with each song. We weren't trying to match the sound of any room or any studio, because we wanted variation on the album. You can hear one track where the drums are in Davout, which is a huge room, and another where the drum track is totally dead. That adds to it; that was the intent."

The Buddy Blue Band: *Dive Bar Casanovas* (Bizarre/Planet). If it's a

party you're after, check out the swinging jump blues of the San Diego-based Buddy Blue Band. A veteran of numerous San Diego bands, including the nationally popular cult favorite the Beat Farmers, Blue is a top-flight songwriter and band-leader. *Dive Bar Casanovas* is an unapologetic throwback to another era, when horn-driven jump blues still ruled the clubs in Southern California and rockabilly was just starting to make inroads outside of the South. Blue works comfortably in both genres, as well as the sort of smokey blues you'd hear in dark bars in the late '40s and early '50s. He's a very clever lyricist with a gift for vivid imagery and colorful characters: in a way, Blue is to jump R&B what Dan Hicks was/is to the '30s Hot Club style. And though Blue's musical ideas come from another time, he is not afraid to lace his music with contemporary allusions—everything from Harvey Pekar comic books to Rush Limbaugh. Amazingly, Blue and his able cohorts pull it off beautifully.

Interestingly enough, the album's producer, Robert Duffey, worked with Big Joe Turner years ago, so he's

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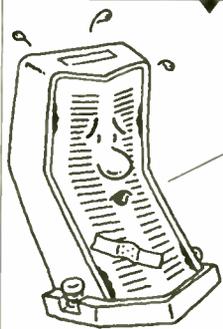
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well-versed in the genre. His approach to making Blue's record was "to get as live a sound as possible, though we didn't actually work that way. What I did was record bass, drums and a scratch track with Buddy playing guitar. We kept the bass and drums, and then Buddy went in and redid his guitar parts, and then I brought in the horn players to do their parts and a keyboard player. There were two horn players, and I just tripled the tracks and made it into a small section. It was real simple."

Engineer Randy Fuelle adds that "another thing Bob did with the horns that was interesting is he ran their tracks back through the monitor into the studio and miked that for extra ambience." The album was cut and mixed at Fuelle's Hit Single Recording in San Diego, a studio Duffey calls "very, very live; a good-sounding room for this kind of music."

Still, Fuelle says that he and Duffey opted not to capitalize much on the sound of the room, preferring to close-mike the instruments for the most part and creating ambience later with a 480L. The choice of horn mics was a bit unconventional: an RCA 77 ribbon on the trumpet and a Neumann TLM170 on the sax. For the stand-up bass, Fuelle recorded direct, "but through an old Stromberg Carlson tube amplifier—it has all these different preamp EQ settings for the different record styles before it was standardized by the AES in '55 or '57. So I ran the bass into the magnetic input on that, and then I could change the EQ setting by changing the phono selector to get different low-frequency and high-frequency roll-off things."

The sessions were cut on Hit Single's Soundcraft 1624 console and 3M M79 recorder at 15 ips using Ampex 499 tape. "They didn't have a tremendous budget to work with," Fuelle says. "I don't think the recording time was more than a couple of thousand dollars. Bob [Duffey] is a guy who likes to get things done efficiently in the studio, so he had them very well-rehearsed before they came in, and he made sure everyone was ready to go."

Dan Penn: *Do Right Man* (Sire/Warner Bros.). You might not know Dan Penn's name, but chances are if you listened to soul music at all during the '60s (and since), you've heard his music. A legend in Southern

songwriting circles, Penn co-wrote such classic tunes as "Dark End of the Street" (recorded by James Carr), "Do Right Woman" (Aretha Franklin), "It Tears Me Up" (Percy Sledge), "Sweet Inspiration" (Sweet Inspirations), "You Left the Water Running" (Otis Red-



Dan Penn

ding) and "I'm Your Puppet" (James & Bobby Purify), among others. What's less well-known is that he's an amazing singer himself, possessor of a smoky and soulful voice that is rich in character. He's kept a very low profile through the years, surfacing occasionally with a new song, but *Do Right Man* marks his most serious step into the limelight since his 1973 album *Nobody's Fool*.

The new record serves as a fine introduction to Penn, who delivers a heaping helping of some of his best-known songs and a few that were unknown to me. Part of what makes the outing so successful is the band that backs him: Muscle Shoals and Memphis soul vets such as keyboardists Spooner Oldham (one of Penn's long-time writing partners), Bobby Emmons and David Briggs, guitarists Reggie Young (who played on the original "Dark End of the Street") and Jimmy Johnson, and the crack bass/drums team of David Hood and Roger Hawkins. Recording took place over a couple of months at Muscle Shoals Sound, with Penn co-producing with George Drakoulis (of Black Crowes fame), while Johnny Sandlin, who has known Penn for more than 30 years and even played in a couple of bands with him years ago, handled the engineering duties.

"The idea was to keep it natural and cut as much of it live as we could," Sandlin says. "So all the tracks were done live, and then the horns and background vocals were overdubbed. We'd go back and fix things if someone hit a clam or something, but most of it was done right there.

—CONTINUED ON PAGE 284

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World Radio History

by Philip De Lancie

MUSIC ANNEX AND SOUNDLINE

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he cassette duplication business has changed dramatically since the glory years of the mid-1980s, when the pre-recorded cassette reigned as the leading music delivery format. As is normal in a mature industry, a finished cassette has become more of a commodity item, which has intensified pricing pressures. At the same time, the quality expectations of consumers, spurred by the ascent of the CD, have risen, while the demand for music cassettes has fallen.

Mid-sized independent duplicators are in a particularly uncomfortable position in the wake of these market changes. They lack the built-in client base of major-label-owned facilities and the economies of scale of large

independents. For these duplicators, resourceful thinking has become a matter of survival.

One of the most innovative companies responding to the changes has been Fremont, Calif.-based Music Annex. Besides expanding its client base in up-and-coming areas such as spoken word, Music Annex has actively sought out ways to extend the range of services it offers to its clients. It uses these ancillary services to build client loyalty and add value to its core duplication operation. In addition to some fairly common extra services such as CD brokering and in-house packaging design, the company offers its customers warehousing and fulfillment

The process of ordering an album through the central SoundLine CPU

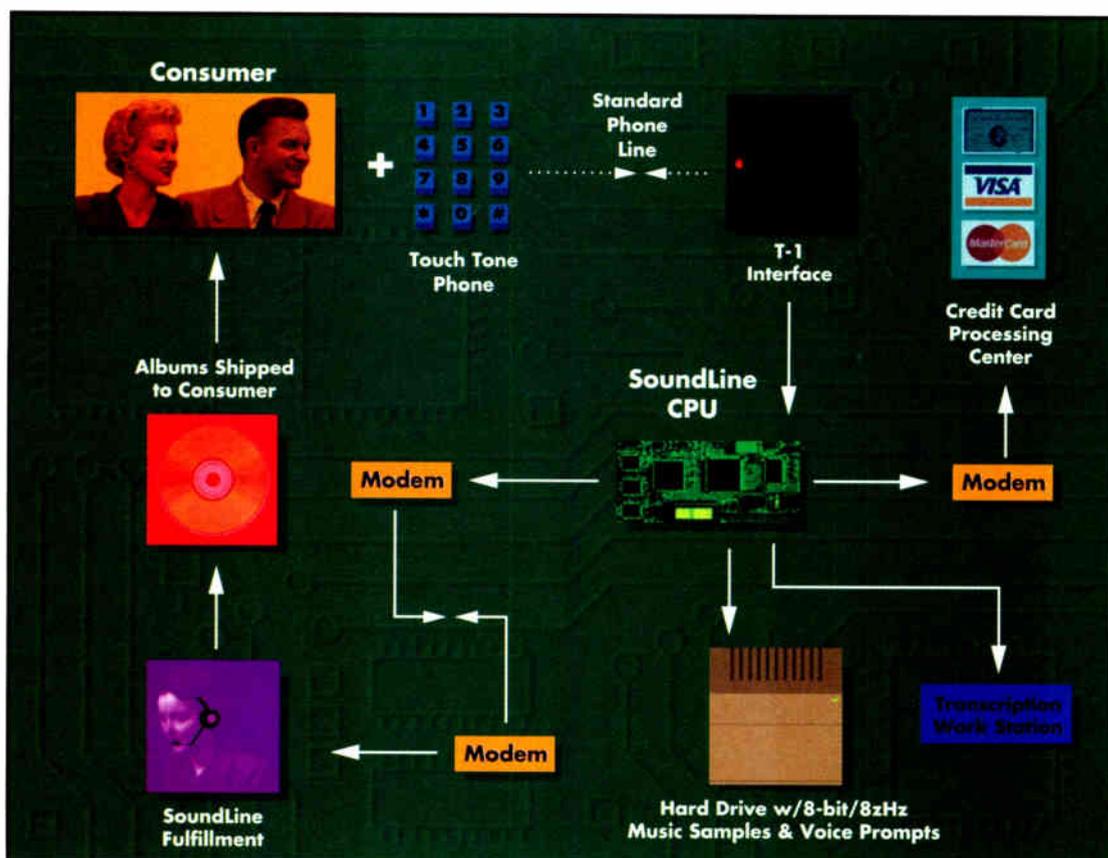


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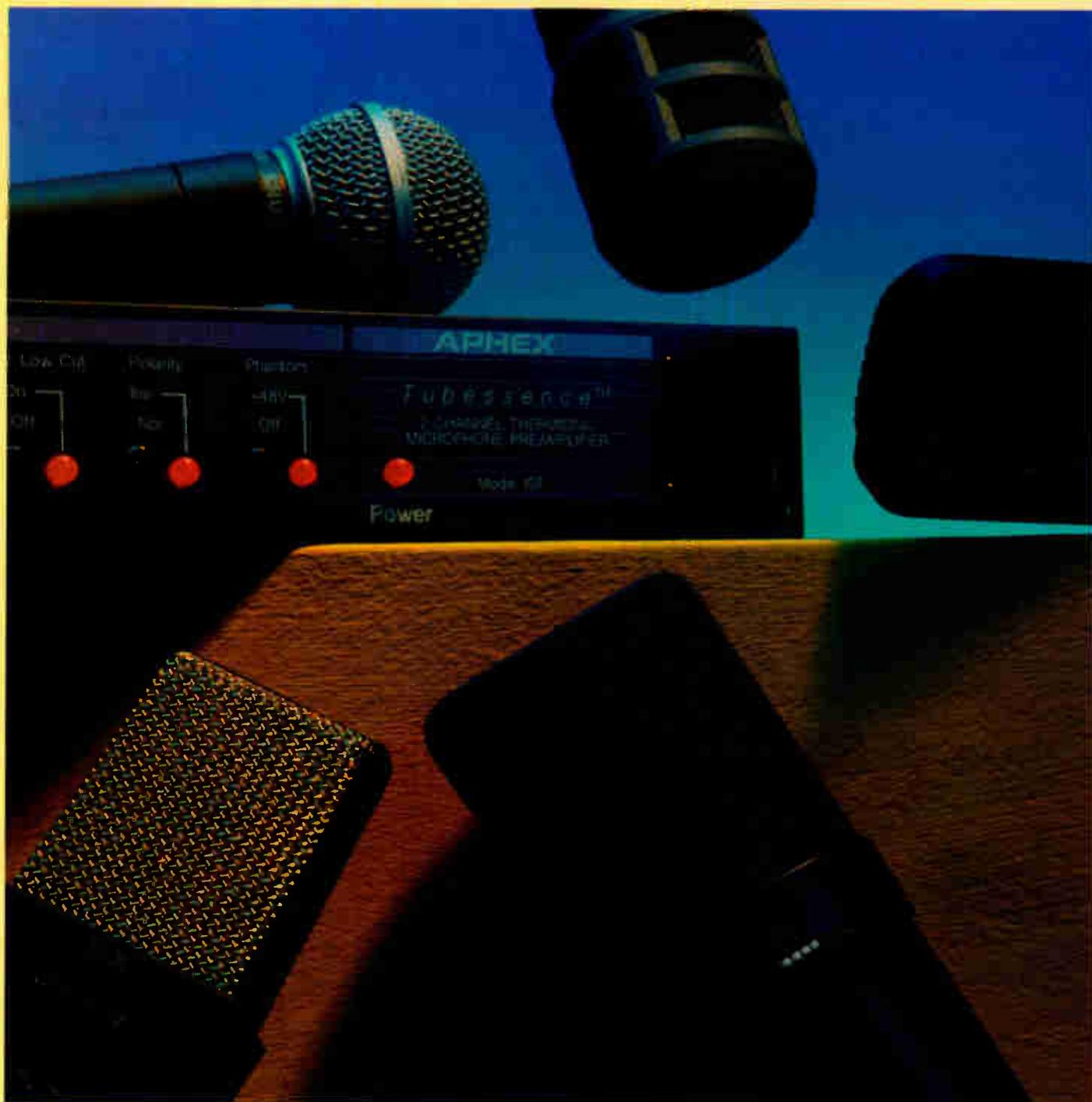
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services (order filling and shipping).

The latest addition to Music Annex's ancillary services menu is SoundLine. "SoundLine," says company president David Porter, "is an automated order-taking system where consumers can call an 800 number that is supported by a given record label, listen to excerpts from the albums that the company offers and buy them over the phone with a credit card. It is an alternative to going into a retail store. The advantage, first of all, is that consumers can sample the music. But also, they can check out a much deeper list than might be available at your typical retail store."

For Music Annex, which owns several recording facilities around the San Francisco Bay Area, SoundLine extends the relationship with the client from recording and duplicating the music to helping to sell it. For the clients, the service is a way to let their music be heard, especially music outside the narrow "formats" allowed on commercial radio. It is also a way around traditional record industry distribution channels, which are tailored

to the needs of major labels selling mainstream music.

"If you own a blues label," Porter says, "and maybe you have a hundred offerings in your catalog, you might be lucky if four or five of those albums are available at a major retailer. With SoundLine, the entire hundred offerings would be available. We think that is a great advantage to these smaller labels. And from a financial point of view, it is very good for them because it speeds up payment and improves their margins."

There are currently about a half-dozen call-in listening systems in the country, according to Music Annex VP Keith Hatschek. But because SoundLine's emphasis is on independent labels, the system is organized somewhat differently from others. Each record company has its own 800 number for its own catalog, rather than being mixed in with music of all different labels and styles. Although Music Annex operates the system that receives the calls and fills the orders, each label is responsible for promoting its own call-in number through advertising and mailings. By using different 800

numbers in different ads, the labels can see which of their advertising vehicles are most effective in generating responses.

From the consumer point of view, the starting point for using the system is to find a catalog or advertisement that includes not only a label's 800 number, but a list of 4-digit codes. The consumer needs these codes to select individual albums for sampling and ordering. Because of the large number of albums some labels offer, there is currently no provision for getting the codes from a menu on the system itself, though the system is able to fax a list to a consumer on demand.

With a list of codes in hand, the consumer can call the 800 number (on a touch-tone phone). Customers can then listen to a set of instructions, or skip right into "browse and select," which is where they enter the codes to sample specific albums. Most of the samples are in the form of several ten- to 20-second snippets of selections from the album.

Music Annex's studio background comes into play in the preparation of the samples, which the company be-

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believes sound as good as possible given the playback limitations of 8-bit resolution at an 8kHz sample rate. "As we were nutzing around with all these little sound files for our multimedia clients," Hatschek says, "we started figuring out a combination of processes to get them to sound fairly decent over limited playback equipment. Those same kinds of things have been very helpful for playback over the phone."

At any time while listening, the consumer can add the selection to a list of possible purchases, choosing CD or cassette, or skip ahead to another selection. When finished browsing, the customer reviews the purchase list, deleting selections, if desired, to narrow it down. When the list is finalized, Porter says, "the automated system allows the person to enter their credit card number, speak their address and choose a method of shipment. Then we act as the fulfillment house and ship the product to the consumer direct."

Given the modest size of independent labels, one might wonder whether they can afford to advertise

enough to generate sales through the system. Porter downplays this concern, noting that small, niche-based labels generally advertise in small, niche-based publications targeted toward their market. These tend to be much less expensive than larger, general-interest publications. With SoundLine, Porter says, the labels will be able to use what he calls "niche-to-niche" marketing to directly reach those most interested in their music.

Music Annex's strategy of offering extended services to existing duplication clients seems to have been well-received. "With one exception," Porter says, "the first ten customers going on the system are all existing manufacturing customers." The emphasis so far has been on smaller labels rather than big "indies" or those that have a major-label distribution arrangement. The labels include folk-imprint Gourd Music and Patrick Ford's blues-oriented Blue RockIt. "These are all people who voiced to us over the past few years that it is increasingly difficult for them to keep satisfactory visibility at retail," Hatschek explains.

"The independent, niche-based labels are getting squeezed out of re-

tail," Porter says. "The big retailers and the major record labels have a stranglehold on the retail experience, and a lot of the little independent labels could conceivably fall off the map. The fact that they don't have shelf space means that they don't place as big a duplication order as they normally would. They can't sell the kinds of numbers that would cause them to call us up and place big orders."

Under these circumstances, SoundLine becomes somewhat of a mutual survival society. "If we give the independents an alternative way to sell," Porter continues, "and they can get their sales up because they are selling direct through their own channel, they are going to sell more units. And that makes them healthier. It's going to help our customers stay in business longer."

The logic of opening up alternative distribution channels does not stop with SoundLine in its current form. The next step is to supplement the telephone access with computer access via an online bulletin board (BBS), probably bringing in a different set of consumers in the process. "We are working on a system where a customer, using a single phone line, will be able to view text from the BBS and also play back an 8-bit/8kHz sound file in real time," Porter says. "The customer will have to have a modem and a sound card."

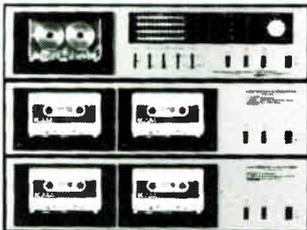
The BBS approach would allow customers to search a label's database to more easily explore potentially interesting music. For the next several years, customer orders on such an online system would still be fulfilled, as with the phone-in system, with finished manufactured recordings. But Porter says that "ultimately everyone wants to see the day when we deliver the music itself over the wire, though we are not advocating that at this point."

Online or off, the move into direct sales may seem like a big leap for a duplicator with roots in the studio business. But given the intensifying pressures they face, audio duplicators are likely to find Music Annex's adaptive, "find a need and fill it" approach to business development to be an increasingly important strategy in years to come. ■

Philip De Lancie is a mastering engineer at Fantasy Studios, Berkeley, Calif.

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TAPE & DISC NEWS

P

RERECORDED MUSIC SALES UP

The Recording Industry Association of America says U.S. sales of pre-recorded music products for the first six months of 1994 were up substantially over the same period in 1993. Based on results from its member companies, which account for more than 90% of the U.S. market, the trade association reports a gain of 12.4% in net units shipped to 479.5 million. The dollar value (at list price) of those shipments rose 11.9% to \$4.795 billion.

As usual, CD sales, which jumped 26% in units (275 million) and 21% in value (\$3.3 billion), accounted for the bulk of the sales gains. Cassettes, which have performed erratically in recent years, slumped 4% in units (148 million) and 5% in value (\$1.2 billion). Perhaps the biggest surprise was the 80% gain in LP units, which had nearly slipped entirely off the chart. Even with the gain, however, only about 900,000 LPs were sold by RIAA members.

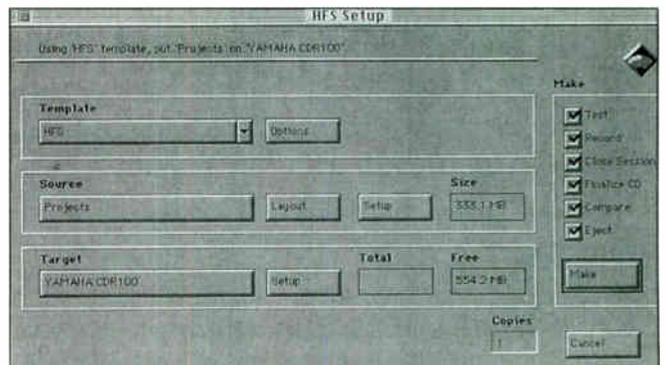
Another big gainer in units was music video, which grew 27% to 4.3 million. The value of music video, however, rose only 4%, reflecting downward price pressure on the format. The overall average price per unit for all music formats remained in the \$10 range, about the same as last year.

CD-R DEVELOPMENTS

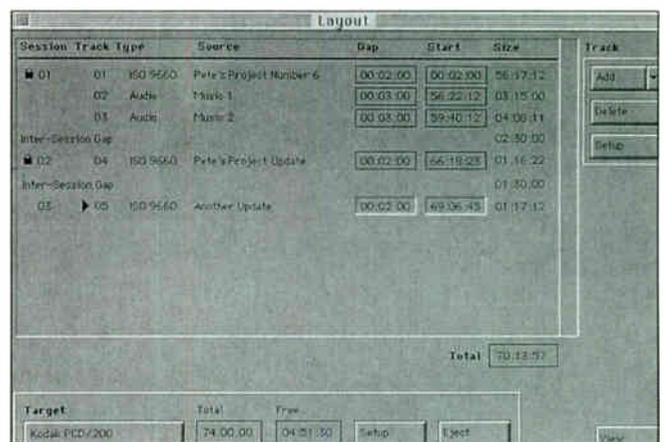
Continued upgrades in computer-hosted CD-recording systems are bringing more sophisticated capabilities to a growing number of CD-R packages. OMI announced plans to ship Macintosh Version 2.0 of its QuickTOPIX CD-recording software in the third quarter of 1994. Bundled with a CD recorder, the package starts at \$3,995 and will support multisection recording of CD-Audio, CD-

ROM and both mixed-mode (data plus Red Book Audio) and hybrid (Mac and PC together) discs.

Young Minds is shipping Version 2.0 of its Windows-based system, SimpliCD. The upgrade incorporates Red Book Audio recording, support for multiple unattended copies and support for multiple-speed recorders. Microboards has also moved to support high-speed recording, offering the turnkey PlayWrite 4000 quadruple-speed hardware/software package for \$5,995.



The main window of OMI's QuickTOPIX supports selection of data sources and target devices, as well as control of the CD-recording sequence.



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NEW CD PLANTS BOOST INDUSTRY CAPACITY

Fierce competition among CD replicators continues to keep disc prices down, but that does not seem to be discouraging a rapid expansion of capacity. Fifteen-year-old tape duplicator National Tape has become National Tape & Disc and is breaking ground on a new 73,000-square-foot facility in Nashville for manufacturing CD-Audio, CD-ROM, Video CD and audio cassettes. The \$8.5 million project is scheduled for completion by February.

In Camarillo, Calif., meanwhile, Technicolor Optical Media Services began construction on a replication plant in February and has already announced the replication of 2 million CDs in the first three months of operation. The company's current production capacity of 65,000 units daily is split about 60/40 between CD-ROM and CD-Audio. An expansion is planned for 1995.

Additional contributors to the replication capacity surge include a new plant owned by KAO in Fremont, Calif., the AstralTech Americas facility in Boca Raton, Fla., and a plant operated by Canada's AmericDisc that is now officially open for business in Miami.

SPLICES

Warner Bros. Records (Burbank, CA) will begin previewing upcoming audio releases in forums on the America Online and CompuServe networks. Subscribers will be able to download 30-second excerpts from singles by artists such as Neil Young, Prince and Laurie Anderson before the recordings are released at retail...The ITA selected Alfred Sikes (president of Hearst New Media and Technology, and former FCC chairman) as the keynote speaker for the organization's Information Super-Highway conference and exhibition, scheduled for January 24-27 in Santa Clara, CA. Call (212) 643-0620 for further information...Sonopress (Weaverville, NC) upgraded its DAAD digital bin systems for audio duplication with Concept Design's VLDS-based, high-speed load option. According to Sonopress' Dean Wilson, the move increases reliability and capacity while reducing maintenance...Otari (Foster City, CA) is offering a TMD Speed Upgrade pack-

age to boost the throughput of its T-700H videotape-duplication systems by 25% to 75%. The \$35,000 package brings the performance of the T-700H up to that of the newer T-700III machines, which run at seven meters per second...Electro Sound (Sun Valley, CA) reports that three audio duplicators have expanded capacity with the addition of slaves to its systems: Videolar in Sao Paulo, Brazil; Sukothai in Bangkok, Thailand, and Kol Zlil in Tel Aviv, Israel. Sister company Gauss, meanwhile, sold slaves to Eva-Tone in Clearwater, FL, and Verbatim in San Diego, CA...AstralTech Americas installed a Koch CDCS-4 CD QC system. The Boca Raton, FL, CD-replication facility also opened a new glass-mastering suite and three pre-mastering rooms...Pacific Coast Sound Works (West Hollywood, CA)



Bob Thompson (front), AstralTech's production manager, and Mark Hand, assistant production manager, using the Koch CDCS-4 CD QC system

recorded and edited the voices of the cast of *Star Trek: The Next Generation* for CD-ROM games being developed by Spectrum Holobyte...Oasis Duplication (Silver Springs, MD) handled duplication and replication work for Nils Lofgren and Jorma Kaukonen...Future Disc Systems (Hollywood, CA) mastered the new Simple Minds CD, cassette and LP...San Francisco's Rocket Lab added an Apogee UV22 and a Sonic Solutions NoNoise system...Masterdisk (New York, NY) added four Panasonic SV-3700 DAT recorders. ■

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C O A S T

L.A. GRAPEVINE

by Maureen Droney

Sound City in Van Nuys celebrates its 25th anniversary this month. On a rising tide since Nirvana recorded and mixed the multi-Platinum *Nevermind* there in 1991, the studio has recently played host to, among others, Black Crowes, Rage Against the Machine, Tom Petty, the Red Hot Chili Peppers, L7, Tom Scott, Green Jelly and Donovan. Studio manager Shivaun O'Brien showed us around the distinctly '70s-style rooms and said with a laugh, "It's great to see our look come back in style. The Black Crowes especially loved the decor here. We're not fancy, but bands feel comfortable here, and they get great sounds. There was a down

—CONTINUED ON PAGE 265

Producer Keith Olsen and studio manager Shivaun O'Brien share a laugh at Sound City in Van Nuys.



PHOTO: MAUREEN DRONEY

SESSIONS

by Jeff Forlenza

NORTHWEST

Industrial band KMFDM were at Bad Animals Seattle/Studio X tracking and mixing their upcoming release, *Nibil*, for Wax Trax!/TVT Records. KMFDM member Sascha Konietzko produced the project, with engineering by Chris Shepard and assistant Sam Hofstedt...Denver-based Kerr/Macy Recording Studios had Nick Cave in with producer Hal Wilner overdubbing Cave's latest release with engineer Steve McNamara. Also at Kerr/Macy, the Nitty Gritty Dirt Band recorded a Christmas album with engineer John Macy...

NORTH CENTRAL

Famed folk singer Glen Yarbrough (of the Limelighters) and his daughter Holly Yarbrough recorded a CD entitled *The Bramble and the Rose* for Folkera Records at Jor-Dan Studios in Wheaton, IL. The 14 songs for the album were produced by national-champion fingerstyle guitarist Muriel Andersen. Basic tracks and overdubs were tracked by Jor-Dan engineer

Glen West. Mike Konopka, owner/engineer of Chicago's Seagrape Recording, handled additional recordings and mixed the Yarbrough album on Jor-Dan's vintage Trident Series A console...

SOUTHERN CALIFORNIA

Tom Petty was at Hollywood's Andorra Studios co-producing his latest MCA album with Rick Rubin and Heartbreaker guitarist Mike Campbell. After a month at Andorra, the team tracked and mixed 27 songs with engineer Richard Dodd. Composer/arranger Michael Kamen was enlisted to conduct a 35-piece orchestra for one tune...Elektra recording artist Angela Winbush was at Hollywood's Soundcastle Studio remixing her single "Keep On Turning Me On" with producer Vincent Davis and mix engineer Conley Abrams...Rapper/producer Ice Cube was at L.A.'s Skip Saylor Recording mixing the upcoming album by K-Dee for Lynch Mob Records with engineer Chris Puram...

NORTHEAST

At Victory Recording Studios in Philadelphia, Elektra recording artist Teddy Pendergrass recorded lead vocals for an upcoming release with producers Terry Coffey and Jon Nettlesby of Mercenary Productions, and engineer Jon Smeltz...Interscope recording artists Cop Shoot Cop were at The Magic Shop (New York City) tracking their new album with producer Dave Sardy, engineer Greg Gordon and assistant Edward Douglas...Alternative producer Lou Giordano was tracking and mixing the Goo Goo Dolls at BearTracks (Suffern, NY) for Warner Bros. with assistant Steve Regina...Jazzy rappers Digable Planets were at Manhattan's Bass Hit Recording tracking and overdubbing their new album on Pendulum/EMI with producer/engineer David Dar-

C O A S T



*Atlantic Records hot new act Hootie and The Blowfish were at NRG Recording (North Hollywood) cutting tracks for their new album, **Cracked Rear View**. Special guest David Crosby added background vocals to the band's first single "Hold My Hand." Left to right: bassist Dean Felber, guitarist Mark Bryan, Crosby, lead singer Darius Rucker and drummer Jim Sonfield.*

lington. The DPs co-produced the follow-up to their Grammy-winning first album from the SSL 4000 E Series console at Bass Hit...

SOUTHEAST

R&B artist/producer Keith Sweat has been working on a variety of projects out of his Atlanta facility, The Sweat Shop, including tracking and mixing his own upcoming release for Elektra Records and producing Atlantic act Men at Large. Sweat Shop chief engineer Karl Heilbron worked the sessions...Nashville's Emerald Sound Studios hosted a variety of sessions: Foreigner stopped in to finish vocals for their new album with engineers Milan Bogdan and Tim Waters; and Bon Jovi spent two weeks tracking and over-

dubbing their new album with producer Peter Collins and engineer Kevin "Caveman" Shirley...Al Kooper was at Nashville's Sound Emporium self-producing and mixing a live album for the Music Masters label with engineers Rocky Schnaars and Giles Reaves... —CONTINUED ON PAGE 269



PHOTO: TERRI BLOOM

NY METRO REPORT

by Dan Daley

New York is a vertical city. To really see this town you have to walk around with your neck fixed at a chiropractor's dream of 45 degrees. From the Art Deco pin-striping on buildings along Park Avenue in the East 30s to the steel gargoyles on the Chrysler Building, the real deal is almost always above eye level.

What's even harder to see, though, are the dozens of studios tucked away up there. Like the private tailors on the second floors along

—CONTINUED ON PAGE 269

Studio owner and producer Walter Taieb at the Euphonix 56-fader CSII console in his studio bau:ton-redesigned WT Studios in New York City

BAY AREA BEAT

by Jeff Forlenza

Welcome to Baghdad by the Bay. A musical, magical city that will always be remembered for the Summer of Love and the psychedelic bands it unleashed on the world 25 years ago. Today, alternative funk/punk with a dab of folk rules the day, and many of those musicians are making international waves from their home base of the San Francisco Bay Area. And the Bay Area has its share of world-class studios, too.

"I think the '90s are going to explode bigger than the '60s," says Arne Frager, owner of The Plant Recording Studios in Sausalito. "If you look at the biggest acts today—Green Day, Counting Crows, Toni Tony Tone, Primus, Metallica—they're all out of the Bay Area. And more good bands are moving here." And Frager should know, since The Plant has probably recorded more hit records than any other Bay Area studio in the studio's 22-year history.

Recent sessions at The Plant that produced international hits include the tracking of "What's Up" by 4 Non Blondes, the recording and mixing of "A Whole New World" by Peabo Bryson and Regina Bella from the *Alladin* soundtrack, the mixing of Primus' last two records (*Pork Soda* and *Sailing the Seas of Cheese*) and the mixing of some cuts off the huge Kenny G. *Breathless* album. San Francisco radio station KFOG



PHOTO: JAY BLAKESBERG

Three out of 4 Non Blondes were at The Plant (Sausalito, CA) working with producer Matt Wallace on a cover of "Bless the Beasts and the Children" for The Carpenters tribute album on A&M Records, *If I Were a Carpenter*. Seen here are (clockwise from right) Wallace, Linda Perry, Dawn Richardson and Christa Hillhouse.

has been broadcasting live in-studio performances from the The Plant. As part of that series, Toad the Wet Sprocket performed in Studio B in front of a small audience of radio contest winners. Recent sessions at The Plant include two mixing projects that began as live performances at Woodstock '94: Primus was mixed by Ron Rigler, and Santana was mixed by Jim Gaines.

Alto sax player David Porter started the Annex Corporation in his garage in San Jose 21 years ago to record himself. Five years later, Porter moved his setup to a facility in Menlo Park. Today Porter is president of the Music Annex, which has expanded to take over the entire building it moved into 16 years earlier. Music recording is the first order of business at the Annex, but they do plenty of CD mastering on their

help of ADAT digital recorders. Annex consoles include a Neve 8036 in Studio A, a TAC Scorpion in Studio B, a Soundcraft 3200 with DiskMix II+ automation in Studio C and a 56-input DDA console in Studio D.

Music Annex chief engineer Tom Carr, who handles tracking, mixing and CD mastering, reports a steady stream of sessions. When asked about the studio business climate in the Bay Area, Carr replies, "I spent 12 years in Boston. In New England, people would travel to whatever studio they wanted to use. In the Bay Area, travel is a big factor. Even if there is a studio that people don't like, they'll use it if it's close by and it's convenient. However, I think musicians travel to our studio for our staff and our rooms."

Carr says good word of mouth sends musicians to the Annex for live tracking dates. Studio A can comfortably fit a 25-piece big band. Studio D can fit a 150-voice choir. Studio A has a Yamaha grand piano and iso booths and is a favorite for jazz sessions. There's a room connected to the A Room called the "Rock Room," which is a bright, all-concrete space that is particularly good for tracking drums. Music Annex engineers are Carr, Patrick Coughlin, Scott Paulson, Robert Iriartborde, Lance Noptle, Steve Pappoutsis and tech Bob Grudulies. Recent sessions at Music Annex include Dan Levitan, first chair harpist with the San Jose symphony, digital editing and mastering an independent release, and Ronnie Montrose tracking and mixing his recently released album, *Music From Here*.

—CONTINUED ON PAGE 270

Two Neville Brothers were at San Francisco's Coast Recorders mixing live recordings for their latest A&M release, *Live on Planet Earth*. From left: Charles Neville, senior mixer John Cuniberti, Cyril Neville and recording engineer Mike Napolitano at Coast's vintage Neve console in Studio A.



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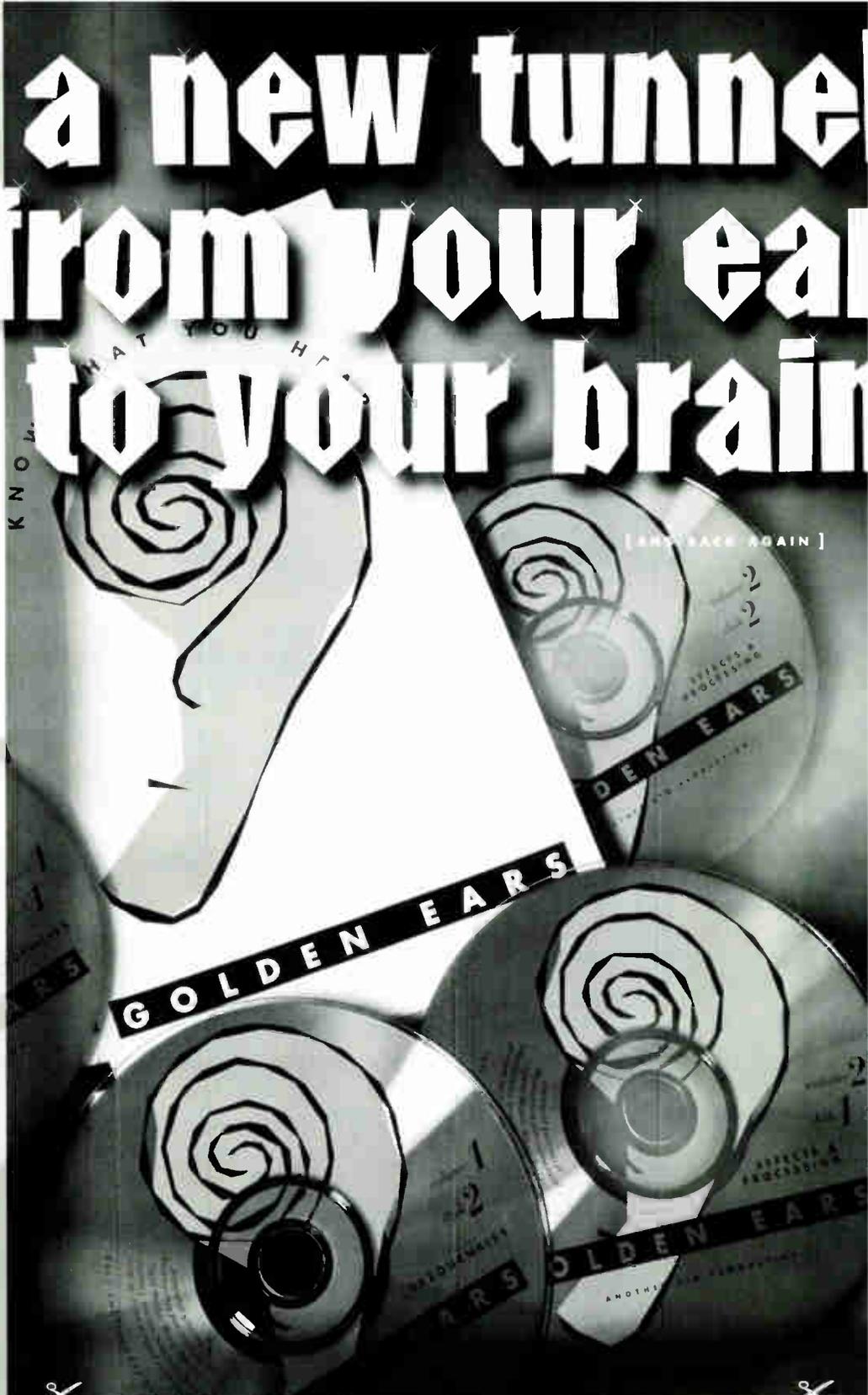
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—FROM PAGE 260. L.A. GRAPEVINE

time a few years ago, but we've put a lot of money into maintenance, and we work really hard to make clients happy. Of course, having Nirvana cut their hit record here really helped bring us back. Oh and by the way, when *Mix* interviewed [Nirvana producer] Butch Vig, it somehow came out that they had recorded at Sound City Seattle! I would like to set the record straight!"

We peeked into Studio A, where producer GGGarth was working on the (original owner!) custom Neve 8028 with the band Mindrot and their long row of Marshall amps. GGGarth, who recently completed recording Rage Against the Machine, L7 and The Melvins at Sound City, cheerfully filled us in on the resident ghost's propensity for making musical judgments on sessions. Other legends about the facility abound, many from the early '70s, including tales of the famed Charles Manson sessions. Another favorite story concerns the morning that owner Tom Skeeter was awakened early by a call telling him to turn on his television to check the news coverage...a SWAT team was deployed on his studio's roof! Apparently, a disgruntled client had taken an engineer hostage after an all-night session, and the L.A. SWAT team had to come to the rescue.

Producer/engineer Keith Olsen, one of Sound City's original clients, has his own Goodnight L.A. Studios next door, and he took a few minutes off from tracking to reminisce. "Sound City is, and was, a special place where a lot of people learned their trade," Olsen said. "A bunch of producers and engineers came out of there, and it was because of owners Tom Skeeter and Joe Gottfried. They not only sold time, they also allowed people to get in on those midnight shifts and refine their art. And in 1975 when the Neve console was put in A, well, back then that desk was the first super-quality console in L.A. What Sound City didn't have in fancy stuff, it had where it really meant it, and people realized it. And people are beginning to realize it again—what it means to have that kind of Class A quality. From Fleetwood Mac to Pat Benatar, to Santana, I did a lot of my records there. Besides, it's always been a place where you could have fun, and making records should be fun!"

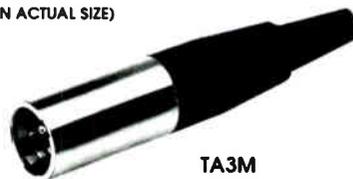
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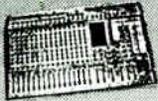


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Manager O'Brien chimed in with the provocative comment: "I can't tell you how many times the fire extinguishers have been emptied in this place in 25 years!"

TRAX Recording opened 14 years ago and has grown from a tiny 8-track home studio to a three-room facility handling orchestral sessions on a regular basis. The studio was originally set up in the carport of studio owner/engineer Michael McDonald's Westwood apartment, but he now operates out of the historic, high-ceilinged Hollywood Chamber of Commerce building on Sunset Boulevard.

Now that he's run both a home and a commercial studio, McDonald has some perspective on the business: "Having worked on both sides of the picture I can feel the resentment that established studios have toward home studios," he says. "But I also understand the struggle to get started. When we started, I had some good equipment, because, as a home studio owner, I'd made enough money to afford to buy some. But when we moved into a commercial space, the construction costs were astronomical! I took out all my credit cards and ran them up to the limit. I'm still paying them off. But things are really working now. The studios are busy. We had Humberto Gatica here, and he was really happy with the way the room sounded. I was very flattered that he liked the room, because when I was learning engineering, he was the guy."

"At TRAX, our whole concept is based on the trends I'm seeing now," McDonald continues. "Whereas MIDI dominated in the last few years, now it has moved back into being just one part of the avenue of production. At TRAX we've got big rooms, with 18-foot ceilings, and we're doing lots of band projects, lots of triple-A stuff. Music now is a hybrid of things: hip hop, rap and rock, with all areas interchanging. There is a huge market for music, especially in the lower end—just like there's 200 channels of television. But the budget and the production costs have been reduced. So that's where we fit in right now."

Studio A is equipped with a DDA AMR-24 console (36 mic ins, 60 mix ins) and Necam 96 automation; Studio B has a Soundcraft 2400 52-in for mix, and Studio C contains a Soundcraft 2400 with 48 inputs. All rooms

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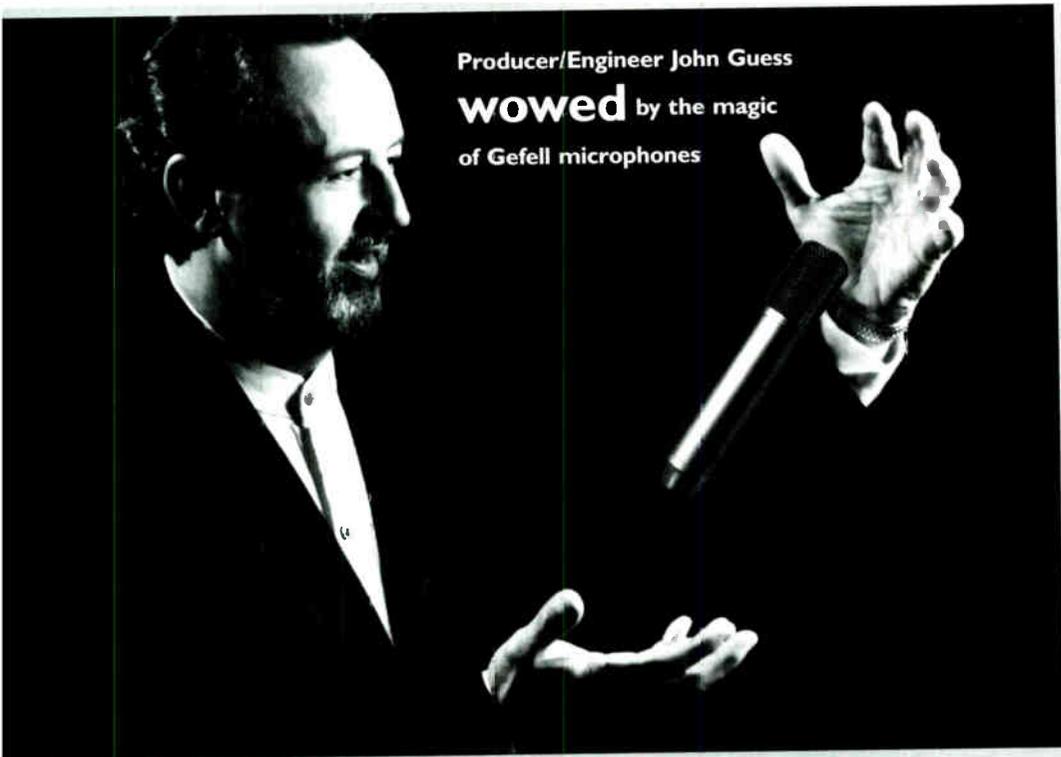
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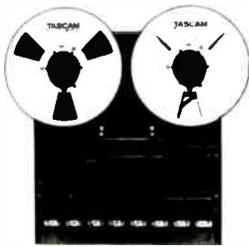
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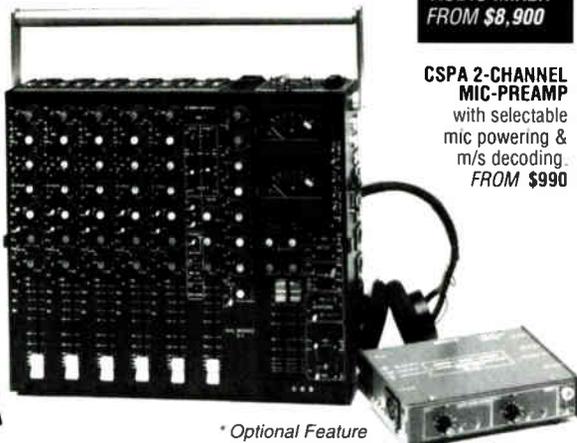
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feature Demeter preamps. Recent clients at TRAX include the bands Helecasters, Portrait, and Nancy Boy, along with work on the television programs *Three Tenors* and the *Country Music Awards*, and the film scores for *Sliver* and *Ironwill*. TRAX also offers that Hollywood necessity, secure parking for 30 cars!

With the advent of digital workstations, audio editing has become random-access and high-speed, yet if you are cutting to picture and using a VCR, the process can be as slow as in the analog days. To solve that problem in an affordable way, ASC Audio Video Corporation, a leading Burbank editing rental facility, has introduced the Virtual Recorder.

The Virtual Recorder is a high-quality, (relatively) low-cost, disk-based, digital random-access recorder/player. An alternative to tape-based systems, it converts your PC into an audio and video recorder. It uses hard drives for digital video storage and retrieval and is plug-in-compatible for adding random-access capabilities to most existing controllers. The VR records and plays broadcast-quality video, two channels of CD-quality audio, and SMPTE time code. It can maintain sync lock at any speed, even during audio scrubbing, allowing much more precise cutting to picture. Instant access also means stable slow motion; no noise bars during slow-motion scrubbing and the absence of cue-up and rewinds, an obvious time-saver. VR applications include dialog cutting, ADR, Foley, laybacks, sound effects, scoring and mixing.

studio bau:ton is busy again. Opening in November is a two-studio facility in North Hollywood designed for the indie label Alias Records. According to bau:ton partner George Newburn, Studio A will be one of the largest new tracking rooms to be built in Los Angeles and will be equipped with a Neve 8078. Studio B is a mixing suite with an SSL 64 G Plus with Ultimation. The 9,200-square-foot facility also has offices, lounges and support spaces designed by bau:ton. The studio, called Royaltone, is being built by Pridemark Contractors, who have worked with bau:ton on rooms at the Record Plant, Post Logic and 525 Post. bau:ton also is starting construction

on a new studio for NRG Recording Services in North Hollywood. That room will feature a 20-foot ceiling, an Oriental/Indian motif and a custom 68-in Neve 8078.

The national finals for Soundcheck—The Yamaha Music Showcase—were held at Hollywood's House of Blues recently. Five bands battled for the Grand Prize of \$20,000 and an all-expenses-paid trip to Japan to represent the United States at The International Pop and Rock Showcase. The winning band was selected by a panel of noted music industry executives. This year's Soundcheck-winner Love Riot, an alternative acoustic act out of Baltimore, also received \$2,500 worth of recording time at the band's choice of studio. ■

Got L.A. news? Maureen Droney's new fax is (818) 346-3062.

—FROM PAGE 261. SESSIONS

SOUTHWEST

Rob Halford (former vocalist of Judas Priest) was at Phase Four Studios (Tempe, AZ) tracking his new band, Fight, with producer/engineer Toby Wright on the Neve VR72 console... Geffen recording artists Whiskey Biscuit were at Pedernales Studios (Spice-wood, TX) working with producer Paul Leary and engineer Stuart Sullivan... Dallas-based acoustic act Cafe Noir tracked a CD for Carpe Diem Records at the Fire Station (San Marcos, TX) with producer/engineer David Rosenblad. ■

—FROM PAGE 261. NEW YORK METRO

lower Fifth Avenue, for every major facility that has a plaque on the lobby wall, there are 20 well-outfitted but unannounced rooms. They're not all project studios; many, in fact, are hybrid or purely commercial rooms that, like Manhattan cabs and jewelry stores, have opted to be selective about their clientele.

Room With a View started as a personal facility for owner Alessandro Ceconi, who scores for films and television. But in March of this year, he decided to open the studio, perched on the 14th floor of a mixed-use building on mid-Fifth Avenue, to select outside clients. "We can't have high traffic because of the



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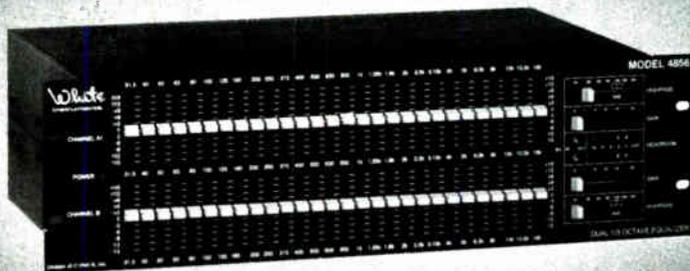
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type of building it is," he says. "But we think we can be successful even tucked away like this based on word of mouth." Frank Fillipetti has been among those who've found RWAV and its 64-input, G Series Ultimation-equipped SSL.

As for the myriad similarly secluded rooms scattered about the island, Ceconi said he wasn't aware of how numerous they were when he first opened in 1991. But he finds a certain charm in the anonymity that New York offers. "We get credits on the albums, and when people want to know where to find us, they do," he says. "If it was on ground level in a commercial building, it would be just like any other studio."

Another hidden gem is producer Mike Thorne's 2,000-square-foot personal studio in the Village. He made it for-hire on a selective basis for a brief period starting about a year ago but found that the clientele suited to the place—music-based recording projects—thought the Synclavier-based technology of the studio too arcane. "That market couldn't support this kind of place," said Thorne, who has produced Laurie Anderson

and Soft Cell. "The music business tends to be a very traditional business, especially when it comes to technology."

The decision to open the studio to outside clients selectively was meant to "let a little fresh air in here," he said. "Running your own studio can make you a bit introverted." But the highly personal mix of technology didn't lend itself to a for-hire business, even a selective one, Thorne found. Ironically, the most recent business move makes the studio's privacy all the more desirable: He just signed on as Warner Music's head of new music media development. "A fancy name for CD-ROM, but this equipment is perfect for this," he said.

"Clubby" is a word that Anne Pope agreed is useful in describing how Looking Glass operates. Pope is the chief engineer and manager at what is now a facility solely owned by art-music entrepreneur Philip Glass on lower Broadway. It's private but does let in outside clients on a selective basis, said Pope, and is trying to do more of that. "The thing is, the kind of people who

would be comfortable here are the kind of people we want here," she said, at a loss to better describe who that might be other than to say it includes more independent rock acts and post projects.

Looking Glass, like the other hidden studios in New York, makes it clear that it can't provide many of the services that larger studios can, from messengers to security. But for those who want a particular place that's off the beaten path, New York apparently has them in droves.

You just have to know where to look. ■

—FROM PAGE 262, BAY AREA BEAT

One of the Bay Area's historic facilities is Fantasy Studios (owned by Saul Zaentz) in Berkeley. Studio C is the room where Creedence Clearwater Revival recorded many a hit years ago. Today, the multiroom facility handles much more than just music: audio-for-video post, CD mastering and more. Recent music tracking sessions at Fantasy include the folkie Linda Brady (profiled in this month's "Recording Notes," page 244) and hard rockers Tesla. On the audio-for-video front, Robin Williams did an ADR session for his recent film, *Being Human*, in Studio C.

Coast Recorders has developed a reputation as one of San Francisco's best rooms. Owned by Dan Alexander, who also buys and sells used gear, Coast is loaded with vintage, hard-to-find equipment. New arrivals at Coast include a Studer A827 recorder and a host of outboard equipment to complement the GML-automated Neve console in Studio B. Coast is awaiting its Platinum disc for work done on The Breeders' *Last Splash* album on 4AD. Upcoming releases tracked or mixed at Coast include the new album by Love and Rockets on American Records, Charlie Sexton's new release for MCA, and alternative act Samiam's new CD on Elektra Records, produced by Lou Giordano.

Dance Home Sound is a Mackie 24x8 console/Fostex 16-track analog facility in Emeryville, right down the street from our offices. Owner Lisa Richmond reports the addition of four channels of Digidesign's Pro Tools system. When asked about the studio business climate in the Bay Area, Richmond answers, "ADAT's

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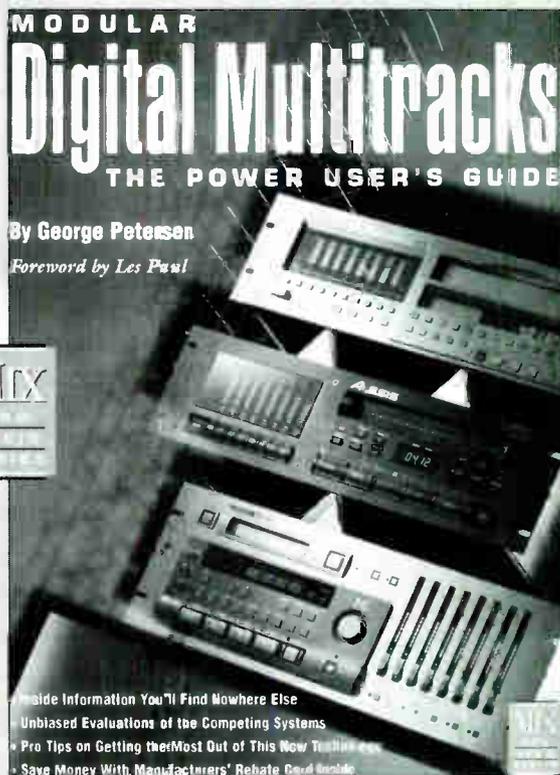
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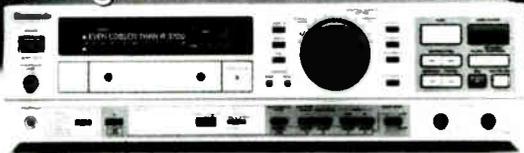
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are definitely affecting business." She's not the only studio owner who has been affected by musicians becoming DIY engineers. "I'm thinking about getting an ADAT to give clients a choice of formats, although I'm not totally sold on the sound. The reason I got the Pro Tools system was for the editing and sequencing capabilities." Recent sessions at Dance Home include Matthew Lacques (formerly of Zulu Spear) working on an independently released CD of roots music.

Robert Berke started a home studio in San Francisco 25 years ago. Today, Robert Berke Sound is a three-room facility specializing in audio-for-video, radio spots and narration projects. In its present location for the past ten years, RBS is planning a major renovation of its rooms with the help of designer Randy Sparks. The first phase is the remodel and redesign of Studio C. New equipment in C includes Tascam DA-88 digital recorders, TimeLine Vista's DAW 80, and digitizing computers for conversion of sound files. The second phase of the renovation is scheduled for late fall 1994, with a new console and redesign of control room B. Once B is revamped, control room A will undergo similar upgrades. Recent work done at RBS includes radio spots for Miller's Outpost stores and audio post and narration of Bay Area TV station KCSM's *Hidden Sanctuaries* program.

OTHER BAY AREA SESSIONS

Alternative act Steelpole Bathtub were at San Francisco's Poolside Studios tracking vocals and guitars for their latest Slash/Warner Bros. release with engineer Eric Holland...At Sausalito's Studio D Recording, Chris Isaak finished tracking his new CD for Sire/Warner Bros. with producer Eric Jacobson, engineer Mark Needham and assistant Larry Brewer...Tuck & Patti mixed their first album for Epic/Sony at San Francisco's Different Fur Recording. Patti Cathcart produced and Different Fur co-owner Howard Johnston engineered the jazzy sessions...In Berkeley, Bay Records Studios recently hosted a variety of sessions including Linda Tillery and The Cultural Heritage Choir working with engineer Michael Cogan and second engineer Jim Ruzicka. Also at Bay Records, The Rova Saxophone Quartet tracked with engineer Bob Shumaker. ■



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STUDIO SHOWCASE



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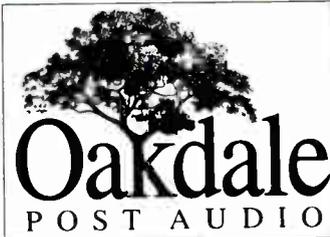
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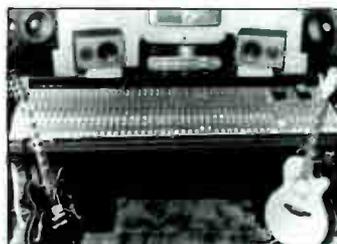
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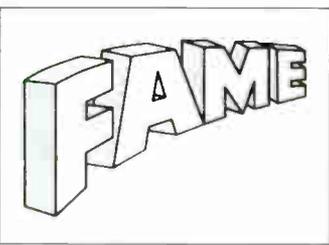
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—FROM PAGE 23, CD RECORDING

make CDs, you would be a fool not to use the same technology for back-up, archival data storage and general offline storage. Remember, the most for the least, so anything that helps in amortization of the investment counts. Huge image and audio files would be proud to reside on nice, pretty, gold 680-megabyte discs, at 13 bucks a pop, though they might be mildly alarmed at being personified to the extent that I just did.

The price of CD-R gear has dropped well into the rational range of the average Class 3 American Techno-Geek.

So what about data management for CD-ROM? Well, that's a bit more complex. Luckily for us (and a major factor in my choosing the RCD 202 as the drive to buy), the software that comes free with this drive actually *works*, but *not if you use it the way they say to!* (I can hear the editors: "Oh boy, here we go again.") Hey, I calls 'em as I sees 'em, and this little bit of information might save you the week of pain that I went through before I figured out the right way to use this thing.

So, use their software, but *not* the way they want you to! If you use the Mac-standard HFS protocol, you will basically be spun into the ground with a nice big screwdriver, for several reasons. Your beautiful new *permanent* CD will probably have the data on it that you put there, but...

1) Mac users use Macs because they *like* the interface. They spend a certain amount of time moving folders, and the files within these folders, around on the desktop until they are arranged in a manner that displays their Mac world as they want it. Then the Pinnacle software happily closes and moves these folders, resizes their windows, and just to make sure you noticed, it rearranges your docu-

ments and applications within these folders. Oops.

2) Every single "last-modified" date will be changed from the real ones to *the date you burned the CD!* This is practically criminal. If you are making an archive, one of the ways that you will most likely use to find the most recent of several evolutionary versions of a project is by the last-modified date, since that is the *only* date that a Mac shows on the desktop.

3) CDs made with this promising but somewhat roguish HFS drag-to-destination mode cannot be confirmed or even read by Norton Disk Doctor, the industry-standard media diagnostic package, so you can't confirm the data on the disc after you have burned it. Not a good feeling.

There is no mention of any of these significant problems in the manual, and when I called, they knew nothing about any of them but later confirmed all three.

LAND MINE WITHOUT A TRACE

I felt that it would be most useful if I actually tried the gear in real-world situations, as this is the only way to find those hidden shortcomings, those little land mines that are invisible until you actually *rely* on a piece of gear or software. I happen to be the proud (or is it embarrassed?) owner of many, many gigabytes of Mac data that I, of course, *need*—everything from the first fish that I drew with MacDraw 1.0 in 1250 B.C. to album covers done with Specular's InfiniD this year. Since modern graphics can easily be 150 megabytes or more, and audio can be any size it wants, big offline storage is essential, and I don't believe in *any* rust-based media for storing data longer than one year. I am uncomfortable with any linear (streamy) storage systems because they are fragile and decidedly *not* random-access. This leaves magneto-optical, which I love, and the much cheaper CD-R, which I am discovering can be a very satisfying solution. But you had better know what you are doing, because I found out that virtually all of the manufacturers, in one way or another (and in some cases, several others), don't.

Anyway, I had all this data that needed to be archived, so I used it. I now have several gigabytes of CD-R, done in Pinnacle's HFS mode, that has the above-mentioned problems—forever. On the other hand, once we discovered these problems,

I stopped using this mode entirely and tried their other mode: "CD Image." Now, *this* is a different story. This works very well, gives solid, stable results as far as folder positions, etc. and does *not* change the last-modified dates. Norton can see and check discs made this way. It's great—I only wish I had tried it sooner. So buy the drive and use MasterListCD for audio CDs, and use Pinnacle's CD Image mode for data.

THE ULTIMATE GIFT FOR THE CONSUMMATE COLLECTOR

Just think: At these prices, this is the anal retentive's ultimate fantasy—never having to throw away *any* data at all! Just slam it all onto CD-ROMs, put them on the shelf and keep everything you have ever done in your life, forever. Well...I will talk about "forever" next month in the third and final installment of my CD-R trilogy, wherein I will cover media and a new double-speed offering from Pinnacle. So stay tuned, a month is pretty soon. ■

Stephen St.Croix writes these columns. He is still sensitive about "copy cat" clever fake biographies.

INSIDER AUDIO

—FROM PAGE 28, JITTER HYSTERIA

sible to achieve in practice. Instead, we live with any number of fairly reasonable approximations, represented by the variety of converter types. Whether these approximations give good results or not is the topic of much debate, but this is immaterial for the purposes of our discussion of jitter—we can assume theoretically perfect D/A and A/D converters.

What happens if the analog waveform in Fig. 2a is sampled nonuniformly? Assume the ideal sample times T_0, T_1, \dots , (indicated by the dotted vertical lines) are perturbed by some random amount of time, as indicated by the solid vertical lines. The "x" marks show the value of the analog waveform at the perturbed (out-of-sync) sample times. Now, different samples of the analog waveform have been captured instead of those that would have been captured at the exact sample times. In other words, we have the wrong samples at the wrong time.

One step further, suppose these samples are presented to a D/A converter and a perfect clock is used to

trigger the DAC. Then these perturbed samples will be converted to analog at times T0, T1, ..., thus giving the wrong samples at the right time, as shown in Fig. 2b. Additionally, any digital processing of these "wrong samples" will also contain the inherent error.

We were doomed once the samples were taken nonuniformly (i.e., with jitter), since there's really no simple way to reconstruct the analog signal cleanly from nonuniform samples. Just how bad the signal sounds depends on the magnitude and nature of the jitter and on the quality of the original analog signal itself. Granted, the magnitude of the jitter in Fig. 2 is fairly large for the purpose of illustration, but in this age of signal-to-noise ratios in excess of 100 dB (THD+N specs better than -95 dB), it should be clear that converter performance can suffer.

This hypothetical discussion illustrates the first point we are trying to make: The point in the signal chain where jitter is the most important is in the analog-to-digital converter. It is absolutely critical that the ADC be provided with a good sample clock

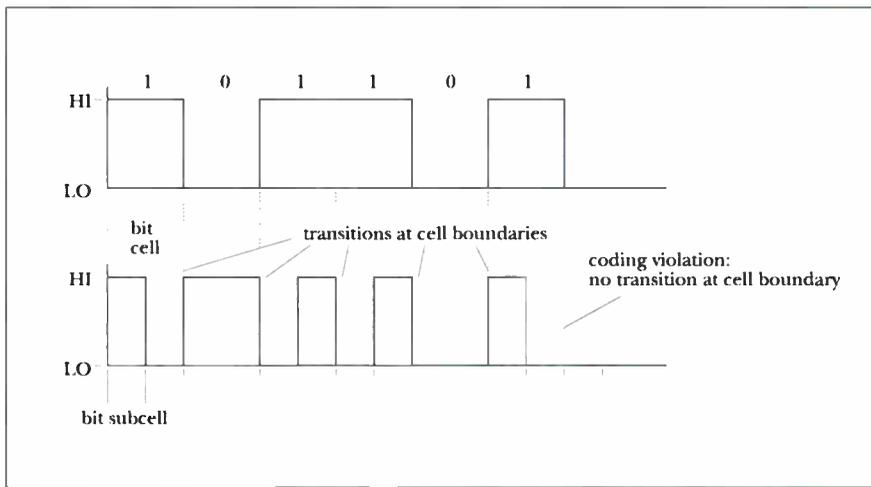


Fig. 3: A coding violation results when transitions do not occur at cell boundaries

source, or the digital recording will be damaged beyond repair.

Given good samples from the ADC, a situation analogous to the one shown in Fig. 2 can also happen if the DAC has a bad sample clock. Suppose the ADC has a perfect clock so that the samples are taken uniformly in time, but the clock source used to trigger the DAC is nonuniform. In this case, the resultant analog waveform also will be distorted.

By analogy with the previous discussion, we have the correct samples at the wrong time. However, it is essential to understand that the distortion of the analog waveform caused by jitter in the DAC jitter is a playback phenomenon only. The sampled waveform is still intact, and the correct analog signal can still be put together; just provide a stable clock reference, and all will be fine. In fact, most good DACs have built-

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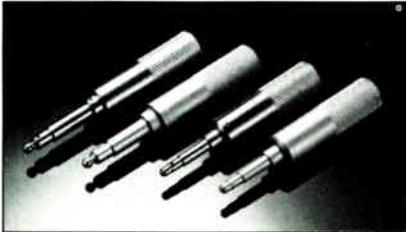
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Making Digital Connections

To some extent—at some cable length, actually—all transmission media have some jitter inherent in the transmission, although some are worse than others. Here is a breakdown of the popular interconnection techniques.

COAXIAL

When used with 75-ohm receivers and transmitters, coaxial cable is good for transmission over short distances (ten meters or so), with the preferred connector being a locking BNC-type. Co-ax is typically found on consumer equipment with RCA-type connectors and in facilities that prefer to use video patch bays for routing digital audio. It can be used in either single-ended mode or balanced mode for longer transmission distances. Co-ax is the least expensive way to connect digital audio equipment, assuming the equipment is outfitted with coaxial connectors.

XLR

XLR connectors should be used with 110-ohm receivers and transmitters, and they can be used for balanced transmission for well over 30 meters. XLR is the type of connector used on most professional equipment, and balanced transmission allows for longer transmission distances because of enhanced noise immunity. For noncritical links, microphone cable will suffice. For clock-critical links, or for long distances, special digital-capable (because of the high switching frequencies involved) cable is recommended—try Apogee, Gotham, Belden or Mogami, to name a few that are low-jitter and fairly low-cost.

PLASTIC FIBER OPTICS

The standard connector for plastic fiber optics in digital audio is

the Toshiba TOSLINK, which is popular on consumer equipment. Because of their small size, these connectors are also frequently found on plug-in cards (e.g., the Sonic Solutions SSP3 card). Plastic fiber is a fairly jittery interface, although still quite usable for most noncritical links. There are two drawbacks, however.

First, plastic fiber is still fairly expensive. Second, it is nearly physically impossible to transmit for distances greater than about 15 meters—the jitter at the electrical output of the optical receiver increases with small signal amplitudes and as transmission distance increases (which also reduces the signal amplitude, doubling the problem). There is also a small amount of jitter inherent in the optical-to-electrical conversion process in the optical receiver, no matter how short the fiber connected to it.

GLASS FIBER OPTICS

Glass is an acceptable connector of choice for those with unlimited budgets. Unlike plastic fiber, it is possible to transmit digital audio over long distances (well in excess of 1 km) on glass fiber. Unfortunately, the cost is extremely high, and most pro equipment is not equipped with the ST-type connectors—the standard glass-fiber connector for digital audio applications. Some high-end ADCs and DACs have ST connectors, but we only recommend glass fiber for extremely long transmissions or for critical links on devices not equipped with XLR connectors.

In terms of jitter, well-implemented glass-fiber systems are roughly comparable with good XLR cable. Like plastic-fiber interfaces, glass-fiber interfaces can also suffer from some jitter in the optical-to-electrical conversion in the optical receiver, albeit to a much lesser degree than plastic fiber, where loss of optical power in the fiber makes matters much worse.

—Zelniker and Taylor

in clock regeneration circuitry (more on this later).

Given the "right" samples, no amount of jitter in the clock that controls the DAC will cause these samples to go "wrong." They will only be reproduced at the wrong time, and reproducing the right samples at the wrong time will result in signal distortion and/or noise. What can we say about these audible effects? Opinions vary, but here are a couple of guidelines:

- Random jitter will tend to result in a reconstructed signal with an elevated noise floor. In extreme cases—low-level digital signals, for instance—the noise floor can dominate the signal. If the jitter is periodic or has strong spectral content at discrete frequencies, these frequencies will appear as sidebands in the reconstructed signal, giving rise to spurious tones.

- Clock jitter can affect different types of DACs in different ways, and different converter architectures are affected by jitter in different clocks. One-bit noise-shaping converters without switched-capacitor filters (some delta-sigma and MASH architectures) tend to suffer the most. These converters are affected by jitter in the high-speed master clock. Resistive ladder-type DACs perform better. These converters are generally affected by jitter in the left/right sample clock, which can be generally reduced by the use of oversampling filters. One-bit converters with integrated switched-capacitor filters may not be influenced at all by small amounts of jitter.

- When dealing with ADC and DAC clock references, it is of the *ut-most* importance that the ADC have a stable clock reference; while it is fairly important that the DAC have a stable clock. If the ultimate destination for the sampled data is a digital medium (DAT, CD, etc.), then the DAC is only important for monitoring. Granted, you want to hear if you did a good job on the editing, EQ and level, but the samples are still going to make it to their destination just fine, whether you can hear them clearly or not.

THE AES/EBU INTERFACE

AES/EBU (and its consumer variant, S/PDIF, which, for our purposes, is identical) is nothing more than an

encoding scheme for transmitting digital audio signals from one place to another. In actuality, AES/EBU refers to a digital signal format and a set of electrical specifications regarding cable, impedance, signal amplitudes and isolation, but we will be concerned only with the signal format. The AES/EBU signal allows a pair of digital audio signals, along with some additional status and user information, to be transmitted on a single connection.

The most significant feature about AES/EBU is that it is asynchronous. In contrast with earlier signal formats, such as SDIF or SDIF-2, which carried

a separate clock line, AES/EBU has no explicit clock—just a single digital signal that contains the left-channel audio, the right-channel audio and the status and user information. There are a number of advantages to such a transmission scheme, not the least of which are economy and simplicity of interconnection.

AES/EBU uses an encoding scheme known as biphase-mark code, which codes logic ones and zeros as signal transitions, or lack thereof. Look at Fig. 3. Suppose we want to biphase-mark-encode the top signal. First, the rules for biphase-mark-encoding require that a

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transition must occur at each bit-cell boundary. The bit cells are further broken down into two subcells. A logic one is coded as a high-to-low or low-to-high transition across subcells, depending on what the previous state was. A logic zero is coded as no transition across subcells. This gives the signal on the bottom. The bit-cell transmission rate is a power-of-two multiple of the sample rate, specifically 64-times the sample rate, and is generated by the clock at the transmit end of the link.

If we coded the digital audio as an endless string of signal transitions with the bits from one sample to the next butting up against one another, it would be difficult to tell when one sample ended and another one started. So AES/EBU delineates one sample from the next by inserting in the biphasemark signal a sequence of bits that violates the biphasemark protocol. This sequence is known as a coding violation, where no transition occurs between bit cells (see Fig. 3).

Both the transition edges associated with the data-transmission rate and the coding violations provide information for clock generation and data recovery. For most of us, developing a circuit to decode AES/EBU in this fashion is a daunting task. Fortunately, there are manufacturers that make single-chip AES/EBU decoders (such as Crystal Semiconductor and Motorola). These chips take in AES/EBU, strip out the audio and status data, and derive the sample clock.

JITTER AND AES/EBU TRANSMISSION

Now we can talk about jitter and its effects on AES/EBU transmission. Remember, the AES/EBU signal has embedded data and timing information. There are two separate issues to deal with: data recovery and clock recovery. And two pertinent questions come to mind: Does jitter in the AES/EBU signal affect the ability to get the audio data from one place to another? And, does jitter in the AES/EBU signal affect the ability to derive a stable clock reference for data conversion? The first question is a matter of data recovery. The second is a matter of clock recovery.

Let's first deal with question one. Consider the case where ADCs and DACs are not in the signal chain. It is important to understand that in this

case, the purpose of AES/EBU is to transfer digital audio data from one place to another—from a CD transport to a DAT, from a DAT to a digital audio workstation, or from a DAW to a DAT, etc. This brings us to the matter of jitter in the transmission of digital audio data. To put it bluntly, outside of clocking ADCs and DACs, jitter is not a problem until it becomes significant enough to result in errors in data recovery. Given the right samples, they will remain the "right" samples unless bit errors occur in the data recovery process.

Just how much jitter can be tolerated before data recovery errors occur? This depends on your equipment and varies from manufacturer to manufacturer. However, there are many digital audio products that can recover data without error when the RMS jitter on the incoming AES/EBU signal exceeds 5 nanoseconds. This gives the user a fair amount of flexibility to implement simple, inexpensive interconnection schemes when data recovery is the sole issue.

In situations where jitter accumulation throughout the system causes data errors or system failure, jitter attenuation will be required at certain points in the system to reduce the jitter sufficiently to retain robust system operation. This is in contrast to the issue of clock recovery, where the recovered clock is intended to be used for a sample clock to a D/A or A/D converter.

Now for Question Two. (Remember, does jitter in the AES/EBU signal affect the ability to derive a stable clock reference for data conversion?) Data recovery and clock recovery are somewhat related, but it's much easier to merely recover the data than it is to recover a good, clean clock. Therefore, when clock recovery is important, a bit more caution is warranted. The fundamental circuit element in the AES/EBU decoder is the phase-locked loop.

Basically, the PLL synchronizes the AES/EBU decoder with the incoming AES/EBU signal, allowing the audio data to be stripped from the biphasemark-encoded data and, in the process, recovering the 64-times clock and perhaps the sample clock. In addition, the PLL generally derives a high-speed master clock. If the clock used to operate the DAC has excessive jitter, jitter attenuation will be required to optimize converter performance.

In situations where clock recovery is important, we can use a two-stage PLL design. The first stage is designed to be very tolerant of jitter; it recovers data without error and outputs a sample clock that will be jittery if the incoming AES/EBU was jittery. The recovered data is then temporarily stored in a first-in/first-out (FIFO) buffer. The second stage is a PLL with low-jitter clock characteristics, designed to lock onto the jittery clock output from the first stage and smooth it out. This "smoothed" clock is then used to read the data out of the FIFO. If the jitter from the first stage is substantially less than one bit period, the FIFO is not needed.

A sensible rule-of-thumb follows from this discussion: In situations where clock recovery is critical, it's a good idea to use good interconnections to give the AES/EBU receiver a low-jitter AES/EBU signal from which to recover a low-jitter sample clock. Where is clock recovery from AES/EBU most important? Or, in other words, what links in the digital audio chain are clock-critical? We've already seen that the input to a DAC is clock-critical; you want the recovered clock to have as low jitter as possible so you can accurately monitor your work and/or make sure a good analog signal gets printed to tape.

How about the A/D converter? Typically, the AES/EBU output of an ADC is destined for a DAT or DAW, so this link is not clock-critical unless the output of the ADC is directly cascaded to the input of a DAC. If, however, the ADC has an external AES/EBU input that is used to derive a synchronization signal for the A/D conversion (namely, an external AES/EBU signal from which to recover the clock and use it as the clock for the ADC), this link should certainly be regarded as clock-critical. We've seen that a poor ADC sample clock can lead to disaster.

WHAT IT ALL MEANS

What's to be learned from all this? For one thing, we can determine where jitter is important and where it's not. For example, consider making a CD-to-DAT transfer. Forget about the oxygen-free cable or the glass fiber (barring, of course, the need to transmit over extremely long distances). Once the input receiver on the DAT locks to the AES/EBU signal from the CD player (which doesn't take much doing, connector-

wise), the DAT will put the bits down on the tape just the same for plastic fiber, glass fiber or good old-fashioned copper. It's nothing more than a case of bits being moved from one place to another.

To prove our point: Suppose we take the following roundabout path to copy a DAT to a DAT. We transfer the audio data from the DAT player to a workstation, then copy the file from the workstation's hard drive to an Exabyte backup. Next, we take the Exabyte backup and restore it to a different workstation, then transfer it to another DAT. Assuming the Exabyte didn't get mangled and all the intermediate AES/EBU receivers were able to recover data (which, as we've seen, doesn't take much doing), the DATs will have identical data. The same holds for transferring signals between ADCs, outboard digital gear, DAWs and digital multi-tracks; as long as your AES/EBU links work, you're in business.

ONE LAST THING

Jitter tends to be cumulative. If you have several devices in a signal chain, each device will likely add some jitter to the retransmitted signal. The signal farthest downstream will have the worst jitter. As long as the cumulative jitter at any point in the chain doesn't surpass the ability of the receiver to accurately recover data, you're in business; the data remains completely intact. And most receivers can handle a substantial amount of jitter.

Where, then, do you want to provide a low-jitter path? We've already talked about this: sync signals and DAC inputs. These clocks, unlike all the others, actually determine whether "right" or "wrong" samples are captured or are played back at the "right" or "wrong" times.

There you have it. We tried to be as scientific and pragmatic as possible. This is by no means an attempt to justify shoddy equipment design or careless equipment installation. It is intended to clear the air and perhaps alleviate the jitter hysteria we encounter from end-users as practicing design engineers. Now we can sit back and wait for the hate mail. ■

Glenn Zehniker runs Z-Systems Inc., a manufacturer of peripherals for digital audio systems. Roger Taylor is a design engineer with Crystal Semiconductor.

LUNCHING WITH BONZAI

—FROM PAGE 112, KRIS KRISTOFFERSON

couple of years I've been going out with Danny Timms and calling ourselves "Crazy Love and the Prophet." Just the two of us, we make it into a little piece of theater where we write all the words. It works real well, and over in Europe we play to big houses. Over here, we just play in the clubs. We were sold-out in Vienna. For some reason, Austria and Ireland respond well to my music. It's particularly surprising in Austria because the language is so important, but those are two great audiences for me. **Bonzai:** What's up next—some films? **Kristofferson:** I don't know. I've been kind of out of the loop in the film business. If I get the chance to do something I like, I'll do it. I've got a great home on Maui, and I've got four little kids in school and another just born. It's like going back in time to when you could live in a small town, sort of a Norman Rockwell place where your kids don't have to wear shoes to school.

Bonzai: How's the music business these days? It seems to be a new period of liberation.

Kristofferson: I hope it's true. The fact that I am able to make a record with Don, I find encouraging. I think that the reception that Johnny Cash got on Lollapalooza indicates that there's some people who want to see the real thing. I've found that if you can get in front of them, they respond to you. Particularly the young people—they want to hear something real, something that might piss off some people.

• • •

Kristofferson went back to the control room while Don Was joined me for a chat about the album, his new record company, and the future of the music industry.

Bonzai: Why Kris Kristofferson?

Was: Well, he's one of the greats, a larger-than-life character, and I'm certainly a fan—I bought his first album when it came out. I think he's in a particularly creative period of his life. I'm just glad that I was privileged to be around and work on the finest batch of songs he's written in a long time.

Bonzai: Did it come together the way you thought it would? Any surprises?

Was: I knew the songs were good before we started, and the musicians are all guys I've worked with for a

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long time. It's got a lot of warmth. I would say that in this case we realized each song to its maximum, and you don't always get to do that. Everyone was really with him on this—we flew through it in four days; cut 14 songs.

Bonzai: Are you playing?

Was: Yeah. I'm playing bass. I went out and bought a string bass, which I've never played. The day before we started I marked off the frets with splicing tape and never took my eyes off the strings; played real simple. It was a thrill to play with this band. I don't think any song took more than two takes, and except for myself and Danny Timms, no one had heard the material before. It was mainly Kris—he was prepared and ready to come in and sing. He'd been performing these songs live with Danny, so they knew 'em. It just came together—sometimes things are just charmed. I can't explain it.

Bonzai: What does Karambolage mean?

Was: An unavoidable collision—the term comes from billiards. Balls colliding in serendipitous fashion.

Bonzai: Why did you start your own label?

Was: It wasn't so much out of hunger to run my own label, as it was someone calling me and offering. Al Teller at MCA called and said he liked the records I make and that he would like to release more of them. How can you refuse that? It wasn't something I was particularly looking for, and the jury is still out as to whether I have the administrative capacities to actually run a record company. I've taken on what I consider a serious responsibility to these artists.

It's easy for me to have coffee with the artist two months after finishing the record and bitch about how they are getting ignored by the company—but now, to go from this really friendly bonding to what's normally somewhat of an adversarial relationship. [Laughs] We'll have to see if people are throwing rocks through my windows in a year.

Bonzai: What else are you up to?

Was: I'm directing a documentary about Brian Wilson for a BBC series called *Omnibus*. Lots of interviews, along with a Brian Wilson concert—and there will be an album from that.

Bonzai: What's your take on multi-media and its effect on the record

industry?

Was: I don't think we'll have a record industry anymore. The die was cast when MTV became popular and a generation of kids started seeing the hit records, as opposed to listening with the lights out with a transistor radio and imagining where it came from. I don't think you can break that down anymore, much in the same way you can't go back to appreciating radio plays on a mass scale anymore.

People are used to having visuals with their dramatic action. We now have the proliferation of Hi-8 equipment and cheap sequencers and synthesizers, home recording equipment and systems like Avid. In general, I believe that a rock 'n' roll band years from now will not be two guys with a guitar and bass player and a drummer. It'll be a guy who can make some music, a guy who can run around with a Hi-8 camera, and a guy who can digitize and edit this information.

I believe in the new media, new technologies, and as they become accessible on a street level this will give us the pop artists of the future. I think back to 1971, when you could buy a Moog for a couple of hundred bucks. Initially, it was the province of jazz piano players who wanted to spark up their gigs at the Holiday Inn. It played just like a piano except it sounded like a crappy oboe [Laughs]. I think that reflected a certain mentality, and it took about eight years for kids to grow up with the synthesizer being their main instrument.

Louis Resta, who's now in his 30s, was 16 when I met him in the '70s, and he freaked me out. He was the first guy I met who said, "I'm not a piano player, I'm not a B-3 player, I play synthesizer." He knew how to go inside and fix the boards and was into shaping sounds, and that was his form of expression. In much the same way, it's really hard for people who have been making records and movies for a long time to imagine a new medium. You can keep up with things, but you can only assimilate so much information and regroup your thoughts so many times in your life.

I'm interested in an emotional art form that's a synthesis of computer technology, visuals and music, not a really good song with some people dancing to it. I think that music video is ultimately an ungratifying art form. If you've made a good record,

you've left just enough to the imagination, and what are these visuals doing? They're filling in the blanks for you. It takes something away from the artist's intention.

I'm talking about an art form, which is by nature experiential. I don't know how much you are supposed to participate, but I like the fact that it changes. The old Tilt-A-Whirl carnival ride gave you a different ride every time, depending on where you sat and how many people were in the car with you. They attribute the lasting popularity of the Tilt-A-Whirl to the fact that, unlike a roller coaster, it owed something to chaos theory. That degree of interactivity, where things might appear differently every time, is something that people can deal with. Who you are at that moment, and what you feel at that moment, affects the artwork—that's an interesting proposition. ■

Contrary to popular belief, roving editor Mr. Bonzai was not Kris Kristofferson's body double for the steamy scenes in The Sailor Who Fell From Grace With the Sea.

—FROM PAGE 250, RECORDING NOTES

We had two keyboards going, and Reggie [Young] was playing electric guitar. We might have an acoustic guitar in there, and Dan played acoustic on a couple of songs. The drums were in a booth and Reggie's guitar was in an iso, and Dan was in another one, but everyone could see each other fine."

Sandlin says there was very little pre-production on this project, "because they're easy songs, and most of the guys knew most of 'em anyway. Also, we didn't want it to sound too rehearsed or anything." Typically, the band would work on two songs a day, cutting on the studio's Neve 8068 console and Studer multi-tracks at 15 ips with SR ("a wonderful format," Sandlin says). "Dan is really together," Sandlin notes. "He knew what he wanted going in, and since everyone knew each other so well, it was pretty easy getting what he wanted."

How do you mike a drumming legend like Roger Hawkins? "You can't lose with him," Sandlin says with a chuckle, "but what I did was use a [AKG] C112 on the bass drum, a [Shure] 57 on the snare, [AKG] 408s on the toms, and [AKG] 460s on the overheads—real straightforward

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stuff." Sandlin used a Neumann U47 or U87 on Penn's vocals.

"You know, Dan was famous for making great demos," Sandlin says. "They probably weren't as good as our memories of them, but we wanted to make something that was as good. This was really a great experience. We're all older now, of course, but man, everybody can still play!"

It's hard to envision what radio format a low-key Memphis soul record like this would fit, but the critical response to the record has been very strong, and whether it succeeds or not commercially, it's another impressive page in a legendary career.

David Grisman and Tony Rice: *Tone Poems* (Acoustic Disc). For the past three years, mandolin virtuoso David Grisman has managed to garner an annual Grammy nomination for at least one CD put out by his fledgling Acoustic Disc label. The only question for the '95 Grammys is whether it will be this gorgeous album of guitar-mandolin duets, or Grisman's and Jerry Garcia's wonderful acoustic children's record *Not for Kids Only*—or both. Grisman and his label define the word class. *Tone Poems* is easily one of my favorite CDs of the year. It's an easy listen in the best sense: two of the finest pickers *ever*, moving comfortably through a panoply of different musical styles.

But wait—there's more to the concept: Each of the 17 songs on *Tone Poems* features Grisman and Rice playing a different historic guitar and mandolin. For instance, the first track, a Grisman tune called "Turn of the Century," finds Grisman picking a 1905 Gibson A-4 mandolin, while Rice plays a Martin 1-21 from 1891. The traditional "Wildwood Flower" has Grisman on a Martin Style 2-30 mandolin from 1936 and Rice picking a 1936 Gibson L-Century. And so on. The CD comes with a beautiful 40-page color booklet that shows every instrument and includes copious descriptions of what makes each axe special. I don't even want to *think* about what all these instruments are worth. Grisman doesn't care, either: He wants us to *hear* them.

And, of course, we hear them as clearly as we could hope for. Grisman has been at the recording game long enough that he's got his miking technique for these instruments down to an exact science. The album was recorded over a few days' worth of ses-

sions at Grisman's own Dawg Studio (in the basement of his Marin County, Calif., house; see *Mix*, Aug. '93) with David Dennison engineering. Dennison's notes in the album tell the story better than I could:

"This project was recorded in an intimate environment, under controlled conditions, direct to 2-track analog (Fostex E-22 at 30 ips) with no noise reduction. Mixing was achieved through an MCI JH 416 console utilizing MDM-4 near-field monitor speakers. Microphone selection and placement (close-miking) remained constant throughout. The guitars were recorded with Neumann KM85 (lower end) and U89 (upper end) condenser microphones; mandolins were recorded with two KM84 condenser microphones. Although some spatial enhancement was incorporated using Lexicon digital processing equipment, no equalization, compression or other tonal enhancement was employed in either the recording or mastering process."

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Linda Brady

Linda Brady: *Linda Brady* (S.O.B. Entertainment). Brady is probably the least-known of the artists included in this piece—she's a young Baltimore singer who moved to the San Francisco Bay Area two years ago. What intrigued me about her initially is that her debut album was produced by Matthew Kaufman, the eccentric former head of Beserkeley Records and producer of several good albums by Greg Kihn and Jonathan Richman. After laying low for a while and working in film, Kaufman has started a new indie label (S.O.B.—Son of Beserkeley), and he's been foraging for new talent to record. In Brady, he's

PHOTO MICHAEL JANG

found a confident singer/songwriter with a keen melodic sense, steady pipes and a knack for writing strong hooks. One hates to get too deeply into the comparison game, but on several songs Brady reminds me a bit of Chrissie Hynde (that's good), though Brady's approach still sounds more rooted in folk than rock 'n' roll.

Kaufman put Brady together with some of Berkeley's finest veterans, including bassist Steve Wright, drummer Larry Lynch (the rhythm section in Greg Kihn's best bands) and former Earth Quake lead guitarist Robbie Dunbar. He then added guitarist W. Davidson, bassist Jimmy Jet Spaulding, keyboardist Paul Jackson, and vocalists Keta Bill and Kathy Kennedy. The chemistry is there, and it really does sound like a band—the perfect complement to Brady's strong singer-with-a-guitar presence.

Kaufman says, "My philosophy now is the same as it's always been: less is best. We did a lot of pre-production before we went into the studio, and then when we got there, we kept it simple." Adds engineer Michael Rosen, who has worked with Kaufman often through the years, "Like Matthew, I like to know what's happening before we go into the studio, and then I like to cut live if we can—get the whole band in there and cop a vibe on the track."

Brady's album was recorded at Fantasy Studios in Berkeley, using Studio A mostly and, to a lesser extent, Studio C (the old Creedence room): "Studio A is live-er than C; it has more room sound," Rosen comments. "C is a little tighter, a little drier. They're both good rooms." Even when cutting live in the studio, Kaufman likes to isolate the players with baffles or in iso booths (actually he and Rosen put the bass in a hallway between Studio A's control room and the studio), getting a live sound in the musicians' headphones, but allowing him greater control at the board.

Rosen's miking was straightforward but effective: on drummer Lynch, a D112 on the kick, a 57 on the snare top, a 452 on the bottom, a 421 on the toms and 87s overhead; for the bass a U67 and a Beta 57 on the amp; for guitars, 421s and Beta 57s; a U67 for Brady's vocals (some of her guitar was DI); and then 452s and U47s for room mics. Brady's vocals, the background vocals and the keyboard parts were overdubbed

after the live tracking sessions, although a couple of the singer's scratch vocals were so strong they appear on the finished album.

"A lot of people when they get in the studio and the 'record' button is pushed, they freak out a little," Rosen says, "but Linda was real natural right from the start. I think she's *really* good, and she'll be even better next time out because she'll be able to compare what she did on this record with what she hears in her head and then figure out what the next step is."

For my money, that next step is to get her a young, tight, aggressive *band*. She's got the goods to go far.



Michael Hedges

Michael Hedges: *The Road to Return* (High Street). Once known primarily as an innovative steel-string guitarist, Michael Hedges has been broadening his horizons in recent years, adding various other instruments to his arsenal and concentrating more on his fine singing voice. *Road to Return*, Hedges' first album in four years, is virtually a one-man show: He wrote all the songs, performed all the instruments (save for a saw part on one tune), did all the drum programming, and engineered and produced the record himself in his new studio tucked away in the trees, a couple of miles away from his rustic Mendocino, Calif., home. "This record was me learning how to be a producer and also me trying to learn how to play the studio," Hedges comments. "I guess you could say it's the whole Todd Rundgren trip."

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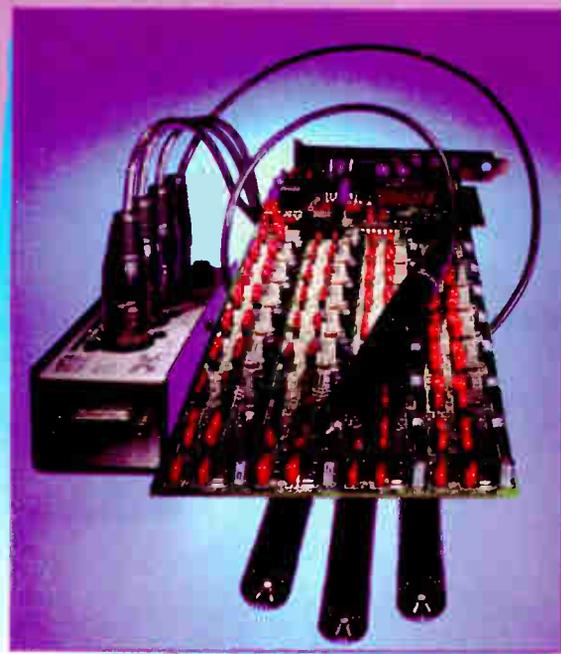
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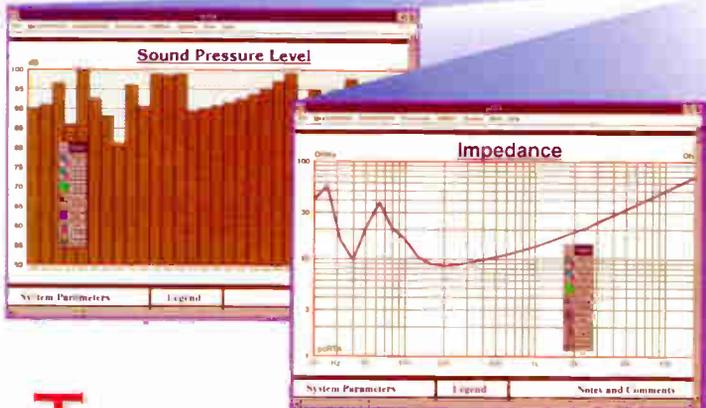
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First on Hedges' agenda was building the studio: "My studio has a control room in a converted water tower," he says. "It's still functional—there are a thousand gallons of water up there—and the main studio is constructed right next to it. The first story is the control room, and above it is this big tank—it looks like a giant hot tub. We put in double walls and isolated the control room, but it also has these big windows and a skylight so it feels like you're in the forest."

The studio (called the Speech and Hearing Clinic, in honor of his late father, who was a speech therapist) is simply equipped, with a Calrec mixer and 1-inch, 8-track (with Dolby SR), a Mac Plus with various programs, some keyboards, a few choice mics, a small selection of outboard gear and an Otari ½-inch, 2-track for mastering. Rather than seeing the limitations of his system, however, Hedges views his equipment as the tools he had available for this project: no doubt as his studio savvy grows, those tools will change.

"I didn't have any trouble working with just eight tracks," he says. "All these songs started out as demos. I thought, 'I'll go back and redo all the songs.' Then I ended up keeping a lot of it, patching up things here and there and adding. They're all done to a click, so it was no big deal: 'I can just run over this.' Now, when you run over something, you're taking a big chance, especially if you've only got seven tracks [the eighth was for SMPTE]. But it forces you to make some decisions—'you've got seven tracks, boy: What're you gonna do with 'em?' It ends up being a very thrifty way to work. I used three reels of 1-inch tape on this record. There was one version of each song. And I used maybe a case of ½-inch for mixes. I didn't pay for studio time or for engineers, so the tape cost is just about the cost of the album."

Whereas in his early days Hedges' writing took place almost exclusively on guitar, this time out he wrote some tunes on keyboards and used his computer extensively. "I striped the 8-track with SMPTE—that ran my Mac Plus, and I used an Opcode Studio Plus MIDI interface," he says. "SMPTE ran Performer, and that ran all the drums and synthesizers. But I didn't make files of the drum parts. What I did was use two Roland Human

Rhythm Composers. I'd make a basic metronome for the song, arrange it, then do all the analog stuff [guitars, flutes, etc.]. Then, if I wanted to change the drum part, I could do it easily with my drum machine. I'd never worked with a click before; all my other stuff had been live. *Taproot* [his previous album] had some multi-tracking, but this was the first time I ever really dove in. Once I got the system of getting the SMPTE going, that solved everything."

Hedges recorded all his guitar parts direct through a Millennia pre-amp. He cut his vocals using a Klaus Heyne-modified Neumann U47. He used a minimal amount of effects: REV7 and Klark-Teknik digital reverb on the vocals, MIDiverb on some of the drums, Lexicon LXP-1 and a few others.

In all, Hedges devoted about a year-and-a-half to making *The Road to Return*, and as he points out with a snicker, "I probably could've worked on this record for another three years. As I get better working in the studio, I'll probably get more choosy. I'll want to record some stuff live, some stuff with a click, some stuff with other musicians. This record was Hedges trying to get inside his own head and not use any other minds but his own. It forces you to make some pretty heavy decisions, and it takes you some interesting places."

Or as he sings on one of the album's many highly personal songs: "Some of us dance to the sound of fortune and fame/Others want to march all around defending their domain/Oh, but you can be a dreamer/You can have your dreams come true/Let imagination lead/Reality will follow through."

Buckwheat Zydeco: *Five Card Stud* (Island). From the rollicking opening track—an inspired remake of Bruce Channel's early '60s hit "Hey Baby"—to the bluesy closing track, "Secret of Love," the new album by Buckwheat Zydeco (a.k.a., Stanley Dural Jr.) is a showcase of smokin' R&B styles. The big surprise is how much of the album veers away from the Louisiana zydeco bag I (and many others) had put Dural in: His "Make It Easy on Yourself" sounds like it could've been plucked from the Sam & Dave songbook, and it doesn't even feature Dural's trademark accordion. Willie Nelson's "Man

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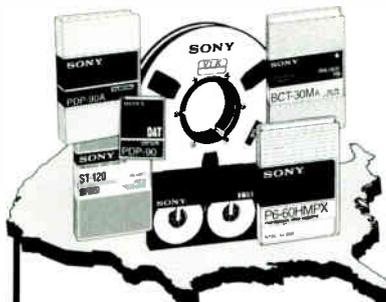
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Stanley Dural Jr., a.k.a. Buckwheat Zydeco

With the Blues," with Nelson on vocals and lead guitar, is more Tex-Mex with an R&B slant. "This Train," a duet with the ever-soulful Mavis Staples, is more gospel/R&B. "Trust Me" has a simmering Memphis soul groove. And there's even a cool previously unrecorded Van Morrison song called "Bayou Girl."

Dural recorded his previous album with engineer David Cook at Dreamland Studio in rural West Hurdley, N.Y., in part because his manager Ted Fox lives nearby. This time out, Dural brought Cook (and Fox) down to Dockside Studios in Maurice, La. (near Lafayette). "Buck had done something for Music for Little People [a spirited album of train songs for kids called *Choo Choo Boogaloo*] at Dockside, and he was really comfortable working there," Cook says. "It's only about 20 minutes from his house, so it was a good choice. It's a nice studio, too. They have a Neve 8058, Studer A820 multitrack, a few good mics and out-board stuff. It's located on this old 12-acre plantation, and the accommodations were unbelievable. It was a great place to be for a while."

Dural tagged Steve Berlin, the Los Lobos sax player and also a producer of some note, to handle the production. Sessions took place over about a two-week period at Dockside. The initial tracking with guitar, bass, drums and some Hammond organ "was all pretty much live," Cook says. "Accordion, horns and vocals were mainly overdubbed later for isolation reasons." Since most of his parts were added after the basics, Dural helped Berlin supervise the band "and sometimes he'd play along with a little Ensoniq [keyboard]

with a Hammond program; lay down a line to keep that chordal vibe going," Cook says. "And he'd do a scratch vocal, too."

Here's Cook on recording Dural's accordions: "Buck has two directs that come out of it, one for the bass and one for the treble, and then I also miked the bass and the treble acoustically with U87s. I combined the two directs into one track so we'd end up with three tracks of it." For the punchy horn parts, Cook put the players in one of the studio's cement-floored hallways and then miked them separately, using a distant mic to get some of the ambience.

The guest artists—Nelson, Staples and Los Lobos' David Hidalgo—were each tracked after the album was essentially finished. Nelson cut at his own Pedernales Studio near Austin, Texas, with engineer Larry Geenhill; Staples' sessions took place at The Chicago Recording Company with engineer Chris Shepard; and Hidalgo went into Studio Masters in L.A. with engineer Omie Craden. The mix was begun by Cook, but after just four days he had to leave the project for personal reasons and was replaced quite ably by Bob Shaper working at Brooklyn Recording in Los Angeles.

As I write this in late August, "Hey Baby" is starting to get significant airplay in several top markets, and there are a few other songs on *Five Card Stud* that would seem to be radio-friendly, as well. Looks like Buckwheat Zydeco is breakin' out of the bayou. ■

Blair Jackson is executive editor of Mix.

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Information in the following directory section is based on questionnaires mailed earlier this year and was supplied by those facilities listed. *Mix* claims no responsibility for the accuracy of this information. Personnel, equipment, locations and rates may change, so please verify critical information with the companies directly.

AC POWER

ETA LIGHTING SYSTEMS

1716 Enterprise Pkwy.; Twinsburg, OH 44087-2204; (216) 425-3388. **Product Name:** PD10VR/S voltage regulator. **Contact:** Victor C. Pavona. **Date Product Introduced:** 4/94. **Product Description & Applications:** Microprocessor-controlled AC line regulators use incoming voltage from 80V to 150V for a full 15-amp, 117V ±3 regulated output. These single-rackspace units are EMI/RFI-filtered, and spike/surge-protected with a four-function digital voltmeter. Models PD10VR & PD10VRS (four-stage sequential) are designed to resolve AC line voltage irregularities by providing clean, stabilized, conditioned power to all sensitive electronic audio & video equipment. **Basic Specifications & Suggested List Price:** PD10VR provides full 15 amps (1,800 watts) at 117 ±3V nominal, 20 amp solid mass core toroidal transformer for low magnetic leakage & cool, quiet operation, 20 amp front access circuit breaker protecting transformer, 15 amp fast-acting fuse also front access, 10 rear panel AC outlets (2 always on) \$890 MSRP. PD10VRS same as PD10VR w/four power up/down sequential circuits \$990 MSRP.



FURMAN SOUND INC.
ACD-100 Power Distr

FURMAN SOUND INC.

30 Rich St.; Greenbrae, CA 94904; (415) 927-1225; FAX: (415) 927-4548. **Product Name:** ACD-100 power distr. **Contact:** Joe Desmond, sales mgr. **Date Product Introduced:** 6/94. **Product Description & Applications:** The ACD-100 power distr is a low-cost 2-space rack-mount system that distributes a 100 amp feed to five 20-amp, 120V circuits protected by high-inrush magnetic circuit breakers, each with a status indicator and MOV spike suppression. A 4-bus design allows easy reconfiguration for 120V, 240V or 208V three-phase inputs. The ACD-100 is ideal for touring P.A. systems, on-location recording or broadcasting, and musical and theatrical acts. **Basic Specifications & Suggested List Price:** The ACD-100's circuit breakers have a pulse tolerance of 10 times the rate current, or 200 amps, making them ideal for avoiding nuisance tripping with reactive loads like large power amps. Suggested list price: \$499.

FURMAN SOUND INC.

30 Rich St.; Greenbrae, CA 94904; (415) 927-1225; FAX: (415) 927-4548. **Product Name:** PRO Series 20 amp power conditioners. **Contact:** Joe Desmond, sales mgr. **Date Product Introduced:** AES 1994. **Product Description & Applications:** New PRO Series versions of Furman's most popular power conditioners use innovative circuits and components to provide the highest level of protection from spikes, surges, and RFI and include extreme voltage shutdown and self-checking features. The PL-PRD power conditioner/light module has the familiar slide-out rack lights pioneered by Furman and an AC voltmeter. The PM-PRD power conditioner/monitor features an AC volt meter and an RMS-reading AC ammeter but no lights. The PS-PRD power conditioner/sequencer can power up a rack of equipment in a 3-step delayed sequence (reversed for power-down). All PRD Series models have eight widely-spaced rear outlets that accommodate bulky plug-mounted power supplies, and a front-panel unswitched outlet. **Basic Specifications & Suggested List Price:** All PRD Series models are rated at 20 amps and use high-inrush magnetic circuit breakers to avoid nuisance tripping. Protection circuitry can absorb up to 770 joules or 49,000 amps impulse surge current. Single-space rack-mount packaging with a 10', 12 AWG power cord. Prices to be announced at AES.

TICE AUDIO PRODUCTS

1530 Cypress Or.; Jupiter, FL 33469; (407) 575-7577. **Product Name:** MBF-3 Powerline Conditioner. **Contact:** George Tice. **Date Product Introduced:** 1/93. **Product Description & Applications:**

MBF-3 power conditioner protection from noise & spikes. Improves detail, clarity and soundstage reproduction. On video the MBF-3 improves detail resolution, color saturation and reduces grain and noise. **Basic Specifications & Suggested List Price:** \$625. 19" rack-style case. Spike protection. 16 outlets. PC-2 power cord is 4 power cords in 1.

VANS EVERS

815 6th St.; Tampa, FL 33611; (813) 837-1224. **Product Name:** Clean Lines Jr. Model 11. **Contact:** Mike Vans Evers, owner. **Date Product Introduced:** 5/94. **Product Description & Applications:** The Clean Line Jr. Model 11 is the newest Clean Line power conditioner. Its space-saving, single-outlet, slim-line chassis allows it to be tucked away behind multitrack recorders. Special models, with increased isolation for digital equipment, are available. The Model 11 is ideal for use where sound quality is of paramount importance but existing space is limited. **Basic Specifications & Suggested List Price:** 2-5/8"Hx2-3/8"Wx10"L. 120 VAC, 15A circuit breaker, 3' custom power cord standard. For analog equipment: \$229 each. For digital equipment: \$299 each.

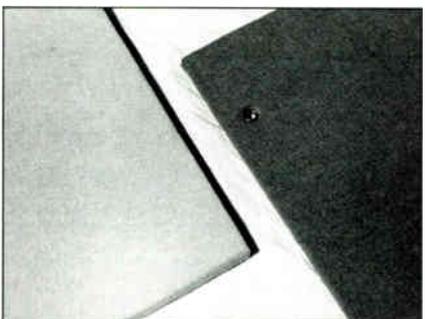
ACOUSTICAL MATERIALS



ACOUSTIC SCIENCES CORPORATION
Sound Flags

ACOUSTIC SCIENCES CORPORATION

PO Box 1189; Eugene, OR 97440; (503) 343-9727; (800) 272-8823. **Product Name:** Sound Flags. **Contact:** Christopher Klein. **Date Product Introduced:** 4/94. **Product Description & Applications:** The Sound Flag is a triangular-shaped 2" panel that edge mounts on 2" centers around the upper perimeter of the room at the wall/ceiling corner. Easy installation with panel adhesive. Room stays bright yet controlled—impossible to overdamp. Perfect for talent and instruments. Use in vocal booths, control rooms and the studio. 100% satisfaction guaranteed. **Basic Specifications & Suggested List Price:** 2"D x 1"W x 2"L, 200 Hz roll-off. Available in five stock colors or 60 custom colors. 12/Set. \$288/Set sugg. list.



ACOUSTICAL SOLUTIONS INC.
AlphaSorb wall panels and Hanging Baffles

ACOUSTICAL SOLUTIONS INC.

2720 Enterprise Parkway, Ste. 101; Richmond, VA 23294; (800) 782-5742. **Product Name:** AlphaSorb wall panels and hanging baffles. **Contact:** Michael Binns, pres. **Date Product Introduced:** 1/94. **Product Description & Applications:** AlphaSorb panels are high-performance absorbers with a unique combination of substantial noise reduction, durability and great aesthetic appeal. They are covered in a choice of two fabric types and available in 60 colors. AlphaSorb has extensive applications in architectural environments, including recording studios, auditoriums, theaters, churches. **Basic Specifications & Suggested List Price:** AlphaSorb are Class I fire-rated and available in standard and custom sizes and shapes. They install easily for wall-mount or ceiling installation. Installation methods include panel adhesive or metal 2-clip system for wall-mount and grommets for hanging baffles.

RADMAR INC.

1263-B Rand Rd.; Des Plaines, IL 60016; (708) 298-7980. **Product Name:** Portable audio booth. **Contact:** Richard M. Davidson, pres. **Date Product Introduced:** 6/16/94. **Product Description & Applications:** The portable audio booth is a desktop unit which has flexible walls and ceiling. It's applications include sound recording in an office environment, sound isolation in a telemarketing or library environment, field audio recording, audio recording for desktop video productions, and sound isolation of equipment or individuals in a noisy area. **Basic Specifications & Suggested List Price:** Flexible plastic construction with acoustical foam lining. Easy setup and take down without the need for tools. Configuration of unit can be adjusted to suit your needs and uses.



RPG DIFFUSOR SYSTEMS INC.

RPG DIFFUSOR SYSTEMS INC.

651-C Commerce Drive; Upper Marlboro, MD 20772; (301) 249-0044; FAX: (301) 249-3912. **Product Name:** Absorbor. **Contact:** Troy B. Jensen, gen. mgr. **Date Product Introduced:** 8/94. **Product Description & Applications:** RPG introduces a complete line of upholstered absorbing panels. In addition to the conventional square/rectangular panels, RPG now offers the music industry fabric-wrapped panels in almost any shape and size at no extra cost due to CNC water-cutting machinery. Now you can use geometrical shapes like hexagons, triangles, etc. as well as any shape we can draw and upholster. **Basic Specifications & Suggested List Price:** Sizes include rectilinear: 2'x2', 4'x2', 4'x4', 4'x8". Geometric: Hexagonal. Free form. Call for pricing.

RPG DIFFUSOR SYSTEMS INC.

651-C Commerce Drive; Upper Marlboro, MD 20772; (301) 249-0044; FAX: (301) 249-3912. **Product Name:** B.A.S.S. traps. **Contact:** Troy B. Jensen, gen. mgr. **Date Product Introduced:** 8/94. **Product Description & Applications:** RPG now offers a line of dedicated low-frequency bass traps using the soft layer absorbing membrane technology. High internal loss membranes allow significant absorption with an absorption coefficient of 0.8 at 100 Hz with limited space utilization. The bass absorbing soffit system trapping, B.A.S.S. trap, can be concealed architecturally behind fabric, used as a molded corner trap or a handsome hardwood wall mounted trap. **Basic Specifications & Suggested List Price:** Corner molded B.A.S.S. trap is 2'x2' and can also fit a standard T-bar ceiling. Wall or free-standing B.A.S.S. traps are 4'x2'9". Please call for pricing.

RPG DIFFUSOR SYSTEMS INC.

651-C Commerce Drive; Upper Marlboro, MD 20772; (301) 249-0044; FAX: (301) 249-3912. **Product Name:** DiffusorBlox II. **Contact:** Troy B. Jensen, gen. mgr. **Date Product Introduced:** 8/94. **Product Description & Applications:** The original 3-block DiffusorBlox system has been simplified to a 2-block system consisting of an A and B block with conventional block mortar joints. This new acoustical concrete masonry unit system is less costly to ship and install. The system offers high sound isolation (STC of 55), 100% absorption at 100 Hz and broad bandwidth diffusion. The new system allows the incorporation of spaced vertical piers of conventional block for additional flexural strength in high walls. **Basic Specifications & Suggested List Price:** The A and B blocks measure 8" (H) x 16" (W) x 12" (D) and weigh 53 and 43 lbs. respectively. An 8" deep veneer version without rebar/mortar section is also available. DiffusorBlox molds are licensed to block producers worldwide to minimize shipping costs. Installed price is approximately \$11 per square foot, making it the most cost-effective approach to building structural acoustic environments.

RPG DIFFUSOR SYSTEMS INC.

651-C Commerce Drive; Upper Marlboro, MD 20772; (301) 249-0044; FAX: (301) 249-3912. **Product Name:** Diviewisor. **Contact:** Troy B. Jensen, gen. mgr. **Date Product Introduced:** 8/94. **Product Description & Applications:** RPG offers a new completely transparent line of 1D and 2D diffusors for applications where natural/artificial light and visibility are required. RPG also offers a completely custom architectural acrylic fabrication facility for custom ceiling clouds and acrylic acoustic sculpture. Customized recording and broadcast facility windows are now possible. **Basic Specifications & Suggested List Price:** Standard sizes include 2'x2' and 4'x2' 1D QRD® diffusors and 2'x2' 2D Dmniffusors for wall or ceiling mounting. Please call for pricing.

RPG DIFFUSOR SYSTEMS INC.

651-C Commerce Drive; Upper Marlboro, MD 20772; (301) 249-0044; FAX: (301) 249-3912. Product Name: Golden Ratio Pyramid. Contact: Troy B. Jensen, gen. mgr. Date Product Introduced: 8/94. Product Description & Applications: RPG has developed a new asymmetric pyramid design by incorporating the golden mean geometry favored in architectural design since antiquity. This new T-bar ceiling or wall-mounted unit is made of Class A fiber-reinforced plastic for fire-safe application in public spaces. Applications include TV and recording studios, music education facilities and general architectural use. The Golden Ratio Pyramids are available in 2'x2' and 4'x4' models. Fiber-reinforced gypsum pyramids are also available when non-combustibility and nontoxic emissions are required by fire codes.

RPG DIFFUSOR SYSTEMS INC.

651-C Commerce Drive; Upper Marlboro, MD 20772; (301) 249-0044; FAX: (301) 249-3912. Product Name: PilloBaffle. Contact: Troy B. Jensen, gen. mgr. Date Product Introduced: 8/94. Product Description & Applications: RPG introduces an affordable noise control wall or ceiling-mounted baffle, which offers uniform broad bandwidth absorption for less than \$4/sabin. PilloBaffles are a general-purpose treatment for noise reduction and reverberation control. Random incidence absorption data in lab and field testing are available. Typical uses are TV, recording and broadcast studios, gymnasiums, swimming pools, worship spaces, music educational facilities, etc. Basic Specifications & Suggested List Price: PilloBaffles are available as 2' x 6' baffles for \$79 in seven standard colors for an attractive installation.

RPG DIFFUSOR SYSTEMS INC.

651-C Commerce Drive; Upper Marlboro, MD 20772; (301) 249-0044; FAX: (301) 249-3912. Product Name: RPG Classic Plus. Contact: Troy B. Jensen, gen. mgr. Date Product Introduced: 8/94. Product Description & Applications: A new package for recording studios is now available including RPG's classic QRD® 734 Diffusor and Abffusor®, which have been dramatically reduced in price. The system has been extended to include a new dedicated B.A.S.S. Trap for a complete room package. Basic Specifications & Suggested List Price: The basic package consists of (2) QRD® 734 Diffusors, (2) Abffusors® and (1) B.A.S.S. Trap™ and fells for \$1,658. Various AcousticSuite Room Designs can be configured using groups of this basic package.

WHISPERROOM INC.

116 S. Sugar Hollow Rd.; Morristown, TN 37813; (615) 585-5827; FAX: (615) 585-5831. Product Name: WhisperRoom. Contact: Ben White. Date Product Introduced: 4/94. Product Description & Applications: New expandable line of portable sound isolation rooms is now available in numerous standard sizes. Now WhisperRooms can grow as your space requirements grow. Available in two series: Professional and Residential. Professional Series WhisperRooms include ventilation systems, electrical service and adjustable casters. Options include door window, wall window and cable passage. Residential Series WhisperRooms offer similar characteristics, features and options in a more economical package. WhisperRooms without floors and partial enclosures are now available. Basic Specifications & Suggested List Price: Prices start at \$1,845.00. Sizes from 4' x 4' up to 8' x 20'.

AMPLIFIERS

AB INTERNATIONAL ELECTRONICS INC

1830-6 Vernon St.; Roseville, CA 95678; (916) 783-7800. Product Name: Model 9620 Power Amplifier. Contact: Robert Bird, pres. Date Product Introduced: 3/94. Product Description & Applications: 2-channel audio power amplifier designed for use in large sound reinforcement applications and sound company applications, especially touring sound systems. Basic Specifications & Suggested List Price: 2-channel 900 watts/channel 8 ohm; 1,500 watts/channel 4 ohm; 2,000 watts/channel 2 ohm; with soft clip and dual LED level display.

APHEX SYSTEMS

11068 Randall St.; Sun Valley, CA 91352; (818) 767-2929. Product Name: Model 107 Tubessence™ Dual Channel Mic Preamp. Contact: Chrissie McDaniel. Date Product Introduced: 10/94. Product Description & Applications: Introducing "Tubessence™"! The Model 107 is a dual-channel thermionic microphone preamp, meaning a tube is incorporated in the circuitry. The tube circuit adds a spectacular sound quality unmatched by more expensive preamps. The Model 107 brings out the best sound of any microphone for performers and engineers both in the live and studio environments. Subtle details of the sound are enriched by the warmth and clarity of the tube, while the harshness of a sibilant microphone becomes better tamed. Basic Specifications & Suggested List Price: Transformerless input and output, extremely low noise (-130dBu equivalent input noise), low distortion and high overload limit, 48V phantom power, 0 to 60dB gain range, signal presence and overload LEDs, switchable 60Hz low cut filter, switchable polarity, remote control muting. Long-life tube design with years of trouble-free service. List price: \$599.



APOGEE SOUND INC.
DA-800

APOGEE SOUND INC.

1150 Industrial Ave.; Petaluma, CA 94952; (707) 778-8887. Product Name: DA-800. Contact: James Lamb, nat'l sales mgr. Date Product Introduced: 11/94. Product Description & Applications: Apogee Sound Inc. introduces its new digitally controlled amplifier, the Model DA-800. The first amplifier designed to be digitally controlled. All amplifier and load-operating parameters are measured by a microprocessor selectively displayed on a front-panel LCD and can be monitored simultaneously from a Medialink computer. The 3-1/2"-high, 2-channel amplifier delivers 800 watts/channel into 4 ohms with less than .006 THD at 1 kHz. Basic Specifications & Suggested List Price: Frequency response: 20 Hz to 20 kHz; +0. -3dB. Power: 800 watts at 4 ohms per channel, both channels driven, 20Hz to 20kHz .03% THD. Hum and noise level: greater than 115dB below rated output, "A" weighted. Input sensitivity: 1.4V for rated output.

ASHLY AUDIO INC.

100 Fernwood Ave.; Rochester, NY 14621; (716) 544-5191. Product Name: MFA-8000. Contact: Bob French, Sr. Exec. VP. Date Product Introduced: 7/94. Product Description & Applications: Very high-powered amplifier for use in subwoofer or full-range applications. Power output is 800 watts per channel into 8 ohms, 1,200

watts per channel into 8 ohms, 1,200 watts into 4 ohms, and 1,500 watts RMS into a true 2-ohm load. Basic Specifications & Suggested List Price: \$2,299.99.

AUDIOARTS ENGINEERING

7305 Performance Dr.; Syracuse, NY 13212; (315) 452-5000. Product Name: SDA-8400. Contact: Rick Strage, sales mgr. Date Product Introduced: 7/94. Product Description & Applications: Single-rackspace, quad 1x4 distribution amplifier. Configures to 1x16 mono, 1x8 stereo or anything in between. With 4 inputs and 16 outputs, this DA, with electronically balanced ins & outs, is perfect for many situations. Rear panel 3-pin molex plugs allow quick changes or easy remote set-up. Front panel has turn gain trims, and a power-on indicator makes adjustments easy. High-quality components and top-notch performance specifications. Basic Specifications & Suggested List Price: THD (+4dBu) 0.002%, DIM 0.002%, noise: -95dBu, output crosstalk (1kHz) -105dB, dynamic range 121dB. Specifications exceed the requirements for 16-bit digital audio. Suggested retail price is \$499.

AUDIO UPGRADES

6410 Matilija Ave.; Van Nuys, CA 91401; (818) 780-1222. Product Name: High Speed Mic Preamp. Contact: Jim Williams, Rick Luxenberg. Date Product Introduced: 10/94. Product Description & Applications: The high-speed mic preamp incorporates new class A current feedback amplifier technology in a differential, symmetrical circuit design. Gain is adjustable from +15 to 60dB, and onboard 50-volt phantom power is available. The transformerless bipolar transistor front end is coupled to the mic through MIT coaxial film capacitors. The onboard power supply features a low-noise toroidal transformer and low-impedance Linear Technology regulators. Basic Specifications & Suggested List Price: THD + noise = 0.0006%, CCIF IMD = 0.0002%, Noise = -132 dB EIN. Phase shift less than 1/2 degree. Frequency response = 1Hz to 4MHz. Slew rate 2500 volts per microsecond.

AUSTRALIAN MONITOR U.S.A.

PO Box 226; Malvern, PA 19355; (610) 380-1394; FAX: (610) 380-1380. Product Name: Australian Monitor. Contact: Paul Sherwood. Date Product Introduced: 11/94. Product Description & Applications: A.M. 2400 dual biamp 2x800 watt; 2x350 watts or 3x800 watts into 4 ohms. Opal 2802 2x280 watts into 4 ohms. Contractor series-installation amplifier. Signal processing equipment. Basic Specifications & Suggested List Price: Prices on application.

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AMPLIFIERS



AVALON DESIGN
Avalon AD2033 Ultra-Link

AVALON DESIGN

PO Box 5976; San Clemente, CA 92673; (714) 492-2000. Product Name: Avalon AD2033 Ultra-Link. Contact: Sales. Date Product Introduced: 8/94. Product Description & Applications: The AD2033 ultra-link is a 2V high preamplifier, compressor and parametric equalizer. All circuits operate with high-voltage, equalizer. All circuits operate with high-voltage, 100% discrete, pure class A mode. The AD2033 Ultra-Link offers internal patching of all sections simplifying the patch for direct signal path recording. The preamplifier will accept microphone and direct high impedance instrument inputs with variable gain. Basic Specifications & Suggested List Price: US \$5990. Preamplifier - microphone or instrument, balanced compressor, variable, ratio, threshold, attack & release equalizer, full pure class A parametric. Max output: 30dB 600 ohms fully balanced. Frequency response: 1Hz to 600kHz - 3dB.



BLACK AUDIO DEVICES
Stereo Battery-Operated Mic Pre: SBMP-01

BLACK AUDIO DEVICES

P.O. Box 106; Ventura, CA 93002; (805) 653-5557. Product Name: Stereo Battery-Operated Mic Pre: SBMP-01. Contact: Bruce Black. Date Product Introduced: Summer 1994. Product Description & Applications: Using the finest components and proven topologies, the SBMP-01 brings a level of quality to field recording that rivals any mic pre found in a fixed studio. Expensive, hard-to-find exotic batteries are never needed; it uses widely available 9-volt batteries. Features include phantom power, individual gain adjustment, pad, and changeable LF cut for each channel; gain range from 0 dB to +75 dB; compact belt pack size; and removable belt loop. Basic Specifications & Suggested List Price: Price: \$699 each; external power option, \$40; balanced outputs option, \$25; locking switches option, \$20.

BRYSTONVERMONT

RFD #4, Berlin; Montpelier, VT 05602; (800) 673-7899. Product Name: BP-20P. Contact: Craig Bell, VP sales. Date Product Introduced: 7/94. Product Description & Applications: The BP-20P pre-amplifier has been superseded by the new BP-20P. The BP-20P comes standard with a front-panel headphone jack. This jack does not mute the output. The other significant change is the BP-20P now matches levels between source inputs. The BP-20P maintains all discrete construction for high reliability. Basic Specifications & Suggested List Price: 2 pair balance inputs (XLR), +4 sensitivity on XLR inputs, -10 sensitivity on RCA outputs, 5 pair unbalanced inputs (RCA), 1 pair unbalanced outputs (RCA), 1 tape/effects loop, 1 pair balanced outputs (XLR). All inputs buffered for low noise. Suggested retail \$1,495.

BRYSTONVERMONT

RFD #4, Berlin; Montpelier, VT 05602; (800) 673-7899. Product Name: 8B NPB. Contact: Craig Bell, VP sales. Date Product Introduced: 6/94. Product Description & Applications: The 8B NPB is a multichannel amplifier designed for rooms with near or mid-field monitors. The 8B NPB can be configured in a 4-channel mode with 120 watts available per each channel. In a 3-channel configuration the 8B NPB delivers 400 watts to the center channel while delivering 120 watts per channel to each side, and in a stereo mode will deliver 400 watts per each channel. Basic Specifications & Suggested List Price: Balanced inputs (XLR) (includes 1/4" input for unbalanced use). Individual channel screwdriver access gain controls. 3 color on/warning/clipping indicators. Delivers full current into 4 ohms at any phase angle. Suggested retail \$2,695.

CHORD/AXI

357 Liberty St.; Rockland, MA 02370; (617) 982-2626. Product Name: Chord SPA1232 DA. Contact: Bruce Bartone. Date Product Introduced: 1994. Product Description & Applications: Innovative, leading-edge technology exclusive to Chord is fundamental to the amplifier's performance. The 80 kHz switched-mode power supply is unique in employing "dynamic coupling" of the voltage rails, which ensures that whatever transient demand is presented to the amplifier stages, the positive and negative rails remain in perfect and absolute equilibrium. Power delivery is therefore completely free from ground loop modulation distortion. Protection against overload and internal and external short circuits is totally electronic, and the output signal path is free of any fuses or sound-degrading resistive components. Basic Specifications & Suggested List Price: Output power: 280W RMS continuous, 360W RMS burst per channel into 8Ω, 400W RMS continuous, 750W RMS burst per channel into 4Ω, 500W RMS continuous, 1000W RMS per channel into 2Ω. Frequency response(4Ω): -1dB 0.2Hz to 39 kHz, -3 dB 0.1 Hz to 75 kHz. Output connections: 4 x 4 mm 30 Amp binding posts per channel. Cooling: Twin aluminium chassis fans w/gold plated grills, controlled by dual heat sink sensors. Dimensions & weight: 465mm (19" rack) (w) x 405mm (d) x 3U (h) - 18 Kgs.

CHORD/AXI

357 Liberty St.; Rockland, MA 02370; (617) 982-2626. Product Name: SPA-1016 DA. Contact: Bruce Bartone. Date Product Introduced: 1994. Product Description & Applications: Innovative, leading edge technology exclusive to Chord is fundamental to the amplifier's performance. The 80kHz switched mode power supply is unique in employing "dynamic coupling" of the voltage rails, which ensures that whatever transient demand is presented to the amplifier stages, the positive and negative rails remain in perfect and absolute equilibrium. Power delivery is therefore completely free from ground loop modulation distortion. Protection against overload and internal and external short circuits is totally electronic, and the output signal path is free of any fuses or sound-degrading resistive components. Clipping is virtually impossible. Basic Specifications & Suggested List Price: Output power: 250W RMS continuous, 360W RMS burst per channel into 8Ω, 300 RMS continuous, 750W RMS burst per channel into 4Ω. Frequency response (4Ω): -1dB 0.2Hz to 39kHz, -3dB 0.1Hz to 75kHz. Inputs: Electronically balanced via gold XLR connectors standard. Slew rate 70V/µs. Cooling: Twin aluminum chassis fans, operating when heatsink temperature >70°C. Dimensions & weight: 465mm (19" rack)(W) x 405mm (D) x 3U (H) - 18kgs.

CROWN INT'L

1718 Mishawaka Rd.; Elkhart, IN 46517; (219) 294-8000. Product Name: IQ-P.I.P. v 1.4. Contact: Jim Beattie. Date Product Introduced: 1/94. Product Description & Applications: The new IQ-P.I.P. v 1.4 module, which plugs into the back of any premium Crown amplifier, actually provides stand-alone intelligence. A smooth output limiter discretely controls the maximum output of the amp to prevent damage. A power supply gate saves energy. Interrupt driven reporting lets the user define error conditions for the amp to report. ODEP protection is taken one step further. Basic Specifications & Suggested List Price: List price: \$480. Note: current IQ-P.I.P. modules can be retrofit for \$50.

EDCOR ELECTRONICS

7130 National Parks Hwy; Carlsbad, NM 88220; (800) 854-0259; FAX: (505) 887-6880. Product Name: AP Series power amplifiers. Contact: Phyllis Weston, sales mgr. Date Product Introduced: 7/94. Product Description & Applications: A 60-watt (AP60) and a 120-watt (AP120) power amplifiers rack-mountable in a 3-1/2" space. A voice coil output or a constant voltage output of 25 or 70 volt line output. The amplifiers will accept a balanced or unbalanced line-level input. The AP60 and AP120 have a very low noise and distortion level and are electronic and thermal circuit protection for continuous use. Basic Specifications & Suggested List Price: Distortion: less than 0.25% (midband) at full rated power (THD). Full RMS Power: AP60: 60 watts, and AP120: 120 watts. Priced economically at \$315.90. EDCOR Products manufactured in the United States of America.



ELECTRO-VOICE INC.
EV/Dynacord P 1050



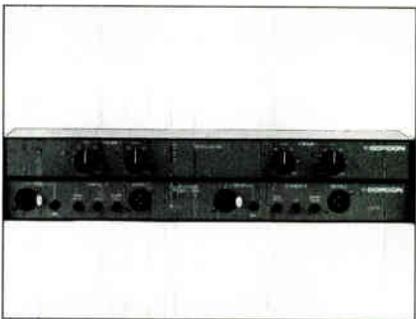
ELECTRO-VOICE INC.
EV/Dynacord L 1000

ELECTRO-VOICE INC.

600 Cecil St.; Buchanan, MI 49107; (616) 695-6831. Product Name: EV/Dynacord P1050 and L1000. Contact: Mike Turfano, dir of mktg. Date Product Introduced: 8/94. Product Description & Applications: The L1000 linear precision and the P1050 processed precision power amplifier set new standards for performance, features and values. Designed and built in Stranberg Germany, each printed circuit board and subassembly is tested and the finished product undergoes 24-hr burn-in while being computer monitored. With features like built-in limiters and dual differential discrete topology, it's no wonder these amps are taking the music community by storm. Basic Specifications & Suggested List Price: P1050 550 watts per channel at 4 ohms \$1,900. retail; L1000 550 watts per channel at 4 ohms \$1,700 retail.

ESE

142 Sierra St.; El Segundo, CA 90245; (310) 322-2136. Product Name: ES-217/XLR. Contact: Bill "R", factory sales eng. Date Product Introduced: 6/94. Product Description & Applications: Rugged and portable audio distribution amplifier with 1 input and 4 outputs all via SLR connectors. Excellent for signal distribution and compensation for lengthy cable runs. Basic Specifications & Suggested List Price: Individual gain adjustment for each of the 4 outputs. Output level +21 dbr. Response 20-20,000Hz. ±0.2dB distortion<1.2% at +18dBm output. Portable 4.7"x3.7"x2.2" rugged enclosure. List price: \$267.



GORDON INSTRUMENTS
Microphone Preamplifier System

GORDON INSTRUMENTS

PO Box 150644; Nashville, TN 37215; (615) 665-1005. Product Name: Microphone preamplifier system. Contact: Grant Carpenter. Date Product Introduced: 1994. Product Description & Applications: An extremist design that is easy to use, the mic pre and separate gain control allow preamp placement near the transducer, eliminating cable losses and interference. A parallel XLR and 1/4", balanced, overhead-proof input (eliminating mic pads) combines

with a unique intrastage digital attenuator to provide a very wide dynamic range over the entire gain range. The balanced, minimalist signal path is void of transformers, ICs and mechanical contacts. Discrete, class A topology uses custom-made FETs with auto-biasing. Preamps are custom-built with options such as teflon circuit boards, mic power supplies and hard-wiring at little or no extra cost. **Basic Specifications & Suggested List Price:** Two-channel preamplifier, \$2,500; four-channel gain control, \$410; eight-channel gain control, \$620.

HAFLER DIV. OF ROCKFORD CORP.

546 S. Rockford Dr.; Tempe, AZ 85281; (602) 967-3565. **Product Name:** P1500 Trans-Nova amplifier. **Contact:** Rick Gentry, nat'l dir. of mktg. **Date Product Introduced:** 11/94. **Product Description & Applications:** Audio amplifiers for the control room monitor, sound contractor and sound reinforcement markets. Featuring Jim Strickland's U.S. patented Trans-Nova circuit with J-FET input and MOS-FET output devices. These amps set a new price/performance standard. **Basic Specifications & Suggested List Price:** P1500 Trans-Nova 75 WPC at 8 ohms, \$499 list price.

HAFLER DIV. OF ROCKFORD CORP.

546 S. Rockford Dr.; Tempe, AZ 85281; (602) 967-3565. **Product Name:** P3000 Trans Nova Amplifier. **Contact:** Rick Gentry, nat'l dir. of mktg. **Date Product Introduced:** 11/94. **Product Description & Applications:** Audio amplifiers for the control room monitor, sound contractor and sound reinforcement markets. Featuring Jim Strickland's U.S. patented Trans-Nova circuit with J-FET input and MOS-FET output devices. These amps set a new price/performance standard. **Basic Specifications & Suggested List Price:** P3000 Trans-Nova 150 WPC at 8 ohms, \$699 list price.

LEITCH INCORPORATED

920 Corporate Ln.; Chesapeake, VA 23320-3641; (804) 548-2300; (800) 231-9673. **Product Name:** ASM Series Embedded Audio Monitoring Amplifiers. **Contact:** Trevor Smith, product spec. eng. **Date Product Introduced:** NAB '94. **Product Description & Applications:** The ASM Series modules combine audio demultiplexing and digital-to-analog conversion for up to 4 channels of audio in a compact, inexpensive package. All modules accept composite or component serial video, and offer 18-bit D/A conversion, making them ideal for monitoring or transmission applications. The ASM-6804 offers analog audio outputs only, while the ASM-6800 doubles as a serial D/A, providing retimed serial video outputs and embedded audio monitor. **Basic Specifications & Suggested List Price:** Serial video standards: 143Mbps (NTSC); 177Mbps (PAL); 270Mbps (component). Equalization: >21dB. Return loss: >18dB to clock frequency. Signal level: 800mV ±10%. Impedance: 75ohms video; 66±20ohms balanced audio, ASM-6800 embedded audio monitoring distribution amplifier: \$1,750. ASM-6804 embedded audio monitor: \$1,995.



MANLEY LABS INC.
Manley Reference 440/200

MANLEY LABS INC.

3880 Magnolia Ave.; Chino, CA 91710; (909) 627-4256; FAX: (909) 628-2482. **Product Name:** Manley Reference 440/200. **Contact:** Oavid or EveAnna Manley. **Date Product Introduced:** 1/94. **Product Description & Applications:** Clean, involving and powerful, the all-tube 440 sets a new standard for reference playback/monitoring. Features: Balanced and unbalanced inputs, 10x6550A Sovtek output tubes per monoblock, Triode/Tetrode switching, Soft-Start power-up with Ever-Warm standby mode. Revolutionary "Magic" output transformer proprietary to Manley Labs delivers exceptional harmonically correct bass extension and control that the best solid-state designs cannot match. Super-smooth tube midrange continues into the uppermost highs for maximum accuracy, minimum fatigue. **Basic Specifications & Suggested List Price:** 600 watts continuous (tetrode), 200 watts (triode) into 5 ohms, W 19" x H 8" x D 11". Shipping weight, 90 lbs. each. Input level preset available upon request. Suggested retail price \$9,000 per pair. Also available factory-direct.



THE MASTERING LAB
The Mastering Lab Studio Products Microphone Preamplifier

THE MASTERING LAB

6031 Hollywood Blvd.; Los Angeles, CA 90028; (213) 466-3528; FAX: (213) 465-7570. **Product Name:** The Mastering Lab studio products microphone preamplifier. **Contact:** Phyllis Sax, mgr. **Date Product Introduced:** 1/94. **Product Description & Applications:** The Mastering Lab microphone is a single-channel monoblock in a one-rack-high package. This pure tube class A triode design features a wide-bandwidth input transformer and internal low radiation power supply. User controls include gain, trim, 4-position input attenuator, phase, and phantom power. This design offers maximum resolution and very high output for unequalled sonics. **Basic Specifications & Suggested List Price:** 19"x10"x1-3/4"; 1 unit: \$1,195; 2 units: \$2,150.



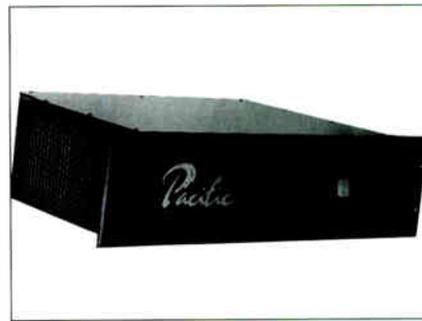
MILLENNIA MEDIA
HV-3C

MILLENNIA MEDIA

9624-C Kiefer Blvd.; Sacramento, CA 95827; (916) 363-1096. **Product Name:** HV-3C. **Contact:** John La Grou, principal. **Date Product Introduced:** 1/95. **Product Description & Applications:** 20-bit A-to-D converter upgrade for Millennia HV-3 microphone preamplifier. 20-bit resolution with selectable 16-bit encoding, AES, SPDIF and ADAT outputs, low-jitter clock circuitry, full sync capability, digital compression, reference oscillator and more. Available new or as factory upgrade for all existing HV-3 mic preamps. **Basic Specifications & Suggested List Price:** Price TBD.

MILLENNIA MEDIA

9624-C Kiefer Blvd.; Sacramento, CA 95827; (916) 363-1096. **Product Name:** Quad Microphone Preamp. **Contact:** John La Grou, principal. **Date Product Introduced:** 8/94. **Product Description & Applications:** Four-channel high-performance microphone preamplifier. Employs identical circuitry as found in Millennia's acclaimed HV-3 microphone preamp. Dual stereo design packaged into single 1U rackspace, includes signal present and overload indication. Designed for ultimate signal path purity and transparency. **Basic Specifications & Suggested List Price:** Exhibits performance identical to HV-3, including 5 PPM THD+N, +32dBu headroom and ultra-light channel matching parameters. Price: \$2,295.



PACIFIC INNOVATIVE ELECTRONICS
KHS-450 Stereo Reference Amplifier

PACIFIC INNOVATIVE ELECTRONICS

10840 Vanowen Street; North Hollywood, CA 91605; (818) 761-8393. **Product Name:** KHS-450 Stereo Reference Amplifier. **Contact:** Ralph Skelton. **Date Product Introduced:** 9/93. **Product Description & Applications:** 175 watt-per-channel MOSFET power amplifier for highly accurate monitoring and playback applications. Hand-built with strict adherence to parts specification matching, using Cardas wire and the highest-quality power supply components. Pacific Innovative Electronics amplifiers exhibit accuracy and warmth of sound usually found in amplifiers costing much more. Also available in 125 watt stereo (PS-400), 175 watt mono (PM-500), and 225 watt mono (KHM-850). **Basic Specifications & Suggested List Price:** Specs for model KHS-450: Output power: 175 watts at 8 ohms. Input sensitivity: 0.9 volts. Frequency response: -1.5dB 10Hz to 120 kHz ±0dB 20 Hz to 100kHz. Weight: 36 lbs. Size: H 5.25" x W 19" x D 13.4". Input impedance: 51K unbal., 3K bal. Price: \$2,280.

PASO SOUND PRODUCTS INC.

14 First St.; Pelham, NY 10803; (914) 738-4800. **Product Name:** 4000 Series Amplifier P4241B. **Contact:** Ken O'Brien. **Date Product Introduced:** 5/94. **Product Description & Applications:** Commercial amplifier, rack-mountable. AC/DC operation with built-in battery recharger. 240-watt output, 8 ohm, 25 volt or 70 volt operation. Bridgeable with up to five amplifiers. Separate mic/tel input with

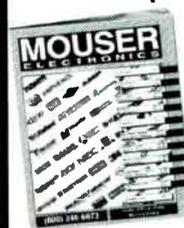
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AMPLIFIERS

—LISTING CONTINUED FROM PREVIOUS PAGE

level control and vox-activated muting. **Basic Specifications & Suggested List Price:** 240 W at less than 1% distortion. Frequency response: 20Hz to 20kHz \pm 3 dB.

QSC AUDIO PRODUCTS INC.

675 MacArthur Blvd., Costa Mesa, CA 92626; (714) 754-6175. **Product Name:** MX3000a. **Contact:** John Subbiondo. **Date Product Introduced:** 8/94. **Product Description & Applications:** The MX3000a is the newest and largest addition to the MXa line of amplifiers. Low profile design and rugged construction make it ideal for all fixed and portable applications that require reliable, high-power amplification.

QSC AUDIO PRODUCTS INC.

1675 MacArthur Blvd., Costa Mesa, CA 92626; (714) 754-6175. **Product Name:** Power Force amplifier. **Contact:** John Subbiondo. **Date Product Introduced:** 11/94 (AES show). **Product Description & Applications:** 2-channel, professional power amplifier. First in the new Powerlight™ series of lightweight amplifiers. These amps will feature QSC's Powerlight Switching Technology™ and provide high power and reliability without the weight of transformers. Powerlight™ amps are ideal for any mobile application. **Basic Specifications & Suggested List Price:** 425 watts per channel, 1kHz, 1% THD, minimum; 700 watts per channel, 1kHz, 1% THD, minimum, 22 pounds net weight. List price: TBA.

QUAD ELECTROACOUSTICS LTD

30 St. Peters Rd., Huntington, PE18 70B UK; (44) 480 52-561. **Product Name:** Quad 270. **Contact:** Allen Mornington-West. **Date Product Introduced:** 3/95. **Product Description & Applications:** The most recent member of the Quad 200 Series of automation-ready amplifiers. Q200 Series are supplied ready to work under QuadNet™ network control. Applications in medium to large installations where fuss-free automation will be appreciated. **Basic Specifications & Suggested List Price:** 600W continuous into 8 ohms per channel, 18-bit equivalent dynamic range, fully Quad net ready. Ball park recommended UK selling price is 1,690 UK£ excluding taxes.

SIERRA VIDEO SYSTEMS INC.

PO Box 2462; Grass Valley, CA 95945; (916) 478-1000. **Product Name:** Distribution Amplifiers. **Contact:** Dennis Brunnenmeyer. **Date Product Introduced:** 4/94. **Product Description & Applications:** The model 1011 audio distribution amplifier is a 10-output audio DA with a transformer-coupled input stage for balanced input isolation. It joins our extensive line of audio and video terminal distribution equipment. **Basic Specifications & Suggested List Price:** Hi-Z balanced input; low-Z balanced outputs (10-each); +24dBm maximum output level, 100kHz bandwidth, unity gain. List price: \$220.

SYTEK AUDIO SYSTEMS CORP.

2424 W. Irving Park Rd., Chicago, IL 60618; (312) 588-4477. **Product Name:** MPX-4B. **Contact:** Mike Stoica Badescu, sales. **Date Product Introduced:** 3/94. **Product Description & Applications:** The MPX-4B is a 4-channel microphone preamp with an advanced transformerless input design to achieve an extremely low noise floor, minimum distortion, wide bandwidth and linear phase response. Gain: 70dBm; THD: 0.0015%. Peak indicator, mute, phase inverter, and 48V phantom power switch for each channel. XLR balanced input/output and internally low EMI toroidal transformer for power supply for 120/220/240 VAC 50/60Hz. **Basic Specifications & Suggested List Price:** List price: \$1,850. Frequency response: 5Hz to 85kHz \pm 0.25dB; output: 24dBm into 600 ohms; noise: better than 90dB.

TASCAM

7733 Telegraph Rd., Montebello, CA 90640; (213) 726-0303. **Product Name:** PA-2D MkII. **Contact:** Bill Mohrhoff. **Date Product Introduced:** 3/94. **Product Description & Applications:** Single-space, rack-mountable, dual-channel power amplifier for project or personal recording studio. **Basic Specifications & Suggested List Price:** 25 watts (RMS) per channel into 8 ohms, frequency response 20Hz-20kHz, includes both XLR balanced and RCA unbalanced inputs, headphone monitor output and continuously variable level control, can be bridged for a mono output at 50 watts (RMS).

VACUUM TUBE LOGIC

PO Box 2064; Sunnyvale, CA 94087; (909) 627-5944; FAX: (909) 627-6988. **Product Name:** Vacuum Tube Logic/VTL. **Contact:** Luke Manley, VP sales. **Date Product Introduced:** 6/94. **Product Description & Applications:** Complete range of pure tube amplifier & pre-amplifier for monitor playback, with 2 O-to-A processors using Ultra Analog DACs. Application: highly recommended for rugged applications where long hours & high reliability with extremely accurate reproduction needed. Specializing in high-power amplifiers that are rugged & serviceable. **Basic Specifications & Suggested List Price:** Prices range from \$1,600 to \$12,000 (amplifiers) and \$1,000 to \$3,000 (preamplifiers), with D-to-A converters priced at \$3,500 and \$5,000.

AUTOMATION, SYNC AND CONTROL SYSTEMS

AD SYSTEMS

635 Weyburn Sq., Pickering, ON L1V 3V3 Canada; (905) 420-3946. **Product Name:** OPTIFILE Tetra. **Contact:** Curt Smith, mktg. mgr. **Date Product Introduced:** 4/94. **Product Description & Applications:** OPTIFILE from AD SYSTEMS is a 3rd generation SMPTE based automation system designed to deliver top quality performance at a realistic price. Over 450 systems in daily use. This fader/mute system will retrofit to any console and offers an elegant and easy to use operating system. Features include machine control, active cue list, track sheet, offline editing, real time, compare, 9 groups, local status control, auto null and total or individual VCA bypass. **Basic Specifications & Suggested List Price:** Complete 24 Channel System under \$10,000.

AKAI DIGITAL

1316 East Lancaster; Ft. Worth, TX 76102; (817) 336-5114. **Product Name:** DP88. **Contact:** Mike McRoberts, product mgr. **Date Product Introduced:** 1/94. **Product Description & Applications:** The DP88 is a programmable patchbay designed specifically for digital audio signals. The DP88 provides an affordable solution to the growing digital signal routing needs of virtually all studios. **Basic Specifications & Suggested List Price:** The DP88 provides 10 I/O pairs (8 XLR, 2 optical), and 128 patch memories. Any input may be routed to any combination of outputs. The OP88 is rack mountable and occupies a 2U vertical rack space.

AUDIO KINETICS UK LIMITED

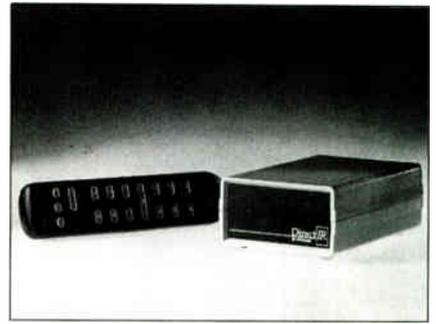
Kinetics Centre, Theobald Rd., Borehamwood, Herts, WD6 4PJ England; 44 81 953 8118. **Product Name:** ES Lock 1.12 Synchroniser. **Contact:** Ian Southern. **Date Product Introduced:** 6/92. **Product Description & Applications:** The ES Lock 1.12 synchroniser is the replacement for the highly successful 1.11 module, incorporating almost identical operational features and performance with improved manufacturing techniques to full EMC specifications. The 1.12 module is fully compatible with the 1.11, and both can be used together on the same ESBUS system. It offers flexible serial control, with the addition of RS232 to the existing RS422 capability, allowing a direct interface to machines such as the Studer A827, without the use of an interface cable pod box. **Basic Specifications & Suggested List Price:** The ES Lock 1.12 provides enhanced operation in terms of fast operational verification of good code (LTC); easier hard reset, and a higher contrast display for easier set-ups. Its Memory Module incorporates an EEPROM for non-volatile retention of all module and machine file set-up data.

BRAINSTORM ELECTRONICS INC.

10560 Blythe Avenue; Los Angeles, CA 90064; (310) 836-3638. **Product Name:** SR-15+ Time Code Stripalyzer. **Contact:** Bernard Frings, president. **Date Product Introduced:** 12/93. **Product Description & Applications:** The SR-15+ Time Code Stripalyzer combines a Oistripper, a Stripper and an Analyzer. The analyzer verifies format, frame rate, video phase and color field alignment, identifies errors (drop outs, repeated frames...) and faulty addresses. A comprehensive report can be sent to an external printer or computer through the parallel and serial ports. The Distributor reshapes and distributes time code through 5 buffered outputs. The Stripper extracts a synchronous pilot tone from code, video or AC mains. **Basic Specifications & Suggested List Price:** Housed in a single space 19" chassis, the SR-15+ has XLR connectors for time code, BNC's for video, OB-9M for RS-232 and OB-25F for centronics. The front panel includes an 8 digit reader and a 4 digit frame rate counter. The distributor reshapes LTC at any speed. Input threshold is better than -30dB. Output levels are adjustable individually with front panel pots from full off to +12dB. Suggested list price: \$1,490.

CAD (CONNEAUT AUDIO DEVICES)

PO Box 120; 341 Harbor St.; Conneaut, OH 44030; (216) 593-1111; (800) 762-9266. **Product Name:** MHR-16. **Contact:** Michael Ketchell, nat'l sales mgr. **Date Product Introduced:** 11/94. **Product Description & Applications:** Designed to offer powerful automated mix features, superior audio specs and easy installation on any console, the MHR Series features High Resolution, Class A VCA's for low noise, low distortion and NO ZIPPER NOISE! MegaMix systems come with MegaMix Mixing Software for Macintosh, featuring ease of real time automated mixing, along with many off-line editors. Mixes can be controlled directly from MegaMix software or via I/F-8 Intelligent Fader Interface. **Basic Specifications & Suggested List Price:** MHR-16 \$1,995.



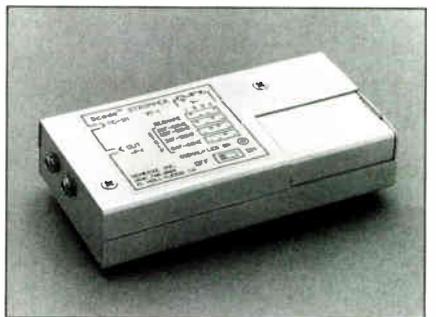
CIPHER DIGITAL INC.
DirectIR to RS-422 to IR Translator

CIPHER DIGITAL INC.

30 W Patrick St., Suite 310; Frederick, MD 21701; (301) 620-7052. **Product Name:** DirectIR to RS-422 to IR Translator. **Contact:** Ken Ellis, prod mgr. **Date Product Introduced:** 10/1/93. **Product Description & Applications:** Finally, an easy, low-cost way to control your D2.1, or Beta machine for mixes, laybacks, scoring, or screening; the DirectIR from Cipher Digital. The DirectIR allows a simple hand-held infrared remote to control any video machines, without sacrificing the accuracy and flexibility you require for a professional job. Great for project studios and AOR/Foley work, too. **Basic Specifications & Suggested List Price:** Basic controls include PLAY, PAUSE, STOP, FF REW, SHUTTLE, RECORD, AUTOEDIT; plus additional user-programmable commands for track selection, setting edit points, etc. User commands can be up/downloaded, edited, or saved with a PC. The S349 DirectIR includes IR remote, cable, DOS and Windows software, power supply, and 1 year warranty.

CM AUTOMATION

Plummer St., Chatsworth, CA 91311; (708) 449-7269. **Product Name:** PM 216. **Contact:** Ken Paul. **Date Product Introduced:** 1/94. **Product Description & Applications:** The PM 216 is a MIDI-controlled crosspoint switcher. Any input can be routed to any output or multiple outputs. 64 onboard presets can be recalled via MIDI or from the front panel. **Basic Specifications & Suggested List Price:** All inputs & outputs balanced. Bandwidth 3Hz to 100k \pm 1dB. THD \pm N <.007%. A weighted. List price \$699.



DENECKE INC.
Dcode™ ST-1 Time Code Sync Stripper

DENECKE INC.

5417 B Cahuenga Blvd.; N. Hollywood, CA 91601; (818) 766-3525. **Product Name:** OCodem™ ST-1 Time Code Sync Stripper. **Contact:** Jeni Van Trees, office mgr. **Date Product Introduced:** 6/94. **Product Description & Applications:** The OCodem™ ST-1 is a small battery operated time code sync stripper and time code re-shaper. Low level code can be re-shaped and brought up to a 3volt peak to peak level useful for driving most professional equipment. The high output drive can feed sync or time code over long lines, great for concert recording. The ST-1 features long battery life and an LEO indicator which strobes at the sync rate. **Basic Specifications & Suggested List Price:** Price-\$275.

ENTERTEC INC.

2522 Hermitage Rd.; Richmond, VA 23220; (804) 233-2327. **Product Name:** Serial Converter (SCNV). **Contact:** John Harlow. **Date Product Introduced:** 1/94. **Product Description & Applications:** The SCNV allows control of Sony® type RS-422 machines via a PC's RS-232 serial port. No external power supply is necessary. **Basic Specifications & Suggested List Price:** SCNV comes with machine control programs for OOS and Windows. Price: \$119 + shipping.

ENTERTEC INC.

2522 Hermitage Rd.; Richmond, VA 23220; (804) 233-2327. **Product Name:** Serial Timecode Reader (STCR). **Contact:** John Harlow. **Date Product Introduced:** 1/94. **Product Description & Applications:** The STCR converts longitudinal Timecode into serial data. No external power supply is necessary. A status LEO indicates valid code is being read. **Basic Specifications & Suggested List Price:** Range: 1/2 to 2 times play speed. Includes display programs for DOS and Windows. Price: \$179 + shipping.

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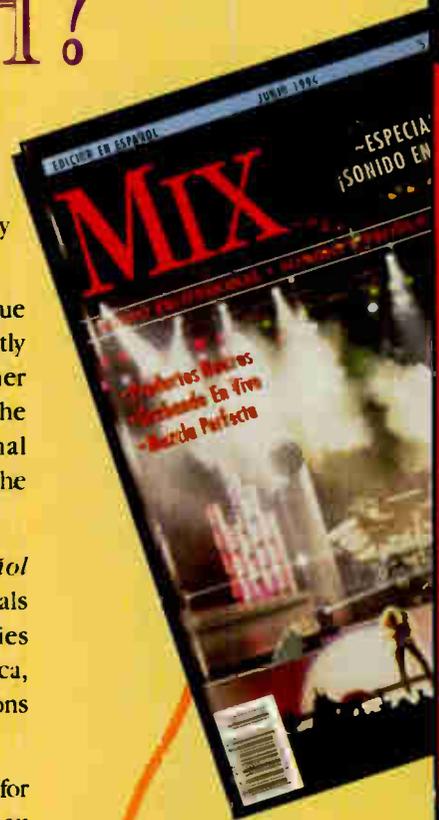
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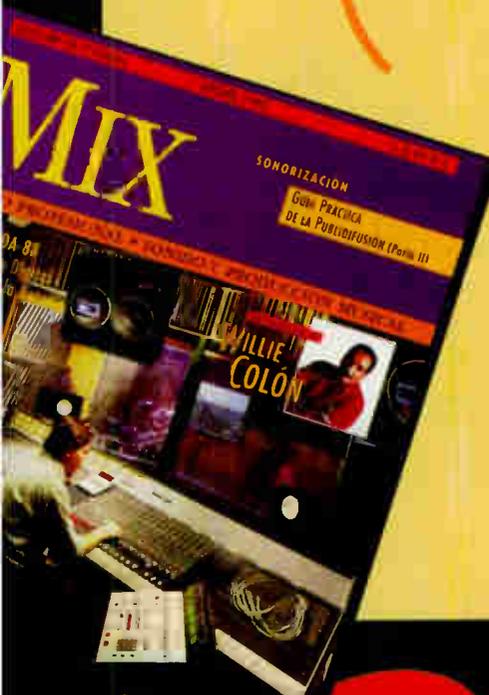
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AUTOMATION SYNC & CONTROL SYSTEMS

ESE

142 Sierra St.; El Segundo, CA 90245; (310) 322-2136. **Product Name:** ES-185 **Contact:** Bill "R." factory sales eng. **Date Product Introduced:** 4/94. **Product Description & Applications:** GPS Time Code Generator/Master Clock. Locked to the Global Positioning Satellite System, this unit produces many different time codes with accuracies of better than 300 Nanoseconds of UTC. Tapes can be produced thousands of miles apart from one another with the exact time code on each. **Basic Specifications & Suggested List Price:** Standard outputs include SMPTE/EBU, ASCII, ESE, IRIG-B and 1PPS. Battery backup and antenna are also included. Many optional codes are available. List price \$2,495.

GEFEN SYSTEMS

6261 Variel Ave., Ste. C; Woodland Hills, CA 91367; (818) 884-6294, (800) 545-6900. **Product Name:** 100CF Crossfader. **Contact:** Hagai Gefen, president. **Date Product Introduced:** 1994. **Product Description & Applications:** Gefen 100CF crossfader unit switches between two audio sources under computer control or by contact closure. The unit offers automatic gain control. **Basic Specifications & Suggested List Price:** Gefen 100CF Crossfader Unit \$1,200.

GEFEN SYSTEMS

6261 Variel Ave., Ste. C; Woodland Hills, CA 91367; (818) 884-6294, (800) 545-6900. **Product Name:** 100DS Digital Audio Switcher. **Contact:** Hagai Gefen, president. **Date Product Introduced:** 1994. **Product Description & Applications:** Gefen 100DS Digital Audio Switcher switches between two digital audio sources under software control or by contact closure. The unit accepts multiple input/output digital formats (AES/EBU, DPTICAL, COAX) **Basic Specifications & Suggested List Price:** Gefen 100DS Digital Audio Switcher: \$1,200.

JLCOOPER ELECTRONICS

12500 Beatrice St.; Los Angeles, CA 90066; (310) 306-4131. **Product Name:** CuePoint-Universal Autolocator. **Contact:** Howie Jackson, nat'l sales mgr. **Date Product Introduced:** 1/94. **Product Description & Applications:** CuePoint can simultaneously control multiple recorders and is fully compatible with analog tape machines, the Alesis ADAT, Tascam DA-88 and Fostex RD-8. Computer based workstations and software programs which support MIDI Machine Control, (MMC), can also instantly respond to CuePoint's precise control. CuePoint is the first device of its kind to support MMC.

JLCOOPER ELECTRONICS

13478 Beach Ave.; Marina Del Rey, CA 90292; (310) 306-4131. **Product Name:** V/Desk. **Contact:** Howie Jackson, nat'l sales mgr. **Date Product Introduced:** 9/94. **Product Description & Applications:** V/DESK - Console Automation System: V/DESK is JLCooper's new flagship automation system. It provides SMPTE locked fader, mute and signal processing automation and surpasses the expectations of even the most discerning engineers. V/DESK features accurate moving fader graphics, enhanced off-line editing, intuitive user interface and auto nulling, softgroups, choice of VCA's and reroloffs any console.

MACKIE DESIGNS INC.

20205 144th Ave. NE; Woodinville, WA 98072; (800) 898-3211. **Product Name:** OTTO-34. **Contact:** David Firestone. **Date Product Introduced:** 1994. **Product Description & Applications:** 2-rack space device capable of automating up to 34 control points. Used with our 8-bus mixer, the system would be normally used to control up to 32 inputs plus master left and right. The system is also compatible with any mixing board equipped with channel inserts. Channel access is provided through TRS patch cords that connect the inserts of the mixer's inputs and the masters to the OTTO-34 rear panel. The front of OTTO-34 provides these same channel points using twin jack send & return in a normalized patch bay arrangement. **Basic Specifications & Suggested List Price:** The unit will be equipped with a hardware bypass to take the VCAs out of the signal path if desired for tracking etc. These bypass switches will also be accessible through software control. Other features provided on the OTTO-34 include: Snapshot editing and storage, cue list event editor, and the ability to daisy-chain multiple OTTO-34 units together to create a larger system.

MACKIE DESIGNS INC.

20205 144th Ave. NE; Woodinville, WA 98072; (800) 898-3211. **Product Name:** OTTOpilot. **Contact:** David Firestone. **Date Product Introduced:** 1994. **Product Description & Applications:** OTTOpilot is a large format MIDI fader controller capable of a one-to-one mapping of the OTTO-34 system. In addition to providing full control of fader and mute for 32 channels & masters simultaneously, OTTOpilot will also be able to completely control other MIOI devices and sequencers through the use of MIDI and MIOI machine control. **Basic Specifications & Suggested List Price:** OTTOpilot's front panel is designed to allow the user to operate the OTTO-34 unit with the same flexibility as working the actual mixer.

MACKIE DESIGNS INC.

20205 144th Ave. NE; Woodinville, WA 98072; (800) 898-3211. **Product Name:** UltraMix Professional. **Contact:** David Firestone. **Date Product Introduced:** 1994. **Product Description & Applications:** This program is designed to provide a virtual representation of the OTTOpilot fader pack layout. Thus users who have already learned the ropes with OTTOpilot will have no problem adapting to this interface and vice-versa. In addition to offering all of the features on OTTOmix 2.02, UltraMix professional will provide several major improvements including: graphic editing, the ability to play MIDI files, fully OMS 2.0 compatible for use with Mackie OMS drivers. The program also offers a reduced system requirement, allowing OTTO-1604 mixes to run on systems as small as the Classic II, while also providing one of the first PowerPC native modes in the music software industry.

MUSEUM TECHNOLOGY SOURCE INC.

20 Bacon St.; Winchester, MA 01890; (800) 729-6873. **Product Name:** VC-8 Video Cruiser. **Contact:** Martha Bradford, admin. asst./sales. **Date Product Introduced:** 11/94. **Product Description & Applications:** Used with a Pioneer laserdisc player, this controller allows viewers to select any one of eight segments of video, and to watch it at normal speed, fast forward, slow motion, or to pause on a frame. Ideal for use with time lapse images, and in lecture situations or guided tours where a lecturer may want to pause on, or return to certain images. **Basic Specifications & Suggested List Price:** Size: 2.5H x 7.25W x 10" deep. Power: External UL/CSA transformer 120 volts 60Hz. Connects via RS-232 cable to Pioneer LD-V2200, LD-V2400, LD-V2600, LDV-4200, LD-V4400, LD-V8000.

NVISION INC.

443 Crown Point Circle; Grass Valley, CA 95945; (916) 265-1000; FAX: (916) 265-1010. **Product Name:** EM0094 RS-232 Machine Control Data Router I/O Card. **Contact:** Andrew Walls, sales/mktg coordinator. **Date Product Introduced:** 9/94. **Product Description & Applications:** The EM0094 RS-232 Machine Control Data Router I/O Card brings direct machine control routing of RS-232 devices to the NV3128 Machine Control Router. Used in conjunction with the RS-422 I/O card, the EM0094 enables the user to use RS-232 and RS-422 devices interchangeably as controlled and controlling machines. The router automatically translates information to and from RS-232 and RS-422!

PENNY & GILES INC.

2716 Ocean Park Blvd., Ste. #1005; Santa Monica, CA; (310) 393-0014. **Product Name:** MM16 MIDI Management System. **Contact:** Neal Handler. **Date Product Introduced:** 1994. **Product Description & Applications:** The MM16 MIDI Management System is designed to simplify the handling of MIDI systems. It features an assignable control surface, utilizing 16 endless-belt controllers with integral LED displays. A truly ergonomic, accessible and informative MIDI control product, the MM16 has extensive applications across recording, broadcast, post-production, lighting and live environments. It provides excellent status feedback for operators, with control positions being instantly apparent, combined with rapid real-time access to variable parameters in a MIOI installation. **Basic Specifications & Suggested List Price:** A 6U 19" rack mounting unit, the MM16 enables real-time access to variable parameters in a MIDI installation. Control assignments are stored in up to 64 programs, with data values saved in up to 128 Snapshot memories. The internal battery-backed memory can be augmented by a plug-in 64k static RAM card or dumped externally via MIDI. Price per unit: \$2,500 + VAT/Tax.

CABLES AND CONNECTORS

AUDIOWORKS

15004 Ventura Blvd.; Sherman Oaks, CA 91403-2441; (818) 766-9101; FAX: (818) 505-0149. **Product Name:** AudioWorks DataLink™. **Contact:** Richard David Katz, owner. **Date Product Introduced:** 10/93. **Product Description & Applications:** AudioWorks DataLink™ AES/EBU balanced digital data cable & balanced analog microphone & line cables advance the recording/replay art via much-improved signal transfer. Subtle harmonics & ambient information that is missing with all other digital data cables (including ST/AT&T) & all other mic & line cables are recovered for the first time. Twenty years R&D/patent & the finest materials & hand-assembly ensure the finest performance obtainable. **Basic Specifications & Suggested List Price:** Every AudioWorks DataLink™ undergoes a rigorous quality-control & burn-in program & listening evaluation. Available in balanced AES/EBU configuration w/gold-plated XLR connectors & w/custom gold-plated RCA & BNC connectors for unbalanced applications PRO NET: 1.0 meter = \$175. Each + 0.5m = \$10. Rental = \$20/day.

BELDEN WIRE & CABLE CO.

2200 U.S. 27 South, PD Box 1980; Richmond, IN 47375; (317) 983-5200. **Product Name:** Belden Brilliance SVHS dual co-ax cables. **Date Product Introduced:** 4/94. **Product Description & Applications:** New Belden Brilliance SVHS dual 30 AWG 75-ohm co-ax cables are specially developed for use in Super VHS (SVHS) or 4/C applications and provide separate transmission of video signal, resulting in better picture resolution and less noise. They are highly flexible and feature a foam high-density polyethylene insulation for superior crush resistance and low capacitance.

BI-TRONICS INC.

76 Main St.; PO Box 125; Tuckahoe, NY 10707; (800) 666-0996. **Product Name:** Audio Snake Assemblies. **Contact:** Greg Schwartz, mktg. dir. **Date Product Introduced:** 1/94. **Product Description & Applications:** Bi-Tronics' snake and ADAT assemblies are the finest in the industry—designed for the most demanding professional audio applications. Each assembly is hand-crafted with Mogami cable, Neutrik and EDAC connectors and then tested for 100% quality assurance—ensuring that you get a perfect assembly every time. Assembly ends can include any combination of XLR, 1/4", RCA, Long frame, BANTAM, EDAC, ELCO and other connectors. **Basic Specifications & Suggested List Price:** Prices vary according to length of assembly and type and quantity of connectors. Immediate pricing information can be obtained over the phone, with custom cables normally shipping in 3-5 days.

BI-TRONICS INC.

76 Main St.; PO Box 125; Tuckahoe, NY 10707; (800) 666-0996. **Product Name:** EIA 19" panel/cable assemblies. **Contact:** Greg Schwartz, mktg. dir. **Date Product Introduced:** 1/94. **Product Description & Applications:** Bi-Tronics' 19" panel/cable assemblies are the perfect addition to any studio rack. Whether you're interfacing with a multitrack, patch bay, console, router or other audio device, Bi-Tronics can custom build a panel to fit your needs. Each panel is manufactured to your specifications using Neutrik XLRs and 1/4" locking phone jacks and Mogami cable. The other end can be terminated with Neutrik XLRs, 1/4" mono, 1/4" stereo, long frame TRS plugs, or any of the thousands of connectors that Bi-Tronics offers. **Basic Specifications & Suggested List Price:** Prices vary with design... please call us with your specifications for a quote.

CANARE CABLE INC.

511 5th St., #G; San Fernando, CA 91340; (818) 365-2446. **Product Name:** Digital audio cable. **Date Product Introduced:** 1994. **Product Description & Applications:** DA202 110 ohm twisted pair cable. 25 AWG, thin profile. Can be used in punch blocks. **Basic Specifications & Suggested List Price:** 1 to 8 channels of AES/EBU digital audio signals. Recommended length: 180 meters.

CANARE CABLE INC.

511 5th St., #G; San Fernando, CA 91340; (818) 365-2446. **Product Name:** Impedance Transformer. **Date Product Introduced:** 1993. **Product Description & Applications:** For coaxial transmission of all AES/EBU digital audio signals. **Basic Specifications & Suggested List Price:** 110-ohm to 75-ohm conversion. Replaces XLR3 cables with BNC cables. List: \$55.

CONQUEST SOUND INC.

26113 S. Ridgeland; Monee, IL 60449; (800) 323-7671. **Product Name:** MPS-1000, Conqueror cables. **Contact:** Ed Knecht, sales. **Date Product Introduced:** 1/94. **Product Description & Applications:** MPS-1000 is a 48-point balanced 1/4" patch bay. Can be normalized or half normalized with no soldering or cutting of wires. All connectors are mounted on boards of high-grade epoxy-glass mounted in a single rackspace. Conqueror woven cables are covered with a heavy cloth braid that is the most durable and lightweight available. Available in 1/4" instrument, speaker and microphone.

GEPCO INTERNATIONAL INC.

2225 West Hubbard; Chicago, IL 60612-1613; (312) 733-9555. **Product Name:** LN888 guitar/instrument cable. **Contact:** Greg Hansen, nat'l sales mgr. **Date Product Introduced:** 1993. **Product Description & Applications:** The LN888 is a guitar/instrument cable designed to significantly reduce and, in some cases, eliminate low tribo-electric (handling) noise. The unique advantage of the LN888 can be attributed to the design. Four ends of bare copper run opposite of the spiral between the tape and spiral shield, which helps to greatly reduce handling noise. Used for connection of instruments to amps, mixers, effects gear, etc. **Basic Specifications & Suggested List Price:** Conductor is 18AWG (65 strands of 36AWG) bare copper insulated with low-density polyethylene. Shielding consists of a semiconductive PVC tape, 4 ends of 36AWG bare copper helically applied and a conical helical bare copper spiral. The jacket is matte finish, ultraflexible PVC. List price: \$410/1,000 feet.

GEPCO INTERNATIONAL INC.

2225 West Hubbard; Chicago, IL 60612-1613; (312) 733-9555. **Product Name:** LVT61859S, stranded 59V tri-ax. **Contact:** Greg Hansen, nat'l sales mgr. **Date Product Introduced:** 7/94. **Product Description & Applications:** The LVT61859S is an ultraflexible RG 59V-type tri-ax with a stranded center conductor. This stranded center conductor gives the tri-ax increased flexibility over the conventional solid center conductor tri-ax. It is ideal for remote use and handheld cameras where increased flexibility is preferred. **Basic Specifications & Suggested List Price:** Standard RG 59V type tri-ax with a 20AWG compacted, stranded, bare copper center conductor. This product is currently available with a flexible black thermoplastic colpolymer jacket. Other jacket colors are available with a minimum run. List price: \$775/1,000 feet.

GEPCO INTERNATIONAL INC.

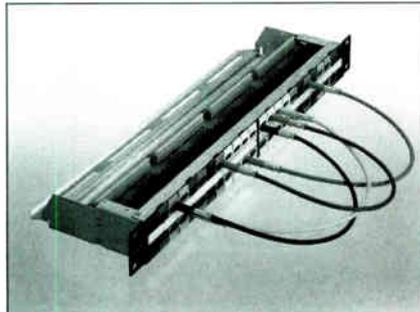
2225 West Hubbard; Chicago, IL 60612-1613; (312) 733-9555. Product Name: VS102000. video snake cable. Contact: Greg Hansen, nat'l sales mgr. Date Product Introduced: 01/94. Product Description & Applications: The VS102000 consists of ten conductors of Gepeco's original VPM2000 cabled together with a flexible yet durable black jacket. This E2-10 video snake cable is ideal for terminating between racks and equipment, video walls, remote use or any application where multiple video cables are used and cable management is critical. Ten different colored conductors make termination simple. Basic Specifications & Suggested List Price: Ten precision video coaxials (VPM2000) under a thermoplastic colpolymer jacket. Ten different colored coaxials (black, brown, red, orange, yellow, green, blue, violet, grey, white). All ten coaxials meet the national electric code. Rating of type CM List price: \$5 per foot.



NEUTRIK USA INC.
A-B Series

NEUTRIK USA INC.

195 Lehigh Ave.; Lakewood, NJ 08701; (908) 901-9488. Product Name: A-B Series. Contact: William J. Dorman, product mgr. Date Product Introduced: 6/94. Product Description & Applications: XLR Connector with the smallest size and highest packing density. Same dimension for male or female. Gold contacts standard. New contact design. Direct connection of pin to ground for digital applications. Basic Specifications & Suggested List Price: Please contact factory for specifications and local distribution.



NEUTRIK USA INC.
Easy Patch

NEUTRIK USA INC.

195 Lehigh Ave.; Lakewood, NJ 08701; (908) 901-9488. Product Name: Easy Patch. Contact: Lawrence P. Niles, product mgr. Date Product Introduced: 9/94. Product Description & Applications: Available in 96 Bantam and 48 "B" gauge styles. Unique jumper blocks easily change switching configurations from parallel, half normalled (top row), half normalled (bottom row) and fully normalled. Top and bottom rows are linked by internal gold D-sub connectors for easy accessibility and repairs. Fast rear connections are made with "spring force" push terminal blocks. Fully PCB-wired with a flexible (jumper block) grounding system for individual, group, or central grounding. High-quality Neutrik gold-plated jacks. e Basic Specifications & Suggested List Price: Please contact factory for specifications and local distribution.

NEUTRIK USA INC.

195 Lehigh Ave.; Lakewood, NJ 08701; (908) 901-9488. Product Name: Minicon. Contact: Lawrence P. Niles, product mgr. Date Product Introduced: 11/94. Product Description & Applications: The next generation of Neutrik connectors features up to 12 poles in a miniature configuration (dia. 12mm). Unique chuck type cable retention and positive push pull locking. Machined, gold-plated crimp or solder contacts with precisely machined, robust all-metal housing design. Receptacles for vertical and horizontal PCB mounting. Metal polarizing guides (keys) on all connectors. Available in male/female in-line, chassis, and PCB styles. Basic Specifications & Suggested List Price: Please contact factory for specifications and local distribution.

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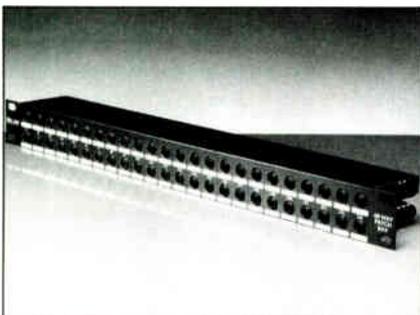
CABLES & CONNECTORS



NEUTRIK USA INC.
NP2RCS

NEUTRIK USA INC.

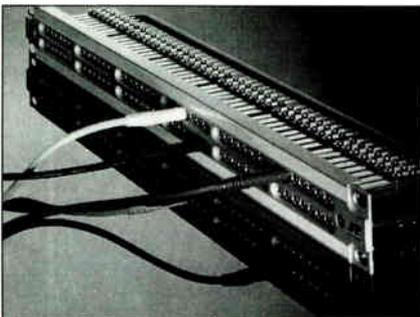
195 Lehigh Ave.; Lakewood, NJ 08701; (908) 901-9488. Product Name: NP2RCS. Contact: Lawrence P. Niles, product mgr. Date Product Introduced: 5/94. Product Description & Applications: Two pole, compact 1/4" right-angle plug. Easy to assemble with chuck-style strain relief. Ground termination without soldering. Attractive styling and looks. Basic Specifications & Suggested List Price: Please contact factory for specifications and local distribution.



RE AN PRODUCTS INC.
Modular 19" - 1/4" patch bay system

RE AN PRODUCTS INC.

16 Passaic Ave.; Fairfield, NJ 07004; (201) 808-0063; (800) 828-7266. Product Name: Modular 19" - 1/4" patch bay system. Contact: Frank Riordan. Date Product Introduced: 1993/1994. Product Description & Applications: 48-point x 1/4" patching system using PC Board modules for easy customizing. Enables normalizing, half normalizing or denormalizing without soldering or cutting wires. Modules offered in stereo, mono, hardwire and RCA version, which can be mixed in the chassis if desired. Re An 24" patch cord also available. Basic Specifications & Suggested List Price: Jack contact material is solid nickel silver with gold-plated versions available. Jack switch performance better than 15 milliohms.



RE AN PRODUCTS INC.
Class 1 professional patch bay system

RE AN PRODUCTS INC.

16 Passaic Ave.; Fairfield, NJ 07004; (201) 808-0063; (800) 828-7266. Product Name: Class 1 professional patch bay system. Contact: Frank Riordan. Date Product Introduced: 1993/1994. Product Description & Applications: 96-point patching using Re An manufactured Bantam connectors, extremely rugged extruded aluminum chassis. Eliminating flex or twist. Connectors feature nickel-plated nose and high-grade paladium contacts. Patch cords available in four lengths and three colors.

SWITCHCRAFT, INC.

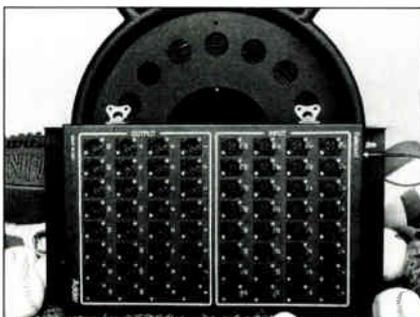
5555 N. Elston Ave.; Chicago, IL 60630; (312) 631-1234. Product Name: 280 Dry™ solderless 1/4" audio plug. Contact: Sam Florio, audio prod. Date Product Introduced: 9/94. Product Description & Applications: The 280 Dry™ plug replaces conventional phone plugs in most audio interconnect situations. No soldering or wire preparation is needed to terminate to single conductor shielded wire. Just chop end off of wire and assemble to plug. Unique "fer-rule" insert grips and pierces wire simultaneously for use with .235 to .245 inch single conductor shielded wire. Basic Specifications & Suggested List Price: Suggested list price \$3.63.

SWITCHCRAFT, INC.

5555 N. Elston Ave.; Chicago, IL 60630; (312) 631-1234. Product Name: TTP96 Series TT jack panel. Contact: Sam Florio, audio prod. Date Product Introduced: 7/94. Product Description & Applications: The TTP96 Series of jack panels have nickel-plated steel frame jacks, which will not deform even under extreme temperature conditions. Switching contacts are gold-plated for reliable normal through connections. Features fanned ground terminal for easier ground busing and extra wide labelling strips. For use in recording and broadcast studios. Basic Specifications & Suggested List Price: Suggested list price \$320.

TAPER WIRE

627 Terri Ann; West Covina, CA 91791; (818) 967-1424. Product Name: Taperwire. Contact: Diane Waldron. Date Product Introduced: 1/93. Product Description & Applications: Flat wire suitable for under carpet, up walls and across ceilings. Taperwire can be painted or spackled. Basic Specifications & Suggested List Price: 15- to 24-gauge wire. two to four conductors.



TELECAST FIBER SYSTEMS
Adder™

TELECAST FIBER SYSTEMS INC.

102 Grove St.; Worcester, MA 01605; (508) 754-4858; FAX: (508) 752-1520. Product Name: Adder™. Contact: Richard A. Cerny, pres. Date Product Introduced: 1994. Product Description & Applications: The Adder is a portable digital multiplexer that turns virtually any cable (fiber, co-ax or tri-ax) into a 64-channel digital audio "snake." The Adder speeds set up, eliminates interference and hum and increases distance to 20km. Fiber cable weight is only 1% of multipair audio cable weight. Connectors are standard 3-pin XLR and internal mic preamps are provided. Applications include remote recording, sound reinforcement and broadcasting. Basic Specifications & Suggested List Price: Number of channels: 64 (64 one-way or 32 two-way). Frequency response: 15Hz-20KHz. Signal-to-noise ratio: >90dB. Weight (each unit): 8lbs. Price range: \$16,500-\$19,500.

TELECAST FIBER SYSTEMS INC.

102 Grove St.; Worcester, MA 01605; (508) 754-4858; FAX: (508) 752-1520. Product Name: Viper™. Contact: Richard A. Cerny, pres. Date Product Introduced: 1994. Product Description & Applications: The Viper™ is a portable video/audio snake system that uses a lightweight (14 lbs/1,000 ft.) fiber-optic cable to transmit up to 4 video and 8 audio channels up to 10 kilometers. The modular Viper may be used to remote up to 4 TV cameras at events. Applications include teleproduction and facility video/audio distribution. Intercom and data channels are optional. Basic Specifications & Suggested List Price: Video S/N: >70dB, audio S/N: >90dB. Freq. response: 30Hz-10MHz (video); 0C-22KHz (audio). Transmission method: FM (video); 18-bit digital (audio). Audio THD: <0.05%. Prices start at \$6,200 for 2V+4A Viper.

WHIRLWIND MUSIC OIST. INC.

PO Box 12692; Rochester, NY 14612; (716) 663-8820. Product Name: Field Pinnacle Mass Connector. Contact: Sales Department. Date Product Introduced: 10/94. Product Description & Applications: A new generation of the Mass high-reliability multipin connector series, featuring field-crimppable pins. All Mass connectors feature an extra-heavy metal housing designed to withstand severe environmental conditions with high reliability. They have become a standard for large theme parks, outdoor shows, and major facilities. Mass connectors employ a universal male/female coupling to completely eliminate the problem of finding the wrong sex connector at the end of a long cable run. Basic Specifications & Suggested List Price: Available in both in-line and panel-mount 122-pin and 176-pin versions; price to be announced.

wireworks

WIREWORKS CORPORATION
Express Service Panels

WIREWORKS CORPORATION

380 Hillside Ave.; Hillside, NJ 07205; (908) 686-7400. Product Name: ESP: Express Service Panels. Contact: Angela Kelly, customer service mgr. Date Product Introduced: Spring 1994. Product Description & Applications: Wireworks' ESP (Express Service Panels) Program eliminates all the hassles associated with custom panels. Customers provide a simple sketch, complete draftings, or a CAD drawing file. Wireworks takes it from there. We provide the exact level of service required; panels complete with cut-outs and tapping, precision engraving including lettering, logos, diagrams and symbols, paint filling in a choice of colors, connector and component mounting, and wiring to specification. Basic Specifications & Suggested List Price: Panels manufactured to client's exact specifications; prices quoted when specs are issued.

COMPUTER HARDWARE
AND SOFTWARE

AUDIOFILE INC.

4 Militia Dr.; Lexington, MA 02173; (617) 863-0890. Product Name: TalkWorks 2.1. Contact: Renee Keel. Date Product Introduced: 11/93. Product Description & Applications: TalkWorks, an OLE application for recording, playback, editing and embedding of digital audio messages into Windows applications, offers superior voice annotation and audio editing capabilities to the PC. TalkWorks includes advanced audio capabilities such as high rates of compression and variable speed playback. The high-performance editor is capable of working with both compressed and uncompressed file types. With advanced functionality like support for digital signal processors and state-of-the-art voice messaging, TalkWorks sets the new standard for Windows-based voice messaging. Basic Specifications & Suggested List Price: TalkWorks 2.0 retails at \$59, and is available directly from AudioFile or through resellers. TalkWorks requires a minimum platform of 16 MHz 386-based IBM-compatible PC, with 2MB RAM and 1MB of hard disk space, Windows 3.1 or later, audio hardware, audio drivers, speakers, and microphone.

AUDIOFILE INC.

4 Militia Dr.; Lexington, MA 02173; (617) 863-0890. Product Name: TalkWorks 3.0. Contact: Renee Keel. Date Product Introduced: 11/94. Product Description & Applications: TalkWorks 3.0 software combines telephone management and fax send/receive with the market-leading digital audio messaging product. TalkWorks 3.0 differentiates itself from other desktop answering machines with its thorough use of multimedia standards and its inheritance from TalkWorks 2.0 of advanced audio processing such as high compression and variable speed playback. Because TalkWorks 3.0 is an OLE server, you can embed audio messages into standard Windows applications for forwarding, editing, archiving and notation purposes. Basic Specifications & Suggested List Price: Pricing information for TalkWorks 3.0 is currently not available. For more information, contact AudioFile. Minimum platform required is a 386-based IBM-compatible PC (full functionality requires a 25 MHz 486) with 4 MB RAM, Windows 3.1 or later, running in enhanced mode, audio hardware, compatible speakers, and microphone.

THE BARANTI GROUP INC

2650 John St. #22; Markham, Ontario L3R 2W6 Canada; (905) 479-0148. Product Name: Custom product design & manufacture. Contact: B. Papoff. Date Product Introduced: 1990. Product Description & Applications: Baranti is an engineering firm, which performs electronics design (R+D) and manufacturing, on contract, for U.S. and Canadian companies. The company has particular expertise in the design of professional video, audio & multimedia products. Design for manufacture is emphasized as many of our designs are manufactured by major professional equipment suppliers in volume. Basic Specifications & Suggested List Price: Complete product development, high-performance digital & analog design, PCB design, approvals liaison, packaging, contract manufacturing. Please call factory for pricing.

DIGIDESIGN INC.

1360 Willow Rd., Menlo Park, CA 94025; (415) 688-0600; (800) 333-2137. **Product Name:** TDM Bus™. **Contact:** Dave Lebolt. **Date Product Introduced:** 7/94. **Product Description & Applications:** The Digidesign TDM Bus provides an expandable virtual digital mixing environment and extensive DSP processing capabilities to the Pro Tools system. Functionality is added by hardware cards and DSP software Plug-Ins that run on the Digidesign DSP farm, a Macintosh NuBus card that acts as a powerful effects/mix engine. A 256-ch./24-bit data path allows for future growth. With TDM, you can integrate digital and analog gear into the system, and TDM's flexible routing allows control routing of sources and destinations from pop-up menus without patch-bay headaches. The TDM environment provides mixing and routing for your Pro Tools system and external processing devices. TDM supplies the potential for all of the devices in your studio (both analog and digital), to be connected together into an integrated digital system—all at an affordable price. TDM also provides SampleCell II with 8 discrete, digital outputs directly to Digidesign's Pro Tools™ system. **Basic Specifications & Suggested List Price:** TDM starter kit: \$3,495.

DIGIDESIGN INC.

1360 Willow Rd., Menlo Park, CA 94025; (415) 688-0600; (800) 333-2137. **Product Name:** D-Verb™. **Contact:** Dave Lebolt. **Date Product Introduced:** 9/94. **Product Description & Applications:** D-Verb is a Digidesign DSP software plug-in for the Pro Tools/TDM bus environment that provides high-quality reverb effects on a single Digidesign DSP-Farm™ chip. D-Verb is significantly cheaper than a stand-alone reverb processor of similar quality. It allows easy on-screen editing and program storage, and the ability to run multiple reverb processors for the price of one software plug-in. D-Verb allows addition of high-quality reverb or ambience processing to single or multiple tracks. With the arrival of TDM, a 256-channel/24-bit virtual digital mixing and plug-in environment, exciting new EQ, dynamics and effects devices can be created in software—from Digidesign and third-party developers. These plug-ins are powered by the Digidesign DSP farm, a powerful DSP effects/mixing engine card.

DIGITAL WAVES CENTRE

116 Consumer Sq., Ste. 318; Plattsburgh, NY 12901; **Product Name:** Digital Waves Sample Sound. **Contact:** Ben Provost. **Date Product Introduced:** 1990. **Product Description & Applications:** Digital Waves samples are designed especially for Ensoniq sampler family EPS-EPS16 + ASR10. You will find a complete library of all hot synth and drum machines samples available on today's market. **Basic Specifications & Suggested List Price:** Sound can be bought by single disk or set of disks.

FUTUREVIDEO

28 Argonaut, Ste. 140; Aliso Viejo, CA 92656; (714) 770-4416. **Product Name:** V-Station™ for Windows. **Contact:** Stephen Godfrey. **Date Product Introduced:** 9/94. **Product Description & Applications:** PC-based desktop videotape editing systems for "cuts" and for A/B roll applications. Built-in RS-232C serial interface for Panasonic WJ-MX30 and WJ-MX50 digital A/V mixers. GPI trigger of other switchers. Supports VCRs and camcorders with Sony Control-L (Lanc) and Panasonic Control-M (5-pin). Optional VTR Driver Kits available to professional VISCA, RS-232C, RS-422A VTRs. **Basic Specifications & Suggested List Price:** 386/486 compatibles w/8MB RAM, 80 MB hard drive, DOS 5.0 or higher, Windows 3.1. V-station 2200 for Windows (cuts) \$695. V-station 3300 for Windows (A/B roll) \$995.

GEFEN SYSTEMS

6261 Variel Ave., Ste. C; Woodland Hills, CA 91367; (818) 884-6294; (800) 545-6900. **Product Name:** M&E Organizer System. **Contact:** Doug Perkins. **Product Description & Applications:** The M & E Organizer System locates and auditions sound effects and production music tracks instantly, so post-production runs more efficiently. The software is tailor-made to search for only the effects you own, and can easily be updated as you add libraries. Search by category, word synonym, style, as well as print records of all effects used. PC & Macintosh programs available. Networking too. **Basic Specifications & Suggested List Price:** M&E Windows: IBM-Compatible; M&E Library (software only) MAC; M&E Organizer (locates & plays effects): MAC & IBM Compatible; Sony 360 CD Autochanger; Pioneer 300 CD Autochanger. Denon 200 CD Autochanger.

GREYTSOUNDS

501 Fourth Street S.E.; Bandon By The Sea, OR 97411; (503) 347-4700. **Product Name:** Great Ram. **Date Product Introduced:** 1993. **Product Description & Applications:** Greysounds produces great RAM memory and SCSI products for a wide range of keyboards, samplers and synthesizers. **Basic Specifications & Suggested List Price:** Products supported are MPC60, MPC60 II, S950, S1000/S1100, EPS, 16+, TS10, TS12, VFXSD, SO-1, SO-2, TX16W.

GREYTSOUNDS

501 Fourth Street S.E.; Bandon By The Sea, OR 97411; (503) 347-4700. **Product Name:** Philip Wolfe Rock Keyboards CD-ROMs. **Date Product Introduced:** 9/94. **Product Description & Applications:** This CD-ROM has the most complete B-3 collection to date. Sampled direct from the preamp of the organ and with the mics on the Leslie. Sampled with percussion, harmonic, with and without percussion, slow and fast, light, medium and heavy distortion, B-3 Bass Pedals, with and without Leslie and much more. This CD-ROM also covers MOOG warm pads, filter sweeps, polysynths, polybrass,

bass sounds, analog strings and much more. **Basic Specifications & Suggested List Price:** Over 400 MB of samples and instruments. Available for AKAI S1000/S1100, Digidesign Sample Cell (Mac & PC), E-mu E-111xp/xs, Ensoniq ASR-10/TS-12, Kurzweil K2000, Peavey SP. Retail \$299.95.

JUPITER SYSTEMS

PD Box 697; Applegate, CA 95703; (800) 446-2356; (916) 878-6666. **Product Name:** Infinity DSP Looping Tools. **Contact:** Gabriel Sakakeeny. **Date Product Introduced:** 1/93. **Product Description & Applications:** Stand-alone sample-editing program for the Macintosh featuring powerful DSP algorithms that automatically create near-perfect loops in almost any sampled sound. Applications include sound design, sound FX, sample editing, background looping, video games, multimedia, drum loops. **Basic Specifications & Suggested List Price:** Looping tools include: SPR Looper™, Rotated Sound Looper™, Freeze Looper™, and crosstade Looper with Smart Auto-Scan™. Other features include Real Time Loop Adjust & Adjustable Edit Blending. Runs with System 7.0 or greater and is compatible with all Digidesign DSP cards. Reads and writes Sound Designer and AIFF files.

JUPITER SYSTEMS

PD Box 697; Applegate, CA 95703; (800) 446-2356; (916) 878-6666. **Product Name:** JVP-Jupiter Voice Processor. **Contact:** Gabriel Sakakeeny. **Date Product Introduced:** 6/94. **Product Description & Applications:** The JVP is a unique software plug-in for Digidesign's Sound Designer II™ & TDM™. It features a de-esser, a compressor/gate, a parametric EQ, and a multi-THP delay combined in one easy-to-use program. The tools can be used simultaneously in either stereo or mono. The 3-point parametric EQ features new & unique filter designs that give a true 16-bit dynamic range. All other digital filters give a max of 13 bits. **Basic Specifications & Suggested List Price:** JVP runs inside Sound Designer II v.2.5 or greater and TDM™. It is compatible with Sound Tools II, Pro Tools & AudioMedia II DSP Cards. It runs with diminished functionality on Sound Tools I & AudioMedia.

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MDT-Multiband Dynamics Tool

JUPITER SYSTEMS

PO Box 697; Applegate, CA 95703; (800)446-2356; (916) 878-6666. Product Name: MDT-Multiband Dynamics Tool. **Contact:** Gabriel Sakakeeny. **Date Product Introduced:** 1/94. **Product Description & Applications:** The MDT is a powerful dynamics processing plug-in for Digidesign's Sound Designer II™ software & TDM™. MDT uses a unique graphic interface, which allows you to see and shape the sound of your recordings with up to 30 thresholds & ratios, in up to 5 individually adjustable spectral bands. Tube compressors, de-essers, dynamic EQs, and soft-knee compressors can be emulated. **Basic Specifications & Suggested List Price:** MDT runs inside Sound Designer II V2.5 or greater and TDM™. It is compatible with Sound Tools I & II, Pro Tools, AudioMedia & AudioMedia II, DSP card from Digidesign.

MARK OF THE UNICORN INC.

1280 Massachusetts Ave., Cambridge, MA 02138; (617) 576-2760; FAX: (617) 576-3609. **Product Name:** Digital Time Piece. **Contact:** Daniel Rose. **Date Product Introduced:** 2/94. **Product Description & Applications:** The Digital Time Piece is a desktop digital synchronizer specifically designed for studios using random access hard disk, modular digital multitrack such as ADAT and DA-88 and MIDI recorders. It translates SMPTE time code to address track and vice versa. The DTP allows users to easily select a master synchronization source from among many recording devices. The DTP becomes the "synchronization hub" of a studio, integrating disk, MIDI and tape-based audio & video recorders. **Basic Specifications & Suggested List Price:** The Digital Time Piece supports Word Clock, ADAT, DA-88, LTC, Video, Sony 9-pin, SPDIF, RS422 and MIDI. It allows remote control of ADAT without a BRC, or a DA-88 without an RC848 or SY-88. The DTP can also burn in a genlocked time code window.

MARK OF THE UNICORN INC.

1280 Massachusetts Ave., Cambridge, MA 02138; (617) 576-2760; FAX: (617) 576-3609. **Product Name:** Performer Version 5. **Contact:** Daniel Rose. **Date Product Introduced:** 4/94. **Product Description & Applications:** Performer 5 is the latest upgrade of the popular MIDI sequencing software for Macintosh. Performer has won three Mix TEC and two MacWorld World Class awards. Designed for high-end music production, Performer is a software standard with studios, composers and performing artists. Performer supports unlimited tracks, notes, sequences and songs. From film scoring to dance music, Performer offers a wide array of features that let creative artists choose how they want to work. **Basic Specifications & Suggested List Price:** New features include MIDI Machine Control, full color user interface, Groove Quantize, Enhanced QuickScribe® notation, FreeMIDI configuration system and Advanced Cycle Record. Editing views include standard notation, graphic, event list and tracks overview. Custom consoles, advanced region and editing commands and algorithmic composition tools let users modify their performances.

NORTHSTAR PRODUCTIONS

13716 S.E. Ramona St., Portland, OR 97236; (503) 760-7777. **Product Name:** Digital Session Log™. **Contact:** Scott James Hybl. **Date Product Introduced:** 1/94. **Product Description & Applications:** Studio management program. Macintosh-based on HyperCard. Clock in and clock out. Up to 100 clients simultaneously clocked in. Keeps track sheets on all clients and all songs. Money is managed through the "bank," which gives a client-by-client accounting. Numerous studio calculations are also included: tempo to digital delay times, MIDI note to frequency, sample bytes to measure number, operating levels, etc. **Basic Specifications & Suggested List Price:** \$199 System 6 or 7 for Macintosh HyperCard 1.2 or 2.1. Call or write for more information.

OPCODE SYSTEMS INC.

3950 Fabian Wy., Ste. 100; Palo Alto, CA 94303; (415) 856-3333. **Product Name:** Overture. **Contact:** Tim Self. **Date Product Introduced:** 9/94. **Product Description & Applications:** Overture is easy-to-use professional music notation software for the Macintosh. It has graphic editing of MIDI data, so all performance parameters can be edited in the notation environment, including note durations, attack times, key velocity, pitch bend, controllers and program changes. It also supports complete MIDI playback of all rests, repeats, endings and dynamics. Other features include extensive text handling, scaling of all objects, zooming to any level, nudging of notes, and creation of EPS files. **Basic Specifications & Suggested List Price:** Suggested list \$495. Requirements: a Macintosh computer running System 7.0 or newer, a Macintosh-compatible printer.

OPCODE SYSTEMS INC.

3950 Fabian Wy., Ste. 100; Palo Alto, CA 94303; (415) 856-3333. **Product Name:** Studio Vision Pro. **Contact:** Paul de Benedictis. **Date Product Introduced:** 1/94. **Product Description & Applications:** Studio Vision Pro is integrated MIDI sequencing and digital audio recording software for the Macintosh. The program's features include Track Overview, Notation, Groove Quantize and a full-color user interface. Using DAE and Pro Tools™, Studio Vision Pro will support up to 16 channels of digital audio, which can be non-destructively edited (alone, or with the MIDI information). Studio Vision Pro supports MIDI Machine Control (MMC), SMPTE synchronization and the Open Music System (OMS). **Basic Specifications & Suggested List Price:** Suggested Retail \$995. Requirements: Macintosh IIfx, Quadra or Centris with 32-bit addressing enabled, minimum 8 MB RAM, 12MB RAM preferred, (16MB RAM for 8 or more tracks of digital audio with Pro Tools), System 7.0x or newer, MIDI interface, MIDI device, Digidesign hardware, hard disk with 18 ms access time (2 channels only on Sound Tools I and LC AudioMedia).

OSC

480 Potrero Ave., San Francisco, CA 94110; (415) 252-0460. **Product Name:** DECK II V2.2. **Contact:** Todd Souvignier. **Date Product Introduced:** 9/94. **Product Description & Applications:** DECK II is professional digital audio workstation software, offering CD-quality multitrack hard disk recording, timeline-style waveform editing, synchronous QuickTime movie playback, plus a full range of pro features for music and multimedia production. Maintain unlimited virtual tracks, bounce and mix direct to disk with full mixer automation and sync to all SMPTE frame rates. DECK II will operate in tandem with OSC's METRO sequencer for integrated digital audio+MIDI. **Basic Specifications & Suggested List Price:** DECK II v2.2 runs on any Power Macintosh, PowerBook 500-series, and Mac Quadra/Centris "AB" models—no extra audio hardware required. It also works with any Mac containing Digidesign® AudioMedia™ series, SoundTools II™ card. DECK II has a suggested retail price of \$399.

OSC

480 Potrero Ave., San Francisco, CA 94110; (415) 252-0460. **Product Name:** Trans-Port: the audio workgroup utility. **Contact:** Todd Souvignier. **Date Product Introduced:** 9/94. **Product Description & Applications:** Trans-Port: the audio workgroup utility™ is the first OMF file conversion program. It performs exchange of audio files and session documents between the DECK II, Pro Tools and Open Media Framework (OMF) project formats. With Trans-Port, producers can set up work groups combining expensive workstations and cheap desktop systems. Trans-Port even prints out detailed mixer's cue sheets—a real time saver. Trans-Port knocks down boundaries and lets you get more done. **Basic Specifications & Suggested List Price:** Trans-Port converts all compositions, playlists, edits, automation, sync references and file locations between the DECK II, Pro Tools and Open Media Framework session formats. It requires a Mac with 4 or more megabytes of RAM and System 7. Suggested retail price \$699.

PAVO

10 S Front St; Philadelphia, PA 19106; (800) 546-5461; (215) 413-2355. **Product Name:** MIDITools Computer Kits. **Contact:** Greg Bartlett. **Date Product Introduced:** 6/1/94. **Product Description & Applications:** MIDITools computer kits are discussed in the book, "Digital Projects for Musicians," written by Craig Anderton, Bob Moses and Greg Bartlett. There are 21 PROMpacks available for the computer: Universal Transmitter, Channel Message Transmitter, Programmable Controllers, Tap Tempo Transmitter, Sequencer Remote Control, Data Monitor, Control Thinner, Show Controller, Channel Filter, Data Filter, Channel Mapper, Controller Mapper, Keyboard Mapper, Translating Randomizer, Multi-Effector, Sequencer Helper, Chord Player, Sys Ex Folder, Custom Instrument, Relay Driver and Patch Bay. **Basic Specifications & Suggested List Price:** When you want additional MIDI tools devices, simply buy a new PROMpack. Plug the PROMpack chip into your MIDITools computer. You can create up to 21 MIDI devices from a single MIDITools Computer Kit. Complete kit prices (includes one PROMpack): \$210 for handheld enclosure; \$225 for rack-mount enclosure.

PERSONAL COMPOSER

3213 W. Wheeler St., Ste. 140; Seattle, WA 98199; (206) 524-5447. **Product Name:** Personal Composer for Windows Version 1.1. **Contact:** Susan Miller. **Date Product Introduced:** 10/93. **Product Description & Applications:** Complete MIDI control with notation; musical marks affect MIDI playback; smooth linear or envelope transitions of MIDI controllers; pitch-bend, key velocity and tempo; scalable music symbols and text; point and press + or - to instantly size

objects; zoom tool; print-to-clipboard for inserting music into word processors; complete page layout including user-definable page and staff sizes; spectacular printed music. **Basic Specifications & Suggested List Price:** An MS-DOS-compatible computer capable of running Windows, 80386 or faster with a hard disk and at least 4 MB of RAM. An 80486 with 8 MB is recommended. Microsoft Windows V 3.1 or later. \$440 suggested list price.

Q SOUND LABS INC.

2748 - 37 Avenue N.E.; Calgary, Alberta T1Y 5L3 Canada; (403) 291-2492. **Product Name:** QExpander. **Contact:** Brian Cowieson. **Date Product Introduced:** 10/94. **Product Description & Applications:** QExpander is a Sound Designer II software plug-in module, which applies QSound Labs' patented sound-localization algorithms to the task of soundfield expansion on stereo materials. QExpander is the first of a line of software and hardware tools designed to place QSound capabilities within reach of working audio professionals. QExpander takes existing stereo imaging well beyond the speakers without imparting unnatural coloration, and provides a sophisticated means for retaining bottom end and center impact. **Basic Specifications & Suggested List Price:** Requires Digidesign's Sound Designer II Version 2.5 or above. List price to be announced.

RICHMOND SOUND DESIGN LTD.

1234 W. 6th Ave.; Vancouver, BC, BC V6H 1A5 Canada; (604) 732-5860; FAX: (604) 734-3901. **Product Name:** MIDIShowCD. **Contact:** Kim Bell, P.E., general mgr. **Date Product Introduced:** 2/94. **Product Description & Applications:** MIDIShowCD is the world's first software for synchronizing CD players, giving you unparalleled access to disk, cut and frame with lockstep accuracy. Using common and reliable CD's, MIDIShowCD allows embedded Autoplay and Repeat functions for CD segments while transmitting out-of-range codes to your sequencer. MIDIShowCD provides multichannel audio and multisource visual effects at a fraction of the cost of alternative systems, using common and reliable CD's. Available as standalone software or with drives and interface completely customized to your needs.

SEALEVEL SYSTEMS INC.

PO Box 830; Liberty, SC 29657; (803) 843-4343. **Product Name:** DIO-32B. **Contact:** Tani Ellenburg or David Pratt, media coord. **Date Product Introduced:** 1993. **Product Description & Applications:** The DIO-32B provides 32 channels of isolated digital I/O for the PC. The card is designed with two 8-bit isolated input parts and two 8-bit relay output parts. Each input is isolated from ground, host PC ground, and from all other channels. Isolation is provided up to 400V DC. Applications include instrumentation and test equipment, analog multiplexing and audio switching, satellite/microwave network control, and control of servos, lights, buzzers and other low-current-level applications. **Basic Specifications & Suggested List Price:** 16 reed relay outputs: highly reliable 10VA DIP reed relays utilized; 16 optically isolated AC or DC inputs; output ports have nondestructive read-back capabilities; supports interrupts 2-7; DB-37 connectors for all 16 inputs and 16 outputs; socketed DIP resistor allows user-specified input range. Part #3093; price: \$339.

SEALEVEL SYSTEMS INC.

PO Box 830; Liberty, SC 29657; (803) 843-4343. **Product Name:** AV-COM. **Contact:** Tani Ellenburg or David Pratt, media coord. **Date Product Introduced:** 1/94. **Product Description & Applications:** The AV-COM provides the PC with two serial ports with DIP jumper selections for MIDI, RS-232, PA-422 and SMPTE 207M interfaces. These are the most common audio and video equipment connections used by industry professionals today. The AV-COM can be configured as a COM: port providing simple integration and software development. Applications include video/audio editing, ATR/VTR control and automation, PA-422 sound-system control, and multitrack mixing and playback of SMPTE RS-422 and MIDI devices. **Basic Specifications & Suggested List Price:** Ports can be addressed as COM1:, 2:, 3: or 4:, or as any other I/O address; selectable interrupts IRQ 2-5, 7, 10-12, and 15; two DB-9S Sony RS-422 pin-out serial connectors; 16550 buffered UART; Windows compatible; Windows 3.1 drivers provided; MIDI drivers available. Part #3086; price: \$249.

SONIC SCIENCE

119 Spadina Ave., Ste. 767; Toronto, ON M5V 2L1 Canada; (416) 345-9211; (800) 26-SONIC; FAX: (416) 345-8618. **Product Name:** Sonic Search™. **Contact:** Chris God. **Date Product Introduced:** 10/93. **Product Description & Applications:** Sonic Search™ is a revolutionary sound effects and music management system that enables a user to: search virtually all major sound effects manufacturers' libraries simultaneously using keywords; locate a desired effect from those libraries they own; select and play the effect through control of a CD auto changer; control a digital audio workstation; and transfer the desired sound digitally to the selected position and track on the DAW. Sonic Search™ is packed with innovative features like a one million word thesaurus. Multi-user support for networking of CD changers is also available. **Basic Specifications & Suggested List Price:** Sonic Search™ requires a Macintosh with a minimum of 4MB RAM. Digital Audio Workstations currently supported include Fairlight MFX II; Digidesign's Pro Tools. Post View; and Sonic Solutions Sonic Studio. CD Auto Changers currently supported are Denon 1200-F, NSM 3101AC, Pioneer CAC-V3000, CAC-V180M, and Sony CDK-3600. Sonic Search™ is sold in three different feature configurations starting at \$695 U.S.

SPECTRAL

SPECTRAL SYNTHESIS INC.
AB-1 AuxBox

SPECTRAL SYNTHESIS INC.

18800 142nd Ave. N.E.; Woodinville, WA 98072; (206) 487-2931. Product Name: AB-1 AuxBox. Contact: Mark Doenges. Date Product Introduced: 10/94. **Product Description & Applications:** The AuxBox, as its name suggests, is an auxiliary device for Spectral workstations, and provides connectors for every relevant signal that an engineer might wish to bring into the DAW. BNC, as well as RCA, connectors are provided for video in/out, which can be used for black burst or composite video with VITC. 5-pin DIN connectors are included for MIDI control in and out, as well as for MTC in, out, and thru. Female 1/4" plugs are offered for SMPTE LTC in and out. 9-pin serial machine control is supported with DB9 connectors and signal translation built into AB-1 for RS422 signals. Software support for Sony protocol machine control has or will be implemented on Spectral's AutoTracks, StudioTracks and Prismatic to take advantage of this interface. The AB-1, of course, provides connectors for interface to both the AudioEngine and the AudioPrisma. **Basic Specifications & Suggested List Price:** The AuxBox uses all industry standard signals, levels and protocols. The unit sells for \$295.

SPECTRAL SYNTHESIS INC.

18800 142nd Ave. N.E.; Woodinville, WA 98072; (206) 487-2931. Product Name: AutoTracks™ 1.1. Contact: Mark Doenges. Date Product Introduced: 12/94. **Product Description & Applications:** Spectral's auto-conforming software gets machine control via this Version 1.1 upgrade, and the inclusion of an AuxBox in the system.

SPECTRAL SYNTHESIS INC.

18800 142nd Ave. N.E.; Woodinville, WA 98072; (206) 487-2931. Product Name: StudioTracks™ 2.1. Contact: Mark Doenges. Date Product Introduced: 1994. **Product Description & Applications:** Following on the enormous success of StudioTracks Version 2.0 for the AudioEngine, Version 2.1 provides major feature enhancements of its own. The primary improvement is serial machine control, a feature for video edit conforming and sound-for-video editing. In addition, some of the features included in Prismatic 1.0 will be ported to StudioTracks so that the two DAW systems from Spectral will continue to be as work-alike as possible. Most notable is the inclusion of waveform viewing and editing directly under the Multitrack window. The existing waveform editor is also still available in StudioTracks 2.1.

THE SYNCLAVIER COMPANY

Rivermill Complex; Lebanon, NH 03766; (603) 448-8887. Product Name: S/Link 2.0. Contact: Monica Meagher. Date Product Introduced: AES 1994. **Product Description & Applications:** S/Link 2.0, the industry's fastest conversion software, now offers compatibility with an even wider variety of standards used in professional and multimedia audio production. By facilitating batch transfer of audio between common—but formerly incompatible—formats, S/Link 2.0 permits users to move freely between audio and video production systems of all types, without leaving the digital domain. **Basic Specifications & Suggested List Price:** Formats S/Link 2.0 supports include .WAV, the Windows PC standard; VOC, the format used by SoundBlaster; MOD and IFF/SVX, two formats used on the Amiga; .SND/.AU, used on NeXT and Sun UNIX-based workstations; plus SoundEdit and Macintosh Sound Resource. S/Link 2.0 also supports AIFF/AIFC, Open Media Framework (OMF) Interchange, Post-Prod™, QuickTime, Sound Designer 1 and II, and Synclavier®. Users can also transfer sounds directly from CD-ROM or CD-Audio.

TRUE IMAGE AUDIO

349 W Felicitia Ave., Ste. 122; Escondido, CA 92025; (800) 621-4411. Product Name: MacSpeakerz V 3.0. Contact: Sharon Alsop. Date Product Introduced: 1993. **Product Description & Applications:** MacSpeakerz is a computer-aided loudspeaker design application for the Macintosh. Version 3.0 can analyze 6 basic box types: 2nd order closed, 3rd order closed, 4th order vented and 4th, 5th and 6th order bandpass speaker systems, plus variations on all of these for a total of 18 different box designs. Includes large library of 800 drivers, and can be easily expanded to include new drivers. Includes crossover and box calculators. **Basic Specifications & Suggested List Price:** Any Mac Plus or later with at least 1 MB of memory and one 800K drive. System file should be Version 4.0 or higher and the Finder file should be Version 5.4 or higher. System 7 compatible. List price: \$349; Direct: \$299.

TURTLE BEACH SYSTEMS

52 Grumbacher Rd.; York, PA 17402; (800) 645-5640. Product Name: Quad Studio. Contact: Stacey Pierson. Date Product Introduced: 7/94. **Product Description & Applications:** Quad Studios allow users to record, overdub, mix and bounce tracks in real time with no loss in sound quality. Lay down your vocal or lead guitar tracks while simultaneously listening to the rest of the mix. Quad Studio provides full synchronization between your digital audio tracks and your MIDI sequencer. Includes the Turtle Beach Tahiti digital audio card and Quad software. **Basic Specifications & Suggested List Price:** Quad Studio provides 4 tracks of 16-bit audio recording in real time. The Tahiti includes the Motorola DSP-56001 and Turtle Beach's proprietary Hurricane architecture, which speeds audio data throughput, up to eight times faster than antiquated DMA-based solutions. Quad Studio has a list price of \$499.

TURTLE BEACH SYSTEMS

52 Grumbacher Rd.; York, PA 17402; (800) 645-5640. Product Name: Monte Carlo. Contact: Stacey Pierson. Date Product Introduced: 8/94. **Product Description & Applications:** Monte Carlo is Turtle Beach's new 100% game-compatible sound card. But we couldn't offer just a sound card, we also added our new Sierra Audio Rack, V-Synth™ software and games. Sierra Audio Rack features

Stealth, our proprietary mode, which gives you CD-ROM playback control in the title bar of any Windows program. To add wavetable synth load, the revolutionary V-Synth software and be up and running with 128 general MIDI instruments. **Basic Specifications & Suggested List Price:** Monte Carlo is a low-cost, game-compatible sound card, which features 16-bit recording & playback, wavetable synthesis through software and a selection of CD-ROM interfaces. Monte Carlo has a list price of \$149.

TWELVE TONE SYSTEMS

PD Box 760; Watertown, MA 02272; (617) 926-2480; (800) 234-1171. Product Name: Cakewalk Home Studio. Contact: David Kilkenny. Date Product Introduced: 1/94. **Product Description & Applications:** Cakewalk Home Studio is an entry-level MIDI sequencer for Windows 3.1 designed for PC hobbyists and music enthusiasts. With Cakewalk, you create and play back music through a sound card or an external MIDI instrument. Cakewalk lets you "build" music layer by layer: record a drum track, add a bass line, lay down a melody and even insert sound effects from Windows wave files. Cakewalk Home Studio offers a basic set of graphical tools for recording, editing, and printing your music, including: a multitrack Staff view with printing of up to 16 staves per page, a Piano Roll

—LISTING CONTINUED ON NEXT PAGE

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COMPUTER HARDWARE AND SOFTWARE

—LISTING CONTINUED FROM PREVIOUS PAGE

view, a Faders view, a Controllers view, a Markers view, Tempo and Meter/Key maps, a multitrack Event List view, and support for digital audio wave files on .WAV compatible sound cards. **Basic Specifications & Suggested List Price:** List price: \$169. IBM PC 286/10MHz or higher, 2MB of RAM, Windows 3.1, hard disk drive, MIDI interface or sound card with MME drivers.

TWELVE TONE SYSTEMS

PD Box 760; Watertown, MA 02272; (617) 926-2480; (800) 234-1171. Product Name: Cakewalk Professional for Windows 3.0. **Contact:** David Kilkenny. **Date Product Introduced:** 7/94. **Product Description & Applications:** This 256-track MIDI sequencer for Windows 3.1 features: a multitrack Staff view with printing of up to 24 staves per page with lyrics, a scrolling Lyrics view, a Controllers view, a Faders view with 96 assignable MIDI faders, a multitrack Event List view, System Exclusive librarian, support for SMPTE/ATC sync and MIDI Machine Control, Tempo and Meter/Key maps, and support for digital audio wave files on .WAV-compatible sound cards. **Basic Specifications & Suggested List Price:** List Price: \$349. IBM PC 386 SX or higher, 4 MB of RAM, hard disk drive, Windows 3.1, mouse, MIDI interface or sound card with MME drivers.

VOYETRA TECHNOLOGIES

5 Ddell Plaza; Yonkers, NY 10701; (914) 966-0600. Product Name: MIDI Orchestrator Plus. **Contact:** Fred Romano. **Date Product Introduced:** 6/94. **Product Description & Applications:** A full-featured MIDI sequencer that puts the power of a recording studio on the desktop. It is simple enough for beginners, yet powerful enough for professionals. MIDI Orchestrator Plus allows the user to build a song at his own pace, one part at a time. One may compose a song with traditional music notation or in piano roll format. Music notation printing is also part of MIDI Orchestrator Plus. **Basic Specifications & Suggested List Price:** System recommendations: 386 SX or higher microprocessor, running at 20MHz or faster; at least 4 MB of RAM; hard disk with at least 20 MB of free space; DOS 3.1 or higher; Windows 3.1 or higher; VGA monitor, Sound Card or MIDI interface. Offered directly through Voyetra at \$129.95. Also available through many distributors & dealers.

WAVES

4028 Papermill Center, Ste. 14; Knoxville, TN 37909; (615) 588-9307. Product Name: L1-Ultramaximizer. **Contact:** Dave Ball. **Date Product Introduced:** 2/94. **Product Description & Applications:** An advanced look-ahead peak limiter and re-quantizer, with IDR (Increased Digital Resolution) dithering and noise-shaping. Used for mastering highest-quality digital audio of files from 8 to 24-bit. Optimal psychoacoustic performance with minimal distortion in both the peak limiter and re-quantizer. Used by major multimedia companies, mastering houses, and post-production facilities. A plug-in for TDM, Sound Designer II. **Basic Specifications & Suggested List Price:** Output: 8 to 24-bit; threshold 0.0dB to -30.0dB; output level 0.0dB to -30.0dB; release 0.01ms to 1 sec; dithering type 1, type 2; noise-shaping (moderate, normal, ultra); A/B compare; load/save; digital/analogue peak compensation; input level trims in 0.1dB steps; full undo, preview, & reset.

WAVES

4028 Papermill Center, Ste. 14; Knoxville, TN 37909; (615) 588-9307. Product Name: Q10 version 1.1. **Contact:** Dave Ball. **Date Product Introduced:** 10/93. **Product Description & Applications:** 10-band parametric equalizer, with dithering and noise-shaping. Version 1.1 includes many enhancements to the renowned Q10, including direct keyboard numeric entry and control, IDR processing (increased digital resolution), phase invert, channel reversal, and autotrim (allows normalization during process). Each band is fully parametric, shelf or pass; 10 bands for each channel (left and right). EQ curve of actual response may be directly moved with the mouse. **Basic Specifications & Suggested List Price:** 10 bands EQ (L & R); ± 18dB gain, Q variable 0.5 to 100.0, frequency 16Hz to 20kHz, A/B compare, fast peak meters, left/right strapping, load/save, 20-bit & 16-bit dithering, phase & channel reverse, clipping indicators, color graphing, input/output level trims in 0.1 dB steps, peak hold numeric indicators.

MAGNETIC TAPE

BASF CORP INFORMATION SYSTEMS

35 Crosby Dr.; Bedford, MA 01730; (617) 271-4000; (800) 225-3326. Product Name: Digital Master 931. **Contact:** Joanne Aiber, prod mgr. **Date Product Introduced:** 10/93. **Product Description & Applications:** Digital Master tape for multitrack recording, newly developed magnetic coating is very robust and extremely smooth for low-level error correction. Accurate edges due to new slitting process ensure exact tape tracking. Supplied on precision metal reels for precise operation. Fully compatible with the international IEC Reference Tape. **Basic Specifications & Suggested List Price:** DM 931 1/2"x2,500' reel list price \$88.39; 1"x5,000' reel \$171.39; 1"x10,000' reel \$311.32

BASF CORP INFORMATION SYSTEMS

35 Crosby Dr.; Bedford, MA 01730; (617) 271-4000; (800) 225-3326. Product Name: Studio Master 900 Maxima. **Contact:** Joanne Aiber, prod mgr. **Date Product Introduced:** 8/94. **Product Description & Applications:** High-output tape for analog recording with 3dB higher MOL and 2dB lower noise. SM900 Maxima has a 5dB greater dynamic range than standard analog tapes. Its low print through alleviates problems associated with pre- and post-echo. Using only chlorine-free paper product and pure polystyrene core, SM900 Maxima's packaging is completely recyclable. **Basic Specifications & Suggested List Price:** SM900 Maxima 1/4" 2,500' hub, list price \$13.59; 1/4" 2,500' reel \$24.79; 1/2" 2,500' reel, \$45.22; 1" 2,500' reel, \$77.45; 2" 2,500' reel, \$163.48; 2" 5,000' reel, list price \$404.24.

OIC DIGITAL

500 Frank W Burr Blvd.; Teaneck, NJ 07666; (201) 692-7700; FAX: (201) 692-7757. Product Name: 8mm digital audio recording cassette. **Contact:** Kevin Kennedy, VP mktg. **Date Product Introduced:** 6/94. **Product Description & Applications:** 8mm digital audio recording cassettes for multitrack recording applications—specifically the Tascam DA-88 The cassettes are available in 4 lengths—15, 30, 60, and 120 minutes. The times are true audio times. This is the only 8mm multitrack cassette that gives a full 120 minutes of audio. **Basic Specifications & Suggested List Price:** DA-8-15 15min., \$5; DA-8-30 30min., \$5.75; DA-8-60 60min., \$6.50; DA-8-120 120min., \$8.50.

OIC DIGITAL

500 Frank W Burr Blvd.; Teaneck, NJ 07666; (201) 692-7700; FAX: (201) 692-7757. Product Name: 8mm cassette for multitrack recording. **Contact:** Kevin Kennedy, VP mktg. **Date Product Introduced:** 6/94. **Product Description & Applications:** DIC Digital is proud to announce the introduction of a new U.S.-made 8mm cassette that is designed for use in digital multitrack decks, in particular the Tascam DA-88. The new product was field-tested extensively at prominent DA-88 installations, and all the feedback has been exceptional. DIC Digital will offer the tape in four lengths, 15-, 30-, 60- and 120-minute lengths. These lengths are actual audio recording times, not videotape lengths that offer the user less than what they expect.

EASTMAN KODAK COMPANY

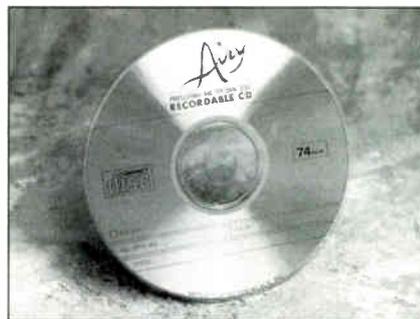
343 State Street; Rochester, NY 14650; (800) CD-KDDAK. Product Name: Kodak Infoguard CD Writable Discs. **Contact:** Paul W. Melnychuk, sales mgr. **Date Product Introduced:** 3/94. **Product Description & Applications:** The new and improved Kodak Infoguard Writable CD discs are Orange Book compliant for compatibility with all manufacturers' CD recorders. Record Red Book audio, text, images, graphics and drawings on a single CD. Available in individual jewel case or convenient 50-disc bulkpack. **Basic Specifications & Suggested List Price:** CD write-once media 580MB capacity with 63-min. discs, 682MB with 74-min. discs. Each disc has a unique bar code and numerical labeling. Bar code is readable in Kodak PCW Writers 200/225/600. List price: \$25.

MAXELL CORPORATION OF AMERICA—PROFESSIONAL PRODUCTS

22-08 Rte. 208; Fair Lawn, NJ 07410; (201) 794-5900. Product Name: CD-R. **Contact:** Patricia Byrne, product mgr. **Date Product Introduced:** 4/94. **Product Description & Applications:** CD-R compact recordable disc—120mm CD-recordable, with up to 680MB capacity. These discs are the ideal media for applications such as image storage and retrieval, desktop publishing, software development and distribution, as well as multimedia applications. **Basic Specifications & Suggested List Price:** Recording capacity 680MB. Dimensions 120 mm. Available in 63- and 74-minute lengths. List prices: CDR-63, \$34.90; CDR-74, \$38.75.

MAXELL CORPORATION OF AMERICA—PROFESSIONAL PRODUCTS

22-08 Rte. 208; Fair Lawn, NJ 07410; (201) 794-5900. Product Name: R-DA. **Contact:** Patricia Byrne, product mgr. **Date Product Introduced:** 8/94. **Product Description & Applications:** R-DA—professional-grade certified DAT cassettes. **Basic Specifications & Suggested List Price:** Major advances, 5-layer tape structure, ceramic armor metal particles, and an ultra-precision-constructed cassette mechanism. The result of these advances is superior output, matchless reliability and stable tape travel. Product available in lengths of 19, 34, 49, 64, 94 and 124 minutes. List prices: \$6.50 to \$12.60.



MTC AMERICA
Mitsui CD-R

MTC AMERICA

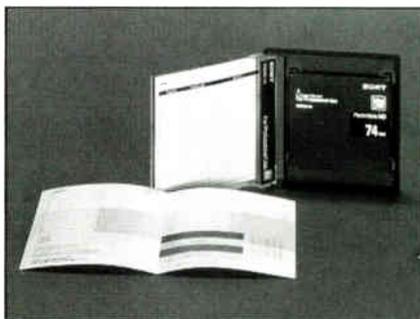
140 E 45th St.; New York, NY 10017; (212) 867-6330. Product Name: Mitsui CD-R. **Contact:** Mike Warman, mktg mgr. **Date Product Introduced:** 1993. **Product Description & Applications:** The Mitsui CD-R is based upon a dye (PTHALOCYANINE), for which MTC owns the worldwide patent. It is a 5-layer CD-recordable media, with extreme longevity and durability. The product has a 3-year warranty. It is also Yamaha-certified. The CD-R blank disc is available in both logo or blank disc. Recording sizes are 18 min., 63 min. and 74 min. It can be used for all audio recording as well as data and is extremely useful for archiving purposes. **Basic Specifications & Suggested List Price:** 18-min. disc has an SRP of \$18; 63-min. disc, either logo or blank, SRP \$20; 74 min disc, either logo or blank, SRP \$23; 63-min. disc Yamaha-certified has an SRP of \$30.

SONY ELECTRONICS INC.

1 Sony Drive; Park Ridge, NJ 07656-8003; (201) 930-6981; FAX: (201) 358-4058. Product Name: CD-R, write-once compact disc recordable media. **Contact:** Beverly Randolph Meaux, pub rel. **Date Product Introduced:** 3/94. **Product Description & Applications:** As co-developer of the compact disc, the CDD-74 (74-minute audio/650 megabytes), and the CDD-63 (63 minutes audio/533 megabytes) line-up has a ten-year minimum shelf life, record at a constant linear velocity of 1.4 and 1.2 meters per second, respectively. Special coating on discs' label side accepts imprints from many sources. Used in professional audio, DVI, CD graphics and Photo CD applications. **Basic Specifications & Suggested List Price:** Suggested list price: CDD-74, \$29.95; CDD-63, \$27.95.

SONY ELECTRONICS INC.

1 Sony Drive; Park Ridge, NJ 07656-8003; (201) 930-6981; FAX: (201) 358-4058. Product Name: Pro DAT Plus™ (PDP) Professional Digital Audio Tape. **Contact:** Beverly Randolph Meaux, pub rel. **Date Product Introduced:** 3/94. **Product Description & Applications:** Designed for the rigors of professional music, sound and dialog recording, the line-up includes several formulation and packaging features to reduce dropouts and protect the tape in archives and the field. Ultra-fine magnetic particles enhance playback output and improve the signal-to-noise ratio. **Basic Specifications & Suggested List Price:** Sony's HD&R binder system better adheres the individual metal particles to the film backing, hence reducing the build-up of debris and dust, which can cause dropouts. Anti-static lids on the DAT shells protect the tape from dust in the archive. The shells also include heat-resistant resins to protect the tape from dust when taken into the field for such applications as film sound recording. A larger window enables users to easily check tape status. Larger label area provides for additional program interest. Jewel cases packaging lengths: 15-, 34-, 48-, 64-, 94- and 124-minute tapes for \$10.29, \$12.03, \$13.80, \$15.73, \$19.13 and \$22.50, respectively. New album box lengths include 34-, 64-, and 124-minute tapes for \$13.93, \$15.93, \$18.05, \$21.25 and \$24.43, respectively.



SONY ELECTRONICS INC
Pro Recordable MD PRMD-74

SONY ELECTRONICS INC.

1 Sony Drive; Park Ridge, NJ 07656-8003; (201) 930-6981; FAX: (201) 358-4058. Product Name: Pro Recordable MD PRMD-74. **Contact:** Beverly Randolph Meaux, pub rel. **Date Product Introduced:** 4/94. **Product Description & Applications:** New from Sony,

the recordable MiniDisc offering professional performance. It is the newest member of the recordable MiniDisc family, guaranteeing digital sound at professional standards; all packed into one small disc. Engineered to ensure optimum reliability and consistent quality to satisfy every professional need, whether BGM, sound effects or audio for broadcasting. **Basic Specifications & Suggested List Price:** Ensures inherently non-contact playback using a laser beam, eliminating the physical contact of the magnetic head in conventional tape systems. Audio quality thus remains clear and free from the effect of wear on the media or hardware. Has quick random access. Sound sources can be recorded on up to 255 tracks (in both stereo and mono), and any track can be accessed instantly. Ideal for playing sound effects during stage performances and concerts. Block error rate dramatically reduced and quality performance maintained for 1,000,000 erase/read/write cycles. This is one order of magnitude better than the consumer MD. Suggested list price: \$16.99.

3M

3M Center Bldg., 223-5N-01; St. Paul, MN 55144-1000; (800) 752-0732. Product Name: AHD Audio Hi8 digital mastering cassette. Contact: John Yorkovich. Date Product Introduced: 10/94. **Product Description & Applications:** The new AHD Audio Hi8 digital mastering cassettes offer state-of-the-art technology in a durable, compact format for Audio Hi8 recorders such as the Tascam DA-88. 3M AHD digital cassettes are designed with ultrafine metal particles and a rugged polyester backing to assure fewer data errors and maximum durability. **Basic Specifications & Suggested List Price:** 3M AHD digital cassettes provide a full 113 minutes of record time, 5 more minutes than standard Hi8 cassettes. They are packaged in a hinged album box and come with audio specific (APRS/SPARS) labels to identify and library recordings.

3M

3M Center Bldg., 223-5N-01; St. Paul, MN 55144-1000; (800) 752-0732. Product Name: ASD Audio S-VHS digital mastering cassette. Contact: John Yorkovich. Date Product Introduced: 11/94. **Product Description & Applications:** The new ASD Audio S-VHS digital mastering cassettes have been developed for use on all ADAT recorders, such as the Fostex RD-8 and the Alesis ADAT. 3M ASD digital cassettes include an exclusive binder system and a stabilized polyester backing to ensure fewer data errors and increased durability. 3M ASD tape utilizes the 3M Total Anti-Static System of protection to minimize dust and dirt accumulation and reduce errors throughout the program. **Basic Specifications & Suggested List Price:** 3M ASD digital cassettes provide a full 42 minutes of record time at the 48kHz sampling rate, 2 more minutes of record time than standard S-VHS cassettes. They are packaged in both a sleeve and an album and come with audio specific (APRS/SPARS) labels designed for digital audio mastering.

MICROPHONES

AC-CETERA INC.

3120 Banksville Rd.; Pittsburgh, PA 15216; (412) 344-8609. Product Name: PIG-E-BAK. Contact: Mark Tarshis. Date Product Introduced: 1994. **Product Description & Applications:** PIG-E-BAK is a dual clamp mounting system with adjustments for proper polarity alignment and comfort to enable use of two microphones simultaneously, either separate feed or stereo. Microphones can be mounted parallel, vertical or at any other angle. The tilt of the mic is also adjustable for exact polarities. Other important features: shock mount protective pads on clamps; adjustable opening to accept thin or wide-bodied mics; lockable to protect mics. **Basic Specifications & Suggested List Price:** PIG-E-BAK weighs only 4 ozs and is made in the USA of virtually unbreakable material. PIG-E-BAK enables total adjustability of dual mics. PIG-E-BAK locks to protect mics. Shock mount pads eliminate as much as 80% of shock or vibration noise. List price: \$32.95.

ALLEGRO SOUND/AUDIOWORKS

15004 Ventura Blvd.; Sherman Oaks, CA 91403-2441; (818) 766-9101; FAX: (818) 505-0149. Product Name: 6072M Microphone Tube. Contact: Richard David Katz. Date Product Introduced: 10/93. **Product Description & Applications:** Allegro Sound 6072 vacuum tube specially selected for use in classic and modern tube mics. Guaranteed improvement in sound quality and lower noise. Recommended by AKG Acoustics. Other Audiophile Reference™ tubes available on request. **Basic Specifications & Suggested List Price:** Microphonics, shorts, Grm tests, general use only, \$25.

AUDIO ENGINEERING LTD. (MICRON)

Fitzroy House, Abbot St.; London, E8 3LP UK; 011-44-71-254-5475. Product Name: Micron TX505 Hand-Held Transmitter. Contact: John Wykes. Date Product Introduced: 7/94. **Product Description & Applications:** An important new product for the broadcast and live entertainment industries, the TX505 Hand-Held Transmitter is designed specifically for in-shot applications. Available with a wide range of high-quality microphone heads from Milab of Sweden, the TX505 can also be supplied custom-fitted with a choice of other dynamic and electret heads. It is designed for a very high standard of audio performance, even at extreme sound pressure levels. **Basic Specifications & Suggested List Price:** A choice of mi-

crophone heads from Swedish manufacturer Milab are available for the TX505, which is available with switchable frequency options and an integral antenna. It incorporates the improved Micron CNS system for excellent performance.

AUDIO ENGINEERING LTD. (MICRON)

Fitzroy House, Abbot St.; London, E8 3LP UK; 011-44-71-254-5475. Product Name: TX500 & TX600 Series Pocket Transmitters. Contact: John Wykes. Date Product Introduced: 7/94. **Product Description & Applications:** The new TX500 and 600 Series Pocket Transmitters feature an advanced development of Micron's unique Complementary Noise Suppression (CNS) system. This ensures a very low noise floor, wide dynamics and extended operating range, with the new version exhibiting very tight tracking of high energy, high frequency transients, and a more transparent ambience in quiet locations. Micron products are widely used in the broadcast, sound reinforcement and theater sectors. **Basic Specifications & Suggested List Price:** Built into a new lightweight yet rugged stainless steel case, with a captive battery cover, the transmitters' circuitry includes a sophisticated design of audio limiter, which has variable threshold adjustment and is entirely free of pumping effects. The new products offer a wider range of input sensitivities and microphone powering arrangements, together with built-in line-up tone, battery test and transmitted "low battery" signal.

AUDIO-TECHNICA U.S., INC.

1221 Commerce Drive; Stow, OH 44224; (216) 686-2600. Product Name: AT4050/CM5 Studio Capacitor Microphone. Contact: Garry Elliott. Date Product Introduced: 2/94. **Product Description & Applications:** The AT4050/CM5 expands on the technology of the critically-acclaimed AT4033 studio capacitor microphone. Its new large-diaphragm design utilizes two capacitor elements to provide consistent, superior performance in cardioid, omnidirectional and figure eight polar pattern settings. The AT8441 shock mount is included. **Basic Specifications & Suggested List Price:** Frequency response: 20Hz to 20kHz; max input sound level: 149dB SPL, 1 kHz at 1% THD; 159dB SPL with 10dB pad (nominal); dynamic range, typical: 132dB, 1 kHz at max SPL. \$995 list price includes AT8441 shock mount.

AUDIO-TECHNICA U.S., INC.

1221 Commerce Drive; Stow, OH 44224; (216) 686-2600. Product Name: AT873R UniPoint® Condenser Microphone. Contact: Garry Elliott. Date Product Introduced: 11/94. **Product Description & Applications:** Audio-Technica's AT873R is the most recent addition to the UniPoint® Series of condenser microphones. This small, handheld microphone features the latest in low-mass condenser technology, hypercardioid polar pattern with interchangeable elements (omni, cardioid, subcardioid capsules are available separately), and a self-contained, pneumatic shock mount. Ideal for live sound, on-location recording, many types of vocal groups and places of worship. **Basic Specifications & Suggested List Price:** Frequency response: 30Hz to 20kHz; maximum input sound level: 144dB SPL; dynamic range: 117dB.

BEYER DYNAMIC

56 Central Ave.; Farmingdale, NY 11735; (516) 293-3200. Product Name: MPC65. Contact: John Cardone. Date Product Introduced: 11/94. **Product Description & Applications:** The MPC65 is a cardioid boundary effects mic. It is small and unobtrusive, making it extremely suitable for conference or church. Due to its unique trapezoidal design and half-cardioid polar pattern, the feedback effects resulting from reverberation or echo are greatly reduced. It utilizes a detachable preamp which terminates to an XLR connector, requiring a phantom power source of 12V to 48V. **Basic Specifications & Suggested List Price:** Frequency response: 80Hz to 18kHz. Signal-to-noise ratio: 138dB. Impedance: 190Ω. Dimensions: 86x61x29mm. Weight: 190 g (w/preamp). Price not available.

BEYER DYNAMIC

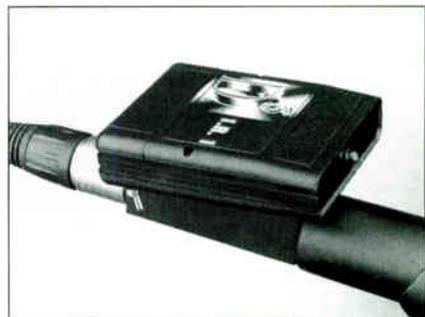
56 Central Ave.; Farmingdale, NY 11735; (516) 293-3200. Product Name: NE700. Contact: John Cardone. **Product Description & Applications:** The NE700 is a UHF diversity receiver. It features two independent diversity receivers, an internal distribution amplifier, 2 independent isolated audio outputs per receiver, switchable AF output levels, headphone monitoring, connection of up to 3 units to provide a 6-channel system via an external UHF splitter. Rack mountable. **Basic Specifications & Suggested List Price:** Frequency range: 470-980 MHz max. 2 channels per unit max. 12 per TV channel, AF frequency response: 30-20,000 Hz. Dimensions: 1 u 19", 31 cm deep. Comes w/ power cable. Retail \$9,449.00.

CAD (CONNEAUT AUDIO DEVICES)

PO Box 120; 341 Harbor St.; Conneaut, OH 44030; (216) 593-1111; (800) 762-9266. Product Name: Equitek E-300. Contact: Michael Ketchell. Date Product Introduced: 11/94. **Product Description & Applications:** CAD continues its tradition as a leading manufacturer of professional audio products by introducing the Equitek E-300. The E-300 is an extremely high-quality multi-patterned microphone featuring a uniquely designed 1.2" dual diaphragm capsule, and completely manufactured in the U.S.A. This microphone will be shipped complete with a custom 360° shock mount, an external power supply and a hard shell case. **Basic Specifications & Suggested List Price:** Retail prices to be announced.

CROWN INT'L

1718 Mishawaka Rd.; Elkhart, IN 46517; (219) 294-8000. Product Name: CM-312 Headroom Microphone. Contact: Bob Herrold. Date Product Introduced: 2/94. **Product Description & Applications:** The CM-312 provides condenser hypercardioid directional characteristics with the same comfort and fit found with Crown's CM-311. The CM-312 is ideal for situations where a little less discrimination against high stage levels is desired. It's ideal for live concert sound, aerobics and even broadcasting. It includes a battery beltpack for use hardwired or with a wireless transmitter. The CM-312/E connects directly to any wireless transmitter. **Basic Specifications & Suggested List Price:** Electret condenser element; 50 Hz to 17kHz frequency response; hypercardioid polar pattern; -5 ohms impedance; 4 mV/Pa sensitivity. List price: \$259.



D³ INC.
IR-1

D³ INC.

1012 Morse #19; Sunnyvale, CA 94089; (408) 745-7899; (800) 701-7899. Product Name: IR-1. Contact: Dale Deremer. Date Product Introduced: 10/94. **Product Description & Applications:** D³ Inc. has revolutionized microphone control with the IR-1, a battery powered device which easily attaches to a wide variety of microphones used in live or studio applications. IR-1 noiselessly switches microphones on or off by automatically detecting when a performer is within an adjustable range, and displays on/off status by way of a visible indicator. System headroom is increased since unwanted stage noise is no longer amplified. In the studio, IR-1 eliminates gates; the performer is the trigger, not the audio. You work the audience...let the IR-1 work the mic. **Basic Specifications & Suggested List Price:** Suggested list price \$165.

D³ INC.

1012 Morse #19; Sunnyvale, CA 94089; (408) 745-7899; (800) 701-7899. Product Name: IR-2. Contact: Dale Deremer. Date Product Introduced: 10/94. **Product Description & Applications:** D³ Inc. has revolutionized microphone control with the IR-2, an AC powered device which easily attaches to a wide variety of microphones used in live or studio applications. IR-2 noiselessly switches microphones on or off by automatically detecting when a performer is within an adjustable range, and displays on/off status by way of a visible indicator. System headroom is increased since unwanted stage noise is no longer amplified. In the studio, IR-2 eliminates gates; the performer is the trigger, not the audio. You work the audience...let the IR-2 work the mic. **Basic Specifications & Suggested List Price:** Suggested list price \$199.



DENECKE INC.
d-code™ PS-1 48 Volt Microphone Power Supply

DENECKE INC.

5417 B Cahuenga Blvd.; North Hollywood, CA 91601; (818) 766-3525. Product Name: d-code™ PS-1 Volt Microphone Power Supply. Contact: Jeni Van Trees. Date Product Introduced: 6/94. **Product Description & Applications:** The d-code™ PS-1, designed as a low-cost auxiliary phantom power supply, features long battery life with a low battery LED indicator. The low noise output will work in the most demanding applications. Automatic power off conserves battery life when the microphone is unplugged. It is designed with a

—LISTING CONTINUED ON NEXT PAGE

MICROPHONES

—LISTING CONTINUED FROM PREVIOUS PAGE

small rugged case and features a quick change battery holder. Battery life, using a 9V alkaline battery, is over 10 hours with a 4 mA mic. **Basic Specifications & Suggested List Price:** Price \$95.



G PRIME LIMITED
Microtech Gefell UMT 70S

G PRIME LIMITED

1790 Broadway, Suite 402, New York, NY 10019; (212) 765-3415.
Product Name: Microtech Gefell UMT 70S. **Contact:** Jerry Graham.
Date Product Introduced: 10/94. **Product Description & Applications:** Studio condenser microphone with large diameter capsule and transformerless output. Utilizes the M7 capsule, whose sonic qualities are legendary. Newly designed amplifier features active balanced output to reduce noise floor and eliminate RFI. **Basic Specifications & Suggested List Price:** Three switchable polar patterns, max SPL 149dB, 48V phantom powering. Price \$1,295.

NADY SYSTEMS, INC.

6701 Bay St., Emeryville, CA 94608; (510) 652-2411 ext. 252.
Product Name: Nady ENG-11. **Contact:** Joe Territo. **Date Product Introduced:** 9/94. **Product Description & Applications:** The Nady ENG-11 is a snap-on transmitter module that converts hardwired microphones to professional wireless operation. The ENG-11 operates on one channel in the VHF high band and is compatible with all Nady VHF wireless receivers. The ENG-11 offers 120dB dynamic range, maximum power allowed by FCC for 200 to 1,500 feet operating range and 16 to 20 hours performance from a single 9V alkaline battery. **Basic Specifications & Suggested List Price:** Frequency Response: 25 to 20k Hz \pm 3dB. THD: less than 0.3%; Frequency stability: \pm 0.005%, crystal controlled; dimensions: 1.5" x 4.2" x 1.5"; weight: 7 oz.

NADY SYSTEMS, INC.

6701 Bay St., Emeryville, CA 94608; (510) 652-2411 ext. 252.
Product Name: Nady ENG-12. **Contact:** Joe Territo. **Date Product Introduced:** 9/94. **Product Description & Applications:** The Nady ENG-12 is a snap-on transmitter module that converts any hardwired microphone to multichannel UHF wireless operation. It features up to 160 user switchable channels in pre-programmed groups from 477MHz to 951MHz. Nady's proprietary UHF RF link is up to 20dB quieter than currently available models. The ENG-12 is compatible with the Nady 950GS rackmount and the Nady 661 VR portable multichannel UHF receivers. **Basic Specifications & Suggested List Price:** Frequency response: 25Hz to 20kHz \pm 3dB; dynamic range: 120dB; output power 50mW to 125mW, depending on frequency (max allowed by FCC); operating range: 2,000 feet in adverse conditions; up to 1,500 feet line of sight. Dimensions: 1.5" x 4.2" x 1.5". Weight: 7 oz.

NEUMANN (USA)

6 Vista Dr., PD Box 987, Did Lyme, CT 06371; (203) 434-5220.
Product Name: KM184. **Contact:** Jeff Alexander. **Date Product Introduced:** 10/94. **Product Description & Applications:** The KM184 is a cardioid, small diaphragm condenser microphone designed for live sound and recording applications. It utilizes the capsule from the famous KM84 and the electronics from the TLM170. The KM184 offers outstanding Neumann performance at a price much lower than previously possible. **Basic Specifications & Suggested List Price:** Frequency range 20Hz to 20kHz. Self noise 16dB(A)-weighted. Dynamic range 122 dB. Price: less than \$600 (preliminary).

OKTAVA, (DIST. BY TULA AUDIO INTERNATIONAL)

73 Hemenway St., #502, Boston, MA 02215; (617) 859-0992.
Product Name: Oktava MK 012. **Contact:** Robin Cox-Yeldham/Simaen Skolfield. **Date Product Introduced:** 6/94. **Product Description & Applications:** New Russian studio and broadcast capacitor "pencil" microphone. Interchangeable cardioid, hypercardioid, omnidirectional capsules, -10dB level pad body, optional elastic suspension cage. Comes complete in presentation wooden box. High performance, flat frequency response for close-miking acoustic instruments, coincident and spaced stereo miking, choral and ensembles. **Basic Specifications & Suggested List Price:** Interchangeable cardioid, hypercardioid, omnidirectional capacitor

capsules, 20Hz to 20kHz frequency response, 10m V/Pa sensitivity, low noise output, 300 ohms impedance (nominal), 48 volts phantom power, XLR balanced connector, transformerless preamp circuitry. \$600 Box set.

OKTAVA, (DIST. BY TULA AUDIO INTERNATIONAL)

73 Hemenway St., #502, Boston, MA 02215; (617) 859-0992.
Product Name: Oktava MK 219. **Contact:** Robin Cox-Yeldham/Simaen Skolfield. **Date Product Introduced:** 6/94. **Product Description & Applications:** New Russian cardioid studio condenser "classic" microphone. A fixed cardioid pattern large diaphragm capsule, gold plated, transformerless and discrete preamp circuitry. High input sensitivity (SPL), low noise output, 48 volts phantom power (nominal), 10dB level pad and low frequency filter. A professional microphone for lead vocals, percussion, acoustic instruments. **Basic Specifications & Suggested List Price:** 1-1/4" gold plated dual symmetry diaphragms, cardioid polar pattern, 40Hz to 16kHz frequency response, 110mV/Pa sensitivity; nominal output impedance 200 ohms, 48V phantom powered, XLR fitted, balanced input. Recommended retail price: \$500.

OLSEN AUDIO GROUP INC.

7845 E. Evans Rd., Scottsdale, AZ 85260; (602) 998-7140. **Product Name:** WindTech™. **Contact:** Craig Olsen. **Date Product Introduced:** 1994. **Product Description & Applications:** WindTech™ offers a broad range of windscreens to fit virtually any microphone made. We use a proprietary acoustical foam that is hypo-allergenic and transparent to soundwaves while eliminating windnoise. Windscreens are available in up to 25 different colors including "Tie-Dye." **Basic Specifications & Suggested List Price:** 300 Series (SM58 Size) \$4.75; 5700 Series (SM57 Size) \$4.25; 20421 Series (RE20, MD421 etc.) \$39.95; Shotgun Series (8" to 21") \$19.95 to \$29.95.

PASO SOUND PRODUCTS

14 First St., Pelham, NY 10803; (914) 738-4800. **Product Name:** R134. **Contact:** Ken O'Brien. **Date Product Introduced:** 5/94. **Product Description & Applications:** Modular 4-channel VHF wireless receiver. Allows operation of up to 4 wireless microphones simultaneously. Offers mixed or separate outputs per microphone. Built-in active antenna distribution and amplifier also available in 8-channel version (R38). **Basic Specifications & Suggested List Price:** Bandpass 170MHz to 200MHz. RF amp gain +10 dB. Output level 2V 600 Ω (line); 100mV 250 Ω (mic).

POPLESS VOICE SCREENS

PD Box 1014; New Paltz, NY 12561-1014; (914) 255-3367; (800) 252-1503. **Product Name:** VAC-3.5. **Contact:** Brian Gunn. **Date Product Introduced:** 1/2/94. **Product Description & Applications:** Popless Voice Screens introduces Variable Acoustic Compression™. VAC is a pop filter that allows you to adjust the distance between two layers of acoustic material or use just one layer. By changing the distance between the two layers you vary the amount of direct attack to the capsule of your microphone. This system allows you to adjust for the best combination of pop protection and sonic transparency. All this before the sound reaches the microphone! **Basic Specifications & Suggested List Price:** The VAC-3.5 screen measures 3.5 inches in diameter and comes with two screens, the screen holder and a ball socket with standard female mic thread. The VAC-3.5 attaches to a mic stand or gooseneck. The cost is \$32, available through retailers or direct. Write or call for free brochure.



POPLESS VOICE SCREENS
VAC-6c

POPLESS VOICE SCREENS

PD Box 1014; New Paltz, NY 12561-1014; (914) 255-3367; (800) 252-1503. **Product Name:** VAC-6c. **Contact:** Brian Gunn. **Date Product Introduced:** 1/94. **Product Description & Applications:** Popless Voice Screens' new Variable Acoustic Compression™ is an adjustable pop filter for the recording and broadcast industries. Model VAC-6c comes with voice screen (see description under model VAC-3.5), 15 inches of gooseneck and a clamp to attach to the same mic stand as your microphone. Acoustic compression is achieved by varying the distance between the two screens or using only one screen. The VAC-6c does the job and sounds transparent. **Basic Specifications & Suggested List Price:** The VAC-6c comes with two 6 inch diameter voice screens, the screen holder and a ball

socket with female mic thread. Also included: 15 inch gooseneck and mic stand clamp with sorbathane pads for vibration absorption. The cost is \$54 available through dealers or direct. Call or write for free brochure.

PROFESSIONAL SOUND CORPORATION

24932 Avenue Kearny #4; Valencia, CA 91355; (805) 295-9395.
Product Name: PSC Headset Mic. **Contact:** Chris Palmer. **Date Product Introduced:** 4/94. **Product Description & Applications:** The PSC Headset Microphone is the premier boom-style microphone offering superior sonic specifications in a comfortable headband design. Its cardioid pickup pattern rejects sounds from the rear, such as those delivered from floor monitors, on-stage musical instruments and crowd noise. Simple in its function, the Headset Mic sports a comfortable, inconspicuous, user-adjustable headband and flexible boom arm in an attractive non-reflective black matte finish. It may be used in applications ranging from live performance vocals, broadcast announcing or group presentations to numerous other hands-free uses.

SAMSON TECHNOLOGIES CORP.

PD Box 9068; Hicksville, NY 11802-9068; (516) 932-3810. **Product Name:** Install Series. **Contact:** Jack Knight. **Date Product Introduced:** 1/94. **Product Description & Applications:** Dedicated wireless system for sound contractors. Microprocessor True Diversity™ for maximum RF reception over greater distances. Removable rear-mount antennas. Rear panel terminal output strip. XLR balanced output, dbx noise reduction. Compact, rack-mountable receiver. Wide selection of popular mic elements. **Basic Specifications & Suggested List Price:** Transmitters (TX-3 belt-pack and HT-3 handheld). Frequency range: 174.60MHz to 213.20MHz. Operating range: 300 ft. avg. Radiating harmonic and spurious emission: less than -40dB (below carrier frequency) signal-to-noise 94dB overall. THD: < 5% at 1kHz (input: -20dB). Receiver (IR-3): Frequency range: 174.60MHz to 213.20MHz. Signal sensitivity: 15dBu at 55dB. Selectivity: \pm 150kHz at -60dB. Audio frequency response: 40Hz to 15kHz \pm 3dB. Price: \$579.99 and up.

SAMSON TECHNOLOGIES CORP.

PD Box 9068; Hicksville, NY 11802-9068; (516) 932-3810. **Product Name:** Stage 33. **Contact:** Jack Knight. **Date Product Introduced:** 1/94. **Product Description & Applications:** True Diversity™ wireless system, microprocessor True Diversity™ for maximum RF reception, dbx noise reduction, 13 available frequencies, full range on-board transmitter controls, 17-hour battery life, available with a wide variety of popular hand-held, lavaliere and headset mics. **Basic Specifications & Suggested List Price:** Transmitters (HT-3 handheld, CT-3 belt-pack); transmit frequency range: 174.60MHz to 213.20MHz; operating range: 300 ft. average; frequency response: 40Hz to 15kHz \pm 3dB; signal-to-noise: 94dB overall. THD: > 5% at 1kHz. Receiver (SR-33) frequency range: 174.60MHz to 213.20MHz; signal sensitivity: 15dBu at 1kHz-deviation 15kHz; THD: > 1.5%; frequency response (audio): 40Hz to 15kHz \pm 3dB. Suggested list: \$399.99 and up.

SCHALLTECHNIK DR.—INO SCHOEPS GMBH

Spitalstr 20; 76227 Karlsruhe, Germany; 0721/9 43 20-0. **Product Name:** CCM: Classic Compact. **Contact:** Jerry Bruck. **Date Product Introduced:** 10/94. **Product Description & Applications:** CCM: Classic Compact Condenser Microphone with permanently attached cable having an XLR connector at its end. The complete microphone is exactly as small as the microphone capsule MK—plus connector of the active cable. The cable is balanced, thus the miniature microphone is insensitive to electromagnetic interference. **Basic Specifications & Suggested List Price:** The technical specifications are nearly the same as for the corresponding microphone of the Colette Series (CMC + MK—). The price is not yet finally calculated.

SENNHEISER ELECTRONIC CORP.

6 Vista Dr.; PD Box 987; Did Lyme, CT 06371; (203) 434-9190. **Product Name:** K6 Series. **Contact:** Gregory Beebe. **Date Product Introduced:** 6/94. **Product Description & Applications:** The K6 Series is a versatile condenser microphone system. By simply exchanging one of the microphone capsules varying from mini lavaliere to shotgun configuration, the applications range from studio recording to sound reinforcement. Whether battery ("AA") cells or phantom powered, the same characteristics are achieved. Exceptional high gain, superior transient response, high signal-to-noise ratio and greater "reach" capability have all been realized as a result of Sennheiser's new developments in surface-mount technology. **Basic Specifications & Suggested List Price:** All capsules are back electret technology offering excellent transparency, dynamic range and transient response. Both the K6 and K6P have balanced output, low impedance (200 Ω) and terminate to standard 3 pin XLR. Present system configurations are priced from \$414 to \$591.

SENNHEISER ELECTRONIC CORP.

6 Vista Dr.; Did Lyme, CT 06371; (203) 434-9190. **Product Name:** Proforce BF-1053. **Contact:** Gregory Beebe. **Date Product Introduced:** 9/94. **Product Description & Applications:** The BF-1053 is the newest addition to Sennheiser's Proforce line. This wireless transmitter is designed to offer freedom of movement to performers, while maintaining sonic qualities of wired systems. Pickup is done by the world famous MKE-2 microphone in conjunction with a two position sensitivity switch to ensure a proper input level. **Basic**

Specifications & Suggested List Price: It features a 2-channel, 50 mW (-3 dB) transmitter which utilizes Sennheiser's HiDyn plus noise reduction technology. Frequency response is 20 Hz to 20 kHz (-3dB) and an impressive 120 dB (A) signal-to-noise ratio makes the BF-1053 a wise choice for vocals, saxophones, trumpets, clarinets, trombones, acoustic guitars, violins, etc. Pricing TBA.

SEYMOUR DUNCAN ACOUSTIC

5427 Hollister Ave.; Santa Barbara, CA 93111-2345; (805) 964-9610; (805) 964-9749. Product Name: Antiquity™ Hand Made, Aged, Vintage Guitar Pickups. Date Product Introduced: 1/94. Product Description & Applications: Each pickup is entirely hand built in Santa Barbara by Seymour (or under his watchful eye) and employs the same production techniques and the same materials as the originals. In addition to the handwork, each pickup is carefully distressed through numerous painstaking steps to achieve the exact look and sound of the 35 year old originals. Every detail has been attended to with meticulous attention. Basic Specifications & Suggested List Price: The Antiquity™ Line is currently 21 models strong and includes humbuckers, Strats, Teles, Duo-sonics, Jaguars, Jazzmasters, P-Bass and Jazz Basses, mandolins, lap steels and more! The pickups range in price from \$90 to \$165. They have to be seen to be believed!

SEYMOUR DUNCAN ACOUSTIC

5427 Hollister Ave.; Santa Barbara, CA 93111-2345; (805) 964-9610; (805) 964-9749. Product Name: SoundSpots™ Piezo Crystal Pickups for Acoustic Musicians. Date Product Introduced: 1/21/94. Product Description & Applications: The handcrafted SoundSpots™ line is currently nine models strong. Unlike other "dot-type" transducers, each SoundSpot is hand ground to extremely fine tolerances. This process, along with the selection of materials, renders a pickup with a very thin surface that also maintains its strength and flexibility. The result is a transducer that is ultra-sensitive and, therefore, natural and warm sounding. Basic Specifications & Suggested List Price: In addition to SoundSpots for acoustic guitars, basses, banjos, mandolins, pianos and violins, there are a host of SoundSpots for non-stringed instruments such as bongos, congas, cymbals, hand drums, harmonicas and steel drums; as well as berimbau, bouzouki, hammer dulcimers and many more. SoundSpots range from \$69 to \$149.



SHURE BROTHERS
SC Wireless Series/1994

SHURE BROTHERS

222 Hartrey Ave.; Evanston, IL 60202; (708) 866-2200. Product Name: SC Wireless Series/1994. Contact: Davida Rochman. Product Description & Applications: Designed by installed sound professionals, the SC Series offers premium-quality features and high performance at an affordable price. SC Series systems are frequency-selectable and feature MARCAD® diversity receivers for improved RF reception. Digital frequency control enables the systems to produce clean signals, which allow up to 12 SC systems to be operated simultaneously in a single installation. Additional features include a Battery Fuel Gauge to visually indicate how much battery life is left; Tone Key Squelch, which eliminates unwanted noise; and Frequency Agility, which allows users to switch among eight frequency selections to avoid interference. Basic Specifications & Suggested List Price: The SC Series is available in both body-pack and hand-held system variations. RF Carrier frequency range: 169.445 MHz to 210,000 MHz; audio frequency response: 50Hz to 15kHz ± 2dB; signal-to-noise ratio: 100dB A-weighted. Suggested list prices range from \$690 to \$960.

SOUNDFIELD/QMI

25 South St.; Hopkinton, MA 01748; (508) 435-3666. Product Name: Mark V. Contact: Barry Fox. Date Product Introduced: 8/94. Product Description & Applications: A unique product offering exceptional accuracy in the generation of phase-coherent truly coincident stereo and mono microphone patterns. The user is able to electronically steer and move the microphone both in real and post-production time, while a fully three-dimensional output signal is available for surround sound use. Basic Specifications & Suggested List Price: Frequency range 20Hz to 20kHz equivalent self noise (IEC 179 cardioid 16-17dB -ASPL) maximum input for less than 0.5% THD—145dB SPL. Maximum output levels, 22dBu output impedance, 100Ω balanced.

SOUNDFIELD/QMI

25 South St.; Hopkinton, MA 01748; (508) 435-3666. Product Name: ST 250. Contact: Barry Fox. Date Product Introduced: 8/94. Product Description & Applications: Uses the same Tetrahedral capsule array as the soundfield Mk V, making it the most advanced stereo microphone in the world. The ST 250 produces the most accurate stereo image available and allows the engineer to switch from X-Y to M-S stereo outputs and from vertical to end-fire remotely. Basic Specifications & Suggested List Price: Frequency range: 20Hz to 20kHz ±2dB SPL (with 20dB attenuator), front sensitivity at 80dB SPL -27dBV. Mains, battery or phantom powering.

STANTON MAGNETICS INC.

101 Sunnyside Blvd.; Plainview, NY 11803; (516) 349-0235. Product Name: Trackmaster Contact: Jean Kapen. Date Product Introduced: 1/94. Product Description & Applications: It doesn't matter how great you spin, if your cartridge stylus is off track, your whole program is weak. We know how critical back-cueing is in mixing, and how important tracking force is for accurate performance. Trackmaster's integrated headshell design completely eliminates the need for headshell mounting or wiring. The cartridge assembly plugs right into the docking collar of any standard-mount tonearm. Basic Specifications & Suggested List Price: EL-1 (w/1 extra stylus) \$258; EL-2 (w/2 extra stylus) \$325; AL-1 (w/1 extra stylus) \$205; AL-2 (w/2 extra stylus) \$245. EL-1 and EL-2 are elliptical styli, 0.4x0.7 mm stylus size. Tracking is at 2-5 grams, freq. response 20Hz-20kHz, output 5.2, tracking ability at 90u at 3 gm. Specifications for the AL-1 and AL-2 model are identical, with one exception: stylus type is spherical.



STEDMAN CORPORATION
N90 dynamic studio microphone

STEDMAN CORPORATION

4167 Stedman Dr.; Richland, MI 49083; (616) 629-5930; (800) 873-0544 (literature requests). Product Name: N90 dynamic studio microphone. Contact: William Hannapel. Date Product Introduced: 1993-94. Product Description & Applications: Dynamic large diaphragm side address microphone with a natural sound for studio, live and broadcast applications. Also available in matched calibrated sets. N90 includes case adapter clip and 2 year warranty. Optional accessories include SMC-shockmount. SMC is O-ring type suspension shockmount. WS-1 windscreens is also available, and is designed to minimize pops on close miking vocals. WS-1 is UV resistant. Basic Specifications & Suggested List Price: N90 frequency response 35Hz to 19kHz, cardioid pattern max. SPL 155dB, 1.1" (30mm) diaphragm. List \$399; matched set \$843. SMC-shockmount list \$49.50; WS-1 windscreen list \$24. All products and accessories are made in USA.

STUDIO TECHNIQUES

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100 Mill Plain Rd., 3rd Fl.; Danbury, CT 06811; (203) 791-3919. Product Name: The Positioner. Contact: Craig Boyce. Date Product Introduced: 7/94. Product Description & Applications: The world's first and only remote-controlled microphone positioning device. The Positioner allows an Audio Engineer to adjust the orientation of a microphone relative to an instrument while listening to the microphone's output in the control room. This revolutionary capability takes the guesswork out of microphone placement by permitting the

engineer to hear the results of a microphone move instantly. The Positioner has been used with excellent results on instruments where microphone placement is critical. Basic Specifications & Suggested List Price: Price: \$749.00 Size: 2' 4"x12" (cylindrical). Weight: approx. 2-1/4 lbs. Power: 9V battery. Rotation: 350°. Tilt: 180°.

TELEX COMMUNICATIONS INC.

9600 Aldrich Ave. S.; Minneapolis, MN 55420; (612) 884-4051. Product Name: FMR-450. Contact: Jeff Peters. Product Description & Applications: The FMR - 450 is a high performance, broadcast quality UHF wireless microphone system that operates from 524MHz to 746MHz (UHF TV channels 23-60). The system is designed to operate up to 50 simultaneous systems, using hand-held or belt-pack transmitter without compromising operating range or audio quality. Basic Specifications & Suggested List Price: 1/2 wave colinear ground independent antenna system. Features RF, audio and diversity LED indicators. Includes WT-450 all metal transmitter, H7-450 hand-held transmitter. Lapel system - \$1,399 suggested list.

WRIGHT MICROPHONES & MONITORS

2091 Faulkner Rd., NE; Atlanta, GA 30324; (404) 321-3886. Product Name: Wright Tube Microphone. Contact: Tom Wright. Date Product Introduced: 8/94. Product Description & Applications: Tube microphone.

MIXING CONSOLES

ARX SYSTEMS

33 Advantage Road; Highett 3190, Victoria, Australia; (800) ARX-SYST; FAX: (707) 766-8431. Product Name: Mixx Master. Contact: John Root, sales & mktg., North American Division. Date Product Introduced: 3/94. Product Description & Applications: Mixx Master is a four-channel mic/line mixer with electronically balanced on XLR connectors, stereo line/aux inputs. Each Mixx Series product can be used as a stand-alone audio mixer, but together form a powerful mixing/zoning system. Excellent for sound reinforcement, industrial paging/BMG systems, AV systems, clubs, gyms, restaurants and high-quality sub-mixers/microphone preamps for DAT. Basic Specifications & Suggested List Price: Bal. XLR connectors, 1 RU space, freq. response 20-20kHz. +1 dB, phantom power switchable on all mic inputs, mic and line ch. eq.-ch. level. ch. pan. Price: TBA.



ATI - AUDIO TECHNOLOGIES INC.
NanoAmp Series, MX100 Mixer & XP100 Expander

ATI - AUDIO TECHNOLOGIES INC.

328 W. Maple Ave.; Horsham, PA 19044; (215) 443-0330. Product Name: NanoAmp Series, MX100 Mixer & XP100 Expander Contact: Ed Mullin. Date Product Introduced: 3/94. Product Description & Applications: The MX100 is a 3-input mixer with switchable mic/line inputs and a metered, balanced line level output plus isolated, adjustable headphone output. A companion 4-channel input expander, the XP100 shares the MX100 power supply and desk mount, AC, battery pack and mobile/belt pack DC converters are available. Basic Specifications & Suggested List Price: MX100: \$325 each; XP100 expander: \$295 each. Mic inputs, -124dBme in, 12dB gain, output balanced/unbalanced line +22dBm max, +4dBm, nominal. THD, .1%, max 20-20kHz. XLR & TRS in/out available. Response ± 25dB 20-20kHz.

ATI - AUDIO TOYS INC.

9017-C Mendenhall Court; Columbia, MD 21045; (410) 381-7879. Product Name: Paragon Mixing Console with stereo inputs. Contact: Larry Droppa. Date Product Introduced: 8/94. Product Description & Applications: The Paragon Mixing Console has become the standard by which other consoles are measured. With 16 sub-masters, 16 AUX sends, 4-band parametric EQ, hi-voltage padless mic preamps and a gauge and compressor on each input, the Paragon provides the ultimate in mixing flexibility and sound quality. The addition of the stereo input module containing a 4-band stereo EQ and stereo gauge and compressor allows the potential for a 96-input Paragon in one console frame. Basic Specifications & Suggested List Price: Basic 40-input frame is 89.5" x weights 425 lbs. List price is \$85,000. Stereo input module set is \$2,565.

MIXING CONSOLES

AT&T DIGITAL STUDIO SYSTEMS

PO Box 20046; Greensboro, NC 27420; (800) 553-8805. **Product Name:** Automated Digital Mixing System. **Contact:** Russ Hamm. **Date Product Introduced:** 11/94. **Product Description & Applications:** AT&T and GLW are introducing a fully automated digital mixing system with advanced features. The mixer will be powered by AT&T's advanced technology digital engine with full signal processing capability on every input channel. GLW's technology provides a logically familiar control surface with full automation of all functions. **Basic Specifications & Suggested List Price:** Not yet available.

AT&T DIGITAL STUDIO SYSTEMS

PO Box 20046; Greensboro, NC 27420; (800) 553-8805. **Product Name:** Integrated Resource Environment. **Contact:** Russ Hamm. **Date Product Introduced:** 11/94. **Product Description & Applications:** AT&T's integrated resource environment stores the entire AT&T DISQ mixing environment as a set of computer files. This brings instant and accurate reset capability to the DISQ system's Neve or SSL control surface settings without the need for control "matching." The process works seamlessly with the console's "recall" computer to greatly speed the tedious control matching process. **Basic Specifications & Suggested List Price:** Stored functions include: electronic cross-patching of tape outputs to all mixer input channels; variable time delay on each tape input of ± 30 ms and 0 to 60 ms on each auxiliary return; channel-by-channel selection of the equalizer characteristic curves to D, E, G or V type. Prices not yet available.

AMEK US OPERATIONS INC.

10815 Burbank Blvd.; North Hollywood, CA 91601; (818) 508-9788. **Product Name:** 501 by Langley. **Contact:** Carl Reavey. **Date Product Introduced:** 1994. **Product Description & Applications:** This sound reinforcement console can be used in front-of-house or monitor applications. 501 features AMEK SHOWTIME computer automation, which allows faders, mute and various switches to be changed as required from user-defined snapshots. MIDI devices can also be triggered. The Recall system allows the positions of non-automated rotaries and switches to be memorized for reset later if required. AMEK VIRTUAL DYNAMICS is an option. **Basic Specifications & Suggested List Price:** 2 chassis are available, for 24 or 40 inputs. The output configuration comprises 8 audio subgroups; 4 VCA subgroups under Master faders; a 10x4 Matrix; Stereo Master, and Monitor Wedge feed. Input channels include 4-band AMEK equalization, 8 aux sends with a selectable direct output and a wide range of facilities. 501 is highly affordable and will be of great value in all areas of the sound reinforcement industry.

AMEK US OPERATIONS INC.

10815 Burbank Blvd.; North Hollywood, CA 91601; (818) 508-9788. **Product Name:** 9098 by Rupert Neve. **Contact:** Carl Reavey. **Date Product Introduced:** 1994. **Product Description & Applications:** The 9098 audio production console is a successor to Mr. Neve's classic designs of the 1970s. 9098 uses enhanced versions of Mr. Neve's classic circuitry to provide comprehensive facilities and in-depth automation. **Basic Specifications & Suggested List Price:** The console has mono, dual monitor and stereo inputs, allowing many flexible configurations to be created. Features include 16 auxiliary buses, 48 output buses, 4 stereo buses and a 4-channel main bus. Multimode panning for various film and proposed television systems is standard. Automation systems comprised of AMEK SUPERMOVE Moving Faders, based on AMEK SUPERTURE computer mixing system, which automates up to 17 switches per module. AMEK RECALL; AMEK VIRTUAL DYNAMICS, and AMEK SUPERLDC machine controller. 9098 covers a wide price range and quotations are individualized to customer inquiries.

AUOIOARTS ENGINEERING

7305 Performance Dr.; Syracuse, NY 13212; (315) 452-5000. **Product Name:** MR-40. **Contact:** Rick Strage. **Date Product Introduced:** 10/94. **Product Description & Applications:** 4-track production console with 4-track mixdown including metering. Stereo aux/mix minus bus, EQ standard on mono mic/line and stereo line inputs, built-in cue speaker with amplifier mic processing insert points, fully modular design, digital-quality audio performance, CR muting, talkback, gold contact auto switches, LED-illuminated assign switches, machine control switches, front panel line and VU trims, hinged meter bridge, CR control module, independent cue selects on each module, and much more. **Basic Specifications & Suggested List Price:** Signal-to-noise, 93dB, THD (+24dBv) 002%, headroom 24dB, dynamic range 113 dB, console exceeds the requirements for 16-bit digital audio. Includes 4 mono mic/line and 8 stereo line inputs for 12 inputs total, 4 submasters, and a stereo master. Suggested price: \$9,995

AUOITRONICS INC.

3750 Old Getwell Rd.; Memphis, TN 38118; (901) 362-1350. **Product Name:** Destiny 2000. **Contact:** Murray Shields. **Date Product Introduced:** 3/94. **Product Description & Applications:** The Destiny 2000 combines an on-air audio console and PC-based Program Management System. The console is a standard audio console with analog inputs, outputs and monitoring. However, virtually every function is available for control via an RS-232 port. Conversely,

every console operation generates a signal to the PC to define the event. Complete computer integration is achieved. **Basic Specifications & Suggested List Price:** 486 SX computer with 200MB hard disk, 8MB RAM, IM Local Bus VGA Card, 14" color monitor, trackball, mini keyboard, 9600-baud Internal Modem, MS-DOS and Windows 3.X, signal-to-noise 100dB, dist < 0.01%, crosstalk < -97dB, frequency response ± 0.3 dB. Pricing is dependent upon configuration.

CADAC ELECTRONICS LTD

1 New St.; Luton, Beds. LU1 50X United Kingdom; +44 582 404202. **Product Name:** "Concert" Live Mixing Board. **Contact:** Clive Green, dir. **Date Product Introduced:** 6/94. **Product Description & Applications:** The new Cadac Concert "live" board is purpose-designed for live touring and theater applications, providing sound designers and operators with a new level of operational flexibility. Key features on Concert include instant reset of all switch facilities; complete manual status recall of knob settings, and a sophisticated computer system with extensive control of MIDI. Concert combines innovative live console design with the traditional Cadac audio performance. **Basic Specifications & Suggested List Price:** Standard items include Cadac's own motor faders and a total of 40 group outputs (12 subgroups, 12 matrix groups and 16 auxiliary groups). Each input channel has direct outputs and switchable pre/post fader, as well as two inputs (A and B), both of which can be on at the same time. Up to four Concert frames may be bused together. The price for a 32-channel dual input board is \$225,000.

CM AUTOMATION; 20621

Plummer St.; Chatsworth, CA 91311; (708) 449-7269. **Product Name:** MX-28. **Contact:** Ken Paul. **Date Product Introduced:** 1/94. **Product Description & Applications:** The MX-28 is a MIDI-controlled stereo mixer. 8 inputs, 8 outputs pre/post switchable mix outs and unity gain bus returns allow units to be combined. 99 on-board snapshots. Can be recalled via MIDI or from the front panel. **Basic Specifications & Suggested List Price:** Bandwidth 3Hz-65k ± 3 dB, Noise floor -100dB, THD+N < .007%, A weighted. List price \$699.

COOPER SOUND SYSTEMS

31952 Paseo de Tania; San Juan Capistrano, CA 92675-3919; (714) 248-1361. **Product Name:** The Cooper "ENG" 4-channel stereo audio mixer. **Contact:** Andrew Cooper, owner. **Date Product Introduced:** 1/95. **Product Description & Applications:** This new mixer will feature the same quality audio path and components that have made the Cooper CS 106 + 1 mixer an industry standard. Features: switchable analog meters (PPM-peak-VU), Jensen coupled inputs and outputs, insert points and channel outs, PFL, four mono input channels with the option to link C1, 2 and C3, 4 as stereo inputs and an ergonomic design that allows for ease of operation in field conditions (all controls are accessible from the front and side panels). **Basic Specifications & Suggested List Price:** Approximate size: 10" x 6" x 2.25". Internal and external powering option. Technical specifications to meet or exceed the Cooper CS 106 + 1 Audio Mixer. Tentative list price: \$3,000



CREST CONSOLES, A DIV. OF CREST AUDIO INC.
Century GTx Console

CREST CONSOLES, (A DIV. OF CREST AUDIO INC.)

100 Eisenhower Dr.; Paramus, NJ 07652; (201) 909-8700. **Product Name:** Century GTx Console. **Contact:** Lisa Vogl, mgr. of mktg. comm. **Date Product Introduced:** 11/94. **Product Description & Applications:** The Century GTx will be introduced at the November AES in San Francisco. The GTx is a meter bridge version of the successful GT console. Enhancements include a discrete 8-group bus assignment system with a true LCR (left-center-right) pan system. The aux system has been expanded to include 8 discrete sends per input channel. Input channel enhancements include: switchable bandwidth of the EQ mid frequencies and separate insert send and return connectors with a front panel "Insert On" switch. Deliveries of Crest Century GTx consoles will begin in December, 1994.

CREST CONSOLES, (A DIV. OF CREST AUDIO INC.)

100 Eisenhower Dr.; Paramus, NJ 07652; (201) 909-8700. **Product Name:** Century Vx Console. **Contact:** Lisa Vogl, mgr. of mktg. comm. **Date Product Introduced:** 11/94. **Product Description & Applications:** The Century Vx will be introduced at this year's AES Exhibition. The Vx is the ultimate extension of the popular Century Series console line. Features include an 8-channel VCA system along

with the features of the new GTx console including: meter bridge, 8-group bus assignment system, true LCR (left-center-right) pan system, expanded aux system, to include 8 discrete sends per input channel, switchable bandwidth of the EQ mid frequencies and separate insert send and return connectors with a front panel "Inserts On" switch. While all Century consoles use an internal balanced bus system on all primary buses, the Century Vx adds fully balanced buses to all 8 aux send systems, exceeding the performance specifications of most live and recording consoles. Deliveries of the Crest Century Vx consoles will begin in January, 1995.

DDA

448 Post Rd.; Buchanan, MI 49107; (800) 695-1010; (616) 695-4750. **Product Name:** DDA FMR Console. **Contact:** Allan Nichols, dir. of sales and mktg. **Date Product Introduced:** 7/94. **Product Description & Applications:** Up to 32 inputs with 24 tape/bus modules. Inputs have 4-band EQ, upper and lower sweep, 6 auxes, 8 buses. Great for small studio recording. **Basic Specifications & Suggested List Price:** \$14,000 to \$25,000 list.

O&R CONSOLES

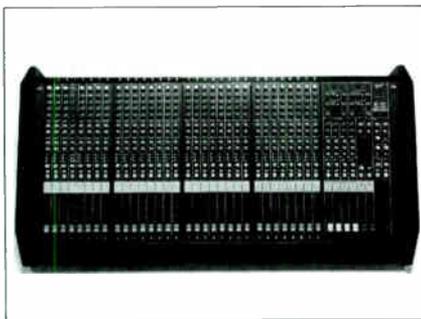
Rte. 3, Box 184-A; Montgomery, TX 77356; (409) 588-3411. **Product Name:** Merlin. **Contact:** Paul Westbrook, pres. **Date Product Introduced:** 2/94. **Product Description & Applications:** Merlin is D&R's fully automated studio mixing console featuring true dual-input-path design. Merlin's input modules boast two 4-band fully sweepable parametric EQs, 12 discrete aux sends (switchable to 36 through Merlin's ARM) and 2 highly automated signal paths with 10 dynamically automatable functions per input module. ARM, D&R's unique Advanced Routing Multiplex, enables Merlin to completely reconfigure the console's routing and switch functions at the touch of a button, allowing group busing from both input paths simultaneously with snapshot recall of templates and automated routing assignments. Merlin comes standard with VCA automation; motor-faders and a dynamics package are optional.



EUPHONIX
CS2000M Music System

EUPHONIX

1220 Portage Ave., Palo Alto, CA 94306; (818) 766-1666; FAX: (818) 766-3401. **Product Name:** CS2000M Music System. **Contact:** Rick Plushner, VP sales Americas. **Date Product Introduced:** 6/94. **Product Description & Applications:** The CS2000M is a range of packaged mixing systems designed specifically for high-end commercial music facilities. The CS2000M is a digitally controlled analog audio mixing system combining high-quality analog audio processing with powerful automated features that only digital control can provide. Based around the CS2000 console, these systems are fitted with the new Euphonix dynamics processors and 20 aux send buses per channel. All systems come complete with SnapShot Recall™ and Total Automation™. **Basic Specifications & Suggested List Price:** Systems can be fitted with up to 104 stereo/mono automated faders. Each channel has two EQs, two mic and four line inputs, at least one dynamics, a pair of digitally controlled filters and 20 aux send buses that can be expanded to 48. Prices range from approximately \$100,000 to \$500,000.



FENDER MUSICAL INSTRUMENTS CORP.
MX5200 Series Mixing Console

FENDER MUSICAL INSTRUMENTS CORP.

7975 N. Hayden Rd., Ste. C-100; Scottsdale, AZ 85258; (602) 596-9690. **Product Name:** MX 5200 Series Mixing Console. **Contact:** Michael Schwartz, mktg. mgr., Pro Audio. **Date Product Introduced:** 9/94. **Product Description & Applications:** Available in 16, 24, or 32 channels, these mixers are ideal for use in touring or installed sound reinforcement systems, commercial or home project studios, and various production applications. Features include four subgroups: stereo main, mono master and up to 6 aux sends. These modular, expandable mixing systems (via Fender Sys-Flex™) allow for doubling inputs & buses. They also offer extensive computer control options, including unlimited mute & level grouping. A meter bridge is also optional. **Basic Specifications & Suggested List Price:** Input channels feature mic & line inputs, channel insert, switchable 48V phantom power, flexible 3-band sweepable input EQ, 2 monitor mixes, switchable pre-post fader, 4 aux sends pre-post fader, pan control, bus assignment switches, solo switch/w/indicator, mute switch, peak indicator and professional grade 100mm fader. MX 5216 is \$1879.99. MX 5224 is \$2449.99. MX 5232 is \$3159.99.

GRAHAM-PATTEN SYSTEMS

PD Box 1960; Grass Valley, CA 95945; (916) 273-8412. **Product Name:** D/ESAM™ 820 Digital Edit Suite Audio Mixer. **Contact:** Ed Hobson, VP mktg. & sales. **Date Product Introduced:** 9/94. **Product Description & Applications:** The D/ESAM™ 820 digital mixer is the newest member of the award-winning D/ESAM 800 Series products from Graham-Patten. The 820 now includes advanced digital signal processing and enhanced digital input modules with optional sample rate converters. Like all D/ESAM mixers, the 820 is designed for serial control for video edit systems. **Basic Specifications & Suggested List Price:** Up to 56 analog or digital inputs, 4 AES/EBU, 4 analog and 4 monitor outputs standard. Options include parametric equalizer, effects loop, delay, assignment panel and input/output accessory panels.

HARRISON BY GLW INCORPORATED

437 Atlas Dr.; Nashville, TN 37211; (615) 331-8800. **Product Name:** Series Twelve Audio Mixing Console. **Contact:** Dave Purple/Gary Thielman, sales. **Date Product Introduced:** 12/93. **Product Description & Applications:** Series Twelve is a fully-automated, digitally-controlled console, which lends itself equally to the applications of music recording and scoring, production and post-production, broadcasting, sound reinforcement and film. Series Twelve may be laid out in almost any desired configuration, from the traditional control surface, to layered and assignable control surfaces. Additionally, because all audio processing is performed in execution racks, Series Twelve may even be configured with digital processing utilizing the AT&T Digital Mixer Core. **Basic Specifications & Suggested List Price:** 48 multitrack buses, 16 auxiliary sends, 4 main stereo outputs, 4-band parametric equalization, high and lowpass filters, gate and compressor per channel. The no-compromise Series Twelve design incorporates auto-nulling optical encoders. The level of automation and control inherent in Series Twelve cannot be achieved using conventional components.

INTELIX CORP.

5618 Ddona Rd.; Madison, WI 53719; (608) 273-6333. **Product Name:** V; Microphone/line mixers. **Contact:** Steven Cohan, president. **Date Product Introduced:** 10/93. **Product Description & Applications:** The 4001 and 8001 VC Series microphone/line level mixers combine superior audio quality with many user-based features and control options. The incorporation of voltage control amplifiers to these mixers offers the user many control options, including DC and network control. The attachment of the CPU card option allows these products to be controlled, monitored and manipulated by internal and external microprocessor-based remotes, personal computers and other devices. All features, including the low-cut filter, switchable stereo line-level input, Aphex Aural Exciter, remote channel mute auto duck and gate-on are simple to access and alter by the user. **Basic Specifications & Suggested List Price:** Signal-to-noise (Ref +26 dBV @ 54 dB sys gain) => 90 dB. Mic preamp equivalent input noise -129 dB @ 150 ohms, 20 Hz => 20kHz. Maximum voltage gain 96 dB. Frequency response ± 0.5 dB 20 Hz to 20 kHz; +0, -3dB 10Hz => 30kHz. Crosstalk (adjacent channels) better than -90dB. Phantom power +15 V DC. Price: \$459 - \$999.

LAFONT AUDIO

635 Weyburn Sq.; Pickering, ON L1V 3V3, Canada; (905) 420-3946. **Product Name:** Chroma LCRS Console. **Contact:** Curt Smith, mktg. mgr. **Date Product Introduced:** 1/94. **Product Description & Applications:** The Chroma LCRS post-production console is a full-featured LCRS film console with gates or compressors and automation VCA's on each channel, with an internal patch bay. Available in both 40- and 64-channel frames, the Chroma features discrete 6-channel (L, C, R, LS, RS, Sub) monitoring with 6 switchable PPM/VU bar graph meters. All Chromas are shipped Dptifile-ready with VCAs on each channel, so adding automation is a simple "plug in."

MACKIE DESIGNS INC.

20205 144th Ave. NE; Woodinville, WA 98072; (800) 898-3211. **Product Name:** LM-3204. **Contact:** David Firestone. **Date Product Introduced:** 1994. **Product Description & Applications:** Features include: 5-rackspace design, 16 mono or 32 stereo line inputs, 40 total inputs: 16 stereo channels plus 4 stereo returns, 4 aux send per channel (2 available at any one time via switching), 4 stereo (8 mono) aux returns, separate tape monitor function w/RCA & 1/4" inputs, 3-band EQ, separate control room system level & output functions, alt 3/4 stereo mix output, stereo in-place solo, 2-way/12-LED metering system, -20dB activity LED on each channel. **Basic Specifications & Suggested List Price:** Frequency response: 10Hz to 150kHz ±3dB, 20Hz to 40kHz ±1dB, distortion: 0.009% at 1kHz any input to any output, working S/N ratio: -90dB typical output noise re +4dBm operation, 16 channels assigned, internal dynamic range: 116dB, equalization: treble shelving ±15dB at 12 kHz, midrange peaking ±dB at 2.5kHz, midrange shelving ±dB at 80kHz, weight: 17 lbs.



MALCOLDM TOFT ASSDCIATES (MTA)
TMTA Series 900

MALCOLM TOFT ASSOCIATES (MTA)

The Did Farmhouse, Ash Hill Rd., Ash, Hampshire, GU12 6AD England; 44 252 318700; Telex: 44 252 345546. **Product Name:** MTA Series 900. **Contact:** Chris West, sales mktg mgr. **Date Product Introduced:** 6/94. **Product Description & Applications:** The New Series 900 mixing console from Malcolmdm Toft has been designed to offer the smaller studio top professional quality, but at a price that is tailored to a budget. It has been designed with options in mind, such as optional patch bay, Penny & Giles faders, automation and different frame sizes. It features the same mic amp, EQ circuitry and split design as the Series 980. The standard 32-input frame has 94 inputs on mixdown. **Basic Specifications & Suggested List Price:** It features two line inputs per channel with 4-band sweep EQ identical to the Series 980, 8 auxiliary sends, with pre-post and mute switching, 6 echo returns with EQ and level fader, 24 groups and 24 monitor channels with bar graph metering. Price from \$33,000.



MALCOLDM TOFT ASSOCIATES (MTA)
MTA Series 980

MALCOLM TOFT ASSOCIATES (MTA)

The Did Farmhouse, Ash Hill Rd., Ash, Hampshire, GU12 6AD England; 44 252 318700; Telex: 44 252 345546. **Product Name:** MTA Series 980. **Contact:** Chris West, sales mktg mgr. **Date Product Introduced:** 10/93. **Product Description & Applications:** Malcolmdm Toft Associates are manufacturers of high-quality mixing consoles.

The Malcolmdm Toft (founder of Trident Audio in 1972) name is synonymous with many classic consoles that are now referred to as 'legendary.' This new company has already had tremendous success this year with the Series 980 in recording studios and post-production suites. Its main attributes being, build equality, sonic performance, split design, good value for money and of course that classic 'Toft' character of sound. **Basic Specifications & Suggested List Price:** Features 4-band sweep EQ, 8 Auxiliary sends, 62 inputs with full EQ plus an additional 32 inputs, 94 on mixdown (standard 32-input frame), Penny & Giles faders throughout, Mosses & Mitchell patch bay. Retrofit of any automation to customer's choice. The Series 980 starting price is U.S. \$59,000.

MANLEY LABS INC.

13880 Magnolia Ave.; Chino, CA 91710; (909) 627-4256. **Product Name:** Manley Custom Mixing Consoles. **Contact:** Craig (Hutch) Hutchison. **Date Product Introduced:** 9/94. **Product Description & Applications:** Manley is now building custom mixing consoles from 8 to 80 inputs. We use vacuum tubes to ensure the ultimate in music fidelity and dynamic range. The input modules are based on our 40 dB mic pre and our enhanced Pultec EQP-1. Basic consoles are priced in the \$4,000 per module range. Options such as gates, limiters, extra routing and auxes are designed and priced to order. Compatible with most automation systems.

MERIOIAN COMMUNICATIONS

PD Box 97; Alameda, CA 94501; (415) 769-1515. **Product Name:** DISTRAMIX II. **Contact:** Shel Gunther, owner. **Date Product Introduced:** 1994. **Product Description & Applications:** A fully expandable (ins and outs) 8x8 matrix mixer. Applications include: separate headphone mixes, stage monitor mixer, console combiner, creative audio distribution and much more. **Basic Specifications & Suggested List Price:** +4 balanced XLR and -10 unbalanced phone inputs and outputs. Input and output LED metering. Inputs and outputs are expandable, i.e., 8x16, 16x8, 16x16, etc.

OTARI CORP.

378 Vintage Park Dr.; Foster City, CA 94404-1134; (415) 341-5900. **Product Name:** Status Model 18R. **Contact:** Lee Pomerantz, Nat'l sales mgr. **Date Product Introduced:** 11/94. **Product Description & Applications:** A new family of low-cost, digitally-controlled, analog consoles that carry forward the design philosophy OTARI began with the successful Concept I console. The first member, the model 18R, is designed for music and post-production markets. Central computer control of module routing and switch setting in addition to the capture and recall of all rotary controls for manual reset is possible. The console will be offered with DiskMix automation, dynamics, moving fader, Snapshot automation plus many other options to meet the user's needs. **Basic Specifications & Suggested List Price:** The Status Model 18R will be available in three frame sizes to accommodate 24-, 32-, 40- or 48-input module configurations with or without metal TT patch bays, allowing up to 96 automated inputs priced from less than \$30,000 to \$50,000 dependent on configuration and option.

RAINDIRK AUDIO

635 Weyburn Sq.; Pickering, ON L1V 3V3, Canada; (905) 420-3946. **Product Name:** Symphony LCRS Console. **Contact:** Curt Smith, dir. of mktg. **Date Product Introduced:** 5/94. **Product Description & Applications:** The Symphony LCRS is a 28- to 72-channel, 32- or 48-group "in-line" LCRS film/TV post mixer. The new LN2 LCRS module includes a parametric EQ w/2 mid band full parametric sections, HF section w/variable crossover shelving response and a bass section with variable frequency positioning, with either peak or shelving response. The Symphony LCRS console also includes a special central section for film applications.

SAMSON TECHNOLOGIES CORP.

PD Box 9068; Hicksville, NY 11802-9068; (516) 932-3810. **Product Name:** PL 2402 Line Mixer (rack mount). **Contact:** Jack Knight, Nat'l Sales Mgr. **Date Product Introduced:** 10/94. **Product Description & Applications:** 24-input (12 stereo channels), 4 bus line mixer w/separate main and control room outputs 56 mm faders on bus outputs, 2 low noise XLR mic inputs, 3 band EQ, 4 aux sends, 4 stereo aux returns, balanced inputs and outputs in place solo/PFL and mute on each channel, headphone output. **Basic Specifications & Suggested List Price:** (Channel section) Mic E.I.N. (Din Audio) 150 ohm source: -128 dBu; Line E.I.N. (Din Audio): 115 dBu; Fader range: -15dB to 80dB; Freq. response: 20 Hz to 20 kHz ± 1 dB; THD+N (unity gain): less than 0.02%; Max gain: 79 dB; Ch.-to-ch. crosstalk: -70 dB; EQ: 10 kHz high (shelving) ±15 dB, 2.5 Hz (peaking) ± 12dB, 80 Hz low (shelving) ± 15 dB. \$599.99 suggested list.

MIXING CONSOLES



SHURE
The M367/1994

SHURE

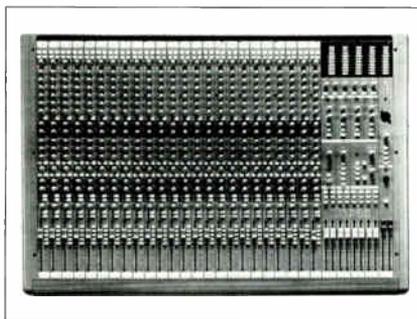
222 Hartrey Ave.; Evanston, IL 60202; (708) 866-2200. Product Name: The M367/1994. Contact: Davida Rochman. Product Description & Applications: The Shure Model M367 is a 6-input, portable microphone mixer designed for ENG, EFP and general audio mixing. An exceptionally low-noise design makes the M367 ideal for use with digital transmission links and digital video/audio recording media. Suitable applications for the M367 include: TV and radio remotes, offline editing, sound reinforcement systems, distance learning, hotel and convention sound. Features include: input peak LEDs, detachable power cord, 2 XLR outputs, easy-access side battery compartment, power-on LED, headphone monitor circuit and more. Basic Specifications & Suggested List Price: Frequency response: 20 Hz-20 kHz \pm 2dB. Total harmonic distortion: 0.25% at +4dBm; 55 to 20,000Hz. Power: 100-120V AC, 50/60Hz, 100mA. A 220-240V AC version is also available. Suggested list price: \$795.



SOUNDTRACS
Solitaire

SOUNDTRACS

PD Box 9068; Hicksville, NY 11802-9068; (516) 932-3810. Product Name: Solitaire. Contact: Bob Caputo, product mgr. Date Product Introduced: 10/95. Product Description & Applications: Production console w/extended bandwidth electronics and DSP micro-processor technology. Dual inputs on every module w/fader & mute automation, EQ & dynamics. 4-band, fully-sweepable EQ using FAB (ST) technology w/dedicated 2-band EQ on monitor, 8 aux sends w/access to 24-track bussing, balanced ins & outs, automation available in both moving faders & VCA w/12-bit resolution & 1/4 frame accuracy on all mutes. Assignable dynamic processor (MDP) includes gating, expansion, compression, limiting and autopanning. Basic Specifications & Suggested List Price: 40-input version, fully automated w/dynamics & moving faders; \$52,300. Other prices vary based on inputs, features and format.



SOUNDTRACS
TOPAZ 8-Bus Console (new automation package)

SOUNDTRACS

PD Box 9068; Hicksville, NY 11802-9068; (516) 932-3810. Product Name: TOPAZ 8-Bus Console (new automation package). Contact: Bob Caputo, product mgr. Date Product Introduced: 10/94. Product Description & Applications: 24 or 32-channel 8-bus recording console with quality input, in-line design with full 4-band equalization with dual swept mids, plus dedicated EQ on all tape monitors. Solo and mute on all tape monitors. "Floating Bus" design allows 8 group outputs to be routed to all 24 inputs of a tape machine without any re-patching. PC-driven VCA/Mute automation utilizing SSM 2018 and 12-bit resolution. Basic Specifications & Suggested List Price: TOPAZ 24: \$3,995. TOPAZ 32: \$4,995. Optional merge bridge: (24) \$850, (32) \$999.

STUDIOMASTER INC.

3941 Miraloma Ave.; Anaheim, CA 92807; (800) 878-7883; (714) 524-2227. Product Name: Mixdown Classic 8-bus. Contact: Jim Giordano, nat'l sales mgr. Date Product Introduced: 6/94. Product Description & Applications: Available in 16-, 24-, and 32-channel versions, the Mixdown Classic is a full-featured, budget-priced 8-bus mixing console, designed primarily for multitrack recording, MIDI muting, balanced mic/line inputs, channel tape outputs, 3-band EQ with semi-parametric mid and bass, 6 aux sends, 16 auxiliary inputs (8 with EQ), fader reverse, split on-board monitor facilities, are a few of the Mixdown Classic's standard features. An EP-5 external rackmount power supply is included and is UL approved. Basic Specifications & Suggested List Price: Total E.I.N. (150 ohm mic source): -129dB, maximum mic gain: 80dB, C.M.R.R.: 78dB, T.H.D.: less than 0.05% at 1kHz, frequency response (+0 -1dB): 30Hz to 20kHz, signal to noise ratio (line or tape to sub-group): -92dB. Suggested retail price: 16x8x16x2= \$2,495; 24x8x16x2= \$2,995; and 32x8x16x2= \$3,595.

STUDIOMASTER INC.;

3941 Miraloma Ave.; Anaheim, CA 92807; (800) 878-7883; (714) 524-2227. Product Name: Powerhouse 300. Contact: Jim Giordano, nat'l sales mgr. Date Product Introduced: 6/94. Product Description & Applications: 8x2 and 12x2 powered mixers. Features include: 300 watts per side, 3-band EQ, 3 aux sends, 2x7 band master EQ, master EQ assign up to 127 combinations of reverb, delay and special effects, 2-track record/playback bus, stereo aux return and master line outs, power amps switchable to the monitor bus w/various patching options, main mixer inserts, 48V phantom power and rugged all steel chassis. Basic Specifications & Suggested List Price: E.I.N.: -129dB (150 ohm mic source), C.M.R.R.: greater than 87dB, T.H.D.: less than 0.05% crosstalk (input to adjacent input); below noise. Nominal noise (DIN audio) -87dB. Maximum gain (mic input to master output): 80dB. List price: 8x2= \$1,595, 12x2= \$1,895.

TASCAM

7733 Telegraph Rd.; Montebello, CA 90640; (213) 726-0303. Product Name: M-5000. Contact: Bill Mohrhoff. Date Product Introduced: 3/94. Product Description & Applications: 24 bus input/output console with 32-input channels in a 40-input channel frame. Basic Specifications & Suggested List Price: 24 group routing, integral patch bay, input/output configuration has two independent paths (channel & monitor), independent hi & low shelving EQ for both channel & monitor paths, hi & low-mid EQ (sweepable) is fully assignable to either path, 8 aux sends, 3 cut groups.

TRIDENT AUDIO DEVELOPMENTS

3200 West End Ave., Ste. 500; Nashville, TN 37203-1373; (615) 783-1625; Fax: (615) 783-1629. Product Name: Dynamics. Contact: Kim Templeman-Holmes, dir. Date Product Introduced: 11/94. Product Description & Applications: A retrofit Dynamics package for Trident's TRIMIX automation system will be shown for the first time. TRIMIX is fitted as standard to all 90 consoles and is a factory-fitted option on the vector range. Dynamics, which features two independent compressor/limiters and noise gate/expanders per I/O module, affords the user the luxury of simultaneous dynamics on both channel and monitor paths. While the system benefits from displaying the various levels and settings on screen, operation can be either via standard rotary controls and switches or the trackball and cursor keys. Pricing will be announced at the show.

TRIDENT AUDIO DEVELOPMENTS

3200 West End Ave., Ste. 500; Nashville, TN 37203-1373; (615) 783-1625; Fax: (615) 783-1629. Product Name: Trident Ventura 85. Contact: Kim Templeman-Holmes, dir. Date Product Introduced: 11/94. Product Description & Applications: Trident will debut the eagerly awaited replacement for the Series 80. The all new 'split' design features a mic input, which may be specified with or without transformer coupling, two line inputs, 24-track routing, 8 auxiliary sends, and a comprehensive 4-band EQ per input. All consoles will be delivered Offsite Tetra automation ready, needing only the computer and monitor to utilize the system. Basic Specifications & Suggested List Price: Initially the Ventura 85 will be available in three frame sizes: 32/24/2, 40/24/2 and 48/24/2. All Ventura 85s will include a full patch bay and stand. Expect prices to range from the low \$50s for the 32-input, to the low \$60s for the 48.

WHIRLWIND MUSIC DIST. INC.

PD Box 12692; Rochester, NY 14612; (716) 663-8820. Product Name: Mix-8. Contact: Sales Department. Date Product Introduced: 10/94. Product Description & Applications: A new generation of Whirlwind's 8-channel professional stereo mixer in a single-rack-space package, the Mix-8 provides exceptional performance and flexibility in a compact, professional package. Channels 1-4 have stereo aux send controls; channels 5-8 have pan pots on each channel. Front panel headphone jack and level control allow monitoring of left & right buses, and a front panel foot switch jack controls the output mute circuit while permitting continued monitoring of the main mix. Basic Specifications & Suggested List Price: Frequency response 30Hz-20kHz \pm 0.5 dBu; unity gain EIN -90dBu; input impedance 1M ohm, output impedance 47 ohms; power requirements 115/230V AC; price to be announced.

YAMAHA CORP. OF AMERICA

6600 Drangethorpe Ave.; Buena Park, CA 90620; (714) 522-9011. Product Name: PM3500. Contact: Susan Hart, admin coor. Date Product Introduced: 11/94. Product Description & Applications: The PM3500 is a compact, lightweight professional 8 mixing bus VCA-type mixing console. It features 128 MIDI-controlled scene memories and an expanded cue/solo system with VCA group cue, last cue, mix (pile) cue, master solo and VCA and PFL cue trims. The mono and stereo inputs feature 4 bands of full parametric equalization. The master section offers 4 stereo and 4 mono matrix outputs, and sigma-peak bus overload indicators. Basic Specifications & Suggested List Price: The PM3500 will be available with 24, 32, 40 and 48 mono + 4 stereo inputs on the SR version, and 44c and 52c monitor inputs on monitor version. Price TBA.



YAMAHA CORP. OF AMERICA
ProMix 01 Programmable Mixer

YAMAHA CORP. OF AMERICA

6600 Drangethorpe Ave.; Buena Park, CA 90620; (714) 522-9011. Product Name: ProMix 01 Programmable Mixer. Contact: Susan Hart, admin coor. Date Product Introduced: 9/94. Product Description & Applications: The Yamaha ProMix 01 is an 18-input digital mixer with "Snap-Shot" Recall and automation of all settings. Designed for use with multitrack recorders, microphones and electronic instruments on stage, in the studio, or commercial installation. All mix parameters can be stored/recalled in 50 snapshots and automated via MIDI motorized faders with grouping, 2 digital effect units, 3 assignable stereo compressor/gates with key function, 3-band parametric EQ with "EQ library" for storage of frequently used EQ settings. Pan, solo key, and phase-reverse and peak meter each channel. Digital stereo output for direct mixdown to R-DAT and other digital recorders. Large LCD screen shows graphic display of EQ curves, compressor action and other mix functions. Basic Specifications & Suggested List Price: 18 inputs; 16 balanced mic/line, 1 stereo. Phantom power channel 1-8. 3 stereo analog outputs, 1 digital SPDIF output, 2 aux outputs 24-bit mix bus; 32-bit EQ/A/D converters: 20-bit $\Delta\Sigma$ D/A converters; 20-bit. MSRP: \$1,999.

YORKVILLE SOUND INC.

4625 Witmer Industrial Estate; Niagara Falls, NY 14305; (716) 297-2920. Product Name: 300K. Contact: Joe Dorn. Date Product Introduced: Summer 1994. Product Description & Applications: The Yorkville 300K is a 5-channel stereo keyboard mixer/amplifier suitable for practice, monitor or sound reinforcement applications. Basic Specifications & Suggested List Price: Power 150w per channel at 4 ohms. Frequency response: 20Hz to 20kHz \pm 3dB.

MONITORS AND LOUSPEAKERS

ATM FLY-WARE INC.

20960 Brant Ave., Carson, CA 90810-1040; (310) 639-8282. Product Name: AMTS Series Modular Track System. Contact: Jack Noble, project mgr. Date Product Introduced: 11/94. Product Description & Applications: ATM Fly-Ware's AMTS Series of modular track-rigging hardware combines the strength and flexibility of a track-style rigging hardware system with the arrayability and coherence of a modular loudspeaker-rigging system. Basic Specifications & Suggested List Price: The AMTS Series is a rigging attachment and internal brace system combined with modular attachment facilities. The part must be built into the loudspeaker enclosure.



APOGEE SOUND INC.
CSM-2

APOGEE SOUND INC.

1150 Industrial Ave., Petaluma, CA 94952; (707) 778-8887. Product Name: CSM-2. Contact: James Lamb, nat'l sales mgr. Date Product Introduced: 10/94. Product Description & Applications: Apogee Sound Inc. proudly introduces the CSM-2 studio monitor. This unique monitor, with its extended frequency response (24Hz to 25kHz) and high power handling capabilities, does not suffer from many of the common shortcomings of most near-field monitors. Its physical design precisely aligns the drivers acoustically and minimizes edge diffraction. Basic Specifications & Suggested List Price: Nominal impedance: 8 ohms, sensitivity: 90dB @ 1 watt/1 meter (60Hz-7kHz). Frequency response: 34Hz-25kHz ± 3dB equalized by processor, dispersion: 40Hz-16kHz, greater than 90 degrees vertical. Finish: black lacquer.

ATLAS/SOUNDOLIER

1859 Intertech Dr., Fenton, MD 63026; (314) 349-3110. Product Name: Soundolier® ThundraPro™ Series Subwoofer Systems. Contact: Nora Steele, mkg. communication spec. Date Product Introduced: 1993. Product Description & Applications: Choose from three ThundraPro™ Series models. Free-standing ThundraPro™ 1 may be positioned upright amidst other audio equipment or on its side behind furnishings. Versatile in-floor/in-ceiling model ThundraPro™ 2™ is designed for installation between floor/ceiling joists or above suspended tile ceilings. In-wall Model ThundraPro™ 3™ is offered for wall/ceiling installation in new/retrofit applications (back-box also available). For best performance, use passive ThundraPro™ subwoofers with the ThundraPro CXA™ 100-watt amplifier/active crossover system. Basic Specifications & Suggested List Price: ThundraPro™ 1 and 2 are passive 100W RMS units with two 8" woofers, 1 1/2" voice coils and 21 oz. magnets. ThundraPro™ 3™ is a passive, 50W RMS unit with a single 8" woofer, inverted stabilizer and dual 1 1/2" voice coils. ThundraPro CXA™ is a 100W RMS amplifier. ThundraPro 1, 2, CXA: \$498.75 ea.; ThundraPro 3: \$165.38

AUDRA INT.

PO Box 38, Silverado, CA 92676; (714) 649-2207. Product Name: EC 600. Contact: Algis Renkus. Date Product Introduced: 1/94. Product Description & Applications: HF driver 6" diaphragm 3.3 throat opening. Basic Specifications & Suggested List Price: From 150Hz to 3kHz. Price: \$1,000.

B&W LOUSPEAKER

64 Concord St., North Reading, MA 01864-2699; (800) 370-3740. Product Name: Matrix HTM. Contact: Timothy T. Wyatt, tech. support spec. Date Product Introduced: 7/94. Product Description & Applications: This two-way, fourth-order, vented-box loudspeaker system features the B&W Matrix cabinet with the tweeter mounted on top in a free-field time-aligned format. Timbre-matched to the entire Matrix 800 Series, this near-field monitor is magnetically shielded enabling center channel surround sound capability. A Kevlar bass/mid driver complements the metal-dome, magnetic, fluid-cooled tweeter. Bi-wire terminal posts. Basic Specifications & Suggested List Price: Drivers include a 6.5" bass/mid and a 1" tweeter; power handling is 50W-120W; crossover at 3kHz; frequency response is from 63Hz to 20kHz; sensitivity is 88dB SPL 1W/1M and impedance is 8 ohms. Price: \$800 each.

BAG END LOUSPEAKERS

PD Box 488; Barrington, IL 60011; (708) 382-4550. Product Name: MM-8 "Studio A" Near-Field Monitor Package. Contact: Jim Wischmeyer. Date Product Introduced: 11/94. Product Description & Applications: Includes: two MM-8 time-align near-field monitors with coaxial 8" speaker in an attractive wood cabinet, one ELF-1 dual channel integrator for flat response and unheard of fidelity to 8Hz, two D10E-S double 10" subwoofers in a beautiful, compact wood cabinet. Applications include home theater, post-production, studio near and mid-field monitoring, film production, high-end home stereo. Basic Specifications & Suggested List Price: Studio A Package: \$4,906. Flat response in a time-aligned system (including bass) from 8Hz to 20 kHz! ELF-1 has frequency division in 2Hz increments from 8Hz-70Hz in real time with super accurate DIP switches. MM-8 coaxial monitors offer three levels of attenuation and polarity switch. Ask about studio stands!

BAG END LOUSPEAKERS

PD Box 488; Barrington, IL 60011; (708) 382-4550. Product Name: TA12-B. Contact: Jim Wischmeyer. Date Product Introduced: 11/94 (with improved crossover). Product Description & Applications: Time-aligned, two-way, ported, monitor and stage loudspeaker system. Perfect for home theater, surround sound, post-production and studio mixing/monitoring. Features superb transient response, high-power capacity, excellent efficiency, low fatigue at any listening level, superb construction technology, 6-year warranty; (made in USA). Purchased by Chick Corea, Todd-AO/Glen Glenn Sound (L.A.), Axis Studios, Steppenwolf Theater, Frank Gambale, churches, studios and DJ's. Basic Specifications & Suggested List Price: 70Hz to 19kHz, 90°x40° dispersion, 103dB SPL 1W/1M, 400 watts power w/limiter, 8 ohms, time-aligned two-way, one 12" mid/bass, one E-350 horn tweeter in a time-aligned crossover filter (3.3 kHz). Made from 13-ply imported Finland birch plywood with unmatched construction technology, improved crossover. Price: \$878 each.

BARBETTA MANUFACTURING

5301 Commerce Ave., Moorpark, CA 93020; (805) 529-3607 or (315) 423-2857. Product Name: DIVA OmniField 3.2™ active reference monitors. Contact: Keith Winston (West Coast) or Shelly Goodman (East Coast). Date Product Introduced: 7/94. Product Description & Applications: The DIVA-3.2 are self-powered, two-way systems that generate a broad image field, full natural bass, sharply focused mids and fluid transients, with very high transparency to the source. The power amplifiers, precision active crossovers, cabinet and speaker drivers are all designed using Barbetta's exclusive Interactive Design™ method to create a self-contained, carefully balanced component. The low distortion characteristics of the design allow hours of mixing or tracking with very little fatigue, or "auditory burn-out." Basic Specifications & Suggested List Price: 230 watts total power, 165mm woofer, 25mm tweeter, 3dB down at 32Hz and 23kHz. Dual sensitivity input for +4dBm and -10dBm compatibility without adjustment. Special cabinet design for maximum dispersion and minimum parasitic resonance. Drivers aligned symmetrically for optimum image production. 11.5"x14.5"x10.5". List: \$2,399 a pair.

BLUE ROOM LOUSPEAKERS

64 Concord St., North Reading, MA 01864-2699; (800) 370-3740. Product Name: The House Pod. Contact: Timothy T. Wyatt, tech. support spec. Date Product Introduced: 6/94. Product Description & Applications: This two-way loudspeaker utilizes a vented enclosure that features a cabinet designed without any flat surfaces or sharp corners! Available in red, blue, black or white two pack acrylic, the House Pod includes Neutrik connectors that can be bi-wired or bi-amped. A Kevlar bass/mid driver complements the metal-dome, magnetic fluid-cooled tweeter, and magnetic shielding facilitates video applications. Also available is a choice of stands or a wall-mounting bracket. Basic Specifications & Suggested List Price: Drivers include a 6.5" bass/mid and a 1" tweeter; power handling to 120 watts; crossover at 3kHz; frequency response is from 45Hz to 20kHz; sensitivity is 89dB SPL 1W/1M and impedance is 8 ohms. Price: \$1,900 pair.

BLUE ROOM LOUSPEAKERS

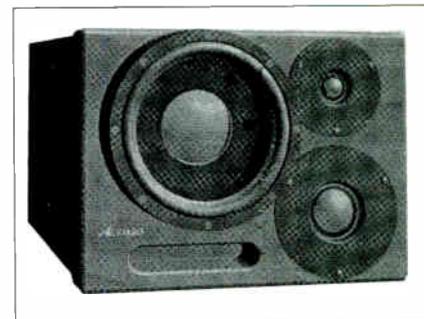
54 Concord St., North Reading, MA 01864-2699; (800) 370-3740. Product Name: The Techno Pod. Contact: Timothy T. Wyatt, tech. support spec. Date Product Introduced: 6/94. Product Description & Applications: This three-way loudspeaker utilizes an acoustic suspension enclosure that features a cabinet designed without any flat surfaces or sharp corners! Available in red, blue, black or white two pack acrylic, the Techno Pod includes Neutrik connectors that can be bi-wired or bi-amped. Two Kevlar bass/mid drivers complement the metal-dome, magnetic fluid-cooled-tweeter, and magnetic shielding facilitates video applications. Wall mounting brackets are included. Basic Specifications & Suggested List Price: Drivers include two 6.5" bass/mid and a 1.25" tweeter; power handling to 250 watts; crossover at 900Hz and 3kHz; frequency response is from 45Hz to 20kHz; sensitivity is 94dB SPL 1W/1M and impedance is 4 ohms. Price: \$2,500 pair.



CADPRO CHICAGO INCORPORATED
Audigo SGlex

CADPRO CHICAGO INCORPORATED

2525 E. Dakton, Ste. C-33; Arlington Heights, IL 60005; (708) 640-1853; FAX: (708) 640-1868. Product Name: Audigo SGlex. Contact: Paul F. Bergetz, sales mgr. Date Product Introduced: 9/94. Product Description & Applications: Electronically crossed, near-field reference monitors capable of 6dB more output than last year's passive model. The new tunable crossover allows for complete control over the operating range. The enclosure is constructed of MDF and cast epoxy using a tapered transmission line. The drivers are set in a closely coupled, linear phase (no more than 15° shift at crossover point), mirror image group radiating forward. Driver array integrates a Morel MDT33 tweeter crossed at 6.5kHz with a DynAudio D54AF mid-range electronically crossed at 650Hz to the low frequency driver, an Audigo LFM8. Basic Specifications & Suggested List Price: All measurements are referenced to 100dB at 1 meter on axis. FR 39Hz to >2kHz ±2dB. Maximum SPL: 120dB; HD (3rd, 5th, and 7th order): >2% 39Hz to 20kHz; impedance >LF=2 ohms HF=6 ohms; phase: ±75° 39Hz to 20kHz. Power requirements: 250 watts minimum to 1,000 watts maximum per channel x two (must be bi-amplified). Dimensions: 14.8"x10.8"x14". Weight: 58lbs. each. With passive magnetic radiation shields to inhibit video monitor distortion. Priced at \$4,795 a pair (Model Audigo SGlex until 12/31/94).



CADPRO CHICAGO INCORPORATED
Audigo 1ex

CADPRO CHICAGO INCORPORATED

2525 E. Dakton, Ste. C-33; Arlington Heights, IL 60005; (708) 640-1853; FAX: (708) 640-1868. Product Name: Audigo 1ex. Contact: Paul F. Bergetz, sales mgr. Date Product Introduced: 9/94. Product Description & Applications: Electronically crossed, near-field reference monitors capable of 6dB more output than last year's passive model. The new tunable crossover allows for complete control over the operating range. The enclosure is constructed of MDF using a tapered transmission line. The drivers are set in a closely coupled, linear phase (no more than 15° shift at crossover point), mirror image group radiating forward. Driver array integrates a Morel MDT33 tweeter crossed at 6.5kHz with a DynAudio D54AF midrange electronically crossed at 6.5kHz to the low frequency driver, an Audigo LFM8. Basic Specifications & Suggested List Price: All measurements are referenced to 100dB at 1 meter on axis. Frequency response: 39Hz to 20kHz ±2dB; maximum SPL: 120dB; HD (3rd, 5th and 7th order): >2% 39Hz to 20kHz; impedance >LF=2 ohms HF=6 ohms; phase: ±75° 39Hz to 20kHz. Power requirements: 250 watts minimum to 1,000 watts maximum per channel x two (must be bi-amplified). Dimensions: 11.9"x15.9"x13.3". Weight: 60lbs. each. Finish is heavy duty "Ultra Suede" for maximum durability in black or gray. Priced at \$2,925 a pair (Model Audigo 1ex until 12/31/94).

CERWIN-VEGA

555 E. Easy St., Simi Valley, CA 93065; (805) 584-9332. Product Name: CO-AMT 12 & CO-AMT 15. Contact: Gene Czerwinski, pres. Date Product Introduced: 11/94. Product Description & Applications: This is a unique, through-bore coaxial with a ribbon mid-high-frequency driver. Distortion is 10 to 104 times lower than compression driver devices. The 15" can be full range; with the 12" driver, a subwoofer is recommended. Basic Specifications & Suggested List Price: Sensitivity: 100dB 1watt/1 meter; distortion: >.3% THO

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MONITORS AND LOUSPEAKERS

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@100dB, 100Hz to 20kHz. Frequency response: 40Hz to 20kHz ± 2.5 dB, (15"), 90Hz to 20kHz ± 2.5 dB, (12"); low-frequency driver: 4" voice coil in 1.6 Tesla field; maximum input power: 500 watts; crossover: 1.2kHz; high-frequency driver: 1" x 3" throat (moving mass—ribbon diaphragm is less than .8 grams). Type: folded ribbon—air motion transfer (AMT).

CERWIN-VEGA

555 E. Easy St.; Simi Valley, CA 93065; (805) 584-9332. Product Name: T-36 1.5 Bass Horn Module. Contact: Gene Czerwinski, pres. Date Product Introduced: 11/94. Product Description & Applications: To minimize power compressive heating at high-input power, the air chamber and entire 18" driver is thermally coupled through an aluminum door and external heat sink. Basic Specifications & Suggested List Price: Maximum power handling: 1500 watts (with dedicated 2kW control amplifier); sensitivity: 109dB 1 watt, 1 meter; frequency response: 32Hz-320Hz (for two horn array); driver: 18"; dimensions: 36"x24"x36" (30").



COMMUNITY PROFESSIONAL LOUSPEAKERS
CSX S2 loudspeakers

COMMUNITY PROFESSIONAL LOUSPEAKERS

333 E. Fifth St.; Chester, PA 19013-4511; (610) 876-3400. Product Name: CSX S2 loudspeakers. Contact: Doug Wilkens. Date Product Introduced: 8/95. Product Description & Applications: The new CSX-S2 loudspeaker line from Community is comprised of eleven models ranging in size from a compact two-way enclosure to full-range systems and subwoofers. Representing the next generation of products to evolve from Community's CSX Series, the CSX-S2 line features ferrofluid-cooled woofers, black-carpeted exteriors and custom corner protectors with new acoustically transparent grilles.

DIGITAL DESIGNS

100 N. Quapah, Ste. K; Oklahoma City, OK 73107; (405) 946-4500. Product Name: DD161c and DD261c. Contact: Alice Sandhu, dir. of sales. Date Product Introduced: 3/94. Product Description & Applications: The DD "C" Series are 2-way, close-proximity studio monitors. The DD 161c model features one 6" woofer and our new titanium tweeter. The DD 261c has two 6" woofers and a titanium tweeter. The woofer motor assembly has been doubled in size and a stiffer cone composition has improved the frequency response by 50% at ± 2 dB. Beautiful hand-crafted oak and fiberboard black cabinets complete this beautiful musical tool. Basic Specifications & Suggested List Price: Woofer-6.5", tweeter-25mm. DD161c; impedance - 4 ohm, freq. response - 48Hz-20kHz, sensitivity - 90dB, power handling - 100 watts, dimensions - 9"x13.5"x11". DD261c; impedance - 8 ohm, freq. response - 42Hz-20kHz, sensitivity - 90dB, power handling - 200 watts, dimensions - 10"x18.5"x15".

DIGITAL DESIGNS

100 N. Quapah, Ste. K; Oklahoma City, OK 73107; (405) 946-4500. Product Name: Magma "A" Series Studio Monitors M6 and M26. Contact: Alice Sandhu, dir. of sales. Date Product Introduced: 3/94. Product Description & Applications: The Magma "A" Series are 6 1/2 two-way, close-proximity studio monitors featuring a 1" tweeter and two 6" woofers per cabinet configuration. Many improvements differentiate the "A" Series from the previous models: magnet structure has been doubled, voice coil size increased by 30% and double venting of the pole piece enhances heat dissipation. Frequency response accuracy is increased by 50%. Basic Specifications & Suggested List Price: Price range: \$283/\$429 pair. Freq. response: M6a 48Hz-20kHz; M26a 42Hz-20kHz. Woofer 6.5" Sensitivity: 90dB. Tweeter 20mm. Impedance M6-4 ohm; M26-8 ohm. Power handling: 100 and 150 watts (M6a & M26a). Dimensions: M6a - 9"x13.5"x11"; M26a - 10"x18.5"x15".

DYNAUDIO ACOUSTICS/AXI

357 Liberty St; Rockland, MA 02370; (617) 982-2626; FAX: (617) 982-2610. Product Name: "Low Profile" Surround Sound Monitoring. Contact: Bruce Bartone, sales mgr. Date Product Introduced: 8/94. Product Description & Applications: Designed specifically to overcome cost and space limitations when installing, L-C-R moni-

toring for surround sound and film work. Systems are constructed with the low-frequency drivers electronically integrated with but physically separate from a chaise of very high power mid and high-frequency cabinets. Full-range, high-SPL monitoring of extremely high-quality may be realized at lower cost than standard full-range cabinet installations. All systems include direct sub bass channel input and surround sound channel amplifier. Basic Specifications & Suggested List Price: PPM-1-based system (3-way) Mid/high cab size: H 10.8" x W 6.7" x D 9.1". Freq. response 35Hz-20kHz, distortion <1%. Max continuous SPL 117dB. List price: \$9,049.00. Mz based system (4-way), Mid/high cabinet size: H 13.4" x W 26.8" x D 19.7". Freq. response: 35Hz-20kHz, distortion less than 1%. Max continuous SPL: 129dB. List price: \$16,840.



EASTERN ACOUSTIC WORKS INC.
OMX8000i Closely Coupled Electronic Processor™

EASTERN ACOUSTIC WORKS INC.

One Main St.; Whitinsville, MA 01588; (508) 234-6158; FAX: (508) 234-8251. Product Name: MX8000i Closely Coupled Electronic Processor™. Contact: Christian Doering, dir. of communications. Date Product Introduced: 10/94. Product Description & Applications: The MX8000i Closely Coupled Electronic Processor™ ushers in a new generation of network-addressable speaker processors. The MX8000i is a mono four-way crossover with asymmetrical filters, high-frequency horn EQ, low-frequency cone excursion protection and three subwoofer modes. In addition, each frequency band has peak amplifier clipping protection limiting, as well as RMS limiting to prevent thermal overload. Limiters can be monitored and adjusted using a remote computer through the serial control port, or the optional MediaLink™ card, an advanced proprietary version of this widely accepted network audio control interface. The computer control interface also allows access to micro and millisecond digital delays on each MX8000i frequency band.



ECLIPSE RESEARCH CORPORATION
Omnisphere™ OS 2000-R

ECLIPSE RESEARCH CORPORATION

PO Box 8299; Incline Village, NV 89452-8299; (702) 832-0666; FAX: (702) 831-5349. Product Name: Omnisphere™ OS 2000-R. Contact: Ted Haugam, pres. Date Product Introduced: 2/94. Product Description & Applications: The model 2000-R is specifically designed for large, open outdoor installations, where the unit must blend with the environment, match the hardscape, be weather resistant, and be placed into areas where theft or vandalism could be a problem. The 2000-R incorporates a shell of cement and fiberglass, and can be given the look of almost any stone. This system, houses a 12" woofer with a 1" compression driver as a standard, and can also support a high powered version 15" with a 2" compression driver, which will deliver very high SPL. The system allows a given area to be covered with fewer units. Basic Specifications & Suggested List Price: The frequency response of the OS-2000-R is 40Hz to 15kHz ± 6 dB. The standard version will handle 300 watts RMS of power and the high-power upgrade will support 500 watts RMS, and provide 128dB maximum SPL. All components and hardware are either stainless steel, chrome or powder-coated. UV protected ABS, cement or fiberglass or moisture proofed. Overall dimensions are 24.5" x 35". 150lbs. List: \$2,325.



ECLIPSE RESEARCH CORPORATION
Omnisphere™ OS-2012-C

ECLIPSE RESEARCH CORPORATION

PO Box 8299; Incline Village, NV 89452-8299; (702) 832-0666; FAX: (702) 831-5349. Product Name: Omnisphere™ OS 2012-C. Contact: Ted Haugam, pres. or Bob Coziar, VP. Date Product Introduced: 1/94. Product Description & Applications: A high-power, omnidirectional speaker system, which was designed for easy installation into "T" bar, drop-in-ceilings. The use of a large-format coaxial driver, along with a time aligning phase plug within the 360° manifold, gives the 2012-C a 360° horizontal by 180° vertical radiation pattern of full bandwidth, high SPL coverage. Also utilizes a dual-walled, steel back-box, with a high density foam core. Applications include: convention halls, night club/discos, shopping malls, theaters, casinos, airports, let your imagination go. Basic Specifications & Suggested List Price: The frequency response of the OS 2012-C is 40Hz to 15kHz ± 6 dB, and can handle 300 watts RMS of power. Also can be utilized with a 70 volt system by using the Eclipse ET 70/400, which is a 400 watt/70 volt transformer. The exposed phase plug cover extends into the room 6.5 inches, and can be custom formed to almost any look, from company logo, to a golf ball look, the design possibilities are almost endless. List: \$895.

GALAXY AUDIO

625 E. Pawnee; Wichita, KS 67211; (316) 263-2852. Product Name: Chameleon HF. Contact: G.L. Graves, prod. coord. Date Product Introduced: 1/94. Product Description & Applications: The Chameleon HF is a compact full-range hi-fidelity monitor speaker in a black ABS cabinet with a cloth-covered Noryl grille. Available in white or primer grey finish; other options include swivel brackets for wall/ceiling mounting, weather resistant cone treatment and constant voltage transformers. Mount on a mic stand with our SA-1 stand adaptor, use as a bookshelf speaker, near-field monitor, surround sound satellite, or a distributed foreground music speaker. Basic Specifications & Suggested List Price: 8 ohm duct ported reflex bass cabinet with a 5" poly paper woofer and 1" ferrofluid cooled soft cloth dome tweeter. Frequency response: 50Hz to 20kHz ± 6 dB; power handling capacity: 40 watts RMS/60 peak; crossover frequency: 4kHz @ 6dB/octave with auto reset thermal breaker. Suggested retail: \$149.

GENELEC/QMI

25 South St.; Hopkinton, MA 01748; (508) 435-3666. Product Name: 1030A. Contact: Barry Fox, mktg. mgr. Date Product Introduced: 1/94. Product Description & Applications: 2-way bi-amped compact near-field monitor. System includes 6 1/2" plastic bass unit, 3/4" metal-dome tweeter and Genelec's DCW technology for improved and more consistent stereo. Each speaker is bi-amped and has fully balanced inputs. System features include treble & bass tilt controls and bass roll-off control. Basic Specifications & Suggested List Price: Low cutoff frequency: (-3dB) 52Hz; upper cutoff frequency: (-3dB) 20kHz; peak acoustic output: @ 1 meter from engineer with music material 115dB. Suggested pro net price: \$1,998 per pair.

GENELEC/QMI

25 South St.; Hopkinton, MA 01748; (508) 435-3666. Product Name: 1092A. Contact: Barry Fox, mktg. mgr. Date Product Introduced: 12/94. Product Description & Applications: Active subwoofer for use with Genelec 1030A, 1031A, and 1032A near-field monitors. Improves low frequency performance and system headroom. Ideal in studios where space is at a premium as a satellite/subwoofer system or as a part of a surround sound system. Basic Specifications & Suggested List Price: Anticipated pro net price: \$2,000 each. Fully balanced inputs and satellite outputs 2x8" bass units in reflex enclosure.

HOT HOUSE PROFESSIONAL AUDIO

275 Martin Ave.; Highland, NY 12528; (914) 691-6077; FAX: (914) 691-6822. Product Name: SB412 High Impact Subwoofer. Contact: Richard Rose, pres. Date Product Introduced: 11/93. Product Description & Applications: To address the needs of very large control rooms or any application requiring even higher SPL and low-frequency content, the SB412 high-impact subwoofer is offered to augment the full-range SD312 cabinet (or any large-format monitor). Identical in size to the 312, but with four high-speed 12" long-throw woofers (more articulate and faster than 15" or 18"), its addition pushes the system's peak-SPL capability to nearly 150dB... the ultimate dance mix solution. Basic Specifications & Suggested List

Price: Frequency response: 25Hz to 250Hz, 25Hz to 90Hz with SD312; peak SPL in pairs: 142dB; power handling: 5180 watts each; max. THD @ 124dB (10% full power): 0.33%; @ 114dB (1% full power): 0.22%; dimensions: 35 3/4", 31 7/8", 21 1/8". Weight: 250lbs. As addition to SD312 system, price of \$20,000 includes 2 subwoofers and 10 kilowatts of Hot House monoblock amp amplifiers. Single cabinet only: \$5,000.



HOT HOUSE PROFESSIONAL AUDIO
SD312 High Output Series Monitor

HOT HOUSE PROFESSIONAL AUDIO

275 Martin Ave., Highland, NY 12528; (914) 691-6077; FAX: (914) 691-6822. Product Name: SD312 High Output Series Monitor. Contact: Richard Rose, pres. Date Product Introduced: 11/93. Product Description & Applications: Making proprietary use of Tannoy's new Super-Dual technology, the SD312 full-range High Output Series monitor is designed to provide extremely flat, wide-bandwidth response at levels approaching 140dB with negligible phase and harmonic distortion. Utilizing three long-throw 12" woofers, engineered for extreme excursion capabilities, a 10" Super-Dual with a 2" throat concentric high-frequency driver and high-current 9-gauge braided Teflon Kimber Cable, the 312 exhibits transient capabilities exceeding anything previously available in so compact a package. Basic Specifications & Suggested List Price: Frequency response: 25Hz to 25kHz; peak SPL in pairs: 140dB; power handling: LF - 3840 watts, MF - 1400 watts (bi-wired), HF - 1200 watts (tri-amped); max. THD @ 124dB (10% full power): 0.35%; @ 114dB (1% full power): 0.19%; dimensions: 35 3/4", 31 7/8", 21 1/8" (standard retrofit). Weight: 275lbs. Complete system price including all Hot House monoblock amplifiers and dedicated SDX electronic crossovers: \$27,000 to \$35,000.

KOSS CORPORATION

4129 N. Port Washington Rd., Milwaukee, WI 53212; (414) 964-5000; (800) USA-KOSS. Product Name: Quiet Zone 1000. Contact: Cameryne Roberts, PR coord. Date Product Introduced: 11/93. Product Description & Applications: Incorporating "active" noise technology, the QZ/1000 reduces low-frequency noises between 30-1,400 Hz. Higher frequencies are not affected by the active noise technology so conversation or music can be enjoyed without annoying background buzz such as the droning of jet engines or the hum of a vacuum cleaner. The QZ/1000 can be connected to a Walkman or CD player so music can be enjoyed in a noisy environment without having to run it way up. Basic Specifications & Suggested List Price: Frequency response: 20Hz-20kHz. Noise cancellation: up to 18dB. Soft foam ear cushions and a padded headband for extra comfort. Includes patch cord for CD player or Walkman and a 2-pin adapter for use with airline in-flight entertainment.

MARTIN/TGI NORTH AMERICA INC.

300 Gage Ave., #1; Kitchener, N2M 2C8 Ontario Canada; (519) 745-1158; FAX: (519) 745-2364. Product Name: Martin EM 15. Contact: Marc Bertrand, mktg & media rel. Date Product Introduced: 4/94. Product Description & Applications: The Martin EM 15 is a miniature, trapezoid full-range loudspeaker capable of producing SPL's normally associated with larger enclosures. To achieve high-output capability from an enclosure only 28 cm in height, the EM 15 features twin 5" drivers in a unique two-way configuration utilizing patented ICT technology. The high-SPL, durable speaker design and stylish ergonomics make the EM 15 perfect for club and bar installations, delay in-hill in theaters and A/V applications. Basic Specifications & Suggested List Price: Peak power: 200 watts; maximum SPL: 113dB; sensitivity: 91 dB 1 watt/1meter; suggested list: \$295.

MARTIN/TGI NORTH AMERICA INC.

300 Gage Ave., #1; Kitchener, N2M 2C8 Ontario Canada; (519) 745-1158; FAX: (519) 745-2364. Product Name: Martin W1 Wavefront. Contact: Marc Bertrand, mktg & media rel. Date Product Introduced: 4/94. Product Description & Applications: The Martin W1 Wavefront system is a high-performance, ultra-compact loudspeaker designed for specific applications where both high output and small size is required. The W1 features a 10" bass driver and a 1" exit compression driver housed in a rugged plywood enclosure built using the same construction techniques as larger Martin touring systems. Its 2-way passive configuration simplifies operation, ensures predictable system performance and reduces amplifier

count. Typical uses include nightclubs, theaters and A/V applications. Basic Specifications & Suggested List Price: Peak power: 600 watts; maximum SPL: 124dB peak; sensitivity: 97dB 1 watt/1 meter; suggested list \$1,150.



MCCAULEY SOUND INC.
515 Coax Wedge Monitor

MCCAULEY SOUND INC.

13608 94th Ave. E., Puyallup, WA 98373; (206) 848-0363. Product Name: 515 Coax Wedge Monitor. Contact: Bruce Anderson, sales mgr. Date Product Introduced: 4/94. Product Description & Applications: Features new McCauley Coaxial System, that allows the system to be compact & powerful at the same time. The unique construction allows it to be placed on the stage with two different angles for close and distant location. It also can be put on the upright position on a speaker stand or simply on the floor and used as a P.A. system. Applications: live stage, school/church P.A., sound rental systems. Basic Specifications & Suggested List Price: Dimensions: 18"x18"x14"; shape: trapezoidal floor wedge; components: McCauley 6244 loudspeaker, 6520 2" high-frequency driver (6510 - 1" optional). Passive crossover or bi-amp version. Suggested list: 9-ply 3/4" with 2" driver bi-amp version, \$1,525.; with 1" driver bi-amp version, \$1,325, optional passive 3415 x-over, add \$158.



MCCAULEY SOUND INC.
Stage Array Systems

MCCAULEY SOUND INC.

13608 94th Ave. E., Puyallup, WA 98373; (206) 848-0363. Product Name: Stage Array Systems. Contact: Bruce Anderson, sales mgr. Date Product Introduced: 4/94. Product Description & Applications: Trapezoid shape/arrayable SA Series features carpeted exterior, metal hardware, perforated steel grilles, hardwood ply construction. These high-powered systems feature McCauley 1000 Series loudspeakers, 3/4" 9-ply birch laminate is used on all of the enclosures for the Stage Array Series. Super tough carpet surface, plus oak skids give you protection at it's best! Applications: live performance stages, auditorium installation, school P.A., churches, night club/disco. Basic Specifications & Suggested List Price: 22"x42"x14" to 30"; shape: trapezoid, low & mid/low frequency loudspeakers are all 4" voice coil McCauley 1000 series components. McCauley high-frequency 1" & 2" drivers. SA 18XL extended low-frequency system (1x18") list \$1,414.00. SA 218 high-definition low-frequency system (2x18") list \$1,458.00. SA 212 high-efficiency HF/MF system (2x12"+2" driver) list \$1,825. SA1810 full-range system (18"+10"+1" driver - list: \$1,991.



PAS - PROFESSIONAL AUDIO SYSTEMS
FT-1

PAS - PROFESSIONAL AUDIO SYSTEMS

2270 Cosmos Ct., Carlsbad, CA 92009; (619) 431-9224. Product Name: FT-1. Contact: Larry Doran. Date Product Introduced: 1/94. Product Description & Applications: The FT-1 is a fully time offset corrected (TOC™) System-1 full-range cabinet that achieves offset correction by use of a specially designed high-power internal crossover matched to a 1" HF compression driver, which is mounted coaxially onto a PAS CXL-1580C 15" LF driver. PAS' proprietary TOC™ Time Offset Correction circuitry achieves near-perfect phase response from 100Hz to 10kHz, producing a point-source radiation pattern with better transient response, superior array coherence, lower distortion and less tendency to feed back. The rugged, ready-to-fly-or-mount cabinet provides exceptional full-range performance at an affordable price for most club and church applications. Basic Specifications & Suggested List Price: The enclosure is constructed from 11-ply Baltic birch with reinforced corners, a perforated steel grille, and top-and-bottom steel-plate-reinforced air cargo #20050 fasteners and an ultimate support socket on the bottom for stand mounting. The FT-1 system provides excellent results in singles or arrays. Its 21 1/4"x17 1/4"x17" cabinet mounts easily, travels well and features a low suggested professional net price of \$995.

PAS - PROFESSIONAL AUDIO SYSTEMS

2270 Cosmos Ct., Carlsbad, CA 92009; (619) 431-9224. Product Name: RS-2C. Contact: Larry Doran. Date Product Introduced: 4/94. Product Description & Applications: The RS-2C combines active electronics and rugged, ready-to-fly, high-power, full-range cabinets with a front surface area barely larger than the loudspeakers. PAS' proprietary T.O.C.™ Time Offset Correction circuitry achieves near-perfect phase response from 100Hz to 10kHz, producing a point-source radiation pattern with better transient response, superior array coherence, lower distortion and less tendency to feed back than conventional designs. The RS-2C is ideal for large-venue sound-reinforcement applications. Basic Specifications & Suggested List Price: Each RS-2C contains a 2-inch HF compression driver mounted coaxially to a PAS, CXL 2580C 15" LF driver, with additional bass energy output provided by a PAS 15" HL 2580C extended-low-range driver. The enclosure is 11-ply Baltic birch with reinforced corners, a perforated steel grille, and top-and-bottom steel-plate-reinforced Air Cargo #20050 fasteners. The front of the cabinet measures only 35 1/4" x17 1/4". The external dividing network employs 4-pole linear-phase dividing filters, special Time Offset Correction circuitry, equalization, and overdrive protection for the compression driver(s).

PANASONIC/RAMSA PRO AUDIO

6550 Katella Ave., Cypress, CA 90630; (714) 373-7277. Product Name: Ramsa WS-A35 Near-Field Compact Speakers. Contact: Greg Braithwaite, nat'l sales & mktg. mgr. Date Product Introduced: 4/94. Product Description & Applications: Over the years, Ramsa has earned high marks from audio industry professionals for excellence in speaker design and durability. The new Ramsa WS-A35 near-field, two-way compact speakers are no exception. They offer superbly balanced, natural sound reproduction and are ideal for a wide variety of studio-quality applications. Magnetic shielding allows for use in close proximity to a video monitor. Optional brackets are available for permanent installation on a wall (WS-AQ4W) or ceiling (WS-AQ5C).

PROFESSIONAL TECHNOLOGIES

5433 Lowell Rd., Rome, NY 13440; (315) 337-4156. Product Name: PT122HD. Contact: John Puleo, chief eng. or Mike Prote, mktg. Date Product Introduced: 6/94. Product Description & Applications: The PT122HD is a high-power, accurate speaker system consisting of two bass drivers and a horn mid-tweeter arranged in a symmetrical configuration to maintain the soundfield's polar integrity. The crossover utilizes high-quality plastic film capacitors and heavy-gauge air core coils to eliminate saturation distortion. The tweeter has self-reset protective device. Applications include, but are not limited to, live sound, mobile DJ and clubs. Basic Specifications & Suggested List Price: Drivers: two 12" bass drivers; one horn mid-tweeter. Frequency response: 40Hz to 20kHz ±3dB. Power handling: 600 watts, sensitivity at 1 watt/1meter, 98dB; nominal impedance: 4Ω, carpet or epoxy cover veneer, protective corners and grilles; dimensions: 35"x14"x13". Price: \$2,700 per pair.

MONITORS AND LOUSPEAKERS



PROSYSTEMS - THE AWS GROUP INC.
Powerpoint 425

PROSYSTEMS /THE AWS GROUP INC.

65 36th St., Wheeling, WV 26003; (304) 233-2223; (800) 258-8550. Product Name: Powerpoint 425. Contact: Adolph Santorine. Date Product Introduced: 4/94. Product Description & Applications: The Powerpoint line of horn drivers uses ProSystems' new High Frequency Vibrational Shell technology. The HFVS technology provides a wide-bandwidth response, low distortion and clean high end by using a radically different diaphragm that eliminates the need for a phase plug. The HFVS technology replaces the traditional dome and surround with a center-mounted diaphragm that vibrates against a precisely engineered waveguide. The air compressed between these two flows smoothly to the throat of the horn without phase problems or distortion caused by a surround or phase plug. Basic Specifications & Suggested List Price: The Powerpoint is now available in both 1" and 2" throat versions. The 1" version delivers 105dB ± 5dB (1 watt/1M) from 1kHz up past 20kHz. It can handle 60 watts RMS with a two inch voice coil. The 2" version delivers 107dB (1 watt/1M) from 1kHz through 18kHz and can handle 100 watts RMS.

RENKUS-HEINZ INC.

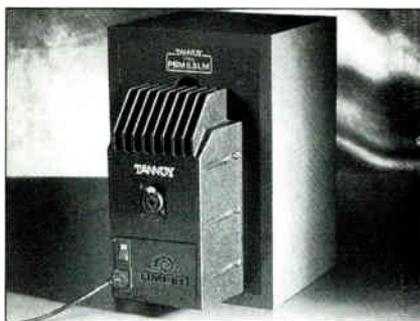
17191 Armstrong Ave., Irvine, CA 92714; (714) 250-0166. Product Name: CE-3T CoEntrant Loudspeaker. Contact: Carl Dorwaldt, sales mgr. Date Product Introduced: 1/94. Product Description & Applications: The CE-3T is the primary building block in the TSC loudspeaker family developed specifically for the touring market by RH. It is a compact 3-way, medium-throw loudspeaker with unprecedented power handling and output capabilities for a cabinet of its small size. The CE-3T's CoEntrant design provides true point source performance and clarity with near-perfect imaging, even at high SPL levels. Its 3-way design features dual-1" high-frequency drivers, dual-6.5" midrange drivers and dual-12" woofers. Basic Specifications & Suggested List Price: The trapezoidal CE-3T is 32.5"x21"x23.75", yet handles over 1kW of power and delivers an output SPL of 130dB from 50Hz to 16kHz. It provides 60° by 30° vertical coverage. Pro net price is \$3,675.

RENKUS-HEINZ INC.

17191 Armstrong Ave., Irvine, CA 92714; (714) 250-0166. Product Name: Complex Conic Loudspeaker. Contact: Carl Dorwaldt, sales mgr. Date Product Introduced: 4/94. Product Description & Applications: Complex Conic loudspeakers offer unprecedented dynamic range and clarity along with exceptional pattern control. Their Complex Conic Waveguide design overcomes the high-frequency coverage irregularities of conventional rectangular horns and eliminates the typical "horn" sound of many loudspeakers systems. Seven compact models, including a miniaturized, wide-angle "under-the-balcony" system are available to cover a wide range of applications. Numerous optional features add to versatility. Basic Specifications & Suggested List Price: The under-the-balcony SR62H has 150° horizontal coverage, is only 7.5"x20"x9". Other models feature a dual-trapezoidal design and offer a choice of cabinet sizes, coverage patterns and options. Pro net prices range from \$1,050 to \$2,175.

SIMON-KALOI ENGINEERING LTD.

707 Clear Haven Dr., Agoura Hills, CA 91301; (818) 707-9980. Product Name: Speaker of the House. Contact: Rick Simon. Date Product Introduced: Winter 1994. Product Description & Applications: Integrated wireless receiver, amp, and speaker. Portable and easy to use. Just plug it in, turn on the mic and start talking. Basic Specifications & Suggested List Price: Speaker of the House. \$1,395.



TANNOY
Tannoy Limpet

TANNOY

300 Gage Ave. #1; Kitchener, Ontario, DN 2M 2C8; (519) 745-1158; FAX: (519) 745-2364. Product Name: Tannoy Limpet. Contact: Marc Bertrand, mktg & media rel. Date Product Introduced: 8/94. Product Description & Applications: The Tannoy Limpet is a bolt-on power amplifier module that comes attached to the back of a Tannoy PBM 6.5 II LM monitor. The unique, compact design combines a very high-current, Toroidal power supply, fully discrete amplification stages and ultra-wide-bandwidth. Each single-channel Limpet system delivers an enhanced stereo image because the channels are fully separated—no power supply sagging due to inter-channel coupling, no crosstalk, no interference. The Limpet is ideal for professional recording, broadcast/post-production facilities, remote and live recording reinforcement applications and project studios. Basic Specifications & Suggested List Price: Peak power 135 watts; maximum SPL: 112dB; connector: Neutrik Combo connector with a 1/4" TRS jack built into the center of a female XLR connector; 0.775/1.0 volt switchable input sensitivities; suggested list \$995/pair.

TANNOY

300 Gage Ave. #1; Kitchener, Ontario, DN 2M 2C8; (519) 745-1158; FAX: (519) 745-2364. Product Name: Tannoy PBM 8 II. Contact: Marc Bertrand, mktg & media rel. Date Product Introduced: 9/94. Product Description & Applications: The Tannoy PBM 8 II represents the completion of the Mark II Series of PBM monitors. The PBM 8 II employs an injection-molded, polyolefin, low-frequency cone mica-impregnated for high resolution and enhanced endurance. Couple the new cone with a high-grade, minimal st crossover topology and the result is an extremely accurate, dynamic monitor perfect for the demands of modern digital recording. The Tannoy PBM 8 II is ideal for all studio applications and capable of performance far beyond its price point. Basic Specifications & Suggested List Price: Impedance: 8 ohms; peak power handling: 125 watts; sensitivity: 92dB; frequency response: 47Hz-20kHz plus/minus 3dB; crossover frequency: 2.4kHz; suggested retail: \$795/pair.

TURBOSOUND

9288 Gorst Rd., Mazomanie, WI 53560; (608) 767-3333; FAX: (608) 767-3360. Product Name: TFL-760LM, TFL-760HM. Contact: Daniel Abelson, pres. Date Product Introduced: 4/94. Product Description & Applications: The TFL-760LM (low-mid) and TFL-760HM (high/mid-high) enclosures are components of the Flashlight and Floodlight systems designed to provide 50° vertical dispersion when underhung at the lower levels of large flying arrays. The underhung enclosures help to provide smooth coverage to audience members closest to the stage. Basic Specifications & Suggested List Price: TFL-760LM: 1 1/2" low-mid driver on a 25" x 50"V axlehead device. TFL-760HM 1 6.5" high-mid driver. 1-1" compression driver on a 25" H x 50" V device.

WOODWORX AUDIO SYSTEMS INC.

3714 Alliance Dr., Ste. 303; Greensboro, NC 27407; (910) 855-5600; FAX: (910) 855-1488. Product Name: MAX 1.5A. Contact: Al Stewart, sales mgr. Date Product Introduced: 6/94. Product Description & Applications: As part of the new MAX™ Series, the MAX 1.5A is a compact, high-SPL arrayable loudspeaker, which utilizes a single 12" LF driver, and 1.5" compression driver mounted to a 60x60 waveguide horn. All Woodworx enclosures are made using Baltic birch with a dark grey finish, Neutrik Speakon™ connectors, and certified flying hardware. Applications include: auditoriums, churches, portable A/V systems, nightclubs, sports arenas, theatrical reinforcement. Basic Specifications & Suggested List Price: LF driver: 600 watts, 1/5" compression driver 150 watts, 60x60 wave. Suggested list price: \$2,083.33.



WOODWORX AUDIO SYSTEMS INC.
MAX 1.5M

WOODWORX AUDIO SYSTEMS INC.

3714 Alliance Dr., Ste. 303; Greensboro, NC 27407; (910) 855-5600; FAX: (910) 855-1488. Product Name: MAX 1.5 M. Contact: Al Stewart, sales mgr. Date Product Introduced: 6/94. Product Description & Applications: MAX 1.5 M is a compact, high-SPL stage monitor, which utilizes a single 12" LF Driver, 1.5" compression driver mounted to a 60x60 wave guide horn. All Woodworx enclosures are made using Baltic birch with a dark grey finish, Neutrik Speakon™ connectors, and certified flying hardware. Applications include: stage monitoring system, theatrical foldback, portable A/V systems and choir monitoring. The MAX 1.5 M has been tour tested and proven to be a monitor that provides maximum output with minimal distortion and unusually smooth frequency responses. Basic Specifications & Suggested List Price: MAX 1.5 M specifications: LF driver 600 watts; 1.5" compression driver: 150 watts; 60x60 waveguide horn, nominal impedance: low frequency 8Ω, high frequency 8 Ω. Suggested list price: \$1,983.33.

WRIGHT MICROPHONES & MONITORS

2091 Faulkner Rd., NE; Atlanta, GA 30324; (404) 321-3886. Product Name: Wave Front Monitors. Contact: Tom Wright. Date Product Introduced: 1993. Product Description & Applications: Mid- and near-field studio monitor loudspeakers. Coaxial configuration with proprietary mounting/phase plug assembly allows drivers to run in polarity at all frequencies, front baffle and cabinet design minimizes baffle and interior reflection anomalies. High power handling. Basic Specifications & Suggested List Price: WFM-I: mid-field 15" woofer—suggested retail price: \$4,000. WFM-II: near-field 10" woofer—suggested retail price: \$2,000. WFM-III: near-field 8" woofer—suggested retail price: \$1,000. All systems are 2-way, 12dB/octave crossovers.

YORKVILLE SOUND INC.

4625 Witmer Industrial Estate; Niagara Falls, NY 14305; (716) 297-2920. Product Name: Elite EX-601. Contact: Joe Oorn. Date Product Introduced: Summer '94. Product Description & Applications: The EX-601 is a premier compact system for the most demanding applications. With the elite P-601EX processor, this critically tuned enclosure is optimized for use with the elite SW-1000 or SW-800 subwoofer systems, or as a stand-alone full-range unit with outstanding performance. Basic Specifications & Suggested List Price: Sensitivity: 101dB @ 1 watt/meter; dimensions: 29.1"x15.4"x16.5"; power handling: 600 watts (program); maximum SPL: 129dB; frequency response: 60Hz to 20kHz; cabinet impedance: 4 ohms; weight: 68lbs.

MUSIC PRODUCTS

ALESIS

3630 Holdrege Ave. Los Angeles, CA 90016; (800) 5-ALESIS. Product Name: S4 QuadraSynth 64 Voice Sound Module. Contact: Marc Nathan. Date Product Introduced: 7/94. Product Description & Applications: The S4 is a single-rackspace synthesis module that was designed with one thing in mind: great sound. To get that sound, the S4's advanced synthesis engine was designed by the team that brought you the greatest and most popular synths in history. The 256 Programs and 200 Multitimbral Mixes were developed by a dedicated in-house team with the help of InVision, an innovative group of sonic designers. You can't find a better-sounding, more powerful synth than the Alesis S4. Basic Specifications & Suggested List Price: True 64-voice polyphony, 16 Megabytes of on-board sample ROM, ADAT optical digital output, PC/MCIA RAM/RDM card slot adds 8 additional MB for 24 MB total, 16 channel Multitimbral, 256 Programs, 200 Mixes, 256 Onboard Effects. U.S. suggested retail: \$999.

ANGEL CITY AUDIO

2 Liberty Place; Middletown, CT 06457; (203) 347-5166. Product Name: PCM library for Korg T Series Synthesizers—New Releases. Contact: Jim Fellows. Date Product Introduced: 10/93. Product Description & Applications: Expanding disk library of PCM and programs for Korg T series synthesizers targeting project studios, arrangers, writers and producers. This long-established and highly regarded library goes far beyond what is normally expected. New ti-

ties this year included many vintage keyboards, basses and exotic percussion. Highlights this year include exquisite, cross-laded recreation of the Wurliizer 140B electric piano as well as Hohner D6 Clavinet, Celeste, 60's organs, B3 and analog synthesizers. **Basic Specifications & Suggested List Price:** Each disk contains 1MB of sample data and between 30 and 200 programs using that data as well as demonstration songs. There are also tutorials and regular program disks available. Most require either a T1 or an expanded (RAM) T2/T3. \$10 to \$37.50 per disk. Direct Only.

DW LABS INC.

PD Box 882; Millburn, NJ 07041; (201) 376-8453. Product Name: D3P Multi Distortion. **Contact:** Jeff Davis. **Date Product Introduced:** 1/94. **Product Description & Applications:** The D3P Multi Distortion offers a preamp with tone, blues, rock and metal distortion settings all in a complete easy to use package. The Dynamic tone feature matches the tone shaping parameters to the distortion type that has been selected. **Basic Specifications & Suggested List Price:** Metal enclosure measuring 5 1/4" x 3 3/4" x 1 1/4". Uses a 9 volt battery or DW external power supply. Suggested list price is \$139.95.

EGNATER AMPLIFICATION INC.

25550 Colleen St.; Oak Park, MI 48237; 810-399-6208. Product Name: IE4 guitar preamp. **Contact:** Bruce Egnater. **Date Product Introduced:** 1994. **Product Description & Applications:** All tube, MIDI switching 4-channel preamp with "the tone of life." Channels are completely independent. Each is voiced differently with its own EQ and presence. Sounds range from vintage clean to modern massive overdrive and anything in between. **Basic Specifications & Suggested List Price:** List price \$1,795.

EGNATER AMPLIFICATION INC.

25550 Colleen St.; Oak Park, MI 48237; 810-399-6208. Product Name: MICA TOL 100. **Contact:** Bruce Egnater. **Date Product Introduced:** 6/94. **Product Description & Applications:** All tube, MIDI switching, 4 mode guitar amplifier with "the tone of life." Each channel has a different character ranging from vintage clean to modern massive overdrive and anything in between. Features include 100 watts output, master presence, level, density and effects loop. **Basic Specifications & Suggested List Price:** TOL 100 list price \$1,995. Combo version available with reverb and 2x12" V-30 speakers.

ESOTERIC SOUND

4813 Wallbank Ave.; Downers Grove, IL 60515; (708) 960-9137. Product Name: BES-2 turntable. **Contact:** M. Stosich. **Date Product Introduced:** 2/94. **Product Description & Applications:** An audiophile quality turntable featuring 33 and 78 rpm play speeds. The unit features a high-quality, fixed-mount arm and dustcover. It is suitable for both home and professional re-recording purposes. **Basic Specifications & Suggested List Price:** Price: \$665. The BES-2 turntable features a 12", 3.4 lbs. platter and belt-drive play system. Tracking force and anti-skating calibration range is 0-3 grams. Speeds: 33.33/78.26 rpm. Wow and Flutter: 0.1 %. Rumble: -65dB unweighted.

FIRSTCOM/MUSIC HOUSE/CHAPPELL

13747 Montfort Dr., Ste. 220; Dallas, TX 75240-4459; (800) 858-8880. Product Name: MusiQuick Software. **Date Product Introduced:** 3/94. **Product Description & Applications:** MusiQuick software and MusiQuick + Clip 2 CD-ROM are the easy to use music search/audition software packages for FirstCom's music libraries. The CD-ROM version allows instant audition of the music selected from the search list. Available for Mac and Windows, these packages are phase 1 of the FirstCom on-line production music network currently under development.

FIRSTCOM/MUSIC HOUSE/CHAPPELL

13747 Montfort Dr., Ste. 220; Dallas, TX 75240; (800) 858-8880. Product Name: Personal Music Library. **Date Product Introduced:** New releases: 12/93, 3/94, 7/94, 9/94, 12/94. **Product Description & Applications:** FirstCom introduces 100 new CD titles into their personal music library. This 100% guaranteed library gives clients the freedom to pick and choose music specific to their needs and budget. FirstCom releases over 80 new CD titles a year—featuring such artists as Rick Rhodes, Larry Carlton, Ray Russell, Billy Joe Walker Jr. and recording artists from American Gramophone and Zomba.



FISHMAN AUDIO DIVISION
Acoustic Performer Pro/Acoustic Monitor Pro

FISHMAN AUDIO DIVISION

340-D Fordham Rd.; Wilmington, MA 01887; (508) 988-9199. Product Name: Acoustic Performer Pro/Acoustic Monitor Pro. **Contact:** Rick Nelson. **Date Product Introduced:** 8/94. **Product Description & Applications:** Compact, powerful performance systems offering unparalleled clear, crisp sound. Unique wedge shape allows for vertical or horizontal operation. 270 watt MOSFET bi-amp, 15V & 48V phantom power for mics, digital reverb, 3 effects tools, tape/CD input, tuner output, pre/DSP Dis. phase switches, master volume. Full range speakers for both instruments and vocals. **Basic Specifications & Suggested List Price:** Amp: 2-1/2 channels; 270 watts RMS bi-amped (23Gw/4-ohm), 3 effects loops, digital reverb, phase switches, anti-feedback notch filter, mute function and compact thermoplastic housing. Steel grille: 19.3"H x 15.15"W x 7.19"D. Monitor unit: 1/4" and XLR inputs, bass extend switch. Weight (each) 29 lbs. Price amp: \$1,995; mon tor: \$1,395

KAT INC.

53 1st Ave.; Chicopee, MA 01020; (413) 594-7466. Product Name: proPAD. **Contact:** Rod Squier. **Product Description & Applications:** The ultimate high-enc studio trigger pad. proPAD is available in either a drum or cymbal configuration. Using the same ultra-high sensitivity FSR (Force Sensing Resistor) trigger technology and gum rubber as the world famous drumKAT controller, the standard proPAD is capable of 1 to 4 zones with any standard interface and up to 24 zones (x 8 deep) with the proPAD interface. You can even control cymbal chokes and other special effects. **Basic Specifications & Suggested List Price:** (4) 1/4" trigger outputs, multi-pin DIN connector (for proPAD interface), uses standard 7/8" mounting bars and 3/8" arms with optional adaptor. Unique mounting base allows pad to swivel to any position regardless of mounting arm position.

KAT INC.

53 1st Ave.; Chicopee, MA 01020; (413) 594-7466. Product Name: trapKAT. **Contact:** Rod Squier. **Date Product Introduced:** 1/94. **Product Description & Applications:** trapKAT, the new studio standard in electronic drum kit. The trapKAT has a big ergonomic 24FSR pad playing surface. It sets up fast, so you spend more of your studio time playing. trapKAT's gum rubber playing surface responds to pressure, adding realistic expression to percussion tracks. It accommodates complex multitrack setups, and the intuitive interface and 2-line display make editing the 24 user kits quick and simple. **Basic Specifications & Suggested List Price:** 10 flat and 14 raised rim FSR pads, bass drum, hi-hat and breath control inputs, MIDI in, (2) MIDI out's, Footswitches: Global edit/Kit edit/Pad edit/Kit Advance, 24 User and Factory Kits, and more!

KURZWEIL MUSIC SYSTEMS/ YOUNG CHANG AMERICA

13336 Alondra Blvd.; Cerritos, CA 90703-2245; (310) 926-3200. Product Name: Ha! Rack Piano Sound Module. **Contact:** Gregg L. Perry. **Date Product Introduced:** 10/93. **Product Description & Applications:** The MicroPiano® is a half-rack sound module containing 32 Kurzweil-quality preset sounds, plus full digital multi-effects. The MicroPiano contains Kurzweil's new acclaimed Grand Piano samples, plus Strings, layered Piano/Strings, Hammond® Organ, and 2 different Electronic Pianos. All sounds feature the same high-quality and full-bandwidth as Kurzweil's top-of-the-line keyboards. **Basic Specifications & Suggested List Price:** \$499.

KURZWEIL MUSIC SYSTEMS/ YOUNG CHANG AMERICA

13336 Alondra Blvd.; Cerritos, CA 90703-2245; (310) 926-3200. Product Name: PC-88 Performance Controller. **Contact:** Gregg L. Perry. **Date Product Introduced:** 6/94. **Product Description & Applications:** The PC-88 Performance Controller combines the flexibility of a full-featured MIDI master controller with a digital piano, utilizing 32-note polyphony, 64 internal voice programs and a stereo digital multi-effects processor. The PC-88 features an 88-key, two-piece, weighted-action keyboard. **Basic Specifications & Suggested List Price:** The PC-88 is 16-part multitrack and can transmit on 4 MIDI channels simultaneously. An optional, independent General MIDI-compatible section with 205 presets and additional 32-note polyphony can be added via the VGM expansion option (PC-88MX is a PC-88 with a factory-installed VGM board). PC-88: \$2,295; PC-88MX: \$2,750.

KURZWEIL MUSIC SYSTEMS/ YOUNG CHANG AMERICA

13336 Alondra Blvd.; Cerritos, CA 90703-2245; (310) 926-3200. Product Name: K2500R. **Contact:** Gregg L. Perry. **Date Product Introduced:** 11/94. **Product Description & Applications:** The K2500R 3-space, rack-mount module has 48-voice polyphony and comes with 8MB of sound in ROM; additional 8MB sound blocks, available as options, include the Orchestral ROM Soundblock, Contemporary ROM Soundblock and an all new Stereo Grand Piano Soundblock. The K2500R supports up to 128MB of RAM via SIMMs memory modules and comes configured with 240K of user-programmable, battery-backed RAM. **Basic Specifications & Suggested List Price:** 48-voice polyphony, rewritable Flash EPROM. Future upgrades include an advanced sampling option featuring digital input/output, optical input/output and sample-while-play capabilities. The digital effects option (utilizing Kurzweil's new VLSI/DSP chip) features an 8-channel digital effects processor. Also available is a digital multi-track output option and an 8-channel (4 independent stereo) digital out box.

LEONARDO SOFTWARE

12421 W. Olympic Blvd.; Los Angeles, CA 90064; (310) 820-2868. Product Name: Audio Pro Sound Effects. **Contact:** Louis Benioff. **Date Product Introduced:** 5/94. **Product Description & Applications:** An 18 CD sound effects collection produced by one of France's leading studios. This collection is a general purpose library containing effects of all types. It also contains many foreign effects. **Basic Specifications & Suggested List Price:** List price: \$990.

MANHATTAN PRODUCTION MUSIC

355 W. 52nd St., 6th Fl.; New York, NY 10019; (212) 333-5766; (800) 227-1954. Product Name: Apple Tracks audiophile sound effects series. **Contact:** Ron Goldberg. **Date Product Introduced:** 9/95. **Product Description & Applications:** A new 90s style production music library. Also available: The Chesky Records Classical Series, over 60 CDs of top quality classical music for spots, corporate, multimedia and more; 5 CD Audiophile Sound Effects Series, 50 CD Manhattan Production Music library. **Basic Specifications & Suggested List Price:** All priced according to desired target medium and market size.

MIDI SOLUTIONS INC.

816-810 W. Broadway; Vancouver, BC, V5Z 4C9 Canada; (604)794-3013. Product Name: Quadra Merge. **Contact:** John Fast. **Date Product Introduced:** 1/94. **Product Description & Applications:** MIDI Solutions Quadra Merge is a 4-in/1-out MIDI merger that merges all types of MIDI messages, including System Exclusive. Includes a MIDI-Indicator LED. **Basic Specifications & Suggested List Price:** Connections: In 1/n 2/n 3/n 4/out, MIDI-powered. Price: \$129.

MUSICRAFTERS INC.

P.D. Box 595; Montgomeryville, PA 18936; (800) 468-TUNE; (215) 368-8863. Product Name: MusicCrafters Library. **Contact:** Elena de Lise. **Date Product Introduced:** Fall '94. **Product Description & Applications:** The MusicCrafters "CD Sampler," NOT A OEMO—this is an album of more than 20 newly recorded acoustic and electronic full length cuts on CD for the introductory price of only \$19.94.

NORTHSTAR PRODUCTIONS

13716 Southeast Ramona St.; Portland, OR 97236; (503) 760-7777. Product Name: Northstar CD-ROM Library. **Contact:** Scott James Hybl. **Date Product Introduced:** 1/94. **Product Description & Applications:** 30 CD-ROM Library for E-mu Emulator III, AKAI S1000, Digidesign Sample Cell, Kurzweil K2000, E-mu Emax II. Includes musical instruments from classical orchestra, ethnic and world instruments, pop and jazz as well as drum and percussion loops. The library also includes the Hollywood Edge, Valentino, Hanna-Barbera and Frank Serafine sound effects. **Basic Specifications & Suggested List Price:** Price: \$199 to \$695. Price includes caddy. Call or write for sampler specifics.

O'CONNOR CREATIVE SERVICES

PD Box 70777; Las Vegas, NV 89170; (702) 733-6986. Product Name: The Crazyies Comedy Effects Library. **Contact:** Harry O'Connor. **Date Product Introduced:** 8/94. **Product Description & Applications:** The only authentic, current collection of cartoon and comedy sound effects, short music cues and funny voices. Assembled and created in association with top Hollywood cartoon effects editors. **Basic Specifications & Suggested List Price:** 3 compact discs for \$295.

PENDULUM AUDIO INC.

PD Box 339; Gillette, NJ 07933; (908) 665-9333. Product Name: SPS-1 Preamp System for acoustic instruments. **Contact:** Greg Gualtieri. **Date Product Introduced:** 10/93. **Product Description & Applications:** The SPS-1 is a 2-channel acoustic instrument preamp that processes any combination of instrument pickups (piezo or magnetic), internal mics or external mics in full stereo. Each channel features a 3-band fully parametric EQ, studio-quality mic preamp with phantom power, channel insert and a balanced direct output. The output section includes channel pan controls, separate master and monitor outputs with ground lift, a headphone amp and a true stereo main effects loop. **Basic Specifications & Suggested List Price:** Each system includes a 2-pickup preamp module, single-rackspace main preamp unit, and a mute/effects footswitch. Price: \$1,095 and up.

MUSIC PRODUCTS

PENDULUM AUDIO INC.

PO Box 339; Gillette, NJ 07933; (908) 665-9333. **Product Name:** SmartCord DI. **Contact:** Greg Gualtieri. **Date Product Introduced:** 8/94. **Product Description & Applications:** The SmartCord DI is an 18" connecting cable with an active impedance buffer and line driver built into the 1/4" plug and male XLR ends of the cable. This "Direct Box without the Box" is ideal for connecting all types of acoustic and electric instrument pickups directly to any mic input supplying phantom power. Perfect for sound reinforcement or television work where a low profile and an uncluttered stage is necessary. The SmartCord DI can be extended to any length with a standard mic cable or snake. **Basic Specifications & Suggested List Price:** Requires standard +48V phantom power. All discrete, Class A circuitry. Input impedance: 10 M Ω . EIN: less than -116 dbu. Frequency response: 0/-0.1dB, 20-20,000 Hz. THD less than 0.01%. Price: \$89.95.

QCCS PRODUCTIONS INC.

1350 Chambers St.; Eugene, OR 97402; (503) 345-0212. **Product Name:** PBTM Music Library. **Contact:** Michael Brewer. **Date Product Introduced:** 4/94. **Product Description & Applications:** Currently 14 volumes of buy-out production music for film/video/television/radio productions. Approximately one hour of music per CD with 12 long themes plus 30/60 second segues of each theme (per vol.), wide range of styles including classical, new age, sports, corporate industry, comedy, Christmas, educational, suspense and several others. Demo/info at (503) 345-0212, fax 345-8117. **Basic Specifications & Suggested List Price:** Single CD prices: \$69.95. Discounts on multiple volumes purchased. MC/VISA/DISC/AMEX. Free catalog—phone line demo.

REACT RECORDINGS

9157 Sunset Blvd. Suite 210; West Hollywood, CA 90069; (310) 550-0233. **Product Name:** The Analog Keyboard Bass Sampling CD. **Contact:** Michael Mavrois. **Date Product Introduced:** 7/94. **Product Description & Applications:** The Analog Keyboard Bass Sampling CD is the most unique and valuable disc for anyone searching for the absolute best vintage bass sounds. The wide variety of samples allows users to create infinite combinations to assemble their own customized bass sounds. Each of the 800 sounds was recorded in three octaves and divided into multiple categories. The user can grab any particular type of sound quickly, sample it, and move on. **Basic Specifications & Suggested List Price:** Format: CD. Keyboards used: Oberheim Matrix-12, Juno-106, Sequential Six-Trak, Oscar, Xpander, SH101, MKS-80 Super Jupiter, OB-8, Juno-60, Pro One, Minimoog, Micromoog, MKS-70 Super JX, CZ-101, Oberheim Sem, Sequential Prophet-5, TB-303, MKS-50 Alpha Juno, OB-XA, Moog Source, JX-3P. Suggested list price: \$99.95.

RIVER CITY SOUND PRODUCTIONS

PO Box 750786; Memphis, TN 38175; (800) 755-8729; (901) 274-7277. **Product Name:** Broadcast Series. **Contact:** Bob Pierce. **Date Product Introduced:** 7/94. 11/94. **Product Description & Applications:** Buy-out production music library. Introduced several new CDs. Each containing sports, mellow, corporate, rock, country, hi-tech, new age, and urban. Each theme comes in a full song length followed by a 60 sec, 30 sec, 15 sec and 10 sec edit. **Basic Specifications & Suggested List Price:** Price: \$59 plus shipping and handling.

RIVER CITY SOUND PRODUCTIONS

PO Box 750786; Memphis, TN 38175; (800) 755-8729; (901) 274-7277. **Product Name:** 1994. **Contact:** Bob Pierce. **Date Product Introduced:** Throughout the year. **Product Description & Applications:** New CDs include "Country," "Corp/Ind," "Mellow Moods" and "Christmas" in our buy-out production music library. Previous discs: "Weddings" and "Nature." **Basic Specifications & Suggested List Price:** \$59 plus shipping and handling.

SIGNATURE MUSIC LIBRARY

PO Box 98; Buchanan, MI 49107; (800) 888-7151. **Product Name:** Signature Music CDs. **Contact:** Joanne Mullin. **Date Product Introduced:** 3/94. **Product Description & Applications:** "Impact Elements" contains logos, stingers, bumpers and more to enhance and punctuate a soundtrack. "Sweetdreams" are tender-hearted children's melodies produced by the Grammy Award-winning Aaron Brown. "Digital frontier" has ultra-sonic tracks with scientific, high-tech, cosmic and exotic moods. "Kidz + Comedy" provides whimsical, playful and animated songs. All available as part of Signature's 27 CD set of production music, with styles ranging from action, corporate, jazz, rock, new age, classical and more. **Basic Specifications & Suggested List Price:** As the only library to offer Flex-Licensing™, producers have the choice of per-use, annual or lifetime licensing. A unique "Rent-to-Own" plan is offered. A risk-free trial evaluation is available to all qualified producers of media productions.

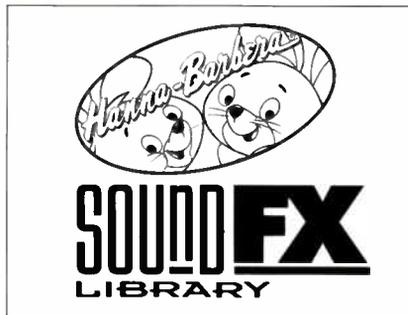
SONIC SCIENCE

119 Spadina Ave., Ste. 767; Toronto, Ontario M5V 2L1; (416) 345-9211; (800) 26-SONIC; FAX: (416) 345-8618. **Product Name:** Sonic Science Foley Footsteps. **Contact:** Chris Good. **Date Product Introduced:** 4th quarter 1994. **Product Description & Applications:** The Sonic Science Foley Footsteps Library is a comprehensive all digital CD collection of male and female footsteps, recorded on a variety of different surfaces and walking speeds. Some surfaces include ce-

ment, wood, grass, gravel, metal and snow. Sounds of individual steps, paced steps, shuffles, running, jumping and climbing stairs are included. Each sequence is recorded in its entirety, while each individual footstep is also indexed to expedite the Foley replacement process. **Basic Specifications & Suggested List Price:** \$75 U.S. (royalty free).

SONIC SCIENCE

119 Spadina Ave., Ste. 767; Toronto, Ontario M5V 2L1; (416) 345-9211; (800) 26-SONIC; FAX: (416) 345-8618. **Product Name:** Sonic Source™. **Contact:** Chris Good. **Date Product Introduced:** 10/93. **Product Description & Applications:** Sonic Source Music Library is an exciting 10 CD collection of almost 500 original compositions offering a broad range of musical categories, styles and composition lengths. The library is structured into nine distinct musical style categories: Cities, Islands, Sports and News, Hums, Drones and Pulses, Drama I & II, Documentary and Jingles. Sonic Source is offered on a laser-drop basis at competitive rates, with blanket rates also available. **Basic Specifications & Suggested List Price:** \$195 U.S. for the entire 10-CD collection, or \$25 per CD, plus hassle-free laser drop reporting by fax.



SOUND IDEAS
Hanna-Barbera Sound FX Library

SOUND IDEAS

105 W. Beaver Creek Rd., Ste. 4; Richmond Hill, ON, L4B 1C6 Canada; (905) 886-5000; (800) 387-3030. **Product Name:** Hanna-Barbera Sound FX Library. **Contact:** Brian Nimens. **Date Product Introduced:** 9/93. **Product Description & Applications:** The Hanna-Barbera Sound FX Library is jam-packed with over 2,200 effects, featuring the great sounds that have become synonymous with legendary cartoon shows: The Flintstones, Huckleberry Hound, Quick Draw McGraw, Yogi Bear and The Jetsons. This collection includes, for the first time, Hanna-Barbera's top ten list of the most popular sounds used at their studio, and a fascinating booklet containing priceless behind-the-scenes interviews with cartoon pioneers William Hannah and Joseph Barbera. **Basic Specifications & Suggested List Price:** The Hanna-Barbera Sound FX Library is on 4 CDs. All the effects that have been included were selected for their excellence, and have been digitally remastered with state-of-the-art noise reduction techniques to make them cleaner...and funnier than ever before. Price: \$495.



SOUND IDEAS
Sound Ideas Music Library

SOUND IDEAS

105 W. Beaver Creek Rd., Ste. 4; Richmond Hill, ON, L4B 1C6 Canada; (905) 886-5000; (800) 387-3030. **Product Name:** Sound Ideas Music Library. **Contact:** Brian Nimens. **Date Product Introduced:** 9/94. **Product Description & Applications:** Talented composers from around the world created true originality and variety in our themes and styles. Sound Ideas introduces one new CD to the Music Library every month, ensuring that our library will surpass your production demands year after year. We offer an indispensable computer reference catalog to work with Filemaker Pro II. Sound Ideas not only gives you an incredible range of music, we offer you a diverse number of flexible, convenient licensing options. **Basic Specifications & Suggested List Price:** The Music Library contains

60 CDs, including 15 musical categories, and one CD each of production elements and sound effects. A new CD will be added every month starting January 1995. Each musical theme includes 60 and 30 second formats, complete with full theme descriptions, tempos and featured instruments. Annual lease: \$1,500; options available.



SOUND IDEAS
The Mix Broadcast Music Library

SOUND IDEAS

105 W. Beaver Creek Rd., Ste. 4; Richmond Hill, ON, L4B 1C6 Canada; (905) 886-5000; (800) 387-3030. **Product Name:** The Mix Broadcast Music Library. **Contact:** Brian Nimens. **Date Product Introduced:** 3/94. **Product Description & Applications:** This library has more than 10 hours of production-ready material totalling over 1,200 broadcast length tracks. And it's yours to use royalty free. The Mix contains the most popular music formats (from news, traffic, weather and sports to pop, rock, dance, easy listening, new country, soft A/C, jazz, travel, comedy, Christmas and holidays); plus 2 CDs crammed with production elements, promo and ID beds, logos, stingers, sweepers, working parts and special effects; as well as over 300 digital stereo sound effects. **Basic Specifications & Suggested List Price:** The Mix comes complete on 10 CDs, with its own unique storage binder and CD track index listing. It has been designed specifically with the needs of the broadcast industry in mind. There are no royalties or leases. Selling price is just \$495.

TM CENTURY INC.

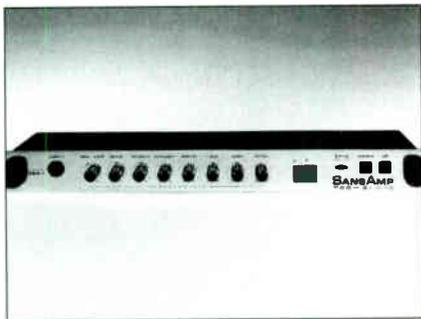
2002 Academy; Dallas, TX 75234; (800) 879-2100. **Product Name:** Playback. **Contact:** Richie Allen. **Date Product Introduced:** 3/94. **Product Description & Applications:** Playback brings the convenience of hearing any or all compositions in TM Century's winning score production library on one CD-ROM. Now you can audition your music outside the studio with a standard 386 PC with a sound card and a CD-ROM drive. No more wasted hours in the studio searching through thick manuals and stacks of CDs. Scanning for the right music is easy and fast. Playback saves time, and that saves money!



TECH 21 INC.
SansAmp Bass Driver DI

TECH 21 INC.

1600 Broadway; New York, NY 10019; (212) 315-1116. **Product Name:** SansAmp Bass Driver DI. **Contact:** Neal Ostberg. **Date Product Introduced:** 7/94. **Product Description & Applications:** Tube Amplifier Emulator specifically for bass. Engineered for direct recording and live performances. Functions as a preamp, stomp box and a DI. Get the sound of traditional miked-up bass amp systems, monster overdrive sounds, and the flexibility to customize your own sound. Exterior rotary controls include presence, drive, level and blend. Active bass and treble controls cut or boost 12dB. **Basic Specifications & Suggested List Price:** Input: 1/4"; Impedance: 1M Ω . Parallel Output: 1/4", unity to input. 1/4" effected output. XLR balanced output: mic level, impedance: minimum 600 Ω . Frequency response: Low, 10Hz or better; high harmonic content, 20kHz or better (varies according to setting). Power: phantom, 9V battery (operable 100+ hours), optional 9VDC power supply. Wt: 11oz. Made in USA. U.S. retail list \$225.



TECH 21 INC.
SansAmp PSA-1

TECH 21 INC.

1600 Broadway, New York, NY 10019; (212) 315-1116. **Product Name:** SansAmp PSA-1. **Contact:** Neal Ostberg. **Date Product Introduced:** 10/93. **Product Description & Applications:** Programmable 1U Tube Amplifier Emulator. 100% analog circuitry with digital programmability. 49 factory presets of industry-recognized guitar and bass tube amp sounds, ranging from vintage to modern. Parameters are adjusted in real time; pot position is stored in memory. 49 user-definable locations. Record direct to tape, use in mixdowns. For live applications, use as a preamp, "monster direct box" to PA system, and as an outboard processor. **Basic Specifications & Suggested List Price:** Input impedance: 1M Ω . 1/4" output impedance: 1K Ω . -10/0dB 1/4" inputs and outputs. Transformerless balanced XLR outputs, switchable -10/0dB range; impedance: 600 Ω minimum. Frequency response: low, 10Hz or better; high harmonic content, 20kHz or better (varies according to setting). Internal power supply, 3-prong grounded, 117VAC, 50/60Hz. Power consumption: 7 watts. List price: \$795. Made in USA.

TIME DESIGNS

1802 King St., Santa Cruz, CA 95060; (408) 454-9734. **Product Name:** MIDINOME 2.0. **Contact:** James Dale Lewis. **Date Product Introduced:** 1/94. **Product Description & Applications:** The MIDINOME is a visual Metronome display. It is fully programmable in order to display an infinite variety of timing patterns. It is designed to save hearing loss due to the excessive monitor levels needed to play along with sequences or click tracks by giving the artist a visual alternative. MIDINOME 2.0 features artist suggestions such as: QUICK FLASH, Slide, and Bar Beat indicator. **Basic Specifications & Suggested List Price:** The MIDINOME has a large row of LEDs and a huge green LED. The row leads you smoothly to the beats of a measure while the green LED indicates the strongest pulses. It responds to MIDI beat clocks, song position pointer and note on/off information. Price: \$249.

VALENTINO INC.

500 Executive Blvd., Elmsford, NY 10523; (914) 347-7878. **Product Name:** Valentino Music and Sound Effects Library. **Contact:** Thomas Valentino. **Date Product Introduced:** 1994. **Product Description & Applications:** CD-ROM Music Clip Library: 250 selections. \$150. CD-ROM Sound Effects Library: 1,000 effects. \$150.

ZETA MUSIC

2230 Livingston St., Oakland, CA 94606; (800) 622-6434. **Product Name:** The Cross Over Bass. **Contact:** Randy Shamber. **Date Product Introduced:** 7/94. **Product Description & Applications:** A unique and innovative bass design that allows today's modern bassist the flexibility to mix the styles of playing electric and upright bass. For electric players, The Cross Over Bass will allow the artist to more easily convert to upright playing styles and techniques. For upright players, The Cross Over Bass will give the artist a creative tool for expressing new rhythms while maintaining acoustic tones. **Basic Specifications & Suggested List Price:** 34" scale, rosewood fingerboard, maple neck, lightweight basswood contoured body, fretless fingerboard that is arched at 3/4". Can be played pizzicato or arco. Uses patented Piezo pickup system. Optional spike and stand allow for playing in the upright position. Price: 4 string - \$2,495; 5 string - \$2,995.

RECORDING DEVICES

AKAI DIGITAL

1316 E. Lancaster, Ft. Worth, TX 76102; (817) 336-5114. **Product Name:** DD1500. **Contact:** Mike McRoberts. **Date Product Introduced:** 12/94. **Product Description & Applications:** The DD1500 is a turn-key digital workstation with a dedicated control surface for all editing functions. It is modular and can be expanded according to user needs. Display is via standard S-VGA monitor. Editing functions include non-destructive trimming and crossfades, QList creation, mixing, time compression, pitch shift, and EQ. Autopunch and looping of audio regions is possible. A wide variety of sync inputs makes the DD1500 ideal for all post applications. **Basic Specifications & Suggested List Price:** 16-track disk playback with MO or fixed disk; 8-track RAM playback (up to 64MB); word-clock, video and biphase

sync; SMPTE/EBU time code; RS422; 4-in/4-out analog (expandable to 8-in/8-out) and 4-in/4-out digital (expandable to 12-in/12 out). Price: TBA.

APOGEE ELECTRONICS CORP.

3145 Donald Douglas Loop South; Santa Monica, CA 90405; (310) 915-1000. **Product Name:** Apogee Transporter. **Contact:** David Kimm, Jane Scobie. **Date Product Introduced:** Winter 1994. **Product Description & Applications:** The Transporter is designed to be the digital arteries of a modern recording and post-production environment. The multi-channel A/D and D/A conversion systems can be combined for use with digital audio workstations and the new modular digital multitracks. By utilizing patented designs and the latest manufacturing techniques, Transporter makes available Apogee quality in a very affordable and flexible system. Modularity allows custom-designed systems to tightly integrate analog and digital devices. **Basic Specifications & Suggested List Price:** Eight channel frames can be combined with various option cards to allow connection of a wide variety of digital and analog systems. Systems can be designed to integrate analog signals, AES, SPDIF, and proprietary formats from Alesis, Tascam, Digidesign and others. Prices depend upon the number of channels and configuration.

AVID TECHNOLOGY INC.

Metropolitan Technology Park; One Park W.; Tewksburg, MA 01876; (508) 640-6789; (800) 959-2843; FAX: (508) 640-1366. **Product Name:** AudioVision (Version 2.6). **Contact:** Kara Misenheimer, pub rel. **Date Product Introduced:** 1994. **Product Description & Applications:** Featuring true nonlinear loop recording for applications such as ADR and Foley, Avid AudioVision is designed for recording, editing and processing multi-track audio to picture. Version 2.6 adds faster timeline redraw during editing and the ability to import sequences from Avid's Film Composer 24 frames-per-second (fps) editing system. Version 2.6 also supports AvidNet™/ATM, Avid's high-performance network solution, and a version of Sprocket Development's Track-It lets users export Avid audio sequences for creating and updating mix logs or track sheets. Avid AudioVision is also fully compatible with Avid's Media Composer systems and support the OMF™ File Interchange. **Basic Specifications & Suggested List Price:** Avid AudioVision Begins at \$35,995 for a 4-channel system. Prices are for complete systems with advanced multi-machine control, EDL auto-conform, digital signal processing (DSP) functions, ADR/Loop Record@ mode and a high-performance 2 GB fixed disk.

AVID TECHNOLOGY INC.

Metropolitan Technology Park; One Park W.; Tewksburg, MA 01876; (508) 640-6789; (800) 959-2843; FAX: (508) 640-1366. **Product Name:** Avid AudioStation™. **Contact:** Kara Misenheimer, pub rel. **Date Product Introduced:** 1994. **Product Description & Applications:** Avid AudioStation™ is Avid's new lower-cost, entry-level digital audio editing system designed for dialog editing and other specialized audio editing applications. Avid AudioStation utilizes the same audio editing technology developed for Avid AudioVision, but does not include integrated nonlinear digital picture, making it an ideal and highly cost-effective solution for post-production applications where digital picture may not be required, such as audio transfers or dubbing and dialog, music and sound effects editing and processing. **Basic Specifications & Suggested List Price:** Avid AudioStation is priced at \$29,995 for a 4-channel system. Prices are for complete systems with advanced multi-machine control, EDL auto-conform digital signal processing (DSP) functions, ADR/Loop Record™ mode and a high-performance 2 GB fixed disk.

DENON ELECTRONICS

222 New Rd.; Parsippany, NJ 07054; (201) 575-7810. **Product Name:** DN-990R. **Contact:** Harry Klane. **Date Product Introduced:** 4/94. **Product Description & Applications:** Denon's MD Cart format offers the playback advantages of CD in a re-recordable format. Features include digital editing, text display, serial control, digital in and out, and extensive user programming. **Basic Specifications & Suggested List Price:** \$3,200 for recorder/reproducer. DN-980F reproducer is \$2,400.

DIGITAL AUDIO RESEARCH LTD.

2 Silverglade Business Park; Leatherhead Rd., Chessington; Surrey, KT9 2QL England; +44 372 742848. **Product Name:** SoundStation Gold. **Contact:** Jeff Bloom. **Date Product Introduced:** 3/94. **Product Description & Applications:** SoundStation Gold is a complete, integrated audio production center, achieving new heights of speed, convenience and power. Its innovative design comprises an assignable dynamic automated mix controller and a dedicated edit control console. **Basic Specifications & Suggested List Price:** The system provides 8 or 16 channels of hard and optical disk recording, editing and playback, powerful DSP, segment-based processing, and moving fader automation. Gold has up to 22 hours of hard disk storage and a choice of touchscreen or compact console.

EASTMAN KODAK COMPANY

343 State Street; Rochester, NY 14650; (800) CD-KODAK. **Product Name:** Kodak PCD Writer 225. **Contact:** Paul W. Melnychuk. **Date Product Introduced:** 9/94. **Product Description & Applications:** The Kodak PCD Writer 225 is a CD recorder capable of 2X writing speeds. It includes a 2MB write buffer, expandable to 8MB or 32MB, features P&Q subcode programming, disc at once, and can be used for premastering a Reb Book audio disc for pressing plants. Also, with a Kodak Disc Transporter, midrange production can provide an automated CD authoring environment. **Basic Specifications & Sug-**

gested List Price: 2/8/32 MB buffer, audio read via SCSI, subcode programming, disc at once, direct SCSI copying, active laser power control, compatible with all Orange Book media. Price: \$4,750.

FOSTEX CORP. OF AMERICA

15431 Blackburn Ave.; Norwalk, CA 90650; (310) 921-1112. **Product Name:** Foundation 2000LS. **Contact:** Steve Cunningham, VP. **Date Product Introduced:** 8/94. **Product Description & Applications:** Foundation 2000LS is a random access 8-track digital audio recorder and editor that can be upgraded to a full Foundation 2000 at any time. Weighted jog/shuttle wheel, touch screen and dedicated buttons for transport control and editing make this DAW one of the fastest and easiest to use. **Basic Specifications & Suggested List Price:** A/D converter: 18-bit; 64x oversampling. D/A converter: 18-bit; 8x oversampling. S/N ratio: 100dB. Dynamic range: 94dB. Suggested list price \$14,995.

FOSTEX CORP. OF AMERICA

15431 Blackburn Ave.; Norwalk, CA 90650; (310) 921-1112. **Product Name:** D-30. **Contact:** Steve Cunningham, VP. **Date Product Introduced:** 3/94. **Product Description & Applications:** The D-30 is a professional studio DAT recorder featuring a 16MB RAM buffer for instant start; built-in SMPTE generator/reader; on-board chase/lock synchronizer with offset; two RS-422 ports; audio scrubbing; jog/shuttle operation; a large LCD display with intuitive main menus and sub-menus, plus in-rack access to the heads and main audio boards for professional maintenance. **Basic Specifications & Suggested List Price:** 4 heads, dual sampling frequencies, 16-bit linear quantization, freq. response: 20Hz-20kHz \pm 0.1dB, S/N ratio and dynamic range: higher than 94dB. Suggested retail price: \$10,995.

JENSEN TRANSFORMERS INC.

7135 Hayvenhurst Ave.; Van Nuys, CA 91406; (213) 876-0059. **Product Name:** Jensen 68JT record electronics. **Contact:** Dave Hill. **Date Product Introduced:** 9/94. **Product Description & Applications:** The Jensen 68JT upgrades Magna-Tech recorders for high audio performance, stability, and setup speed. The kit replaces PC boards, input transformer, several switches and controls, and the front panel. Three bias, equalization, and timing setups are adjustable and selectable from the front panel. A pushbutton selects play, sync, bias, or erase metering. Continuously variable equalization accommodates standard or high output 35mm or 16mm film types. The upgraded units are completely interchangeable with MTE units. **Basic Specifications & Suggested List Price:** Frequency response: -3dB at 0.6Hz & 100kHz; audio distortion: $\leq 0.02\%$ at +20dB re 185 nW/m, headroom: +26dB re 185 nW/m, noise: 15dB below tape noise, HF equalization: -3dB to +12dB at 10kHz, LF equalization: none/+3dB at 50Hz/+3dB at 100Hz, bias: 100kHz at <math>< 0.01\%</math> THD, record head: standard 5mH to 10mH, erase head: standard 1mH to 2mH, timing stability: $\pm 0.001''$ over 30°F temp range, price: \$895.

KABA RESEARCH & DEVELOPMENT

24 Commercial Blvd.; Novato, CA 94949; (415) 883-5041; (800) 231-8273. **Product Name:** TBA. **Contact:** Mark Ellis, sales mgr. **Date Product Introduced:** AES 1994. **Product Description & Applications:** On-site mass duplication of audio cassettes at live performances is possible with a new digital controller in conjunction with the KABA 4-track duplication system. As soon as the performance ends, the first group of cassettes can be delivered to buyers. A digital master has been made during the performance, and the system immediately switches to high speed and produces additional tapes from the digital master in one-quarter of real performance time. **Basic Specifications & Suggested List Price:** Expandable system simultaneously records live performance on both sides of cassettes and creates a digital master. That digital master is then used for 4-track high-speed duplication. Production capacity is limited only by number of record positions installed. Audiophile-quality cassettes are available for sale immediately following performance. Price is a function of system size.



KORG USA INC.
SoundLink V 4.0

KORG PROFESSIONAL AUDIO

89 Frost St.; Westbury, NY 11590; (516) 333-9100; (800) 645-3188 ext. 280. **Product Name:** SoundLink V 4.0. **Contact:** Matt Appelbaum. **Date Product Introduced:** 4/94. **Product Description & Applications:** Version 4.0 increases the basic system storage time to over 240 minutes. Over 30 operational enhancements have been

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RECORDING DEVICES

—LISTING CONTINUED FROM PREVIOUS PAGE

made including additional edit functions, auto-saving, take-numbering, keystroke short cuts and improved scrubbing. SoundLink combines an 8-track hard disk recorder/editor with an automated digital mixer complete with equalization and effects processing. Additional functions include a 16-track MIDI recorder/sequencer and full synchronization to time code and digital audio signals. SoundLink is a dedicated hardware device, shipped complete and optimized for use in audio and video post applications. **Basic Specifications & Suggested List Price:** 8-track recorder, 8-channel mixer, 16-track sequencer, 8 analog inputs, 10 analog outputs, 2-channel assignable digital input, 2-channel assignable digital output, 240 minutes of recording time at 48kHz sample rate, expandable to over 24 hours, 8mm streaming tape back-up system, LTC and VITC timecode inputs, external machine control. Complete systems start at \$37,000.

MICRO TECHNOLOGY UNLIMITED

6900 Six Forks Rd.; Raleigh, NC 27615; (919) 870-0344. **Product Name:** MicroEditor 2.3. **Contact:** David B. Cox. **Date Product Introduced:** 8/94. **Product Description & Applications:** MTU released MicroEditor software Version 2.3 for MicroSound workstations. New features include: 50% more segments visible at any time, append multiple projects together, simplified record/create segment flow for all users, support of SCSI 4X CD recorders for CD-D/A, CDI, CD-ROM/XA automation, further true stereo file processing. Audio-for-video, radio promo/PSA/hour+ productions, CD mastering and multitrack studio users have all reported higher profits and production capacity.

MICRO TECHNOLOGY UNLIMITED

6900 Six Forks Rd.; Raleigh, NC 27615; (919) 870-0344. **Product Name:** MicroSound. **Contact:** David B. Cox. **Date Product Introduced:** 4/94. **Product Description & Applications:** MTU introduced the 4-channel analog input/output MicroSound model based on 386/486 processor workstations. Up to 100 tracks can be played back at any point out of any of the 4 channels using transparent sub-mixing, retaining ability to make/modify any edit after mixing. The MTU unique Floating-Tracks™ and Disk-Layering™ allow any audio event to be instantly moved in the project to any channel's output.

OTARI CORPORATION

378 Vintage Park Dr.; Foster City, CA 94404-1134; (415) 341-5900. **Product Name:** RADAR. **Contact:** Lee Pomerantz. **Date Product Introduced:** 8/94. **Product Description & Applications:** RADAR is a multitrack hard disk audio recorder/editor for professional recording, radio and post-production. With as many balanced inputs and outputs as it has tracks, it is available in 8, 16 or 24-track configurations. Up to 24 tracks are self-contained in one portable 37 lb., 4 U-rack-mountable unit. Its control interface is similar to a traditional tape recorder's, so it is easy to use, but its random access capabilities allow audio to be cut, copied, pasted, slipped, looped and more in just seconds. **Basic Specifications & Suggested List Price:** 20Hz to 20kHz frequency response, 16-bit linear A/D, 18-bit linear D/A, S/N 92dB, Crosstalk 92dB, locks to all standard SMPTE frame rates, supports 32kHz to 48kHz sampling frequencies, AES/EBU/SPDIF digital input/outputs, selectable +4 or -10 balanced TRS input/outputs. Price: 24-track unit, \$21,300; options: RE-8 full function remote, \$1,100; Exabyte 8mm tape back-up, \$3,500.

PANASONIC/RAMSA PRO AUDIO

6550 Katella Ave.; Cypress, CA 90630; (714) 373-7277. **Product Name:** Panasonic SV-4100 DAT machine. **Contact:** Greg Braithwaite. **Date Product Introduced:** 9/94. **Product Description & Applications:** Panasonic has developed a new Pro DAT machine, which offers instant start, external sync capability and improved sonic performance. The new Panasonic SV-4100 is a logical development after the highly successful SV-3700 Pro Dat, which set high standards throughout the pro audio, broadcast and post industries because of its extreme reliability and outstanding record/replay quality. RAM-based quick start function makes the SV-4100 ideal for on-air broadcast, live performance, theatrical sound and recording or production studios any user who requires instant playback and A-time cue search. In addition, the ability to accurately synchronize the SV-4100 to external video sync or word clock ensures highly accurate system lock and glitch-free digital transfers.

SEQUIA ELECTRONICS

4646 Hounds Haven Way; San Jose, CA 95111; (408) 363-1646. **Product Name:** Ampro-Scully Audio Division. **Contact:** Mel Crosby. **Date Product Introduced:** 1/94. **Product Description & Applications:** Full parts and services on Ampro audio consoles, cart tape recorders, Ampro-Scully tape recorders and cart tape reproducers, Scully audio tape recorders, Metrotech tape recorders and slow-speed loggers. **Basic Specifications & Suggested List Price:** Scully recorder: .25 inch tape (full-track, 2-track, QT, 4-track); .5 inch tape (2-track, 3-track, 4-track); 1 inch tape (8-track). Ampro consoles: 6, 8 and 10-channel, linear or rotary pots. Cart recorders: 'A', 'B' and/or 'C' size and 'A' size players.

SIERRA DESIGN LABS

999 Tahoe Blvd.; Incline Village, NV 89451; (702) 831-7837. **Product Name:** Quick-Frame. **Contact:** Merry Romine. **Date Product Introduced:** 3/94. **Product Description & Applications:** Quick-Frame is a family of high-capacity real time digital disk recorders offering high-end component video storage solutions for broadcast,

production, post-production, computer animation and graphics applications. Expandable to over 180 minutes of storage, the Quick-Frame utilizes high-capacity magnetic disk array technology, which can support longer edit/telecine sessions without interruption of lay-off, eliminate some or all digital tape machines, while offering the highest picture quality possible and AES/EBU audio support. **Basic Specifications & Suggested List Price:** Stores from 3 to 24 minutes of uncompressed 8/10 bit 4:2:2 component digital video in 5 1/4" of rack space; VTR-compatible RS422 control, true real time non-linear playback, 525/625 selectable video formats, complete Ethernet support, multi-function SCSI port, optional 4 channels of AES/EBU audio; price range: \$38,500-\$89,500.

SIMON-KALOI ENGINEERING LTD.

707 Clear Haven Dr.; Agoura Hills, CA 91301; (818) 707-9980. **Product Name:** Message Man. **Contact:** Rick Simon. **Date Product Introduced:** Winter 1994. **Product Description & Applications:** Portable digital audio solid-state recorder sampling up to 28kHz, message times to 2 min, 24 sec. No tape or moving parts. Integrated amp, motion sensor and speaker. RAM card I/F for direct digital tapeless copying to other machines. **Basic Specifications & Suggested List Price:** Sampling frequencies: 28kHz, 14kHz, 8kHz. Record times: mm-100 9.18, 36 sec; mm-100L, 36 sec, 1 min 12 sec, 2 min 24 sec. List Price: mm-100, \$695, mm-100L, \$825.



SDNY PRO AUDIO
MDS-83 MiniDisc Cart Recorder/Player & MDS-84P MiniDisc Cart player

SONY PRO AUDIO

3 Paragon Dr.; Montvale, NJ 07645-1735; (201) 358-4114. **Product Name:** MDS-B3 MiniDisc Cart Recorder/Player & MDS-B4P MiniDisc Cart Player. **Contact:** Paul Foschino, mgr. **Date Product Introduced:** 11/94. **Product Description & Applications:** Two new additions to the Sony MiniDisc cart machine line with many of the same features offered in the MDS-B1 recorder/player and the MDS-B2P player. Additional features include IEC 958 Type 1&2 digital I/O; RS-232C 9-pin serial control; headphone jack, timer function (play/resume), optional remote RM-DC1 (included with recorder). **Basic Specifications & Suggested List Price:** Sampling frequency 44.1kHz; digital I/O, IEC type 1 (record input) IEC type 2 (output); RS-232C connector D-SUB 9-pin (male); data transfer rate: 1200/2400/4800/9600. Bit length: 7-bit/8-bit; parity off/odd/even. MDS-B3, \$3,200; MDS-B4P, \$2,350.

SOUNDScape DIGITAL TECHNOLOGY

705-A Lakefield Rd.; Westlake Village, CA 91361; (805) 495-7375; FAX: (805) 379-2648. **Product Name:** SSHDR1 Hard Disk Recorder. **Contact:** Charlie Bosson, dir. of mktg. **Date Product Introduced:** 6/94. **Product Description & Applications:** The SSHDR1 is a pro-quality digital audio system easily expandable from 8 to 128 tracks. Windows-based operation software offers powerful waveform editing tools, including automatic "de-glitching" of cuts and pastes. Each unit provides 64 virtual tracks, 8 real time parametric EQs, full chase lock synchronization. Works with any windows sequencer with dependable stability, even with a 386 PC. **Basic Specifications & Suggested List Price:** SSHDR1 is a 2-space rackmount unit, 16-bit sigma-delta 64x oversampled A/D, 18 bit sigma-delta 64x oversampled D/A. Data storage: 1 DE hard disks, fitted in the rack unit (not supplied), 2 in, 4 out RCA unbalanced analog -10dB/+4dB, S/PDIF digital I/O, Balanced analog and AES/EBU XLR I/O's available. Suggested retail price: \$3,250; expansion unit: \$2,925.



STUDER EDITECH
Dyaxis II with MultiDesk

STUDER EDITECH

1370 Willow Rd.; Menlo Park, CA 94025; (415) 326-7030. **Product Name:** Dyaxis II with MultiDesk. **Contact:** Gerry Kearby, VP sales & mktg. **Date Product Introduced:** 10/93. **Product Description & Applications:** Studer Editech will display the Dyaxis II modular multi-track digital audio workstation. Available in configurations from 4 to 24 channels, Dyaxis II's unique architecture features real time DSP capability for all editing and digital mixing functions, virtual track playback and the plug-and-play option based on 3.1/2" removable optical media. Now available with: extended plug-and-play, utilizing 5 1/4" MO drives with linear recording for instant interchange between projects. MultiDesk, an assignable control surface with moving fader automation; InterMix option, providing multiple summing busses which can be allocated between 4-channel modules to provide record busing, aux and cue busing, as well as main busses. **Basic Specifications & Suggested List Price:** 4 to 24 channels, analog and multiformat digital, 8 to 48 tracks of real-time playback capability. List price: under \$20,000 for 4-channel, 8-track system complete with 1 gigabyte storage.

THE SYNCLAVIER COMPANY

Rivermill Complex; Lebanon, NH 03766; (603) 448-8887. **Product Name:** EditView 4.0. **Contact:** Monica Meagher. **Date Product Introduced:** AES 1994. **Product Description & Applications:** EditView 4.0 is the industry's first completely object-oriented, cross-platform audio editing interface. Scheduled for release during Q1, 1995, EditView 4.0 can be used interchangeably on Synclavier PostPro systems and Digidesign Pro Tools, Sound Tools, and AudioMedia cards, so any of these systems can have the look and feel of a PostPro. EditView 4.0 can also control a PostPro and a Pro Tools simultaneously, viewing tracks on a single interface and allowing the user to drag and drop audio files freely between them.

TELEX COMMUNICATIONS INC.

9600 Aldrich Ave. S.; Minneapolis, MN 55420; (612) 884-4051. **Product Name:** ACC XL Series. **Contact:** Sue Arrington. **Product Description & Applications:** ACC XL features an XL "Extended Life" cassette head. This new head provides a life expectancy 10 times longer than standard heads and offers an extended frequency response for natural sound quality. **Basic Specifications & Suggested List Price:** Available in mono (1/2-track, 2-channel) or stereo (1/4-track, 4-channel). Copy both sides of 3 cassettes at 30 ips (76 cm/sec). Can copy up to 27 copies at once (using copy units). Can copy chrome or ferric cassettes. Price: ACC 2000 XL, \$2,550 (copy and master); ACC 4000 XL, \$3,500 (copy and master).

TELEX COMMUNICATIONS INC.

9600 Aldrich Ave. S.; Minneapolis, MN 55420; (612) 884-4051. **Product Name:** ACC-XL Series Audio Tape Duplicator. **Contact:** Patti DuFresne. **Product Description & Applications:** The XL Series includes the ACC2000 XL mono (1/2-track, 2-channel) and the ACC4000 XL stereo (1/4-track, 4-channel). XL series master units can copy both sides of 3 cassettes at 30 ips (76cm/sec). And because the system is designed for easy expansion, users can add enough XL Series copy units (four copy pockets each) to make up to 27 copies at once. That means it's possible to make up to 27 copies of a C-60 original cassette in under 2 minutes. The ACC4000 XL also offers the flexibility to allow for either chrome or ferric cassette duplication. **Basic Specifications & Suggested List Price:** ACC2000 XL: 2,550 (copy or master units); ACC4000 XL: 3,500 (copy or master units). Frequency response: 50 to 12,000Hz. Signal-to-noise ratio: 50dB.



360 SYSTEMS
DigiCart/II

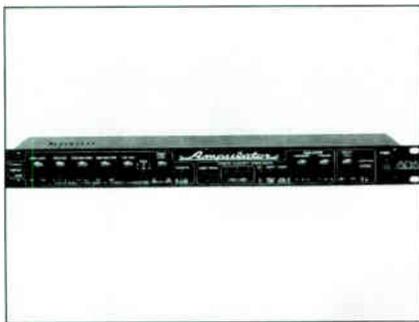
360 SYSTEMS

5321 Sterling Center Dr.; Westlake Village, CA 91361; (818) 991-0360. Product Name: DigiCart/II. Contact: Doug Leighton. Date Product Introduced: 1993. Product Description & Applications: DigiCart/II is a self-contained digital audio hard disk recorder that provides instant access to any one of 10,000 cuts. They can be played back singularly or in custom playlists with seamless transitions. Editing features include head and tail trims and fades. Remote controls allow for 16 present Hot-Keys™, find functions, and alpha keyboard and serial port control. DigiCart/II works in professional applications such as radio & TV broadcasting, production, sports venues, theaters and theme parks. Basic Specifications & Suggested List Price: DigiCart/II features an internal 2, 4 or 8-hour 8 internal hard disk drive, a 68-minute removable disk, editing and playlisting, visual readout, library and file management. Audio ports include digital I/O in AES/EBU and IEC 985 formats and balanced analog I/O. Two dedicated remote controls and mini keyboard are also available. Prices on request.

VESTAX MUSICAL ELECTRONICS CORP.

2860 Cordelia Rd., Ste. 120; Fairfield, CA 94585; (707) 427-1920. Product Name: Vestax. Contact: Matt Shiomi. Date Product Introduced: 7/94. Product Description & Applications: HDR-6 and HDR-4 Digital 6-track and 4-track multitrack recorder with built-in digital mixer. 3-band digital EQ is provided for each track. Edit function, MIDI interface, SCSI, SMPTE interface available. Hard disk format. Basic Specifications & Suggested List Price: S/N ratio: 100dB typical. Frequency responses: 20 to 22kHz. HDR-6 (6-track): \$2,300; HDR-4 (4-track): \$1,880.

SIGNAL PROCESSORS



ADA SIGNAL PROCESSORS
Ampulator

ADA SIGNAL PROCESSORS

420 Lesser St.; Oakland, CA 94601; (510) 532-1152. Product Name: Ampulator. Contact: Chris Keller, sales. Date Product Introduced: 7/94. Product Description & Applications: Tube power amp and miked speaker cabinet emulator. Direct recording device for electric guitar. Effectively emulates a wide range of attributes such as: power amplifier class, triode/pentode tube configuration, output wattage, tube bias and compression, speaker cabinet type, driver number, size, and type, as well as microphone proximity and axis. Completely eliminates the costly and often unproductive miking process for getting good guitar tone to tape. Basic Specifications & Suggested List Price: All-analog tube circuitry. Single rackspace. 7 pounds. \$599 list.

ALESIS

3630 Holdrege Ave.; Los Angeles, CA 90016; (800) 5-ALESIS. Product Name: QuadraVerb 2 Dual Channel Octal Processing Master Effects. Contact: Marc Nathan. Date Product Introduced: 1/94. Product Description & Applications: The QuadraVerb 2 is the flagship of the famous Alesis signal processing line. It offers a stunning sonic quality, with large, complex, natural-sounding stereo reverb, thick doubling and pitch effects, digital equalization and

delay. Q2's innovative software allows it to concentrate its power into a single effect or divide its power among as many as eight separate effects. In addition to superb multi-effects, Q2 provides true dual-channel operation, balanced inputs and outputs, and an ADAT Optical Digital Interface for direct-to-ADAT digital recording. Basic Specifications & Suggested List Price: Eight simultaneous digital effects, 44 effects subtypes EQ, delay chorus, flange, pitch shift and room, hall plate, chamber and reverse reverbs. ADAT optical digital I/O. Balanced +4dBu dual-channel operation. >90dB dynamic range, 20Hz-20kHz response. 100 preset and 100 user programs. U.S. suggested retail: \$799.

API AUDIO PRODUCTS INC.

7655-G Fullerton Rd.; Springfield, VA 22153; (703) 455-8188. Product Name: 225 Compressor/Limiter. Contact: Paul Wolff, pres. Date Product Introduced: AES Show. Product Description & Applications: 225 Compressor/Limiter for Legacy Console Series. Basic Specifications & Suggested List Price: Price: \$600.

API AUDIO PRODUCTS INC.

7655-G Fullerton Rd., Springfield, VA 22153; (703) 455-8188. Product Name: 235 Noise Gate. Contact: Paul Wolff, pres. Date Product Introduced: AES Show. Product Description & Applications: 235 Noise Gate for the Legacy Console Series. Basic Specifications & Suggested List Price: \$500.

ARX SYSTEMS

33 Advantage Road; Highett 3190, Victoria, Australia; (800) ARX-SYST; FAX: (707) 766-8431. Product Name: MSP-1. Contact: John Root, sales & mktg., North American Division. Date Product Introduced: 3/94. Product Description & Applications: The MSP-1 dual fairsale power supply comprises two electrically separate power supplies in a compact one rack unit chassis. Basic Specifications & Suggested List Price: The MSP-1 power supply can power up to 12 MSX 4 units, for a total of 48 channels. AC power is universal. Suggested retail of the MSP-1 is \$998/ea.

ARX SYSTEMS

33 Advantage Road; Highett 3190, Victoria, Australia; (800) ARX-SYST; FAX: (707) 766-8431. Product Name: MSX-4. Contact: John Root, sales & mktg., North American Division. Date Product Introduced: 3/94. Product Description & Applications: The MSX-4 active microphone 4-channel mic splitter and its dual fairsale MPS-1 power supply feature four channels of actively buffered ultra low noise microphone splitter with bal. outputs for main and monitor, plus bal. split outputs on the front panel. Basic Specifications & Suggested List Price: The MSX-4 signal/noise ratio is -94dB, distortion .008% 20Hz-20kHz. Through gain input/output 10dB (may be varied internally). Maximum output 18dB, phantom power +48VDC silent switch on/off. Suggested retail of the MSX-4 is \$1,198/ea.

ARX SYSTEMS PTY, LTD.

33 Advantage Rd.; Highett 3190, Victoria Australia; (800) ARX-SYST; (707) 766-8431. Product Name: Mixx Master. Contact: John Root, sales & mktg.

ATI - AUDIO TECHNOLOGIES, INC.

328 W. Maple Ave.; Horsham, PA 19044; (215) 443-0330. Product Name: NanoAmp Series. Contact: Ed Mullin, VP. Date Product Introduced: 3/94. Product Description & Applications: The BI100 is a stereo bi-directional interface. The BU400 converts 4 balanced +4dBu lines to -10dBu IHF. Ideal to interface multitrack recorders and mixers into balanced systems. Rack and desk mount. AC power, DC battery pack and mobile DC-DC converters available. Basic Specifications & Suggested List Price: BI100 \$225.

ANALOG DEVICES INC.

181 Ballardvale St.; Wilmington, MA 01887; (617) 329-4700. Product Name: AD1877 Single Supply 16-bit $\Sigma\Delta$ stereo ADC. Contact: Maury Wood, mktg. mgr. Date Product Introduced: 4/94. Product Description & Applications: The AD1877 is a low-cost +5V, 16-bit analog-to-digital converter (ADC) for audio bandwidth applications. It uses a sigma delta ($\Sigma\Delta$) architecture, and features a fourth-order modulator and a three-stage digital decimation filter on a single CMOS substrate. The AD1877 is the best overall monolithic 16-bit audio band ADC on the market, and it is very competitively priced. Basic Specifications & Suggested List Price: The AD1877 offers 92dB signal-to-noise ratio and 90dB signal-to-(distortion plus noise) typical performance. The analog inputs are single-ended for ease of use. The AD1877 also features a power-down mode, during which the device dissipates less than 100 μ W. The price in 1,000-unit volumes is \$10 each.

ANALOG DEVICES INC.

181 Ballardvale St.; Wilmington, MA; (617) 461-3717. Product Name: AD1893 Low Cost SamplePort®. Contact: Janelle Huemme. Date Product Introduced: 8/94. Product Description & Applications: The AD1893 is the lowest cost member of the SamplePort asynchronous sample rate converter family of products from Analog Devices. The AD1893 is intended for 16-bit digital audio synchronization and interfacing applications. It offers high-quality sample rate conversion as well as superb clock jitter rejection performance. It is useful in consumer, communication and computer applications. Basic Specifications & Suggested List Price: The AD1893 offers -94 dB THD+N from 20Hz to 20kHz with a full-scale input. Dynamic

range is 96dB. The AD1893 can convert sample frequencies in a 1:2 to approximately 2:1 range. The device is offered in a 28 pin PDIP and a 44 pin TOFP. The price in 100-unit volumes is \$12 each.



ANATEK (CREATION TECHNOLOGIES INC.)
SR-7 Sample Rate Converter

ANATEK (CREATION TECHNOLOGIES INC.)

3938 N. Fraser Way; Burnaby, BC V5J 5G1 Canada; (604) 430-4336. Product Name: SR-7 Sample Rate Converter. Contact: Lisa Barton, mktg & sales mgr. Date Product Introduced: 10/94. Product Description & Applications: 2-channel digital audio sample rate converter. Accepts and outputs AES/EBU, SPDIF & optical formats. Indicates 48K, 44.1K, 44.056K or 32K input rates. Selectable output rates of 48K, 44.1K or 32K. External sync of output rate possible by means of AE's external sync output. Switch selectable output formats. Basic Specifications & Suggested List Price: 20-bit resolution. Dynamic range \geq 120dB unweighted. THD + N \leq -108dB unweighted. Single 19" rack unit. Suggested retail price: \$599.

APOGEE ELECTRONICS CORP.

3145 Donald Douglas Loop South; Santa Monica, CA 90405; (310) 915-1000. Product Name: Apogee AD-1000 Converter. Contact: David Kimm/Jane Scobie. Product Description & Applications: The AD-1000 is Apogee's newest A/D conversion system, which combines 20-bit conversion, microphone and line-level analog inputs and a comprehensive synchronization system. It has been designed for both remote and fixed installations and can be battery-powered for field work. Apogee's UV-22 encoding, patented Low Jitter Clock and unique SoftLimit are included as standard. The unit can operate stand-alone or combined with Apogee's DA-1000E-20 digital-to-analog converter in a complete 20-bit solution. Basic Specifications & Suggested List Price: Analog microphone and line-level inputs, AES, SPDIF and ADAT optical interfaces are standard. Sync sources include WC, NTPC, PAL and Monochrome. Tascam TDIF and SDIF are available as options. Retail price is \$2,995.

APOGEE ELECTRONICS CORP.;

3145 Donald Douglas Loop South; Santa Monica, CA 90405; (310) 915-1000. Product Name: UV-1000 Super CD Encoder. Contact: David Kimm/Jane Scobie. Date Product Introduced: 10/93. Product Description & Applications: The UV-1000 Encoding System incorporates Apogee's UV-22 process for reducing high-resolution sources onto 16-bit formats such as CDs. Apogee UV-22 adds an inaudible, high-frequency 'bias' to the digital bit stream, placing an algorithmically-generated 'clump' of energy around 22kHz. UV-22 silently captures resolution beyond 20-bits on a standard 16-bit CD. Selected by virtually all major facilities, the UV-1000 has quickly become the accepted standard for bit condensation. Basic Specifications & Suggested List Price: The UV-1000 processor includes UV-22 Processing, AutoBlack, oscillator, AES, SPDIF, SDIF, ST Optical, TOSLINK and SDIF-II inputs and outputs. Additional features include OVER and hOVER indication, DC offset removal system and SPDIF copy status controls. Retail price is \$6,800.

APPLIED RESEARCH & TECHNOLOGY

215 Tremont St.; Rochester, NY 14608; (716) 436-2720. Product Name: DXR Elite. Date Product Introduced: 1994. Product Description & Applications: The DXR Elite is a fully programmable 16-bit processor, which offers all types of delay-based effects and dual processing. Dual processing is A.R.T.'s service mark for describing the independent processing of both input channels. The DXR Elite is actually two independent delay processors in one rack unit. A total delay time of 2 seconds is available. Basic Specifications & Suggested List Price: Delay types include: mono, dual mono, offset (ping pong), stereo chorus, stereo flange, mono tapped, dual tapped, and special effects tapped delays (featuring up to 23 taps). The DXR Elite also offers full MIDI programmability and real-time control of parameters. A variable lowpass filter allows for emulation of classic tape delay and analog modulation effects.

APPLIED RESEARCH & TECHNOLOGY

215 Tremont St.; Rochester, NY 14608; (716) 436-2720. Product Name: RXR Elite. Date Product Introduced: 1994. Product Description & Applications: The RXR Elite is a programmable 16-bit processor, which offers all types of reverb effects. New reverb algorithms, based on A.R.T.'s proprietary Acoustic Room Modeling, offer a sound that allows the RXR Elite to be heralded as "the benchmark

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SIGNAL PROCESSORS

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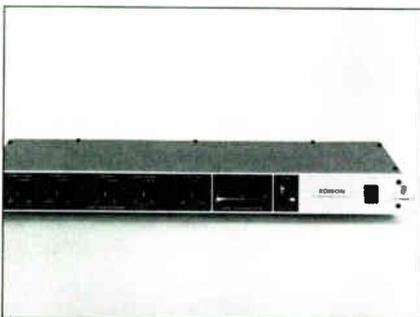
reverb of the 90's." The inclusion of a Variable Filter Network allows the user to instantly modify the characteristics of their listening environment. **Basic Specifications & Suggested List Price:** Reverbs include: rooms, halls, plates, chambers, gated, reverse, and two dual ambience banks (rooms and plates). The dual ambience banks offer independent processing of both input channels (dual processing). The RXR Elite offers full MIDI programmability and real-time control of parameters.

ASHLY AUDIO INC.

100 Fernwood Ave.; Rochester, NY 14621; (716) 544-5191. **Product Name:** PQX-571. **Contact:** Bob French, Sr. Exec. VP. **Date Product Introduced:** 11/94. **Product Description & Applications:** 7-band parametric equalizer, with 5 fully parametric bands sweepable from 20Hz - 20kHz. Also features both high and lowpass filters. Also available as a stereo or dual model with a total of 14 bands (model PQX-572). **Basic Specifications & Suggested List Price:** Price: PQX-571 - \$399; PWX-572 - \$699.

AUDIO ENGINEERING LTD. (MICRON)

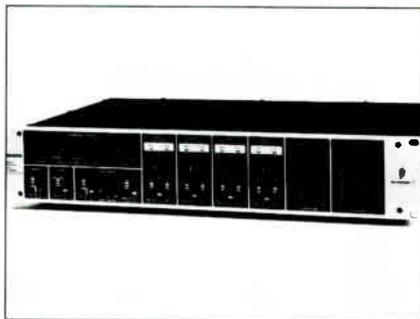
Fitzroy House, Abbot St.; London, E8 3LP UK; 011-44-71-254-5475. **Product Name:** TX500 & 600 Series Pocket Transmitters. **Contact:** John Wykes. **Date Product Introduced:** 7/94. **Product Description & Applications:** The new TX500 and 600 Series Pocket Transmitters feature an advanced development of Micron's unique Complementary Noise Suppression (CNS) system. This ensures a very low noise floor, wide dynamics and extended operating range, with the new version exhibiting very tight tracking of high-energy, high-frequency transients and a more transparent ambience in quiet locations. Micron products are widely used in the broadcast, sound reinforcement and theater sectors. **Basic Specifications & Suggested List Price:** Built into a new lightweight yet rugged stainless steel case, with a captive battery cover, the transmitters' circuitry includes a sophisticated design of audio limiter, which has variable threshold adjustment and is entirely free of pumping effects. The new products offer a wider range of input sensitivities and microphone powering arrangements, together with built-in line-up tone, battery test and transmitted "low battery" signal.



BEHRINGER
Edison Ext. Stereo/Enhancer

BEHRINGER

PD Box 9068; Hicksville, NY 11802-9068; (516) 932-3810. **Product Name:** Edison Ext. Stereo/Enhancer. **Contact:** Bob Caputo, nat'l sales mgr. **Date Product Introduced:** 4/94. **Product Description & Applications:** Comprehensive stereo enhancer offers full parameter control over stereo image to enhance & intensify spatial characteristics of program material. Full parameter control of center information, mono capability, dedicated control over low mid frequency stereo information. Integrated phase correlation meter. **Basic Specifications & Suggested List Price:** \$329.99 suggested list.



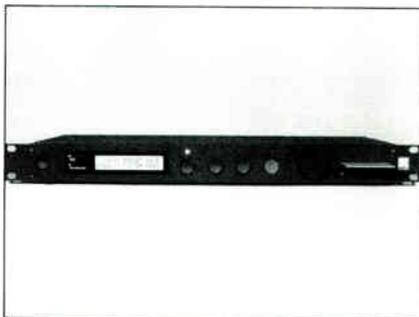
BEHRINGER
Combinator (MDX 8000)

BEHRINGER

PD Box 9068; Hicksville, NY 11802-9068; (516) 932-3810. **Product Name:** Combinator (MDX 8000). **Contact:** Bob Caputo, nat'l sales mgr. **Date Product Introduced:** 4/94. **Product Description & Applications:** Stereo multiband compressor/leveler. Provides simultaneous compression & leveling on 4 discrete bands of stereo program material with individual parameter control and in/out switching on each band. Also features dedicated clipper on each band, overall peak/limiter, gain reduction meter and switchable 25/50/75 ms pre/de-emphasis for broadcast applications. **Basic Specifications & Suggested List Price:** \$1,999.99 suggested list.

BENCHMARK MEDIA SYSTEMS INC.

5925 Court Street Rd.; Syracuse, NY 13206-1707; (315) 437-6300. **Product Name:** The AudioWorld Interface. **Contact:** Rory Rall, sales mgr. **Date Product Introduced:** 3/94. **Product Description & Applications:** The AudioWorld Interface combines a two-way recorder interface with switch selectable operation as a line amplifier or mono mix amplifier. The rack mountable chassis includes LEDs to indicate a signal presence, the onset of peak overload, and power presence. Use the AudioWorld Interface to mate R-DAT and analog recorders. Use it to generate mono from stereo for a broadcast confidence monitor, or as a balanced line amplifier to compensate for level mismatches. **Basic Specifications & Suggested List Price:** THD = 0.0011% @ 20 kHz; Crosstalk = -100dB @ 1kHz; 127dB dynamic range; excellent RF immunity; 20K ohm balanced input impedance; 60 ohm balanced output impedance; rear panel XLR and RCA connectors; suggested list price is \$225.



CUTTING EDGE TECHNOLOGIES
Yellowtec VIP-1 Voice Processor

CUTTING EDGE TECHNOLOGIES

2101 Superior Ave.; Cleveland, OH 44114; (216) 241-7225; Fax: (216) 241-4103. **Product Name:** Yellowtec Vip 1 Voice Processor. **Contact:** Danielle Cline, mktg. **Date Product Introduced:** 2/94. **Product Description & Applications:** The Vip 1 is the first voice processor to store individual settings on a memory card, making it easy for announcers to insert the card and instantly use their personal processing setup. This advanced device features a full complement of digitally controlled processing. The front panel includes an LC display and controls are limited to a jog-wheel and 4 buttons. The Vip 1 offers both fully user-defined and semi-automatic modes of operation. **Basic Specifications & Suggested List Price:** Processing includes limiter, compressor with adjustable threshold, maximum gain, hold-level, and release time; expander with adjustable threshold, range, and release time; de-esser; 3-band parametric equalizer. Electronically balanced input/output (transformer optional); RS-232 interface. Suggested list: \$2,195.



DOLBY LABORATORIES INC.
DP521

DOLBY LABORATORIES INC.

100 Potrero Ave.; San Francisco, CA 94103; (415) 558-0200. **Product Name:** DP521. **Contact:** Kevin Tam. **Date Product Introduced:** Spring '94. **Product Description & Applications:** The DP521 is the first in a family of encoders incorporating Dolby's AC-3 digital audio coding technology. Designed for applications including broadcast, cable and telecommunications, the 2-channel DP521 can be easily upgraded to the full 6 channels which AC-3 can provide when future multichannel delivery systems via cable, satellite and HDTV become available. Present users of the DP521 include the DMX for business music service offered by International Cablecasting Technology (ICT) Inc. **Basic Specifications & Suggested List Price:** A range of sampling rates, total data rates are available. Please contact Dolby Laboratories for complete specification and pricing.

DRAWMER/QMI

25 South St.; Hopkinton, MA 01748; (508) 435-3666. **Product Name:** 1961. **Contact:** Barry Fox, mktg mgr. **Date Product Introduced:** 9/93. **Product Description & Applications:** 2-channel 4-band parametric tube equalizer. Highpass and lowpass filters with input level control for each channel. The four equalizer sections have six carefully chosen overlapping frequencies and a separate tube stage for increased harmonic clarity. Each band includes variable bandwidth from 0.3 octave to 3 octaves and ± 18dB of cut and boost. **Basic Specifications & Suggested List Price:** Balanced XLR inputs, input impedance 20KΩ, output impedance 500 Ω, frequency response < 22Hz to 42 kHz - 1dB. Suggested pro net price: \$2,699.

ECLAIR ENGINEERING SERVICES

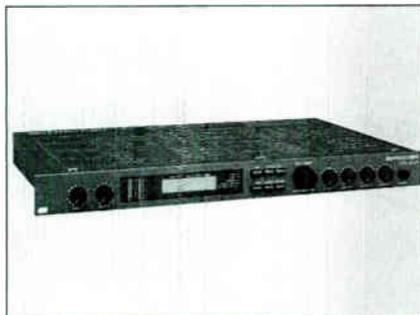
221 Pine St.; Florence, MA 01060; (413) 584-6767. **Product Name:** Model 62/LA-LA limiter. **Contact:** Bruce Seifried, owner. **Date Product Introduced:** 7/94. **Product Description & Applications:** Dual-channel Teletronix LA-2A-style compressor/limiter. Can be used as two individual channels, or linked in stereo mode (for use as a stereo bus compressor, for example). 4:1 compression ratio over first 10dB range, then changes to 20:1 limiting. Both -10dBV and +4dBm inputs/outputs are supported, and utilize low-distortion Jensen transformers. Audio circuitry is entirely vacuum tube-based. Available in a 3-unit rack case. **Basic Specifications & Suggested List Price:** Suggested retail price: \$3,495.

EDCOR ELECTRONICS

7130 National Parks Hwy.; Carlsbad, NM 88220; (800) 854-0259; FAX: (505) 887-6880. **Product Name:** Stereo-to-Mono Audio Adaptor. **Contact:** Phyllis Weston, sales mgr. **Date Product Introduced:** 8/94. **Product Description & Applications:** The S2M is a special transformer designed with three isolated windings featured in a small box that can be easily mounted via four holes. The audio adaptor is designed to interface with a stereo input and convert it to mono or a mono-to-stereo with no loss or phase cancellation. **Basic Specifications & Suggested List Price:** All inputs/outputs are fully isolated from the chassis. Supplies a high-quality stereo-to-mono conversion at a very competitive price of \$23.20. Made in America.



ELECTRO-VOICE INC.
EV/Dynacord DDL 102



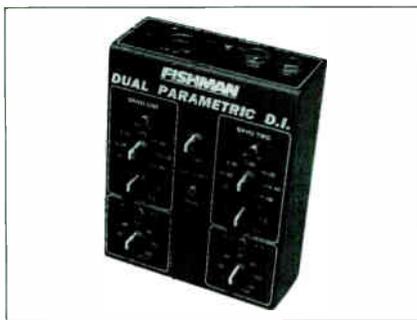
ELECTRO-VOICE INC.
EV/Dynacord DDL 204

ELECTRO-VOICE INC.

600 Cecil St.; Buchanan, MI 49107; (616) 695-6831. **Product Name:** EV/Dynacord DDL 102 and DDL 204. **Contact:** Jim Long, dir. of mktg. **Product Description & Applications:** The DDL 102 and DDL 204 are very high-quality signal delays that complement the performance of EV loudspeakers. Both units incorporate a switchable edit-protection feature that prevents alteration of settings without a special code. Inputs and outputs are electronically balanced, with NRS 90 185 input transformers and NRS 90 186 output transformers optional. Both models feature a 2 x 16-digit alphanumeric LCD display with LED back light. Full, three-year limited warranty. **Basic Specifications & Suggested List Price:** DDL 102: 1 in/2 out; 1,086 msec. max. delay; 90 dB S/N ratio; HF and LF EQ on each output (±.14 dB shelving at 100 Hz and 10 kHz); DDL 204: 1 in/4 out or 2 in/2-2 out; 100-dB S/N ratio; 2,750-msec max. delay; 30 different configs. can be stored in 30 user memories.

EVENTIDE INC.

One Alsan Way; Little Ferry, NJ 07643; (201) 641-1200. **Product Name:** DSP4000 Ultra-Harmonizer® brand effects processor. **Contact:** Gil Griffith, sales mgr. **Date Product Introduced:** 1994 (new software). **Product Description & Applications:** Eventide's DSP4000 Ultra-Harmonizer® effects processor offers the broadest array and fines: quality of pitch change and effects programs. AES/EBU digital and analog I/O are standard. Up to eight simultaneous voices of pitch shift or four voices plus simultaneous stereo reverb are available. The unit's modular effects "building block" approach allows user creation of new algorithms insuring that the DSP4000 will be in the forefront of effects processing for years to come. **Basic Specifications & Suggested List Price:** U.S. suggested list \$4,995.



FISHMAN TRANSDUCERS INC.
Dual Parametric DI

FISHMAN TRANSDUCERS INC.

340-D Fordham Rd.; Wilmington, MA 01887; (508) 988-9199. **Product Name:** Dual Parametric DI. **Contact:** Rick Nelson, nat'l sales mgr. **Date Product Introduced:** 8/94. **Product Description & Appli-**

cations: 2-channel parametric equalizer and active direct box with proprietary electronics incorporating voltage doubling technology to increase the DI's headroom. Each channel has separate frequency, cut/boost and bandwidth controls that can be bypassed at the flick of a switch. Master volume, phase reversal switch and battery/clip indicator LED are included. **Basic Specifications & Suggested List Price:** 10Mohm input (1/4"), high Z and low Z outputs, ground lift, 9V battery or 9V power supply; each channel: boost/cut -25dB to +15dB; octave/bandwidth: 0.015 to 2 octaves; frequency range: x0.1, x1, x10; frequency knob 200 Hz to 2.0 kHz selected by frequency range switch. Dimensions: 4 3/8" x 5 1/2" x 2 1/2"; weight: 18 oz.; list price: \$239.95.

FOCUSRITE AUDIO ENGINEERING LTD.

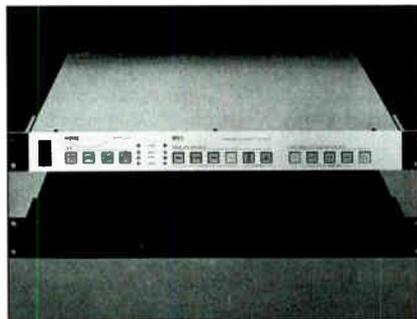
Unit 2; Bourne End Bucks, SL8 5AS United Kingdom; (44) 628-819456. **Product Name:** Blue 330 Stereo Mastering Compressor. **Contact:** Phil Dudderidge. **Date Product Introduced:** 11/94. **Product Description & Applications:** The second product in the Focusrite Blue Mastering range is the stereo compressor & limiter. Equipped with full-size PPM meters. All controls are multiposition rotary switches allowing easy reset to previous position. All the usual Focusrite attributes including transformers, very low noise and wide bandwidth. **Basic Specifications & Suggested List Price:** Stereo compressor & limiters, \$6,750.

FOCUSRITE AUDIO ENGINEERING LTD.

Unit 2; Bourne End Bucks, SL8 5AS United Kingdom; (44) 628-819456. **Product Name:** Red 6 Quad Gate. **Contact:** Phil Dudderidge. **Date Product Introduced:** 11/94. **Product Description & Applications:** Another Red Range module, this time four gates in a 2U 19" package. No VGAs used in this very quiet circuit which has transformers, wide bandwidth & low noise. **Basic Specifications & Suggested List Price:** Red 6 Quad Gate, \$3,600.

FURMAN SOUND INC.

30 Rich St.; Greenbrae, CA 94904; (415) 927-4548. **Product Name:** X-Series Crossovers. **Contact:** Joe Desmond, sales mgr. **Date Product Introduced:** 11/94. **Product Description & Applications:** X-Series 24dB/octave crossovers feature Linkwitz-Riley/Butterworth slope switches; screwdriver-adjustable peak limiters on each output; mute, phase reverse, and horn EQ switches; detented frequency pots; low-sum-to-mono switches; and more. There are three models: X-324 crossover—stereo 2-way, mono 3-way; X-424 crossover—stereo 3-way, mono 4 or 5-way; X-524 crossover—stereo 4-way. A fourth model, the X-312, is a low-cost stereo 2-way, mono 3-way, 12dB/octave unit. **Basic Specifications & Suggested List Price:** Frequency ranges use X1/X10 slide switches. All slide switches are recessed. All models have ground lift switches. 1/4" phone connectors are standard; XLR balanced inputs and outputs are optional. **Suggested list prices:** X-312, \$279; X-324, \$439; X-424, \$599; X-524, \$699.



G PRIME LIMITED
Weiss SFC 1

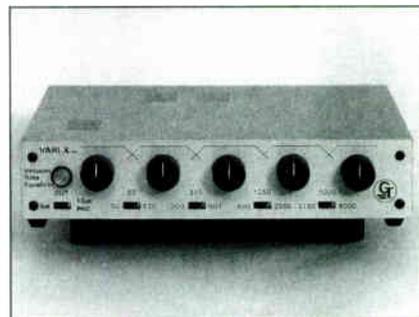
G PRIME LIMITED

1790 Broadway, Ste. 402; New York, NY 10019; (212) 765-3415. **Product Name:** Weiss SFC 1. **Contact:** Russ Hamm. **Date Product Introduced:** 1/94. **Product Description & Applications:** Sampling frequency converter and advanced noise-shaping redither, converts between arbitrary sampling frequencies in range of 32kHz to 55kHz. Highly stable internal circuitry eliminates jitter from input source, and dither at the output smoothly reduces digital word length from 24 to 16, 18 or 20 bits. **Basic Specifications & Suggested List Price:** Input/output formats: AES/EBU, SPDIF, SDIF1, SDIF2. Internal processing 32-bit, variable speed. Price: \$5,500.

GROOVE TUBES

12866 Foothill Blvd.; Sylmar, CA 91342; (818) 361-4500. **Product Name:** CL-1. **Contact:** Aspen Pittman. **Date Product Introduced:** 7/94. **Product Description & Applications:** The Groove Tubes Electronics audio division is pleased to announce the addition of the CL1 vacuum tube compressor and limiter to its growing line of vacuum tube signal processors. The CL1 has the warm tone and smooth response reminiscent of the 40's era radio compressor/limiters that have been used on so many hit records. However, the CL1 is not just another Elvis Impersonator product that looks alike, but costs more than the real thing while delivering far less. The CL1 is an original de-

sign, which couples the versatility of modern electronics with the classic warmth of vacuum tube audio. Therefore, the CL1's audio path is 100% tubes, while the side chain is solid state analog computer controlled. **Basic Specifications & Suggested List Price:** \$600.



GROOVE TUBES
VARI-X

GROOVE TUBES

12866 Foothill Blvd.; Sylmar, CA 91342; (818) 361-4500. **Product Name:** EQ-1. **Contact:** Aspen Pittman. **Date Product Introduced:** 5/94. **Product Description & Applications:** The VARI-X vacuum tube equalizer combines the concept of adjustable bands (variable Q) in a vacuum tube circuit of elegance and section of the circuit is 100% "R-C passive" so your sound gets the benefit of more headroom. Just five knobs and four 3-position frequency select switches provide a total of 64 different configurations of boost/cut flexibility. The middle VARI-X control, for example, could be set as wide as 200Hz to 2,000Hz or as narrow as 500Hz to 800Hz with many more options in between just by relocating the 2 VARI-X switches on either side of the middle control knob. The slopes are a musical 6dB per octave, and the absence of inductors (no coils in any circuit section) insure that the most subtle transients will pass without destructive phase interaction section) insure that the most subtle transients will pass without destructive phase interaction or saturation induced clipping/distortion. Offering a maximum single section boost/cut of 10dB the VARI-X can solve almost any EQ problem that you have. **Basic Specifications & Suggested List Price:** Suggested retail price is \$560.

INNOVATIVE ELECTRONIC DESIGNS INC.

9701 Taylorsville Rd.; Louisville, KY 40299; (502) 267-7436. **Product Name:** IED Model 8000 Series System. **Contact:** Tom Roseberry, VP, mktg. and sales. **Date Product Introduced:** 11/94. **Product Description & Applications:** The new IED 8000 Series System is a multifunctional 20-bit digital/analog control and processing system. Announcement or program routing, gain change, digital delay, equalization, internal and external monitor/testing, ambient sound compensation control, recording and playback of digital stored messages, and limiting/compression are only some of the features selectively available in this system. The internal processors are controlled by user-configured software, via networking source or portable or fixed computer. System size relates easily to everything from the smallest possible single system requirement to large complex applications linking systems by network. The inherent flexibility for system design applications makes the IED 8000 Series the most cost-effective quality solution available in the market. **Basic Specifications & Suggested List Price:** Input/output: +24dBu±0.3dB, frequency response: 20Hz to 20kHz±0.5dB. Recorded information: selectable bandwidth from 10kHz to 20kHz. Total harmonic distortion: 20Hz to 20kHz, less than 0.05%. Signal-to-noise ratio: (+4dBu input ref.); more than 80dB.

KLARK-TEKNIK

448 Post Rd.; Buchanan, MI 49107; (800) 695-1010. **Product Name:** DN320, DN330. **Contact:** Allan Nichols, dir. of sales and mktg. **Date Product Introduced:** 6/94. **Product Description & Applications:** Permanent install dual 2/3 octave 16-band EQ, 1/3 octave 30-band EQ, both with rotary pots and 24-volt DC back-up. **Basic Specifications & Suggested List Price:** \$880.

LEITCH INCORPORATED

920 Corporate Ln.; Chesapeake, VA 23320-3641; (804) 548-2300; (800) 231-9673. **Product Name:** DigiBus® Series Audio Multiplexers/Demultiplexers. **Contact:** Trevor Smith, product spec. eng. **Date Product Introduced:** NAB '94. **Product Description & Applications:** The AMF-3600 was designed to embed (multiplex) digitized audio within, and the ADF-3600 to demultiplex audio from, the composite or component serial video data stream, respectively. 18-bit analog-to-digital conversion is used during the digitization process. Processing is done in 4-channel blocks. Analog or digital (AES/EBU) inputs/outputs are available. Multiple modules and groups may be housed in a single frame, all of which are controlled by Universal Control panels. **Basic Specifications & Suggested List Price:** AMF-3600 audio multiplexer: \$4,085 (serial input); \$4,585 (analog input). ADF-3600 audio demultiplexer: \$2,090 (serial output); \$2,790 (analog output).

SIGNAL PROCESSORS

LEXICON

100 Beaver St., Waltham, MA 02154; (617) 736-0300. **Product Name:** PCM80. **Contact:** Jon Durant, mktg comm. **Date Product Introduced:** 1994. **Product Description & Applications:** New true stereo digital effects processor featuring Lexicon reverb, chorusing, tempo-based delay effects, dynamic spatialization, and other effects. The PCM80 also features a new dynamic patching, network providing extensive control possibilities, new multiple DSP architecture, and digital input/output. **Basic Specifications & Suggested List Price:** List price: \$2,495.

LEXICON

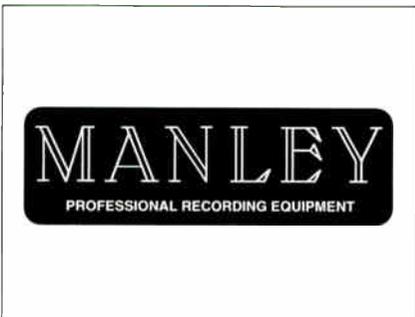
100 Beaver St., Waltham, MA 02154; (617) 736-0300. **Product Name:** Reflex. **Contact:** Jon Durant, mktg comm. **Date Product Introduced:** 1994. **Product Description & Applications:** New dynamic MIDI reverb featuring halls, rooms, gates, plates and inverse reverb algorithms, as well as multivoice chorus, flanging, delay and resonance algorithms, full dynamic MIDI implementation. **Basic Specifications & Suggested List Price:** Under \$500.



LITTLE LABS
Little Labs Multi Z Direct Box Rev. B

LITTLE LABS

8033 Sunset Blvd., Ste. 889; Los Angeles, CA 90046; (800) 642-0064; (213) 851-6860. **Product Name:** Little Labs Multiple Z Direct Box Rev. B. **Contact:** Jonathan Little, electronic dir. **Date Product Introduced:** 1/94. **Product Description & Applications:** The Little Labs Multiple Z direct box is a revolutionary audiophile direct box designed to extract the full tone and dynamics from musical instruments. In the design process, different electronic circuits were found to sound better with different instruments. Rather than compromise, Little Labs built each of these electronic circuits into the direct box and made them front panel selectable. Impedance (or Z) is the key difference between the selectable input circuitry, hence the name Multiple Z Direct Box. **Basic Specifications & Suggested List Price:** Features include: balanced mic/line, unbalanced line, and buffered line driver outputs (for running long guitar cables without signal loss); ability to isolate ground on input as well as lift XLR output ground, overload indication on input and on output; audiophile quality components used throughout. Designed by ear to please yours. Call for pricing.



MANLEY LABS INC.

MANLEY LABS INC.

13380 Magnolia Ave., Chino, CA 91710; (909) 627-4256. **Product Name:** Manley Electro-Optical Limiter. **Contact:** David or EveAnna Manley. **Date Product Introduced:** 5/94. **Product Description & Applications:** The Stereo Electro-Optical limiter was designed for engineers, like ourselves, who prefer the LA-2A for transparent and simple operation. Limiting is achieved with light-dependent resistors while the signal only passes through our super-clear, all-tube line amplifiers. Features: large illuminated Silfam VU meters, gain, reduction, bypass, metering, stereo-link and balance controls. Optimized for clean, safe vocal and instrument recording as a dual-mono

limiter. In linked stereo mode especially useful for drum ambience tracks and reverbs. **Basic Specifications & Suggested List Price:** All-tube high current make-up gain amplifier. Unbalanced in and out. 2-channel unit. Occupies 2 rack units. Audiophile quality componentry. 19"x10"x3 1/2". Shipping weight 16 lbs. Retail price: \$2,500.

MANLEY LABS INC.

13380 Magnolia Ave., Chino, CA 91710; (909) 627-4256. **Product Name:** Stereo Variable-MV limiter/compressor. **Contact:** David or EveAnna Manley. **Date Product Introduced:** 9/94. **Product Description & Applications:** Our new stereo limiter/compressor has been called the best-sounding limiter available. Designed by Manley over 30 years ago, it uses a 6386 variable gain tube in a balanced circuit. The Fairchild 670 used a very similar concept. Input and output controls provide gains to 30dB for use as a line amp or, creatively, for tube distortion, controls include threshold, recovery with a new attack time, bypass, link and analog meters.

MICROAUDIO INC.

64145 Tanglewood; Bend, OR 97701; (503) 383-0741; (800) 445-1248. **Product Name:** EQ POD 1.2CQ. **Contact:** Eugene Rimkeit, pres. **Date Product Introduced:** 1/94. **Product Description & Applications:** EQ POD 1.2/2.2CQ programmable 1/3 octave equalizer w/programmable master gain and lowpass and highpass filters, tamper-proof. **Basic Specifications & Suggested List Price:** Noise specs better than -83dB at any setting. EQ POD 1.2CQ: \$925 list. EQ POD 2.2CQ: \$1,525 list.



MYTEK TECHNOLOGIES
AD2021 and D-DAC20 20 Bit Digital Converters

MYTEK TECHNOLOGIES

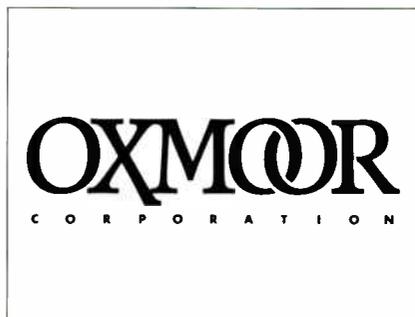
PD Box 1023; New York, NY 10276; (212) 388-2677. **Product Name:** AD2021 and D-DAC 20 20-bit digital converters. **Contact:** Michal Jurewicz. **Date Product Introduced:** 7/94. **Product Description & Applications:** AD2021 is a high-performance 20-bit stereo analog-to-digital converter. D-DAC 20 is a 20-bit digital-to-analog converter combined with a jitter removal system for D-D transfers. The units can be used together or separately. They are designed for the applications which require absolutely top quality analog-to-digital (and back) conversion such as: mastering, mixing to DAT or 20-bit digital, tracking, computer editing and 20-bit digital film and video sound. **Basic Specifications & Suggested List Price:** AD2021 and D-DAC 20 are small 1/2 rackspace units, which can be mounted as one full rackspace unit. They are portable and have built-in power supply. They also include various additional functions such as Hibit-16 for 20 to 16-bit conversion, gentle limit for hotter CDs, jitter removal circuit and class A headphone amplifier. List price: \$1,995 each.

MYTEK TECHNOLOGIES

PD Box 1023; New York, NY 10276; (212) 388-2677. **Product Name:** DDD-603 Digital AES/EBU Meter. **Contact:** Michal Jurewicz. **Date Product Introduced:** 5/94. **Product Description & Applications:** DDD-603 is a sophisticated, DSP-driven digital audio level meter. It's designed to work with DAT machines, computer DAWs, A/D converters, digital VTRs or any other digital audio product, which outputs AES/EBU or SPDIF signal. The meter should be used whenever a precision, convenient digital audio metering is required and the onboard meters are not enough (for example, mixing to DAT). **Basic Specifications & Suggested List Price:** The meter provides several functions: precision peak metering, VU metering, phase metering and calibration, and includes an overload counter for counting true digital overloads. The overload indicator conforms to 1630 standard. The dimensions are 1.425"x5.25"x5.10". List price: \$995.

NVISION INC.

443 Crown Point Cr.; Grass Valley, CA 95945; (916) 265-1000; FAX: (916) 265-1010. **Product Name:** Digital Audio Processing Suite (DAPS). **Contact:** Andrew Walls, sales/mktg coordinator. **Date Product Introduced:** 9/94. **Product Description & Applications:** DAPS provides a powerful collection of digital audio tools in a small package: two NV1308 8x8 digital audio AES routers, an NV9301 XY router control panel, and NV1050 4-Channel sample rate converter, an NV1055 4-Channel digital audio mix/minus with router, an NV9055 remote control panel for the NV1055, and NV1035 20-bit analog-to-digital converter, an NV1045 20-bit digital-to-analog converter, and an NV1060 digital audio delay compensator. This is an excellent solution for Telecine and similar applications.



DXMDDR CORPORATION
DEQ-II

OXMOOR CORPORATION

2111 Parkway Office Cr.; Birmingham, AL 35244; (800) 262-6898. **Product Name:** DEQ-II. **Contact:** Richard C. Mitchell. **Date Product Introduced:** 9/93. **Product Description & Applications:** The DEQ-II high-resolution programmable equalizer provides maximum security, flexibility and audio performance at an affordable price. It may be easily programmed via front panel controls or a personal computer. The unit offers a parallel port to access any of 8 equalization preset curves. The DEQ-II provides 29 constant-Q, minimum-phase 1/3-octave combining filters on iso centers. Filter boost and cut response is symmetrical and reciprocal. Each unit employs sweepable 12dB/octave lowpass & highpass filters. **Basic Specifications & Suggested List Price:** Frequency response 20Hz to 20kHz +0, -0.3dB. Hum and noise -85dB from 20Hz to 20kHz, unweighted. 1/3-octave filters are constant-Q minimum phase combining. Suggested list price: \$1,470.



PACIFIC INNOVATIVE ELECTRONICS
The Studio Integrator

PACIFIC INNOVATIVE ELECTRONICS

10840 Vanowen St.; North Hollywood, CA 91605; (818) 761-8393. **Product Name:** The Studio Integrator. **Contact:** Ralph Skelton. **Date Product Introduced:** 9/93. **Product Description & Applications:** Recording/monitoring bus Interface allowing +4dB to -10dB, bi-directional level shift and balanced-to-unbalanced translation. Seven stereo inputs by six stereo outputs, including a selectable/adjustable monitor output. Used to expand or provide two-track monitoring for studios using line or semi-professional mixers. **Basic Specifications & Suggested List Price:** Size: 19"x12" rackspace; weight: 8 lbs.; input impedance: 100K un-bal., 10K bal.; max input: +28dBm; max output: +28dBm; s/n: -120dB. Price: \$600 retail.

RSP TECHNOLOGIES

2870 Technology Drive; Rochester Hills, MI 48309; (810) 853-3055. **Product Name:** The Reanimator. **Contact:** Bill Rowe, sales mgr. **Date Product Introduced:** 1/94. **Product Description & Applications:** The RSP Technologies Reanimator is a dual mono/stereo compressor that features dynamic enhancement, which selectively replaces high end lost during compression. The Reanimator also includes HUSH Systems' latest noise-reduction circuit, a built-in de-esser, and auto switches per channel, which allow for decision-free compression. Controls per channel include threshold, ratio, attack, release and output. Channels are strapped via a stereo master switch. Performance is transparent, and typical to units three times its price. **Basic Specifications & Suggested List Price:** Maximum input: +8dBu (-10 ref.), +21dBu (+4 ref.). Maximum output: +8dBu (-10 ref.), +21dBu (+4 ref.). Dynamic range: 111dB (A-weighted). Distortion: .007% dBu at 1kHz typical. Frequency response: +1dB, 10Hz to 30kHz. Attack time: 1 to 500 ms. Release time: .05 to 4 seconds. Suggested retail: \$599.

RSP TECHNOLOGIES

2870 Technology Drive; Rochester Hills, MI 48309; (810) 853-3055. **Product Name:** The Saturator. **Contact:** Bill Rowe, sales mgr. **Date Product Introduced:** 11/94. **Product Description & Applications:** The RSP Technologies Saturator is the first product specifically intended to "warm up" digital recordings. Twin 12AX7 tubes interact with proprietary circuitry to replicate the soft frequency attenuation and compression typical to analog tape saturation, therefore

allowing the digital recordist those benefits without having to abandon the digital medium. The Saturator is a two rackspace "retro"-style dual mono unit, equally effective at master inserts during mix-down, or in channel inserts during tracking. **Basic Specifications & Suggested List Price:** Input impedance: 35K Ω balanced, bandwidth: 10Hz to 18kHz; drive rolloff: infinitely variable per amplitude; noise: less than -85dBu at unity gain; distortion: 0.1% (minimal drive); front: drive and output controls per channel, two large VU meters, power, bypass, and meter/saturation switches; rear: XLR 1/4" inputs/outputs. Suggested retail: \$699.

RANE CORPORATION

10802 47th Ave. W.; Mukilteo, WA 98275; (206) 355-6000. **Product Name:** GE60. **Contact:** Ellen Allhands, sales and mktg. coordinator. **Date Product Introduced:** 10/93. **Product Description & Applications:** The GE60 is a stereo interpolating constant-Q 1/3-octave graphic equalizer, with 45mm long-travel faders in a 3-space 19" rack-mount package. Additional sweepable highpass and lowpass filters cut off unwanted frequency extremes. Interpolating filters eliminate irregularities between filter centers for smooth response. **Basic Specifications & Suggested List Price:** Two channels. 30 bands each constant-Q filters; low cut filter range: 10Hz to 250Hz; high cut filter range: 3kHz to 40kHz. TRS, 3-pin and terminal strip balanced inputs and outputs, built-in power supply. 108dB s/n with sliders centered at unity gain. Level and bypass controls. Price: \$849 list.

RANE CORPORATION

10802 47th Ave. W.; Mukilteo, WA 98275; (206) 355-6000. **Product Name:** PE17 Parametric Equalizer. **Contact:** Ellen Allhands, sales and mktg. coordinator. **Date Product Introduced:** 12/93. **Product Description & Applications:** The Rane PE17 is five full bands of parametric EQ, plus sweepable high and low cut filters. Each parametric band sweeps the full audio spectrum from 20Hz to 20kHz, enabling all five bands to overlap if necessary. Each band is bypassable. Applications include recording, sound reinforcement EQ, sub-walker EQ, extremely low noise and distortion with a 120dB dynamic range make it ideal for digital recording. **Basic Specifications & Suggested List Price:** Five parametric bands with -15/+20dB cut/boost, 20Hz to 20kHz frequency sweep, .03 to 2.0 octave bandwidth. Low cut sweepable 10Hz to 250Hz, high cut sweepable 3kHz to 40kHz. 1/4" and 3-pin balanced connectors, single rack height. Price: \$499 list.

RICHMOND SOUND DESIGN LTD.

1234 W. 6th Ave.; Vancouver, BC, V6H 1A5 Canada; (800) 664-5861; FAX: (604) 732-1234. **Product Name:** DSPerser. **Contact:** Ken Bell, P.E., general mgr. **Date Product Introduced:** 4/94. **Product Description & Applications:** DSPerser digital audio hardware offers configurable routing and signal processing with the added advantage of control in real time. Using industrial grade VMF hardware, DSPerser supports 256 inputs and 256 outputs, with 128 parallel channels to and from an expandable processing core. DSPerser comes with local host controller responding both to standard configuration protocols and separate high-speed actuating commands. Custom arrangements and equalizer interfaces available. Call for details.

SABINE INC.

4637 NW 6th St.; Gainesville, FL 32609; (904) 371-3829. **Product Name:** FBX-1802 Dual Feedback Exterminator. **Contact:** Nancy Walsh, communications dir. **Date Product Introduced:** 1/94. **Product Description & Applications:** The 2-channel version of the upgraded FBX-901, the new FBX-1802 automatic feedback controller has nine filters per channel and offers lockable fixed filters, and selectable total number of active filters, selectable total number of active fixed filters, and switchable filter widths (either 1/10 octave or 1/5 octave). The 1802 is ideal for many applications, including controlling feedback in live sound situations, in P.A. and intercom systems and especially for unattended sound systems. **Basic Specifications & Suggested List Price:** Nine independent digital notch filters per channel controlled automatically from 20Hz to 20kHz; filter width: 1/10 or 1/5 octave; filter depth: DSP controlled, variable to -30dB; resolution: 1Hz from 20Hz to 20kHz; time required to find and eliminate feedback: 0.4 seconds, typical at 1kHz; frequency response: < .25dB, 20Hz to 20kHz; signal-to-noise ratio: > 100dB typical; total harmonic distortion: < 0.02% at 23dBV sine wave at 1kHz; dynamic range: > 100dB. Suggested list price: \$1,299.95.

SABINE INC.

4637 NW 6th St.; Gainesville, FL 32609; (904) 371-3829. **Product Name:** FBX-1802 Dual Feedback Exterminator. **Contact:** Nancy Walsh, communications dir. **Date Product Introduced:** 1/94. **Product Description & Applications:** The two-channel version of the upgraded FBX-901, the new FBX-1802 automatic feedback controller has nine filters per channel and offers lockable Fixed filters, and selectable total number of active filters, selectable total number of active Fixed filters, and switchable filter widths (either 1/10 octave or 1/5 octave). The 1802 is ideal for many applications, including controlling feedback in live sound situations, in P.A. and intercom systems and especially for unattended sound systems. **Basic Specifications & Suggested List Price:** Nine independent digital notch filters per channel controlled automatically from 20Hz to 20kHz; filter width -1/10 or 1/5 octave; filter depth - DSP controlled, variable to -30dB; resolution - 1Hz from 20Hz to 20kHz; time required to find and eliminate feedback - 0.4 seconds, typical @ 1kHz; frequency re-

sponse - < .25dB, 20Hz to 20kHz; signal-to-noise ratio - > 100dB typical; total harmonic distortion - < 0.02% @ 23dBV sine wave at 1kHz; dynamic range - > 100dB. Suggested list price: \$1,299.95

SABINE INC.

4637 NW 6th St.; Gainesville, FL 32609; (904) 371-3829. **Product Name:** FBX-901 Feedback Exterminator. **Contact:** Nancy Walsh, communications dir. **Date Product Introduced:** 3/94. **Product Description & Applications:** Utilizing patented digital signal processing technology, Sabine's upgraded FBX-901 Feedback Exterminator automatically detects and eliminates feedback quickly by assigning one of nine very narrow 1/10-octave digital notch filters to the ringing frequencies, without changing sound quality. The 901 now offers lockable fixed filters and selectable total number of active filters, and is available in a 1/5-octave version. The 901 gives you automatic feedback control, more gain before feedback and increased clarity of your sound; it is ideal for unattended sound systems. **Basic Specifications & Suggested List Price:** Nine independent digital notch filters controlled automatically from 55Hz to 13,250Hz; filter width: 1/10 octave; filter depth: DSP controlled, variable to -50dB; resolution: 1/20 octave or better; time required to find and eliminate feedback: 0.4 seconds, typical at 1kHz; frequency response: < 1.5dB, 20Hz to 17,000Hz; signal-to-noise ratio: > 86dB typical (balanced); total harmonic distortion: < 0.02% typical; input-to-output gain variation: +/- 1dB. Suggested list price: \$649.95.

SAMSON AUDIO

PO Box 9068; Hicksville, NY 11802-9068; (516) 932-3810. **Product Name:** E62 Graphic Equalizer. **Contact:** Jack Knight, nat'l sales mgr. **Date Product Introduced:** 10/94. **Product Description & Applications:** 1/3-octave dual 31-band graphic EQ (2-space rack-mount). XLR balanced & unbalanced, inputs & outputs. Bypass switch independent level control for left & right channels. Ultra-low noise circuitry. Peak indicator LED, ± 15 dB of gain & attenuation. Internal power supply. All steel chassis. **Basic Specifications & Suggested List Price:** Frequency response: 10Hz to 50kHz ± 3 dB; THD +N (unity gain) 20Hz to 20kHz: less than 0.0035%; maximum gain: 15dB; center frequencies (Hz) 20, 25, 31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 620, 800, 1K, 1.25K, 1.6K, 2K, 2.5K, 3.15K, 4K, 5K, 6.2K, 8K, 10K, 12.5K, 16K, 20K. \$339.99 suggested list.

SASCOM MARKETING GROUP

635 Weyburn Sq.; Pickering, ON L1V 3V3 Canada; (905) 420-3946. **Product Name:** The SAK. **Contact:** Curt Smith, pres. **Date Product Introduced:** 7/94. **Product Description & Applications:** The SAK is a 1U rack-mount, 16-channel "Swiss Army Knife" solution to the perennial problems associated with interfacing audio equipment in professional and semi-pro environments. It enables easy and reliable connections between virtually every piece of equipment found in recording and broadcast studios and live sound venues. Use it as a DI, line driver, distribution amplifier, ground lift, pad, gain booster, phase flipper or impedance matcher. **Basic Specifications & Suggested List Price:** Each input is electronically balanced and each output is electronically balanced and floating, meaning that the unit doesn't care whether sources and destinations are balanced or unbalanced. Each input and output has its own individual ground lift switch. Each channel has switchable gain/attenuation of -24, -20, -14, -10, -4, 0, +4, +10, +14, +20, and +24dB plus a phase-reverse switch.

SESCOM INC.

2100 Ward Dr.; Henderson, NV 89015; (702) 565-3400. **Product Name:** Rackem "n" Stackem™ Electronics. **Contact:** Franklin J. Miller. **Date Product Introduced:** 9/94. **Product Description & Applications:** Rackem "n" Stackem™ Electronics is 30 items that are in 1/2 rack size. All kinds of audio equipment for studios, post-production, TV, recording and live sound. Competitive pricing and kits are available, also tabletop racks and other mechanical systems.



SIG TECH
Acoustic Environment Correction

SIG TECH

24 Thorndike St.; Cambridge, MA 02141; (617) 491-8890. **Product Name:** Acoustic Environment Correction. **Contact:** Burke Mathes, pres. **Product Description & Applications:** The AEC 1000 is a powerful digital filtering system, which compensates for loudspeaker/room interaction in high-performance monitoring applications, providing accurate tonal balance and stereo imaging. The

AEC generates test signal, measures the system response, then designs an adaptive, inverse FIR digital filter. The algorithm uses both time and frequency domain information and distinguishes between direct and reflected sounds, achieving unprecedented accuracy. **Basic Specifications & Suggested List Price:** The base unit features a 2-channel 250 mips DSP engine with 48/56 bit precision: 2472 taps/channel @ 44.1kHz, 2232 taps/channel @ 48kHz. Processing delay < 2 msec; THD+N < 105 dBFS. Various configurations are available: analog I/O; digital I/O; additional filter settings/memories on front panel or remote controls; response-analysis/filter-design software package. Prices start below \$5,000.

SPATIAL SOUND INC.

743 Center Blvd.; Fairfax, CA 94930; (415) 457-8114. **Product Name:** SSP-200 Spatial Sound Processor. **Contact:** Paul Devlas, mktg. mgr. **Date Product Introduced:** 4/93. **Product Description & Applications:** The SSP-200 is a programmable multichannel 3-D audio signal processor for real time, step time and MIDI/FSK control of sound positions in a 2 or 3 dimensional space on loudspeaker arrays with up to eight loudspeakers including Dolby 4- and 5-channel Surround, DTS, and Dmminax. The SSP-200 incorporates additional effects such as proportional reverberation, phase and Doppler shift. **Basic Specifications & Suggested List Price:** 4 inputs: balanced 1/4" TRS (+4dBu level, max +22dBu); 2-8 outputs (programmable): balanced 1/4" TRS (+4dBu level, max +22dBu), MIDI in, out; S/N: 90dB; THD: < 0.008%; frequency response: 10 to 20kHz ± 1 dB; power: 100-240V AC 30W 50/60Hz; price \$3,995.

SPATIALIZER AUDIO LABORATORIES, INC.

11400 West Olympic Blvd. 11th Fl.; Los Angeles, CA 90064-1507; (310) 268-2700. **Product Name:** Digital Spatializer®. **Contact:** Susan Sloatman, corp. communication. **Date Product Introduced:** Fall '94. **Product Description & Applications:** Digital Spatializer® is a 2-channel all digital processor for spatial expansion, sound movement and localization. Aimed at audio professionals requiring the highest quality sonic performance, this device utilizes 24-bit digital processing and includes Acoustic Bit Correction™ noise-shaping to achieve a 130dB noise floor. Using standard stereo playback Digital Spatializer® may be introduced in any phase of recording or post-production. Finished product requires no decoding, is mono-compatible, surround sound-compatible and presents no multi-path or broadcast problems. **Basic Specifications & Suggested List Price:** 2-channel digital input/output—AES SPDF, spatial expansion, sound movement and localization.



SPATIALIZER AUDIO LABORATORIES INC
HYPERsound

SPATIALIZER AUDIO LABORATORIES INC.

11400 W. Olympic Blvd. 11th Fl.; Los Angeles, CA 90064-1507; (310) 268-2700. **Product Name:** HYPERsound. **Contact:** Susan Sloatman, corp. communications. **Date Product Introduced:** Fall '94. **Product Description & Applications:** Aimed at mid and low-end studios, professional musicians, live and DJ entertainment venues and home recording studio enthusiasts, HYPERsound is a 2-channel real time processor that permits spatial expansion, dynamic sound movement and localization of mono and stereo inputs in three-dimensional space. Utilizing standard stereo playback, the system may be used in any phase of recording, re-recording or post-production. Finished product requires no decoding, is mono-compatible, surround sound-compatible and presents no multi-path or broadcast problems. **Basic Specifications & Suggested List Price:** 2-Channel: Spatial Expansion: Dynamic Sound Movement and Localization.

SPECTRAL SYNTHESIS INC.

18800 142nd Ave. N.E.; Woodinville, WA 98072; (206) 487-2931. **Product Name:** ADAX-4418. **Contact:** Mark Doenges. **Date Product Introduced:** 12/94. **Product Description & Applications:** The new ADAX-4418 adds to Spectral's extensive line of digital audio converters with a 4-in, 4-out model. The ADAX-4418 can be used with either the AudioEngine or the AudioPrisma DAWs and connects directly to the SMDI digital interface port. The first two channels of the 4418 can be either digital or analog input, and provide simultaneous digital and analog output for easy DAT machine connection. The digital input/output features allow for two channels of send and return to external digital processing equipment. Like the ADAX-8818, the 4418 will accept synchronization from a Spectral Sync-Clock or Prisma board to resolve to video genlock or even time code.

—LISTING CONTINUED ON NEXT PAGE

SIGNAL PROCESSORS

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The ADAX-4418 also includes input level indicators. **Basic Specifications & Suggested List Price:** Maximum level is +22dBm balanced, +8dBV unbalanced, and 0dB digital. Record/Play level is -18dB. The ADAX references +4dBm for balanced input and output, or -10dBV for unbalanced input/output. References are selectable and trimmable for each channel. Input impedance is 18K ohms, while output impedance is 50 ohms. Sample rates supported are 32, 44.1 and 48 kHz, as well as external. Input and output oversampling are each 64x. Signal/Noise is greater than 92 dB. THD is less than 0.005% and crosstalk is less than -94 dB. Frequency response is from 0 kHz to 22kHz \pm 0.5 dB.

SYMETRIX

14926 35th Ave. W.; Lynnwood, WA 98037; (206) 787-3222. Product Name: 488 8-channel Compressor/Interface. Contact: Jon Bosaw, dir. sales & mktg. Date Product Introduced: 2/94. **Product Description & Applications:** 488 8-channel compressor/interface is an 8-channel compressor used with digital and analog multitracks in studios and live recording. Allows the user to maximize input signals for optimum recording levels and "push" more information into recorder's dynamic acceptance window. Allows consoles to overload and produces an audible playback of increased presence and articulation of wide-band, wide dynamic range signals.

SYMETRIX

14926 35th Ave. W.; Lynnwood, WA 98037; (206) 787-3222. Product Name: 602 Stereo Digital Processor. Contact: Jon Bosaw, dir. sales & mktg. Date Product Introduced: 2/94. **Product Description & Applications:** The 602 stereo digital processor provides simultaneous digital domain dynamics processing (including compression, limiting, AGC, de-essing, and downward expansion), stereo delay and echo effects and parametric EQ. There are 128 RAM & 128 ROM presets. Designed as an "in-line" device for the studio or live sound professional, the unit combines digital (AES/EBU and SPDIF) and analog stereo inputs and outputs, ultra-clean sound quality, and intuitive front panel controls in one rack-space. **Basic Specifications & Suggested List Price:** Frequency response of 12Hz to 20kHz \pm 1.5dB. Distortion less than 0.01% @ 1kHz, 1V RMS. Dynamic range greater than 104dB, and a sample rate of 48kHz and 44.1kHz. Price: \$1,995.

SYTEK AUDIO SYSTEMS CORP.

2424 W. Irving Park Rd.; Chicago, IL 60618; (312) 588-4477. Product Name: EQ4-1M. Contact: Mike Stoica Badescu, sales. Date Product Introduced: 4/94. **Product Description & Applications:** The EQ4-1M is a 4-band parametric equalizer & 1-channel microphone preamplifier. The equalizer is a true state variable Bessel polynomial and can provide peak and dip or shelving mode for highpass & lowpass. The mid-band-low and mid-band-high have a continuous bandwidth selection from 0.1 to 2.5 octaves. The mic-preamp section contains controls for mute, phase, +48V and mic/line selection. Also includes a peak indicator. **Basic Specifications & Suggested List Price:** List price: \$1,450. Mic gain 70dB, line gain +18dB; output +24 dBm into 600 ohms. Bands: LF 20Hz to 400Hz; LMF 50Hz; HMF 400Hz to 8kHz; HF 1-20kHz; THD + noise: 0.0015% at 60dB mic gain (at 1kHz); bandwidth 10Hz to 85kHz \pm 0.25dB. Phase Lin. 10Hz to 85kHz \pm 0.1°.



TL AUDIO
Tube Compressor/Mic Preamp

TL AUDIO

635 Weyburn Sq.; Pickering, ON L1V 3V3 Canada; (905) 420-3946. Product Name: Tube Compressor/Mic Preamp. Contact: Curt Smith, dir. of mktg. Date Product Introduced: 7/94. **Product Description & Applications:** Balanced mic inputs are transformer coupled to Pentode tube preamps with switchable gain. Triode tube compressor stage with sidechain processing & insertion points (balanced & unbalanced). 2 channels with switchable 48V phantom power. Electronically balanced (unbalanced compatible) line inputs & front panel auxiliary inputs. Control voltages may be linked for stereo operation and monitored on the VU meters. Up to 50dB of gain in 10dB steps plus a compressor bypass switch for easy A/B comparison. **Basic Specifications & Suggested List Price:** U.S. list: \$1,595.

TL AUDIO

635 Weyburn Sq.; Pickering, ON L1V 3V3 Canada; (905) 420-3946. Product Name: Tube EQ/Mic Preamp. Contact: Curt Smith, dir. of mktg. Date Product Introduced: 3/94. **Product Description & Applications:** 4 bands of tube EQ on each of its 2 channels. Phantom powered (switchable) electronically balanced mic inputs and line level inputs. 4 Twin Triode tubes, arranged as a voltage amplifier followed by 3 active EQ stages per channel. Insertion points after input stage & EQ stages may be bypassed for A/B comparison purposes. Switchable +4dB or -10dB output level. Gain range of 20dB to 60dB. Noise (EIN) -127dB at maximum gain 20Hz to 20kHz. **Basic Specifications & Suggested List Price:** U.S. list: \$1,395.

TOA ELECTRONICS INC.

601 Gateway Blvd., Ste. #300; South San Francisco, CA 94080; (415) 588-2538. Product Name: DACsys II. Contact: John Murray, product mgr. Date Product Introduced: Spring '94. **Product Description & Applications:** Capable of supplying over 20 different types of signal processing functions, signal routing and level control, the computer-controlled DACsys II line is comprised of 2 signal processing devices and a digitally-controlled 8 x 8 analog matrix/mixer. The digital processing units are designated by model numbers DP-0202 and DP-0204. The matrix/mixer bears model number DX-0808. **Basic Specifications & Suggested List Price:** A 2-input by 4-output device, the DP-0204 houses a wide array of digital powers in a single rack space. The processing functions include 1/3 octave equalizers, signal delays on each input and output of 1.3 seconds, polarity reversals, compressor limiters, 8 and 16-band parametric EQs, notch filters and more. Suggested retail price: \$5,190 (DP-0204).

TROIIS DESIGN LIMITED

27 Almeria Cir.; Westford, MA 01886-1957; (508) 692-7768. Product Name: Digital Companion 20. Contact: Peter Troisi, pres. Date Product Introduced: 1994. **Product Description & Applications:** Digital-to-analog and analog-to-digital converter pair. Rack mounted or stand alone. Plug-in conversion modules allow easy upgrade. **Basic Specifications & Suggested List Price:** 16, 18 and 20-bit resolution. Multiple digital interface: AES, EBU, SPDIF, optical.



TUBETRONIX LTD.
TUBETRONIX TM-2A Stereo Compressor/Limiter

TUBETRONIX LTD.

47 Arthur Ave. N.; Hamilton, ON L8L 6C7 Canada; (905) 570-1477; FAX: (905) 570-0411. Product Name: TUBETRONIX TM-2A Stereo Compressor/Limiter. Contact: David Koetsier, mktg. mgr. Date Product Introduced: 1/94. **Product Description & Applications:** The TM-2A stereo/compressor is a +4dB balanced line leveling preamplifier. We have incorporated the best features found in other compressor/limiters, into one unit. It can be used for both mono and stereo applications. Intensive acoustic quality control has resulted in excellent reliability, superior sonic quality and low noise nature of the equipment. A dual power supply construction is employed in order to have total separation between channels. The TM-2A has large VU meters, and is quick and easy to operate. **Basic Specifications & Suggested List Price:** Inputs are +4dB balanced, outputs are +4dB balanced. Gain: 40 \pm 1dB; gain reduction: up to 40dB. 0.1% resistors, polystyrene capacitors, teflon-coated silver plated wired throughout. Dual power supply, rigid mounting, turret construction, and all tube design. Price: \$4,200.

VALLEY AUDIO PRODUCTS INC.

9020 W. 51st Terrace; Merriam, KS 66203; (913) 432-3388; (800) 800-4345. Product Name: Model 451 Gate. Contact: Bob Pruitt, product specialist. Date Product Introduced: 1994. **Product Description & Applications:** Four-channel noise gate/expander with variable threshold, range and release controls featuring surface mount circuitry and improved VCA. Three-position mode switch selects gating, or 2 expansion modes and 3-way function switch selects bypass, input detection or external detection. DC-controlled functions eliminate noisy "pot problems." Ideal for reducing drum track leakage, eliminating "breathing" and "lip smacks" in vocals, enhancing dynamic range of sample sounds and reducing unwanted buzz, hum and background noise. **Basic Specifications & Suggested List Price:** The IRU model 451 with 4 analog fully balanced I/O and key inputs for \pm 4dBm and -10dBu levels. List at \$799. Avail-

able with XLR or TRS jacks; it provides +24dBu maximum balanced and +21dBu maximum unbalanced I/Os. Attack times are 10 μ s to 25ms and release times are .05s to .5s.

VALLEY AUDIO PRODUCTS INC.

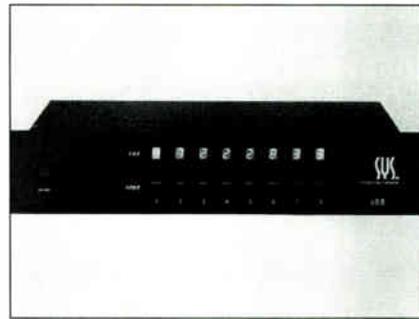
9020 W. 51st Terrace; Merriam, KS 66203; (913) 432-3388; (800) 800-4345. Product Name: Model 570 Split/Mix. Contact: Bob Pruitt, product specialist. Date Product Introduced: 11/94. **Product Description & Applications:** Combination input selector/signal router; level matcher, with master level and balance pots, stereo metering and individual channel input/output level trims. Up to four devices can be connected, allowing any one to be the "master" for feeding any or all others, or combining the inputs to all outputs. Input selection or input mixing capability with multimode mute/select switches are offered, along with a master mono/stereo switch. **Basic Specifications & Suggested List Price:** 2U rack-mount with 2 male and 2 female fully balanced XLR connectors times 4, at +4 level, 2 inputs TRS and 2 output TRS, times 4, at -10dB level, which unbalance when two conductor plugs are inserted. Set screw trims on each channel; additional fifth pair TRS jacks labelled monitor out. 4 push switches with LED indication for input select/combine; single balance & level controls.

WHITE INSTRUMENTS

1514 Ed Bluestein Blvd.; Austin, TX 78721; (512) 389-3800. Product Name: 4856. Contact: Jeff Van Ryswyk, nat'l sales mgr. Date Product Introduced: 1994. **Product Description & Applications:** Dual-channel 1/3-octave R-C active, graphic equalizer, 28 bands on ISO centers from 31.5Hz to 16kHz each channel. Controls are \pm 15 dB range adjustable highpass filter each channel from 16Hz to 190Hz. Electronically balanced in and out. Separate bass output. XLR and 1/4" connectors. XLR on bass output, 5.25x19x12". 14 lbs. **Basic Specifications & Suggested List Price:** \$1,825.

XTA ELECTRONICS LTD.

80 Sea Lane; Farmingdale, NY 11735; (516) 249-1399. Product Name: G0600. Contact: Lloyd Kinkade, nat'l sales mgr. Date Product Introduced: 1994. **Product Description & Applications:** The G0600 1/3-octave 2-channel equalizer combines innovative features with impressive specifications. HF trim section with adjustable gain and frequency allows quick adjustment to overall HF response without re-voicing. A sweepable highpass filter is included. Each band is controlled by a long throw 45mm slider. Overall gain controls and peak level indicators complete the front panel functions. Inputs and outputs are electronically balanced with optional transformer balancing. **Basic Specifications & Suggested List Price:** The G0600 is a 1/3-octave 2-channel equalizer containing 2x30 filters on 1/3-octave ISO centers. The unit features HF trim section, adjustable high pass filter, \pm 10dB gain controls and peak level indicators. List price, electronically balanced in and out, \$1,650.



Z-SYSTEMS, INC.
Z-1SRC Sample Rate Converter

Z-SYSTEMS, INC.

4641-F NW 6th St.; Gainesville, FL 32609; (904) 371-0990. Product Name: Z-1SRC Sample Rate Converter. Date Product Introduced: 1/94. **Product Description & Applications:** Digital audio sample rate converter. Based on the Analog Devices AD 1890 sample rate conversion chip, this unit features XLR, coaxial, and optical inputs and outputs. The Z-1SRC can be externally referenced, tracks varisped, and is an invaluable tool for a variety of synchronization and interfacing applications, including DAT-to-CD and digital lay-back-to-video. Additionally, the unit can be used for format conversion and jitter reduction. **Basic Specifications & Suggested List Price:** 20-bit input, 24-bit output. Input and output sample rates between 25kHz and 55kHz. Transformer-isolated AES/EBU inputs and outputs. -105dB THD+N, 120dB dynamic range. Uses internal crystal oscillators, word clock or external AES reference for output clock. 1Ru form factor, 110/220V 50.60Hz operation. List price: \$1,750.

Z-SYSTEMS, INC.

4641-F NW 6th St.; Gainesville, FL 32609; (904) 371-0990. Product Name: Z-8.8 Digital Defangler. Date Product Introduced: 7/94. **Product Description & Applications:** Digital audio router/distribution amp/channel switcher/format converter. Accepts eight input and output lines of digital audio on any combination of XLR, coaxial, or plastic fiber-optic connectors. At the touch of a few switches on the front panel, simultaneously sends any input to multiple outputs,

switches multiple inputs to any output, and maps any input to any output (including format conversion), regardless of connector type. Switch settings can be stored in preset memory. **Basic Specifications & Suggested List Price:** Transformer-isolated, terminated inputs and outputs. TDSLINK fiber-optic connectors. XLR inputs and outputs are balanced and coaxial inputs and outputs can be balanced or unbalanced. Discrete output drivers for high output drive. 2 RU form factor, 110/220V 50/60Hz operation. List price: \$950.

ZOOM

262 Duffy Ave.; Hicksville, NY 11801; (516) 932-3810. **Product Name:** Zoom Studio 1202. **Contact:** Jack Knight, nat'l sales mgr. **Date Product Introduced:** 8/94. **Basic Specifications & Suggested List Price:** Studio high-quality digital reverb/multi-effects processor; 512 parameter adjustable presets; 32 different effects types with 16 variations each; 44.1kHz sampling rate for CD-quality sound; true stereo or dual independent mono in/out delivering stereo effects or 2 discrete mono effects; reverbs, echos, delays, gates, chorus, flanger, tremolo, 2-octave pitch shift and combinations, plus Zoom noise reduction, 2-band EQ, 2 separate parameter controls for each preset, input, output and mix controls. Price: \$249.99.

TEST EQUIPMENT

ACO PACIFIC INC

2604 Read Ave.; Belmont, CA 94002; (415) 595-8588. **Product Name:** Very Random™ Noise Generator - Model 3024. **Contact:** Noland L. Lewis. **Date Product Introduced:** 6/94. **Product Description & Applications:** The Model 3024 Precision Noise Generator provides white- or pink-noise and a 1kHz reference tone. Very Random™ refers to the 2 hour and 20 minute random cycle time. This assures a high degree of randomness not found in other digitally generated noise sources. Portable and powered by 2x9 V DC batteries, it is used in a wide variety of electronic and acoustic applications including measurement of frequency responses, filter performance, room acoustics, system equalization, telecommunications, acoustical intensity calibration, and vibration applications. **Basic Specifications & Suggested List Price:** White-noise 1.6 Hz to 39kHz; pink-noise: 3dB/Octave 1/0.25dB, crystal controlled 2.33 hour sequence, direct speaker drive, 40dB step and variable attenuators. Portable both external AC and internal battery power. Price: \$695. Made in the USA.

ACO PACIFIC INC.

2604 Read Ave.; Belmont, CA 94002; (415) 595-8588. **Product Name:** PS9200KIT - AC0ustical Interface™ System. **Contact:** Noland L. Lewis, pres. **Date Product Introduced:** 5/94. **Product Description & Applications:** The PS9200KIT features a complete AC0ustical Interface™ System packaged in a rugged die cut storage case. The basic system includes a choice of 1/2" Type 1 measurement microphone (up to 40 kHz response), 4012 preamp, PS9200 2-channel power supply, wall adaptor, WS1 windscreen, and SC1 storage case. Options: SC2 locking storage case, 511E SPL calibrator, and a wide selection of 1 to 1/4" Type 1 microphones and accessories. **Basic Specifications & Suggested List Price:** Performance is determined by the microphone selected. The microphones available in this package include: free-field microphones-7012 40 kHz/15m V/Pa, 7046 20 kHz/50m V/Pa; and pressure microphones 7013 20 kHz/12 mV/Pa and 7047 10 kHz/50mV/Pa. Battery life for one channel: 50 hours typical. Noise floor: 16 dBA typical. Price: \$1,450.

ASACA/SHIBASOKU CORP. OF AMERICA

12509 Beatrice St.; Los Angeles, CA 90066; (310) 827-7144. **Product Name:** AD725D - Automatic Dist Analyzer. **Contact:** Teresa Baker, nat'l sales mktg. **Date Product Introduced:** 1994. **Product Description & Applications:** Wideband Distortion Ratio Measurements of fundamental frequencies 4Hz - 110kHz. High-performance impedance converter, BEF and noise-reduction circuits enable very low distortion measurements down to lower than -120dB (0.0001%). Harmonic analysis circuit enables measurement of components of each harmonic distortion (from the 2nd to 5th). Three kinds of response speed in the RMS and AVG. The input level adjustment, the selection of the measuring range, and the synchronization of the fundamental frequency rejection filter are automatic. GB-IB is provided standard. **Basic Specifications & Suggested List Price:** This Analyzer is ideal for testing and evaluating the performance of high-quality audio equipment and other applications where very low distortion measurements are required. Also, this unit can be used as a sensitive level meter of 10uV full scale in the level measurement mode. \$11,600.

ASACA/SHIBASOKU CORP. OF AMERICA

12509 Beatrice St.; Los Angeles, CA 90066; (310) 827-7144. **Product Name:** AG31A—Digital Audio Generator. **Contact:** Teresa Baker, nat'l sales mktg. **Date Product Introduced:** 1994. **Product Description & Applications:** Generates four kinds of digital codes, 3 Serial and 1 Parallel, which conform to AES/EBU standards, EIAJ CP-340 standard, Normal Sampling and Over-Sampling Serial signals for evaluating D/A converters, and a parallel output for connection to another measuring device or other external device. Generates several different digital waveforms, including sine wave code and

special waves such as impulse, M series PN noise, etc. Can generate L/R channels independently as well as select the desired channel outputs. Measures crosstalk characteristics in 4-channel digital audio equipment. Combined with model AX50A Input Adapter, it is capable of accepting a large number of channels. Contains a 3.5 inch floppy disk drive to store control panel settings, and additional signal waves. **Basic Specifications & Suggested List Price:** The AD31A is ideally suited for applications to measure the characteristics of an amplifier, effects device, digital, mixer, as well as for testing DAT, or Digital VTRs, or other equipment provided with digital sound circuitry. It is also used for applications in designing and testing high-accuracy digital audio equipment, and for the evaluation of D/A converters. \$16,000.

G PRIME LIMITED

1790 Broadway, Ste. 402; New York, NY 10019; (212) 765-3415. **Product Name:** NTP 477-500. **Contact:** Jerry Graham. **Date Product Introduced:** 4/94. **Product Description & Applications:** Digital peak level meter with high-resolution display. True peak display according to IEC standard with A and B scales and peak hold memory. Uses 200-segment neon bar graph. AES/EBU digital input signal. **Basic Specifications & Suggested List Price:** Size 40 x 190 mm, external AC or DC power supply. Price: \$2,500.

GOLD LINE

PD Box 500; West Redding, CT 06896; (203) 938-2588. **Product Name:** DSP30-OPT 1/12. **Contact:** Martin E. Miller. **Date Product Introduced:** 9/94. **Product Description & Applications:** A new option allows the DSP30 real time analyzer to make 1/12th octave measurements from 26 Hz to 141 Hz. This option permits the DSP30 to measure standing waves. When combined with the CUO option, the responses are presented on a PC and software allows the user to store to hard disk. **Basic Specifications & Suggested List Price:** The suggested list for the DSP30 is \$1,500, with an additional \$250 for the OPT 1/12 plus \$375 for the computer interface option.



GOLD LINE

GOLD LINE

PD Box 500; West Redding, CT 06896; (203) 938-2588. **Product Name:** SPL120RM. **Contact:** Martin E. Miller. **Date Product Introduced:** 10/94. **Product Description & Applications:** A rack-mounted sound pressure level meter, which can be set by the installer to trigger an electrical relay when sound is above the pre-set level. Terminals are provided for the installer to connect a notification device such as a light or bell, or he can activate a compressor. An additional circuit is provided that will reduce the sound level by 12dB for 3 seconds. **Basic Specifications & Suggested List Price:** The list price is \$550. This product will be useful for DJ clubs or hotels as a means to control sound levels.

TEKTRONIX INC.

PD Box 500 MS 58-699; Beaverton, OR 97077; (800) TEK-WIDE; (503) 627-3124. **Product Name:** AM700 Mixed-Signal Audio Measurement Set. **Contact:** Jeff Noah. **Date Product Introduced:** 2/94. **Product Description & Applications:** The AM700 is an easy-to-use, high performance audio analyzer. It makes both conventional electronic audio measurements and measurements for emerging technologies. The AM700 accepts balanced and unbalanced analog signals as well as AES/EBU, SPDIF, and optical digital signals. It can generate test signals in both analog and digital domains. It can be operated automatically or manually through an intuitive menu-driven touchscreen in environments from design and test through manufacture, service and installation, and repair. **Basic Specifications & Suggested List Price:** Suggested price: \$16,000. 2-channel FFT, graphic plotting, noise and multi-tone measurements, harmonic, distortion, and digital audio analysis, analog and digital signal generators, graphical pass/fail limits, min/max hold, loudspeaker, headphone output, flexible triggers, digital audio genlock, GPIB remote control, hard copy output, built-in 5 1/4-inch floppy drive.

TEKTRONIX INC.

PD Box 500 MS 58-699; Beaverton, OR 97077; (800) TEK-WIDE; (503) 627-3124. **Product Name:** AM70 Digital Audio Analyzer/Generator. **Contact:** Jeff Noah. **Date Product Introduced:** 3/94. **Product Description & Applications:** The AM70 is a hand-held programmable analyzer and generator with analog and digital audio outputs as well as digital audio inputs. It has three operating modes: Generator (to act as a source of signals), Monitor (to visually or aurally output

and echo signal), and Modify (to perform real-time editing). Designed for installing and troubleshooting audio systems and for digital compatibility debugging, the AM70 features simplified menus and keypad controls and a compact display screen. **Basic Specifications & Suggested List Price:** Suggested price: \$1,995. Balanced analog outputs, balanced/unbalanced digital inputs and outputs, optical inputs and outputs, internal speaker/headphone jack, battery-powered, weighs just 1-1/4 pounds.

wireworks

WIREWDRKS CORPORATION
TEN-4

WIREWDRKS CORPORATION

380 Hillside Ave.; Hillside, NJ 07205; (908) 686-7400. **Product Name:** TEN-4. **Contact:** Angela Kelly. **Date Product Introduced:** Spring 1994. **Product Description & Applications:** TEN-4 Speaker Cable Tester tests Neutrik NL4 to NL4 both 2 and 4 conductor wiring, phone plug to phone plug, and any combination of NL4 to one or two phone plugs. This allows easy testing of adapters from 4-circuit NL4 to two phone plugs. TEN-4 features a rugged chassis, easy operation, up-front circuit identification, super legible LED indicators, and unsurpassed Wireworks quality. **Basic Specifications & Suggested List Price:** 1.375" X 2" X 5.45" overall; 13 oz., powered by one nine-volt battery. 2 Neutrik NL4 Speakon Jacks and 4 1/4" mono jacks, 4 LEDs, 4 contact switches, .050" welded steel construction, black textured finish. List Price: \$129.

XTA ELECTRONICS

80 Sea Lane; Farmingdale, NY 11735; (516) 249-1399. **Product Name:** RT-1 Spectrum Analyzer V2.0. **Contact:** Lloyd Kinkade. **Date Product Introduced:** 8/94. **Product Description & Applications:** The XTA RT-1 Spectrum Analyzer features 32 non-volatile memories with accumulate function. A printer port for directly driving standard printers and RS 232 for computer control of front panel controls and monitor spectrum display are standard. The RT-1 is a powerful analysis tool, combining many features in one unit to facilitate system measurement and calibration. Memory to memory and memory to mic (real time) comparisons display resultant difference curves. **Basic Specifications & Suggested List Price:** The XTA RT-1 is a 1/3-octave RTA, SPL meter, RT60 and a swept-frequency analyzer. The audio spectrum is displayed on an LED bar graph and menu-driven front panel controls are displayed on an LCD screen. List price including measurement mic and cable, \$3,400.

OTHER EQUIPMENT

AC-CETERA INC.

3120 Banksville Rd.; Pittsburgh, PA 15216; (412) 344-8609. **Product Name:** Lumin-Eze. **Contact:** Mark Tarshis, mgr. **Date Product Introduced:** 1994. **Product Description & Applications:** LUMIN-EZE is an adjustable, clamp lighting system that can be mounted to virtually any structure. The adjustable lampshade prohibits glare to audiences and gives personal lighting assistance. The LUMIN-EZE is equipped with our unique flexible extender that moves and bends in any direction. LUMIN-EZE is used on racks and mixers to illuminate subdued work areas. Controls and connectors are easily seen when using the LUMIN-EZE. Our product comes equipped with power supply and with five different lighting intensities. **Basic Specifications & Suggested List Price:** LUMIN-EZE light system incorporates a spring-style clamp device and has a 12" arm that swings and bends in any direction. The system plugs into any 110V wall outlet (with a power supply, which is included with the unit, and will convert to 12VDC). The system has 5 light intensity settings. List price \$44.95.

AMP SERVICES

224 Datura St., Ste. 614; West Palm Beach, FL 33401; (407) 659-4805; (800) 826-0601. **Product Name:** Ferrite Slave Heads. **Contact:** Tom Rappolt, VP. **Date Product Introduced:** 8/94. **Product Description & Applications:** New "flush mount" design. Ferrite slave head designed for use on ElectroSound and Gauss high-speed cassette duplication equipment. **Basic Specifications & Suggested List Price:** Call for more info.

OTHER EQUIPMENT

AMP SERVICES

224 Datura St., Ste. 614; West Palm Beach, FL 33401; (407) 659-4805; (800) 826-0601. **Product Name:** Remanufactured scanner motors for Sony 1" VTR. **Contact:** Tom Rappolt, VP. **Date Product Introduced:** 8/94. **Product Description & Applications:** BVH 1100 and BVH 2000 scanner motors completely rebuilt and aligned. New lower drum section installed and a new long life slip ring and brush assembly also included. **Basic Specifications & Suggested List Price:** Call for more info.

ATLAS/SOUNDOLIER

1859 Intertech Dr.; Fenton, MD 63026; (314) 349-3110. **Product Name:** Soundolier® MR System. **Contact:** Nora Steele, mkg. communication supervisor. **Date Product Introduced:** 1993, enhanced for 1994. **Product Description & Applications:** The MR System is an integrated multiroom A/V entertainment system, which distributes audio, remote control, and telephone lines throughout a home or office. Simple operation is achieved with a selection of easy-to-use wall keypads and/or handheld infrared remotes. The system is compatible with virtually any brand of stereo or video component and can be configured as an advanced, multifunction remote-control system or as a basic two-zone speaker distribution system. **Basic Specifications & Suggested List Price:** Controls two housewide stereo systems (A/B) and a local (C) system in each room. Advanced system offers: operation using one multifunction remote, automatic power-on/off sequences, single button source selection, preset volume levels, muting and "favorite" options, control of non-A/V devices, and stand-alone capability. **Contact factory for pricing.**



AUDIO BROADCAST GROUP INC.

"Digital Ready" Data Stream Series Studio Furniture/Consoles

AUDIO BROADCAST GROUP INC.

2342 S. Division Ave.; Grand Rapids, MI 49507; (800) 999-9281; FAX: (616) 452-1652. **Product Name:** "Digital Ready" Data Stream Series Studio Furniture/Consoles. **Contact:** Dave Howland, VP sales & mktg. **Date Product Introduced:** 4/94. **Product Description & Applications:** Audio Broadcast Group Inc. introduces the dramatically redesigned Data Stream Series of our exclusive "Digital Ready" studio furniture. Created specifically for the efficient housing and operation of today's digital hard-drive storage/studio automation systems and workstations. Our designers have combined the ultimate in functional work space and eye-pleasing appearance. **Basic Specifications & Suggested List Price:** The Data Stream Series features rounded radius corners, angled aerodynamic equipment turrets, pullout keyboard drawers and functional PC workstation areas. Also features modular design, cooling fans and/or ventilation ducts, multiple access panels and slide-out racks, leveling feet, choice of colors and trims, stand-up designs, one-day on-site delivery and setup. Prices range from \$2,200 to \$12,000.

BEC TECHNOLOGIES INC.

9460 Delegates Dr., Ste. 108; Orlando, FL 32837; (407) 855-8181. **Product Name:** Enet Series 2-channel 20-bit stereo input/output modules. **Contact:** Bob Proctor, pres. **Date Product Introduced:** 7/94. **Product Description & Applications:** Sigmanet is literally a "summing" network. The devices are configured as 2-channel distributed architecture, "add"/"drop"/"thru" modules. Modules include the AQ2 20-bit stereo analog input module, the DA2 20-bit stereo analog output module, the AES/EBU in and the AES/EBU out modules for digital audio. **Basic Specifications & Suggested List Price:** Frequency response: 10Hz to 22.5 kHz. Dynamic range: 108dB. Maximum input/output: +24dBu. List pricing: \$995/unit-twisted pair interconnect; \$1,500/unit with fiber-optic option.

BENCHMARK MEDIA SYSTEMS INC.

5925 Court Street Rd.; Syracuse, NY 13206-1707; (315) 437-6300. **Product Name:** Jr. Audio Director Plus. **Contact:** Rory Rall, sales mgr. **Date Product Introduced:** 10/93. **Product Description & Applications:** The Jr. Audio director Plus is a stereo mode controller with 4 switch-selectable inputs per channel and a stereo headphone amplifier. Four primary inputs are available to both channels, via internal jumpers. Or use the secondary inputs for 4 different inputs

per channel. Applications include, TVRO audio subcarrier assignment, O2 and D3 audio channel assignment, mono confidence monitors, etc. **Basic Specifications & Suggested List Price:** Stereo assignment from 8 sources; adjustable mono gain reduction between 3 and 6dB; balanced instrumentation amp inputs; THO=0.0005% @ 2kHz; CMR 100dB-22kHz; superb RF immunity; bandwidth=160kHz; -100dB noise floor; interchannel crosstalk=-105dB @ 1kHz; 60 ohm balance output; rack-mountable; suggested list price \$550.

CAIG LABORATORIES INC.

16744 West Bernardo Dr.; San Diego, CA 92127-1904; (619) 451-1799. **Product Name:** ProGold audio/video maintenance kits. **Contact:** Customer Service. **Date Product Introduced:** 4/94. **Product Description & Applications:** ProGold outperforms all other contact cleaners, enhancers and lubricants. Due to its unique properties, it deoxidizes and cleans surface contamination and penetrates plated surfaces, molecularly bonding to the base metals. No other product does this. This increases conductivity, contact surface area and reduces arcing, RFI, wear and abrasion (the major cause of intermittent signals, noise and distortion). **Basic Specifications & Suggested List Price:** The Audio/Video Maintenance Kit contains ProGold spray, lint-free cloths, swabs and cleaning brushes. Retail: \$32.95. Included with the Pro Audio/Video Maintenance Kit is the ProGold Pen for treating small, delicate parts/pins. Caikleen (ultrapure alcohol for tape heads and other general cleaning), OpticALL (for cleaning glass, metal and plastic) and lint-free accessories. Retail: \$52.95.

COMTEK INC.

357 West 2700 South; Salt Lake City, UT 84115; (801) 466-3463. **Product Name:** BST-25 and PR-25. **Contact:** Steve Dupaix, sales dir. **Product Description & Applications:** COMTEK introduces the BST-25 base station transmitter and PR-25 personal receiver, the latest generation of IFB systems. The base station transmitter and personal receiver are phase-locked and loop-synthesized allowing the selection of 58 R.F. channels. The PR-25's advanced design incorporates an H.C.R. (High Capture Ratio) feature for interference-free operation. **Basic Specifications & Suggested List Price:** This Hi-Fi system has a frequency response of 60 Hz to 15 kHz with a S/N of 80 dB. The receiver's audio output is up to 1/4 watt into a 32-ohm load. The PR-25 operates up to 30 hours on a standard 9-volt alkaline battery. Suggested list price is \$900 for the BST-25 and \$300 for the PR-25. Call for more details.

CONCEPT DESIGN

1105-A Pomeroy St.; Graham, NC 27253; (910) 229-6500. **Product Name:** CD 9000V. **Contact:** Robert Farrow, pres. **Date Product Introduced:** 6/94. **Product Description & Applications:** The CD 9000V is a single-pancake, automatic video loader. Designed with simplicity and reliability in mind. It is competitively priced and features the ingenuity built into Concept Design's audio loaders. **Basic Specifications & Suggested List Price:** Loads prerecorded and blank tape. Easy access to pneumatic and electronic controls and is conveyor-ready for automation.

CONCEPT DESIGN

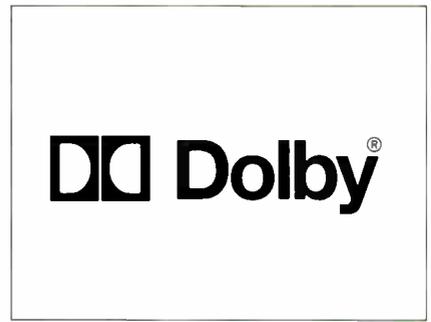
1105-A Pomeroy St.; Graham, NC 27253; (910) 229-6500. **Product Name:** Marathon. **Contact:** Robert Farrow, pres. **Date Product Introduced:** 6/94. **Product Description & Applications:** High-speed productivity improvement for the Sony HSP5000 Sprinter. It converts the HSP5000 into a continuous loop system which can be converted back to stock mode within minutes. EP masters have been run on the Marathon in excess of 12,000 passes with no perceivable degradation in quality. **Basic Specifications & Suggested List Price:** Handles a capacity of 120 meters, expandable to 240 meters.

CONQUEST SOUND INC.

26113 S. Ridgeland; Monee, IL 60449; (800) 323-7671. **Product Name:** MPS-1000, Conqueror cables. **Contact:** Ed Knecht, sales. **Date Product Introduced:** 1/94. **Product Description & Applications:** MPS-1000 is a 48 point balanced 1/4" patchbay. Can be normal or half normal with no soldering or cutting of wires. All connectors are mounted on boards of high grade epoxy-glass mounted in a single rackspace. Conqueror woven cables are covered with a heavy cloth braid that is the most durable and lightweight available. Available in 1/4" instrument, speaker and microphone.

DENON ELECTRONICS

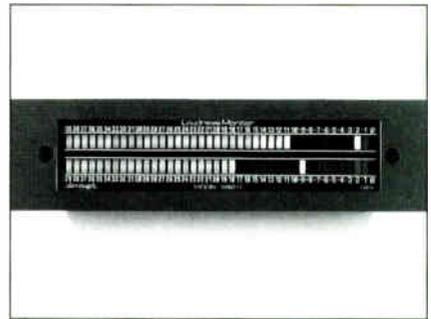
222 New Rd.; Parsippany, NJ 07054; (201) 575-7810. **Product Name:** DN-650F. **Contact:** Harry Klane, nat'l sales mgr. **Date Product Introduced:** 4/94. **Product Description & Applications:** Denon's DN-650F compact disc player offers the end user balanced and unbalanced outputs, digital output, index search, non-TOC Orange Book read capabilities, and extensive user programming. An industry-standard GPI interface is also included. **Basic Specifications & Suggested List Price:** List price is \$750.



DOLBY LABORATORIES INC.
DA20/Cat. No. 700

DOLBY LABORATORIES INC.

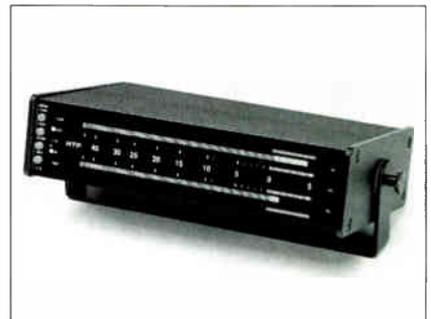
100 Potrero Ave.; San Francisco, CA 94103; (415) 558-0200. **Product Name:** DA20/Cat. No. 700. **Contact:** Bill Mead, VP film mktg. **Date Product Introduced:** Spring 1994. **Product Description & Applications:** The Model DA20 Digital Film Sound Adaptor and companion soundhead (Cat. No. 700) now provide theaters with advanced cinema sound technology at a substantially reduced cost. The DA20 includes a DSP implementation of Dolby's AC-3 digital audio coding technology and straightforward interface with existing cinema processors, while the Cat. No. 700's streamlined optics and integral power supply simplify installation and maintenance. **Basic Specifications & Suggested List Price:** Provides left, center, right, left surround, right surround and subwoofer outputs (5.1 channel system). **Contact** Dolby Laboratories for additional specifications and pricing information.



DORROUGH ELECTRONICS
Dorough Loudness Meters AES/EBU Digital Reading

DORROUGH ELECTRONICS

20434 Corisco St.; Chatsworth, CA 91311; (818) 998-2824. **Product Name:** Dorough loudness meters AES/EBU digital reading. **Contact:** Kay Dorough. **Date Product Introduced:** 5/94. **Product Description & Applications:** An AES/EBU digital reading meter that simultaneously shows average program material and peak. This allows for easy observation of loudness as seen in the gap between the peak and average levels. The meter features a buffered output for digital signal loop-through. **Basic Specifications & Suggested List Price:** 1 or 4 over indication; 40 or 60dB rand; Selectable Peak Hold; 120/230 VAC operation. Price: \$850.



G PRIME LIMITED
NTP 477-500

G PRIME LIMITED

1790 Broadway, Suite 402; New York, NY 10019; (212) 765-3415. **Product Name:** NTP 477-500. **Contact:** Jerry Graham. **Date Product Introduced:** 4/94. **Product Description & Applications:** Digital peak level meter with high-resolution display. True peak display according to IEC standard with A and B scales and peak hold memory.

Uses 200-segment neon bar graph. AES/EBU digital input signal. **Basic Specifications & Suggested List Price:** Size 40K 190 MM external AC or DC power supply. Price \$2,500

GARNER INDUSTRIES

4200 N. 48th St., Lincoln, NE 68504; (402) 434-9100; (800) 228-0275. **Product Name:** Degaussers. **Contact:** Ross Faubel, asst. prod. mgr. **Product Description & Applications:** Garner Industries has been the world's leading manufacturer of tape erasers for over twenty years. Garner offers a complete line of tape erasers for all formats of media, including C-type, VHS, S-VHS, U-matic, Beta-SP, Digital SP, D-1, D-2, D-3, D-5, and mirror image. Garner degaussers feature conveyor belt systems for simple, fast and effective erasure. **Basic Specifications & Suggested List Price:** Please call for color brochures and pricing at (800) 228-0275.

LIGHTWAVE SYSTEMS INC.

900 Jackson St., Ste. 700, Dallas, TX 75202; (800) 525-3443. **Product Name:** FIBOX. **Contact:** Michael Creamer, VP sales & mktg. **Date Product Introduced:** 4/94. **Product Description & Applications:** FIBOX is a 2-channel, high-speed fiber-optic audio transmission system based on latest 20-bit technology. Transmits line- or microphone-level signals up to 4 km through fiber-optic cable with no signal loss. Eliminates signal degradations of copper wire, such as those caused by distance, ground loops and interference. Ideal for remote broadcast, satellite uplinks, live performances, sound stages, studios and post-production facilities. **Basic Specifications & Suggested List Price:** 108dB dynamic range; 0.004 THD; 70dB mic preamp built in; 48V phantom power; 0.1Hz-21.5kHz bandwidth; 48kHz sampling rate; 98dB (typical) channel separation; +4dB (average) output level; continuously variable gain control; list price less than \$2,000.

THE NEW TUBE CO./TNT

PD Box 790202; Middle Village, NY 11379; (718) 894-2131. **Product Name:** "TNT" custom transformers. **Contact:** Joseph A. Sausa, pres. **Date Product Introduced:** 1/94.

RTI-RESEARCH TECHNOLOGY INTL.

4700 W. Chase; Lincolnwood, IL 60646; (708) 677-3000; FAX: (800) 323-7520. **Product Name:** Tape Chek Tape Cleaner/Inspector/Recyclers. **Contact:** T.A. Tisch, VP mktg. **Date Product Introduced:** 1994. **Product Description & Applications:** The TapeChek 490DS is a new microcomputerized VHS Videotape Inspector/Cleaner/Rewinder with remarkable new Defect Search designed for high-speed administration of videotape collections. Defect Search provides for fast visual inspection of physical tape damage...so that informed decisions to save-fix-retire defective tapes can be made. Cleaning and inspecting a 2 hour movie takes less than 2 minutes, and TapeChek cleaned tapes last longer and play better.

RUSSIAN DRAGON/JEANIUS ELECTRONICS

2815 Swandale Dr., San Antonio, TX 78230; (210) 525-0719. **Product Name:** Russian Dragon Model RD-R3. **Contact:** Marius Perron, owner. **Date Product Introduced:** 10/94. **Product Description & Applications:** The RD-R3 is the new version of the Russian Dragon timing accuracy meter. Like an electronic tuner that tells sharp and flat, the Russian Dragon tells if a signal is rushing or dragging. **Applications:** tightening up music tracks, checking timing of trigger samples, revealing timing problems in MIDI systems, displaying how closely a drummer plays to a click. **Basic Specifications & Suggested List Price:** The RD-R3 is the most accurate, stable and rugged Russian Dragon built. It comes with a steel front panel for maximum durability. Channel sensitivity has been improved to accommodate both mic and line level signals. Suggested list price: \$499.

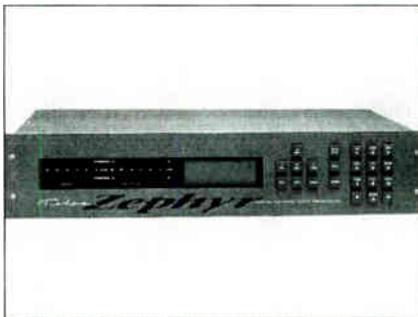
SHARP ELECTRONICS CORPORATION

LCD Products Group, Sharp Plaza; Mail Stop One; Mahwah, NJ 07430-2135; (201) 529-8731; FAX: (201) 529-9636. **Product Name:** XA-520 professional series VHS HiFi VCR. **Contact:** Bruce Pollack, nat'l mktg. mgr. **Date Product Introduced:** 9/94. **Product Description & Applications:** Double Azimuth 4-head record/playback with 26-micron head "clear picture system." Built-in HiFi stereo/MTS decoder; BNC video connectors; remote pause in/out and "record tab override" function (for tape duplication applications); end-of-video auto repeat; universal remote control; auto head cleaner; high-speed rewind; full load rapid response system; 3-wire (grounded) AC cord. **Basic Specifications & Suggested List Price:** Professional Series VCR for record/playback/duplication/presentation applications. Four-head Double Azimuth system; front and rear audio/video inputs; digital program search system; "tamper proof" system; 181-channel PLL CATV tuner/timer; noiseless field-still, variable slow motion, field frame advance; shuttle control on unit.

SHARP ELECTRONICS CORPORATION

LCD Products Group, Sharp Plaza; Mail Stop One; Mahwah, NJ 07430-2135; (201) 529-8731; FAX: (201) 529-9636. **Product Name:** XG-E850U multimedia LCD computer/video LCD projector. **Contact:** Bruce Pollack, nat'l mktg. mgr. **Date Product Introduced:** 6/94. **Product Description & Applications:** VGA/Mac II compatible data/video LCD projector with Stripe Pixel Configuration. Three high-resolution TFT Active Matrix LCDs produce spectacular multimedia (computer and video) images on screen sizes up to 300" (diagonal). Full 640x480 pixel resolution; 500 TV lines (with built-in line-doubler). Audio, composite video, S-Video and RGB inputs and outputs; unique lens shift function (to minimize keystone distortion).

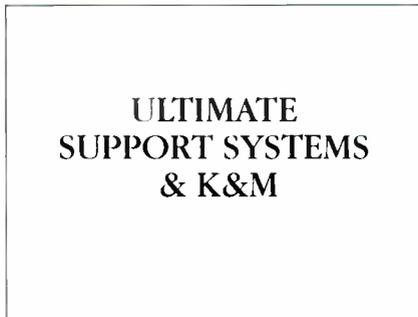
Basic Specifications & Suggested List Price: Ceiling and table-top mounting flexibility; front or rear projection (at the flip of a switch); non-technical (convergence-free) setup and operation; wireless (as well as wired) remote control operation; 600 lux brightness. \$9,995 suggested list.



TELOS SYSTEMS
Zephyr™

TELOS SYSTEMS

2101 Superior Avenue; Cleveland, OH 44114; (216) 241-7225; FAX: (216) 241-4103. **Product Name:** Zephyr™. **Contact:** Danielle Cline, mktg. **Date Product Introduced:** 3/94. **Product Description & Applications:** Using ISDN, Zephyr™ makes sending real-time, 15kHz stereo audio as easy as sending a fax. International listening tests, and the daily experience of hundreds of users, demonstrate the superior performance of Zephyr's advanced ISO/MPEG Layer III coding. Ideal for broadcast remotes, voice-over, overdubs, ad-hoc networks and satellite backup, Zephyr is full-duplex and the ISDN terminal adapter is built-in. Zephyr operates in stereo or true dual-mono with 15 kHz per channel. **Basic Specifications & Suggested List Price:** 56kbps or 64kbps per audio channel operation; V.35/X.21 data interface; G.722 compatible; end-to-end RS-232 data path; full metering; headphone jack; mic/line inputs; ISDN telephone allows calls to analog phones; split-channel mode sends individual mono signals to separate sites; price per unit \$3,380 to \$4,980.



ULTIMATE
SUPPORT SYSTEMS
& K&M

ULTIMATE SUPPORT SYSTEMS & K&M
The Select Series

ULTIMATE SUPPORT SYSTEMS & K&M

2506 Zurich Dr.; Fort Collins, CO 80524; (303) 493-4488. **Product Name:** The Select Series. **Contact:** Doug Towne, nat'l sales mgr. **Date Product Introduced:** 7/94. **Product Description & Applications:** Over 60 products; basic microphone stands and booms, sold in packages or separately, and stands for special applications, ranging from an 8-foot-tall overhead boom stand for choirs to an anti-vibration stand for professional recording environments. The line is completed by accessories such as goose-necks, threaded adapters and flanges that allow adding, repositioning or adapting microphones for a wide variety of applications. **Basic Specifications & Suggested List Price:** See catalog.

WINSTED CORPORATION

10901 Hampshire Avenue So.; Minneapolis, MN 55438-2385; (612) 944-9050. **Product Name:** Video furniture. **Contact:** Randy R Smith, mktg. mgr. **Product Description & Applications:** A wide variety of modular video consoles, integrated multimedia workstations, vertical equipment racks and cabinets. Also available, wood-trimmed decorator panels for a custom-designed look. A full line of console accessories, including VCR rack slide kits, to complete your requirements. Three types of space-saving videotape storage systems for all tape sizes and formats.

Coming in Mix
December 1994

Tape
and
Disc

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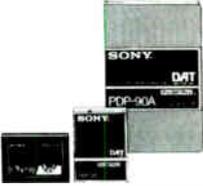
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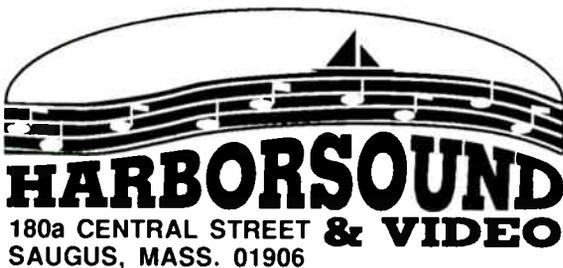
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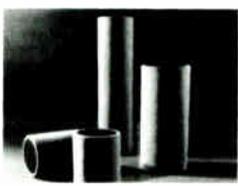
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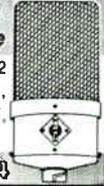
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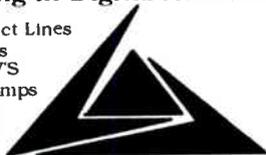
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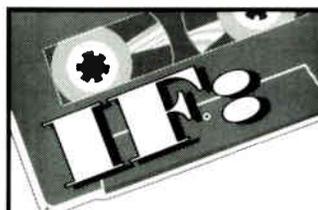
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MIX
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Page 330

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FEEDBACK

SURROUND SOUND: THE MISSING LINK

Dan Daley's article on Dolby Surround ("You're About to Be Surrounded," September 1994) was an excellent piece of work and covered the topic very effectively. I was, however, a little surprised that there was no mention in the "Other Contenders" sidebar of another, widely used surround system that, like Dolby, dates from the early '70s: Ambisonics.

Dolby Surround has been used, you tell us, on over 300 albums to date. We lost count of the number of albums recorded Ambisonically some time in the early '80s, when the figure exceeded the 750 mark, and a great many recordings have been released catalog is recorded Ambisonically; a significant number of production music albums are Ambisonically mixed (I've done about 30 myself). Most of the Collins Classics series is also. The system has also been installed in a number of live venues and used on tour by several major bands.

Ambisonics was developed in the UK by a distinguished group of researchers, including Michael Gerzon of Oxford's Mathematical Institute, and Professor Fellgett and Dr. Geoff Barton of Reading University. Originally conceived as a method of bringing lifelike reproduction of acoustic performances into the living room, using the Soundfield microphone, the system was developed during the '70s and beyond to include a range of rack-mounted systems for multitrack production and mixing. All the elements of the system, including studio, theater and consumer decoders, Soundfield mic and the Ambisonic Mastering System for studio use continue to be available. The system has been featured in a number of professional journals over the years, including *Mix*.

Ambisonics is based on a development of Alan Blumlein's original

sum-and-difference microphone technique, taking it into three dimensions. This enables four channels to carry full surround information, including height, in sum-and-difference format, which we refer to as "B-Format," comprising Left minus Right, Front minus Back, Up minus Down and Mono (L+R+F+B+U+D). The B-Format signal can be matrixed into two, three or four channels for compatibility with existing media, via the UHJ-encoding hierarchy.

Originally devised as an encode/decode system, it became clear early on that Ambisonics was also capable of significant applications in a single-ended, encode-only environment, with results at least as good as other 2-channel "3-D sound" systems currently available. Without a decoder, 2-channel UHJ provides images well beyond the speakers, very solid imaging, and the impression of sounds around the back of the listener.

I hope the foregoing puts the record straight regarding the place of Ambisonics among surround sound techniques currently available.

*Richard G. Elen
Rockvale, TN*

ULTRA OMISSION

I would like to make some comments concerning Dan Daley's article in the September 1994 issue of *Mix*, titled "You're About to Be Surrounded." It always pleases me to find any promotion of the art and technology of surround sound, however, I was very disappointed in the single-sided view that most likely was caused by lack of research.

Nowhere in your article was the name Ultra*Stereo mentioned. Since 1986, Ultra*Stereo has been Dolby's only major competitor. We are proud of the fact that during this period of time we have encoded more than 1,200 films for virtually every major,

minor and independent studio and post facility in Hollywood.

I am at a loss to understand how anyone could write an "in-depth" essay on surround without interviewing and quoting several knowledgeable sources in Hollywood, the world center for film production and post-production. If he had contacted any of the THX-approved recording stages in Los Angeles, Daley would have found that every single one of them has an Ultra*Stereo JS-3000 Cinema Encoder.

Jack Cashin, president of Ultra*Stereo, was honored with a Technical Achievement Award from the Academy of Arts and Science for his work on surround sound technology. Through the years, he has worked steadily toward manufacturing the best possible surround sound equipment available. And today, Ultra*Stereo is one of only two manufacturers building an analog processor that is approved for use in THX-approved cinema houses.

It might interest you to know that the LCRS surround format was designed independently by Peter Scheiber in the early '70s. A point never mentioned in this article is that this technology was licensed by Mr. Scheiber to Dolby Laboratories in 1976 and later to Ultra*Stereo. By 1985, Dolby Labs had encoded fewer than 200 films when Ultra*Stereo entered the market at a considerably lower cost. Because of this, Dolby was forced to drop its price, which subsequently lead to its encoding more than 150 films that same year. We feel that in the last eight years Ultra*Stereo has contributed in a major way to the use of surround sound in all Hollywood films.

*Brian T. Slack
Encoding Engineer
Ultra*Stereo
Tarzana, CA*



CHARLES THE MIXOLOGIST ROANE

D.C.'s hot urban contemporary station WPGC got its current #1 market standing by doing risky, innovative things. Like hiring Charles "The Mixologist" Roane & his trusty CR-1604. Roane's remix of "Whomp (There it is)" helped spur total sales of the single to over 6 million — making it the

all time best selling rap record. Now record labels seek out The Mixologist for his "flava" and clean mixes.

Though he recently bought a Mackie 32x8 8-Bus console, Charles won't part with the CR-1604 that got him started. He calls it his "lucky mixer."

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The rest of Bonzai's resume speaks for itself: top-charted dance remixes for George Michael, Luther Vandross, Jon Secada, Gloria Estefan, The Basement Boyz, Natalie Cole, Class-X with Michelle Weeks and Jose Feliciano. All mixed on two Mackie CR-1604s.

Now let Bonzai speak: "I went through four other small mixers* before finding the Mackie. The others didn't even come

close. The CR-1604 is the only mixer that can handle really huge drum sounds, monstrously fat bass and a ton of synths simultaneously."

Recently, while mixing Crystal (Lo-Do-Di La-Di-Do) Waters at the Basement Boyz' Baltimore studio, the SSL console didn't have enough inputs. So Bonzai rented a CR-1604 to help mix two cuts, "Ghetto Days" and "What I Need." The studio was so impressed with the Mackie CR-1604 that they immediately bought two!

Bonzai then used those two CR-1604s to mix Martha Wash's new remix album release "Leave A Lite On" — sans help from the SSL board.

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*Although Bonzai specifically listed the other brands he'd tried and rejected, we don't mention direct competitors in our ads. If you want a hint, though, see who else is advertising compact mixers in this issue.

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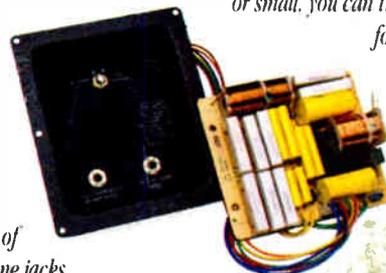
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