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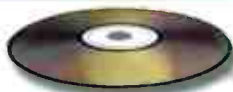
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On the Cover: The Record Plant's Studio SSL 3 was recently refitted with custom Augspurger 5.1 monitoring and a surround-capable SSL 9000 J console. Facility designers studio bau:ton collaborated with Augspurger and the studio's chief tech, Joe Birkman, on the redesign. For more on this and other new and redesigned facilities, see "The Class of 2000" on page 42. **Photo:** Ed Freeman. **Inset:** Steve Jennings.



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FROM THE EDITOR

STUDIO MOJO

Over the past couple of decades, studio design has evolved into a true science. These days, guesswork and phrases such as "we always used to do it this way" have been replaced by the precision of well-documented acoustical materials and software-based measurement/design tools, allowing a room's response to be predicted and tweaked long before the first staggered-stud double wall is framed out. During the same time period, high-resolution digital and high-performance analog recording systems (along with better mics, preamps, consoles and outboard gear) have pushed the noise floor of reproduction systems ever closer to theoretical limits.

Of course, while highlighting sonic nuances, low-noise gear also spotlights any flaws in the recording. As a result, the rumble of distant traffic or nearby air handling systems suddenly takes center stage during playbacks, especially when a project mixed on inadequate monitors is heard on larger speakers or a surround setup with a beefy subwoofer.

All of this asserts the need for adequate monitoring and a solid acoustical design. In a large facility or a smaller project space, it's difficult to create quality audio when your recording room creates odd standing waves or fails to keep outside sounds from becoming part of the performance. With the enormous amount of resources available today—ranging from downloadable datasheets on the Web to a plethora of acousticians, designers and consultants—the goal of acoustic perfection is possible, given the right combination of talent, innovation and capital.

In keeping with this issue's focus on facility design, we begin with "The Class of 2000," showcasing 26 of the industry's hottest new rooms. Aside from merely eye candy, our annual "Class of..." feature provides plenty of great ideas for your next room. Not everyone is lucky enough to start off with an unlimited budget and a large open space to begin building a studio, so in "Acoustic Makeovers," Philip De Lancie talks to a number of experts about their recent remodeling projects. Then, of course, you need to hear it all—Roger Maycock looks at "What's New in Powered Studio Monitors," Maureen Dronney chats with veteran studio designer Russ Berger, and *Mix* takes an inside look at Meyer Sound's top-secret X-10 studio monitors.

One last thought, for the creative spark to occur, there's a certain *je ne sais quoi* required in any successful studio. Call it soul, style, mojo or whatever, but musicians, artists and performers need to be comfortable to perform. A designer could create a chrome, steel and glass enclosure that's acoustically perfect, but if the performers inside feel like they're in a fishbowl, there's no way that magic will come out of those sessions. A little tip? Think natural light.

Digital or analog, no matter what budget you're working with, don't forget to add a little bit of soul, a splash of mojo and just a twist of fun in your next room. Somewhere along the way, it will definitely make a difference.

Count on it,



George Petersen

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World Radio History

FEEDBACK

24/96 CONSPIRACY THEORY

I got the March 2000 issue of *Mix* and thought you ought to know I'm aware of your clever, subliminal campaign to get people into 24/96. Need proof? How about this:

- The first thing I read in the magazine is Stephen St.Croix's column ("The Fast Lane"), which starts on page 24.
- Of course, I next wanted to check out the new column "The Bitstream." It starts on page...96!
- My next read is Lehman's column ("Insider Audio"), which starts on page 26. The first and last digits of 24/96! And the continuation is on page 196—clearly trying to inculcate us with the principle that "96 is number one."
- Numerologically speaking, if you add the digits in 24/96, you end up with 21. Add 2+1, and you end up with 3—the exact same number of letters as *Mix*. Need I say more?

Craig Anderton
via e-mail

HALF FULL

There's been a lot of hubbub lately concerning MP3 and the distribution (legally or illegally) of music over the Internet. After reading Stephen St.Croix's column ("The Fast Lane: Empty Three," March 2000), I thought long and hard about what it means to our industry, livelihood and the popular music scene.

Let's employ some flow-chart thinking here and try to see beyond the immediate threats. For one thing, yes, it will cut into record sales, and, yes, theft will occur. But then what?

Here's how I see it. The important demographic for popular music, ages 18-25, is where the most ardent fans (read, consumers) are. They are also keen on new technology. They are the ones we are worried about. So, let's assume the deed is already done; the music is pilfered, the CD is burned, and the "kids" are listening to it in their cars, at work, etc. In order to reach that point, they need a computer, Internet connection, CD-R writer, blank media, packaging of some kind and playback equipment. So, if indeed the corporate music business as we know it lost \$13.99 on that one, the cash was put

into the pockets of those who develop and manufacture all the "stuff" you need to steal the music in the first place.

Take the equation out further. Major labels take a beating. The music world as we know it comes crashing to a halt. Artists are dismayed by the idea that they can no longer make any money recording. Budding songwriters all over the globe apply for jobs at Wendy's simultaneously. Now what? Where will new music come from? Who will pay for it? I'll tell you who: Yamaha, Philips, IBM, Microsoft and Apple, just to name a few. Manufacturers will have to seek out and develop talent in order to sell more CD-burners and MP3 players.

Does this at all sound familiar? In the '20s, '30s, '40s and '50s, GE, CBS and RCA were not only manufacturing electronics, but making sure there was a reason to buy their wares. Nobody buys a radio to hear static.

This is not a catastrophe, just part of a familiar cycle: a shift in the cash flow brought on by a jump in technology. Part of me is hoping it will thin the herd a bit.

Phil Palazzolo
Basement Productions
via e-mail

THE MORNING AFTER

Gee, what if the Internet wiped every record company off the face of the planet? Would that be fair? No. Even though these companies spew a lot of spew, they and the spew-makers have a right to profit from their intellectual property. Theft is theft, pure and simple.

But what would the music world look like without them? A world where all recorded music is free? 1) There would be no more "Puff Doodys," "Boys 'N Stync" or "Twitney Smears." Without the big, fast and easy money huge record sales bring, only dedicated artists willing to endure any sacrifice would struggle on for such paltry monetary rewards. 2) Most of the money to be made would be in live performance. Great performers and entertainers would have the advantage, and superior production values would be in demand. People will always want to attend con-

certs: There's nothing like real reality. Of course, "Puff Doody" might still be around if he's willing to take a huge pay cut and refrain from throwing wads of money at people. 3) Until the technology exists to cheaply multiply the available number of stations a common radio can receive, radio will remain much as it is today. Without the record companies to coerce them, stations will have to look for new material directly from the artist. When our radios can get thousands of channels and the cost of broadcasting plummets to "do-it-yourself" levels, broadcasting will turn into narrowcasting: more catering to smaller demographics, less revenue but continued competition for larger audiences to increase revenue.

Will all this be good for music? I sure hope so. In the '70s, I thought disco was as bad as it was going to get. Now it's the new millennium, and we got... well...I miss the '70s.

Stuart H. Paul
Long Beach, Calif.

SPOT ON, CAPTAIN!

Just read your "Techno-Abuse" editorial ("From the Editor," March 2000), and boy, does it strike a chord! I just tried to order a spare part for our (home) vacuum cleaner from my home computer, via my Compuserve account. After 10 minutes, having downloaded half of an image of the company's latest product, which I didn't want to know about, I still hadn't accessed the page with contact info. So, I resorted to last millennium technology and sent a fax. It worked.

We're currently redesigning SSL's Web site, and the first thing I'll do is try to access it at home when it's ready. We get spoiled with instant local access. It's what it looks like via an analog phone line modem that matters.

John L. Andrews
Marketing Director
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CURRENT

MCCARTNEY, PHILLIPS TO BE HONORED AT TEC AWARDS

Sir Paul McCartney will be presented with the prestigious Les Paul Award by Les Paul himself at the 16th Annual Technical Excellence & Creativity Awards, to be held September 23 at the Regal Biltmore in Los Angeles. Producer Sam Phillips will be inducted into the Hall of Fame.

The Les Paul Award recognizes individuals who have set the highest standards in the creative application of recording technology. As both a member of The Beatles and on his own, McCartney has constantly challenged both the aesthetics and technology of music-making. McCartney has gone from the complex visions of The Beatles, inventing new ways to record, to stripped-down solo albums recorded in a project studio. Never one to rest on his laurels, McCartney has continued to make vital music and has shown over and over again that he is one of the music world's true innovators.

The TEC Awards Hall of Fame was created to recognize individuals whose careers have exemplified the spirit of creative and technical excellence in professional audio. Sam Phillips is one of the most influential producers in rock history. As owner of Sun Records, Phillips was instrumental in launching the careers of Elvis Presley, Carl Perkins, Johnny Cash, Jerry Lee Lewis, Rufus Thomas and B.B. King, among others.

For a complete list of the 2000 TEC Awards nominees, see page 80. For tickets or information about the TEC Awards, call Karen Dunn at 925/939-6149 or e-mail KarenTEC@aol.com.

FRANK MILLER, 1944-2000

Frank Miller, the founder of Sescom, a supplier of accessories and tools for the pro audio and broadcast industries, died on April 25 from complications of diabetes. Miller began his popular catalog-based business in 1968, selling microphones from various manufacturers, as well as his own mic designs, and later began building transformers for companies such as JBL and Bogen. He will be remembered for his love of audio and zeal for creating solutions-ori-

ented gadgets for real-world applications. He coined the phrases "direct box" and "mic splitter" for products he developed decades ago. Miller is survived by his wife, Brenda, and son, David, and the company will continue, both with catalogs and on the Web at www.sescom.com. —George Petersen

RICHARD SWETTENHAM 1927-2000

Helios founder and noted console designer Dick Swettenham died of cancer on April 9. Until the 1960s, studios typically designed and built their own mixing consoles. Working at London's Olympic Studios and EMI Abbey Road, Swettenham began developing his unique custom designs. In 1969 he left Olympic to design and equip Chris Blackwell's new Island Basing Street Studios. To create these new consoles, Swettenham founded Helios Electronics; over the years, the firm developed

custom mixers for The Beatles' Apple Studios, The Rolling Stones mobile, Manor Studios, Town House and later expanded into overseas markets.

As Swettenham saw it, "The Helios approach was custom building in every detail, at prices within reason; plus face-to-face consultation with clients who had a clear picture of what they really wanted." But he was never a businessman. In 1979—when purchasing decisions were based on "knobs per dollar"—Swettenham closed Helios and turned to studio design/acoustics, installation planning, consulting and updating his older mixers.

At the time of his death, Swettenham was still refurbishing and revitalizing some of his early offerings—now close to 30 years old—but also planned to offer new products, including two equalizers. A new company, Helios Professional Audio, is being run as a divi-

—CONTINUED ON PAGE 16

STUDIOPRO2000 PRESENTS MULTICHANNEL TV DEMOS

As part of *Mix*'s third annual two-day audio conference, StudioPro2000 will include a special luncheon panel on "The Changing Sound of Television: From Stereo to Digital Surround." The forum, sponsored by Dolby, will be moderated by Sync Sound co-owner Ken Hahn, and will feature engineers Josiah Gluck (*Saturday Night Live*), Robin Thomas (ABC/Monday Night Football), Mario Sperandio (Madison Square Garden Network/N.Y. Yankees) and David Hewitt (remote recording for the Academy Awards). The panelists will play clips from these productions in stereo, surround and 5.1.

The workshop on surround sound production, sponsored by Dolby and Genelec, will also feature daily demonstrations of DVD-Audio, with playback from recent releases.

The conference will be held June 12-13 at the New York Hilton & Towers. For registration information, call Robert Irwin at 510/653-3307, fax

510/653-5142 or e-mail studiopro@intertec.com. You can also register online at www.mixonline.com.

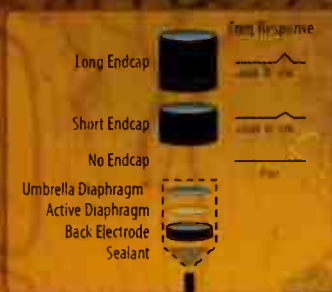
MIX L.A. OPEN SELLING OUT

The Malibu Country Club has proved to be a popular setting for the Mix L.A. Open, to be held on Monday, June 19, at the Malibu Country Club. Once again, the pro audio industry's premier charity golf event is filling up fast. Proceeds from the tournament will be distributed to the House Ear Institute's Sound Partners campaign and various educational programs of the Mix Foundation for Excellence in Audio.

Confirmed sponsors at press time include Audio-Technica, BASF/Emtec Pro Media, Fairlight, Howard Schwartz Recording, Ocean Way, Quantegy, Record Plant, Sony Music Studios, Sony Pro Audio, Soundelux, The Village and Westlake Audio. A limited number of sponsorships and individual tickets are still available. For more information, call Karen Dunn, tournament director, at 925/939-6149. ■

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INDUSTRY NOTES

Tom Fredricks, president of Copp Systems (Dayton, OH) has been elected president of the NSCA; Fredricks will serve a two-year term. In other NSCA news, George Serban, president of Serban Sound and Communications (Bakersfield, CA) will fill John Glans' seat on the board of directors, following Glans' retirement. Current board members Nancy Emerson, VP of MTC Systems (Calgary, Alberta) and Randy Vaughan, president of Ambassador Enterprises (Portsmouth, VA) have also been re-elected...Happenings at Soundcraft (Nashville): Kim Templeman has been appointed general manager, and Sound Sales (Columbia, Md.) was named rep of the year at the recent NAMM show in Los Angeles. Spirit by Soundcraft appointed Greg Addington regional sales manager and named Griffith Sales (Duluth, GA) its rep of the year...A number of new appointments at JBL (Northridge, CA): Mark Engebreston senior systems engineer, Rafael Quintero director of sales for South Central America and Canada, Staci Moore national accounts coordinator, Rod Falconer professional projects group marketing manager, and Brad Ricks professional projects group systems integration specialist...Ian Thacker has been tapped by dbx (Sandy, UT) to be its new director of sales. Other personnel changes at dbx: Aaron Kunz regional sales manager, Jason Kunz communications writer and Todd Stevenson customer service supervisor...Recent changes at Beyerdynamic (Farmingdale, NY): Natalie Scalise national representative for Canada. Jeffery M. Brownstien promoted to director of marketing and strategic projects for North America, and Alan Feckanin director of sales...Jeff Klopmeier has joined Tascam (Montebello, CA) as advertising/marketing manager... Emerald Entertainment Group (Nashville) has named Joe Romeo CEO...Chris Brand has been picked up by SoundTube Entertainment

(Park City, UT) to be its new international sales manager...Producer Jimmy Lee has been added to the roster at JSM Music (New York City)...John Kirchner has been promoted to president and chief operating officer at DTS (Aurora Hills, CA), a provider of multichannel audio technology. Additionally, DTS has announced a partnership with Spruce Technologies (San Jose, CA) to provide a solution for encoding and authoring DVD titles using the DTS standard...Stacey L. Nooney will be the new project coordinator at Cotton Hill Studios (Albany, NY)...Ron Franklin has been named president at Waveframe (Emeryville, CA)...HHB (Los Angeles) a pro audio provider, has tapped Ruth Spencer to be its East Coast sales executive, heading up the company's new office in New York...Nick Cook has joined Amek as sales and marketing director...Harrison South West Sales (Garden Grove, CA) has been recognized by DOD (Sandy, UT) as its rep of the year...Crown International (Elkhart, IN) has appointed Bradford Benn project integration manager...A number of new appointments at Biamp Systems (Beaverton, OR): Felipe Vargas Latin America regional manager, Steve Matzger Southern regional manager and Jeff Peyton senior analog design engineer...Bill Robinson has been appointed VP of sales and marketing at Redwood Music Corp. (Sandy, UT). Redwood Music has also become the U.S. distributor for STK Electronics (Kimpoo City, Korea)...Tom Young has been tapped by Meyer Sound (Berkeley, CA) to be its new technical sales engineer...A pair of new appointments at Symetrix (Lynnwood, WA), provider of installed sound solutions: Ted Wolfe software applications consultant and Gerri Krause marketing communications assistant...John Nemeth will be the new product director at Apogee Electronics Corp. (Santa Monica, CA). ■

—FROM PAGE 12, CURRENT

sion of Caz Limited; Dick Swettenham's legacy lives on. — Mel Lambert

ONLINE RECORDING STUDIOS

HarmonyCentral.com has added an online recording studio to its site. The virtual space allows musicians to collaborate in a number of genre-specific studios free of charge. Private studios are also available on an annual basis for a fee. The venture is powered in part by a partnership between Emagic and Rocket Network, where elements of Logic Audio and Rocket Technology have been combined to form Logic Rocket. The new software enables musicians to collaborate and produce music online. Doug Provisor, VP of marketing at HarmonyCentral.com, says, "You could easily spend more in one day at a real recording studio than you'd spend for a year of service online. Now you're no longer worried about time, travel and arrangements. You're just recording. This is a huge step forward for musicians."

For a free download of Logic Rocket, visit www.harmonycentral.com/Rocket.

MARTINSOUND TURNS 25

Martinsound is celebrating 25 years in the pro audio business. The company was founded in 1975 by Joe Martinson in Alhambra, Calif., just outside of Los Angeles. The company's products help to maximize current and classic mixing consoles. Martinsound is most well-known for its Flying Faders automation system. For more information, visit www.martinsound.com.

UPCOMING SHOWS AND WORKSHOPS

The 19th annual International Conference on Consumer Electronics will be held from June 13-15 at the Airport Marriott in Los Angeles. For more information visit www.icce.org. Last-minute registration will be available on-site.

Synergetic Audio Concepts has announced two upcoming workshops entitled *DSP: Theory and Application* and *Digital Audio Networks* to be held July 12-13 and 14-15, respectively, in Denver. To register or for more information, contact Brenda Brown 800/796-2831, e-mail brenda@synaudio.com or visit www.synaudio.com. ■

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Since we introduced the MX-2424 hard disk recorder, there has been a lot of speculation about its price (which is so low it seems too good to be true).

So we get questions. Like...

"24 tracks is an upgrade?" (No, it's 24 tracks right out of the box.)

"24-bits is an upgrade?" (No, all the bits are there too.)

"Do I have to pay extra for inputs and outputs?" (No. At \$3,999 estimated street price* you get a full set of 24 TDIF-1 or ADAT optical digital inputs and outputs — plus an assignable stereo AES/ EBU - S/PDIF pair. For a little more you can get 24 channels of AES/EBU digital I/O, or analog — or both digital and analog!)

"Does it need an external computer?" (No. The MX-2424s front panel has a full set of professional transport, editing, and track assignment controls, including a shuttle/ scrub knob. So you don't have to have a computer to run it. But — if you happen to own a Mac or a PC, you can take advantage of the digital audio editing and control software that comes standard with each MX-2424 to do even more. Your choice.)

"Before I start recording do I need to buy a monitor, a keyboard, or a hard drive? Or anything else?" (No. Nyet. Nope. Not at all. Just hook up power and start recording.)

So let's make this as plain as we can: The MX-2424 is an amazing, full-featured professional 24-track digital recorder. And there's never been anything like it at this size or price.

Its sonic performance is outstanding. Lots of companies claim 24-bit 48k performance, but only the MX-2424 is part of TASCAM's M Series family of multitracks — the products chosen for their sonic performance by such discriminating facilities as Skywalker Sound, Universal Studios, and 20th Century Fox.



\$3,999^{ESP*}

Superior reliability is guaranteed. The MX-2424 was designed from the bottom up to be a great recorder, and nothing but a great recorder. Its processors and circuitry are fully optimized for audio - not video games, spreadsheet software, or surfing the web. And isn't that absolute focus and rock solid performance exactly what your music deserves? Over the last three decades we've designed and built literally millions of professional recorders and recording systems; the MX-2424 is the culmination of everything we've learned.

So easy to operate, you could do it blindfolded. Of course that way you'd miss the great light show from the 24 tracks of level metering and channel status displays... but the real point here is simplicity. When you want the MX-2424 to start recording, just reach over and press REC + PLAY (just like a traditional tape recorder). In a fast-paced production environment, you can record to hard drives that mount into standard Kingston® carriers and plug into the front panel drive bay. Just pop in a new drive at the start of each session. It doesn't get any simpler than that.

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It's a complete professional hard disk multitrack in a portable, affordable, rack-mount box. You can plug it in, turn it on, and start recording.

✓ Back panel ports include Fast/Wide SCSI, ethernet, MIDI, RC-2424 remote, and TL-BUS!

Extend your reach —
Want a remote control? Get the one that's made to take advantage of the power in your MX-2424. The RC-2424 remote is a powerful, professional multi-machine controller with all of the MX-2424's front panel features, plus macros and more.

Really.

The power to meet your needs. A standalone MX-2424 is an incredibly powerful unit, with enough internal hard disk capacity to hold about 45 minutes of 24-bit 24-track audio. The MX-2424's Fast/Wide SCSI port lets you connect up to 15 external drives and record directly to all of them. And if you need more than 24 simultaneous tracks, just add additional MX-2424's. Up to 32 MX-2424's can be locked together in *sample accurate sync* to act as a single recorder.

Professional recorders need to interface with increasingly complex systems.

- ✓ It provides video and time code lock capabilities as standard features, making it easy to integrate with external workstations.
- ✓ It resolves to AES/EBU, S/PDIF, word clock, TDIF-1, ADAT optical, SMPTE Time Code (LTC), and video, and chases MIDI Time Code.
- ✓ Available Input/Output modules include TDIF-1, AES/EBU, ADAT optical, and analog.

MX-2424 shipments are about to start, and there is already a waiting list. To get yours sooner instead of later, contact your authorized TASCAM dealer!

**So... what's this Estimated Street Price? Instead of quoting you some meaningless "List Price," ESP is what we expect typical U.S. customers to actually pay for an item. It gives you a better way to compare value when you shop.*



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EQ

EEK UNIVERSITY, PART ONE

Well, it seems that I find myself with a lot to say on this subject—in fact, far too much for a single column. Sorry. I hope you will go back and dig this part up again when you read the second part next month. It might be a bit difficult if you don't.

As the title implies, I feel the need to talk about EQ. No, really. EQ.

But no worries. I will not assume that you have become too old and forgotten everything you knew about how to use an equalizer, nor that you are so young that you haven't yet learned. I will not attempt to teach EQ 101.

Instead, I am going to start off by showing you how equalizers use *you*.

MORE THAN MEETS THE EAR

There is so much more equalization going on in your life than you may realize—and *all* of it is a special effect. Not just a little, subtle effect, but the most profound effect that exists, not to mention the most often used.

The very first nanosecond of amplified audio was equalized. Radically. As was the very first audio recording, even though it was totally mechanical, with nary an electron involved.

IT'S COMING OUT OF THE WOODWORK

Every musical instrument produces extremely equalized output. Take a guitar for example. Its size, the way it is built, the choice of materials, how it is shaped, strutted, glued, and even how it is finished and aged, all grossly affect what the instrument sounds like. In fact, these factors determine the final sound of the instrument more than the actual sound generation source itself—the strings.

When someone talks about a guitar's "tone," they are mainly describing the resonant behavior of the instrument. These resonances

impose equalization onto the process of converting the mechanical vibrations of the strings into acoustic energy. Can't get away from it. Not without turning your back on the laws of physics (and I am not going to show you how to do *that* until the second part).

Even human speech is naturally EQ'd—and it's not too subtle. In most Earthlings, the vocal chords vibrate and produce tones rich in harmonics. But this only determines pitch and overtones. The size and shape of the lungs, throat, mouth, teeth and sinus cavities collectively determine the resonant nodes of that person, and therefore the rec-

phones, speakers, earphones, and guitar pickups—all apply their own signature EQ to the signal. So does every stage of amplification. Actually, so does every wire, transistor and capacitor. You literally can't go ¼-inch, much less an entire session, without applying some sort of EQ.

YOU. YEAH, I MEAN YOU!

You analog tape people are playing the most elaborate EQ game possible: You go into your deck's preamp, and it equalizes to pre-compensate for the natural EQ of the record head and the type of tape you have loaded. It also applies a healthy pre-emphasis curve

I will not attempt to teach EQ 101.

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by showing you how equalizers use you.

ognizable "sound" of his or her voice. The resonant character of a person's voice (the EQ, if you will) is so profound that voice printing, or computer identification of a person by voice, can work even if that person is trying to fool it by speaking in falsetto or a forced lower register. EQ rules, literally.

A PAIR OF METRICS IS MORE THAN TWO ONE-LITER FOSTERS

All recorded or electronically generated audio is dramatically bent and curved; it is all equalized. There are inherent curves and corrective EQ stages throughout any and all signal paths. Think about it.

Every audio transducer—from the very first trumpet that drove a diaphragm that in turn moved a steel needle that mechanically cuts a weak and dirty spiral onto a hand-turned wax cylinder, to modern electronic transducers such as micro-

to help overcome tape noise and roll-off.

But the fun is just beginning. Your heads change their response (EQ) curves every time you roll tape. They change when they get warm. And while your heads are inductive, your compensation EQ usually isn't. So the head's resonant curve has a very different *sound* than that of your compensation board. This means that even if you could trim your comp to perfectly cancel the head's insanely complicated, reactive, twisted curve, their respective sounds, their audible *signatures* would remain.

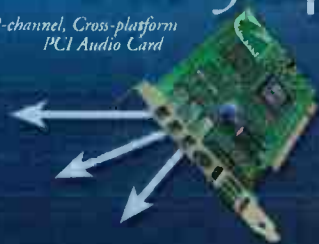
And now for the middle of this fun. Although I have reminded you of some of the hidden EQ in the analog tape recording process, don't think we are even near done. Do not forget that although the compensation circuitry doesn't really saturate, the head and tape combination certainly does. This means

BY STEPHEN ST. CROIX

—CONTINUED ON PAGE 209

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72-channel, Cross-platform
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Why is the enhanced 2408mkII now even better?

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The 2408mkII has quarter-inch TRS analog jacks (8 in / 8 out), with +4 or -10dB level inputs, so you can easily connect everything in your studio directly to your computer: synths, samplers, effects units — you can even plug in your guitar without an amp and use dozens of included 32-bit software plug-ins for fuzz, chorus, echos, and hundreds of other real-time effects.

• 24-bit converters.

The 2408mkII's new 24-bit converters deliver incredible audio quality: 105dB S/N (A-weighted). Your audio will definitely be ready for prime-time.

• Front panel volume knob for the main outs.

Connect your studio monitors directly to the 2408mkII main outputs, mix everything inside your computer — and there's still a volume knob for you to grab when the phone rings.

And the mkII has all the original 2408 features at the same great price, including:

• 24 simultaneous inputs/outputs expandable to 72.

The 2408mkII has way more I/O than any other single-rack space system, and it's ready to expand as your needs grow with our entire line of affordable audio interfaces, including the new 24i with 24 analog inputs in 1 rack space.

• Tons of 24-bit ADAT optical and Tascam TDIF digital I/O.

If you have an ADAT, Tascam tape deck, or digital mixer, the 2408mkII is by far your best choice for digital I/O with your computer.

• Sample-accurate sync.

The 2408mkII has a wide range of professional synchronization features.

• Broad compatibility with all major audio software.

Use your favorite Mac or PC audio software with your favorite plug-ins, or use the included AudioDesk workstation software, a complete virtual studio.

MOTU

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Why put ultra-precise, tweakazoid audiophile XDR™ mic preamps on sound reinforcement consoles? Because live performers deserve good sound, too. Especially when our new design also has the best

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it. You'll enjoy more warmth, detail and headroom than has ever been possible with even the most prestigious mega-consoles. Plus less noise, and total freedom from potential hot-patching and short circuit damage, and flat frequency response regardless of mic/cable impedance.

■ Trim control with 60dB mic gain & 10dB "virtual pad" handles anything from a timid vocalist to a rilly big kick drum.

■ Six separate Aux Send Masters each with its own Solo.

■ Stereo Aux Return 4 Master can be assigned to Buses 1-2 or 3-4.

■ EFX to Monitor lets you send different effects or effects levels to stage monitors without screwing up your main PA mix.

■ Easy level setting with In-Place Stereo Solo. Just solo a channel & adjust the Trim 'til the meter flickers at the Level Set arrow.

■ Separate Tape Return level control.

■ Global Aux Return Solo switch.

■ Separate Solo section with level control, global AFL (post fader) or PFL (pre-fader) mode switch & Aux/Sub Solo LEDs.

■ Separate Talkback section with level control, LED and switches for assigning talkback to Main Mix or Auxes 1 and 2. There's also a separate mic preamp input on the back of the mixer so you don't have to tie up a channel.

■ Tape to Main Mix routes tape inputs to main outputs for music during breaks.

■ Each Submaster bus has Solo switch, Pan control and Left/Right assign switch.

■ Air EQ adds crispness and definition to high-end without boosting ear-fatiguing 8kHz-10kHz range.

■ 60mm log-taper faders allow linear gain control and are super long-wearing to resist dust, moisture and general road crud.

■ Mackie's musical, natural-sounding equalization. On mic/line channels: 12kHz Hi shelving, peak midrange sweepable from 100Hz to 8kHz (so it can also be used as a 2nd HF or LF control) and 80Hz Lo shelving. On stereo line channels: 12kHz Hi shelving, 3kHz Hi Mid peaking, 800Hz Lo Mid peaking and 80Hz Lo shelving.

■ Sharp 75Hz 18dB/octave infrasonic filter on all mic channels cuts wind noise, stage rumble, mic clunks and P-pops.

■ Super-twitchy -20dB signal present and overload LEDs on each channel.

■ Constant loudness pan control.

■ Six aux sends per channel. 2 pre-fader, 2 post-fader and 2 pre/post switchable.

NEW 24•4 & 32•4-VLZ PRO MIXERS

■ 4-bus design with 20 or 28 mono mic/line channels with XDR™ mic preamps and 2 stereo line channels

■ New high-performance 2068 op-amps

■ Muted channels can be soloed!

■ 6 individual aux sends per channel

■ 4 master stereo aux returns

■ Inserts on all mono mic/line channels

■ 3-band EQ w/swept mid on mic/line chs.

■ 4-band fixed EQ on stereo line channels

■ 60mm long-life logarithmic-taper faders

■ 6 aux send masters with individual solos

■ 4 stereo aux returns w/EFX to Monitor

■ 16kHz Air EQ, pan and solo sub buses

■ Double-bussed subs for easy multi-tracking with 8-track recorders

LOADED WITH LIVE SOUND FEATURES.

The new 32•4-VLZ PRO and 24•4-VLZ PRO are designed to make live sound mixing easier. You can solo a muted channel. Effects to Monitor lets you "fold" effects back into a stage monitor mix without affecting the main PA sound. There's a separate talkback section with its own mic preamp. Separate tape inputs with level control and routing to main mix make playing music during breaks easy. And typical Mackie touches like 18dB/oct. Low Cut filters, Rude Solo Light and fast level setting via in-place stereo solo make these mixers awesome values.

CALL, E-MAIL OR SURF FOR MO' INFO.

We'll send you our jumbo product brochure complete with hook-up diagrams — and a serious, graph-and-equation-loaded White Paper on why XDR technology beats the cables off anybody else's mic preamps.

Better yet, visit a Mackie dealer, check out the 24•4-VLZ PRO and 32•4-VLZ PRO. You'll hear just how good a "live" mixer can sound.

* U.S. suggested retail price. ©2000 Mackie Designs Inc. All Rights Reserved. "Mackie" and the Running Man figure are registered trademarks of Mackie Designs Inc. VLZ & XDR are trademarks of Mackie Designs. "Could I have more of me in the mix?", "I loaded in. YOU load out.", "It's a free gig but we'll get lots of publicity" and "Can I borrow a pick?" are trademarks of being a musician.

UNTANGLING THE WEB

HOW TO AVOID EMBARRASSING YOURSELF IN CYBERSPACE



ILLUSTRATION: ANDREW SHACHAT

Like too many people these days, I spend way too much time on the Internet. One of the reasons is that the new rules of access have spoiled me. You see, I started using online services back in the bad ol' days, when connect time was 10 cents a minute, and you got your mail, you checked the bulletin boards, and you got off fast, unless you wanted your online bill to be triple that of your phone bill. Now, with unlimited access, and with an ISP inside my unlimited calling area, the temptation of staying online all day, hopping around and following my mouse wherever it goes, is sometimes too much to resist.

Of course, I have good reasons to be on the Net (at least, that's what I tell myself and my wife). Besides maintaining the *Mix* Web site and two other sites, I do a lot of research online. I'm constantly checking equipment specs, or looking up references, or finding some information

for a reader or a client. So I look at a lot of sites belonging to studios, engineers, dealers and manufacturers. And a lot of them really suck.

I'm not talking about the fact that they're ugly—although many of them are. But my feeling is that when it comes to finding information, ugly doesn't matter that much. Sears catalogs never won any awards for graphic design, but they provided millions of people with valuable product data for many years, and no one complained (they had other uses for them as well, especially in non-urban areas, but I won't get into that now).

I'm talking about the fact that many Web sites are disorganized, boring, hard to navigate, devoid of much useful content and, above all, sss-lll-ooo-www. Web sites can be terrific for telling people about ourselves—what we do and what

we make. If you have a site (and, of course, you do), you want people to be able to get at what they're looking for quickly, and not get pissed off in the process, whether you're pushing your facility, your recordings, your services, your products or just your personality. But there's a lot that can get in the way of that, sending users of your site away frustrated and angry. Once you blow them off the first time, it's exponentially harder to get them back for a second look.

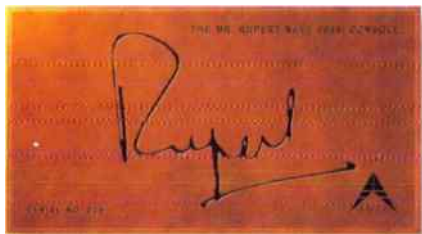
There are four basic things to keep in mind when designing a Web site: 1) viewers' attention spans, 2) bandwidth, 3) bandwidth, and 4) bandwidth. Although DSL, ADSL, cable modems, shared T1 lines and other forms of high-speed Internet access have come a long way in the past few months, and you may have a broadband connection in your office or studio, it's a big mistake to assume that every-

BY PAUL D. LEHRMAN

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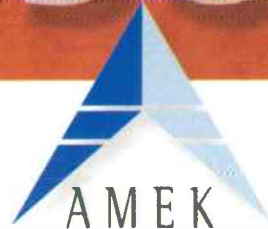
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one who comes to your site is going to have the same thing. A lot of people in our industry surf the Web from home—as often as not because that's where they work, too—and recent data from Nielsen NetRatings (yep, the same people who've been dictating what goes on television all these years) is not good news for bandwidth hogs. As many as 93% of those accessing the Net from home are using 56k dial-ups (which usually operate closer to 44k) or slower, and half of them are using 33k or slower modems! So those flashy Flash files, giant gorgeous JPEGs, QuickTime movies, and even animated GIFs are simply lost on the vast majority of your audience.

Web design is as much of an art as mixing music, and to put together a truly brilliant world-class site requires a considerable amount of expertise and experience. But getting a functional site going that provides a basic, satisfying online identity should be no harder than doing a good demo. Since we live in a do-it-yourself world, a lot of products are available that promise to make Web creation a snap. Tools like Macromedia's Dreamweaver and Adobe's GoLive really can make designing a Web page no more difficult than putting together a newsletter in a page-layout program. Of course, as in the early days of desktop publishing, these tools can be used to produce truly execrable results just as easily. But with a little restraint, you can avoid embarrassing yourself in public. If you know what to watch out for, let common sense prevail and don't overstep your skills, then you should do fine. The Web has a long learning curve, which is to say that the more you study it, the better you get. It's perfectly okay to start slow and simple, and then as you know more, try to do things that are cooler and more clever. Sounds sort of like life, don't it?

The Web itself is a great teaching tool. In every browser you can view the source code of any page you encounter. So, if you see a site you like, you can rip it apart and figure out what makes it tick, and then use those ideas on your site. See what tricks are in the code—and if you see something you don't understand, find out about it from a book or one of the multitude of sites that explain HTML. Extract pictures, load them into your graphics program and look at their size, resolution and the other factors that make them good

or bad, fast or slow. Take a look at tables, frames and all of the other visual and extra-visual elements and see how they make the site what it is.

There's another parallel between designing Web sites and mixing music: You need to keep your delivery system in mind at all times. You'd never do a television mix without checking it in mono on a crummy speaker, or a game soundtrack without listening through a Sound Smasher card. Likewise, you should always check how your Web site looks and acts like on an iMac or small-screen laptop, through a dial-up connection. You need to be aware when you're forcing someone to download a 250k graphic just so they can find your e-mail address—and

Getting a functional site going that provides a basic, satisfying online identity should be no harder than doing a good demo.

checking out your own site on a slow dial-up connection is the best way to find these sorts of bottlenecks. Just because you have a 21-inch monitor, don't assume your viewers will. Unlike TV, where you get essentially the same picture no matter how big the tube, in the Web world, size counts. On small screens, Web pages don't scale—they get chopped off. That same Nielsen report says that even among businesses, two-thirds of Web viewers use screens that are 800x600 pixels or smaller; at home, that fraction increases to three-fourths. So if you clutter up your page with frames, banners, tables, buttons and other graphic doohickeys, you might find that the bulk of your viewers never see half of it.

If you've done a lot of Web programming, none of this stuff is going to be new to you, but perhaps it's worth thinking about one more time anyway. I can't tell you how many Web sites I've seen that are the obvious product of a lot of graphic talent, programming chops and sweat, but they just don't

work because the designers never put themselves in the viewer's position. So here, from my standpoint as the guy who's been behind mixonline.com for the past two years (and listened to all the plaudits for and complaints against it), are some things to think about as you consider your own site.

Make it fast. I've seen studies that say the average person will wait about eight seconds for a Web page to load, and then if they don't see anything, or the process looks like it's going to take forever, they surf away. Maybe that's a little harsh, but the principle is right on: If all people see is the "loading" icon for more than a few seconds, they're gone. A site's front page has to be simple and direct, and if the background is a 550k photo of your control room, no one will stick around long enough to see it.

Make it usable right away. The first thing viewers should see is stuff that identifies who you are and what you do—so they know they're in the right place. Then they need to see what they can expect to find on your site and how to get to it. A navigation bar or frame, or simply a list of pages or areas along the bottom, will do the trick, but you'd be surprised how many sites don't do this, instead forcing viewers to go through every page on the site sequentially. If they haven't found what they're looking for by the second or third page, you've lost them. Your e-mail and snail mail addresses, along with phone and fax numbers, shouldn't be buried; if you don't want to put them on the front page, make sure there's an obvious link that says, "Here's how to reach us."

Keep it slim. Don't force viewers to look at huge graphics. If you want to show off your photo collection, assemble a page of thumbnails and let viewers choose the ones they want to see. Use Photoshop or (my favorite shareware) Graphic Converter to reduce the file sizes of all your graphics as much as you can. Know when to use GIFs and when to use JPEGs. If you have a really big photo that you're dying for everyone to see, make it into a progressive JPEG: This allows a blurry version of the picture to load quickly, so that viewers can figure out what they're looking at right away, and then it fills in the detail as it finishes loading.

Update often. Don't let your site go stale. Always have a "what's new" page, even if not all that much is new. Write about new projects, new gear, new personnel, new furniture—anything, just to show folks that you are paying atten-

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INSIDER AUDIO

tion to your own site. If your "Upcoming Gigs!" page lists shows from November 1998, people will assume you're either out of business or dead. Put a date on your site, and change it any time you update. This will also help people who visit frequently know whether they should spend time looking at your new stuff, or not to bother.

Don't greet new visitors with Java, Flash, QuickTime or anything else. Using any kind of plug-in on the front page will cause a browser to screech to a halt while the plug-in loads, the file downloads and then the file executes. This is not the experience you want to offer. Even a tiny Java applet, written in that most compact of languages, can stop things dead for a few tense seconds. Something as simple as a button mouseover (where a button changes when you move the mouse on top of it) must be handled with caution. Flash presentations can be great, but you have to make them optional, or you'll lose most, if not all, of your viewers. And if you ever, ever want folks to come back and see you again, don't embed a MIDI file on your front page.

Speaking of plug-ins, don't demand that every user have the latest version of every plug-in. There are a zillion competing plug-ins floating around. Some of them are easier to get than others (i.e., they're free and download correctly the first time you try), and once you've downloaded them, some behave better than others. You need to confine yourself to those plug-ins that are really crucial to what you want to do on your site, and to those that other people are likely to have installed, or are going to want to install. Do a little research, find out what other sites are doing and limit yourself to plug-ins that install themselves into browsers painlessly. Some older and/or fussier plug-ins, once you've got them, force you to figure where they've hidden themselves, and then you have to go into your browser's preferences and ferret them out. Given the bloatware that Web browsers have turned into, this process has become incredibly cumbersome and prone to errors, and so it is to be avoided.

Even if you're using the most common plug-ins, try to make your files compatible with older versions. When you're creating downloadable PDFs, for example, make them readable with Ac-

robat 3.0, not just 4.0. And make the plug-in itself accessible from your site: If there's a page with a RealAudio file on it, put in a link to RealNetworks' site that will let your visitors download the plug-in immediately. Don't force them to hunt around for it, or, again, you will lose them.

Which plug-ins should you use? That's a really thorny question, and the answer changes daily. I'm a big fan of Acrobat for brochures, rate cards, high-quality pictures of CD covers, and other printable material that you want to make sure stays formatted just the way you've created it. But you have to be careful creating PDF files, as it's easy to make them really huge, which of course discourages anyone from downloading them. Java is incredibly useful, but for the reasons I mentioned earlier, I use it sparingly. My favorite audio format (at least this week) is RealAudio—it has shown itself to be the most reliable, the easiest to get up on a site, and gets the least complaints from viewers. (No, we don't use it on the *Mix* site—I'm talking about other sites I work on.) The audio quality is what it is, but it gets the point across with the least hassle. (Having multiple versions

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for different download speeds helps a lot.) I've not had such consistent luck with QuickTime or even with the ubiquitous MP3, which I have found incredibly finicky and prone to bad behavior when I try to put a file on my own sites. (I know there are plenty of commercial sites that don't have these problems, but no one seems to be able to tell me what, if anything, I'm doing wrong.)

Keep in mind that when you're providing streaming audio, no matter what you do it's going to sound somewhere between terrible and mediocre. Think of an AM radio in a car that goes under an overpass every 300 yards. Even on the fastest Internet connections, Net traffic well beyond your immediate "neighborhood" will slow down real-time streams, and often viewers will be forced to choose between lower bandwidth (and therefore lower audio quality) or annoying interruptions. So when you make files for streaming, tailor them accordingly. Don't expect that you're going to be able to show off any of the high-tech features of your projects, or products, using Web audio.

In fact, when you think about it, as

far as ordinary Web sites are concerned, pro audio is one of the industries least likely to benefit from Web audio, since what we're all about is sound quality. (Note that I'm not talking about high-bandwidth, specialty Internet audio tools, which can be a big help to professional production—that's a whole different column.) So, big Webmeister, is Web audio actually good for anything? Frankly, I've never found a pro audio site that uses it in any really useful way. Of course, I haven't seen everything, and I expect I'll be getting scores of letters from readers who claim to have done just that—and if I hear about any such sites that are really good, maybe I'll mention them in a future column. But in the meantime, here's a suggestion I'd love to see somebody try:

Some years ago when I was regularly running around the country writing about interesting audio and broadcasting facilities, a studio in a secondary market made a reel-to-reels of a "tour" of their shop, which they sent out with their brochure and rate card. It was incredibly clever, showing off the size of the rooms, and the equipment, and some of the wide range of projects that were produced there. It was, in essence, a demo

reel, but with a "multimedia" feel (you could look at pictures of the rooms as you were walked through). Because it was done with a lot of skill and thought, not to mention a healthy dose of humor, it worked. Heck, it got me to drive 100 miles out of my way to visit them and write a story. Apparently, it got a lot of other people's attention, too, because the folks behind that studio (which is now closed) are today running a shop in the same city—one of the great studio success stories not only of that city, but of the entire region.

Has anyone in our industry done this online? Of course, because it's the Internet, the whole thing can be interactive, and viewers can go through it in any order they want, and put in comments or questions along the way, so the possibilities are even more intriguing. Let me know if you know of any. And if you want to do it yourself, go ahead and steal my idea, which, if I had any smarts at all, I would patent. But please don't make me use Flash to watch it. ■

Paul D. Lehrman is editorial director of the Mix Web site, www.mixonline.com. He thinks it's pretty good, even if it has no audio.

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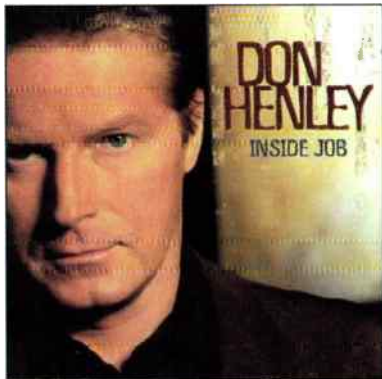
DON HENLEY

GETTING INSIDE HIS LONG-AWAITED SOLO ALBUM

It's a tough assignment: an interview with He-Who-Hates-To-Be-Interviewed. That sharp-tongued, laser-eyed, hypercritical guy who's been there, done that, everywhere, with everything. In other words, the conundrum known as Don Henley, who, on May 23, released his third solo album, 11 years after its predecessor, the quintuple-Platinum *The End of the Innocence*.

Outspoken, opinionated, and just a touch grouchy, Henley's a complex personality. A native Texan who has lived most of his life in L.A., and now officially resides in Texas again, he's ruled by dichotomy. He's impatient but polite, judgmental but tolerant; he places a premium on privacy, but he also has a driving need to be heard. And he's at least as critical of himself as he is of anyone or anything else. It's probably apt to say that Henley lives something paraphrased from Socrates called "the examined life."

Of course, living the examined life creates great fodder for a songwriter, and although Henley still,



unbelievably, doesn't seem to be sure that he is one, his body of work leaves no doubt. *The Eagles: Their Greatest Hits 1971-1975*, featuring classics he wrote with part-



PHOTO: STEVE JENNINGS

ner Glenn Frey like "Tequila Sunrise" and "Desperado," is the top-selling record of all time, certified 26 times Platinum. Then there was the 15 million-selling *Hotel California*, on which that duo wrote (with Don Felder), among other tunes, the classic title cut. Henley's three previous solo albums, which together have sold more than 9 million units, boast the hits "Dirty Laundry," "In a New York Minute," "The Heart of the Matter" and "The Boys of Summer."

Henley's new CD, co-produced with his friend, former Tom Petty drummer Stan Lynch, is titled *Inside Job*. It's full of memorable melodies and soulful singing, but what's really remarkable about the record is its lyric intelligence, which stands in rather stunning contrast to so many current endeavors. Combining love songs with vintage Henley-style bit-

ing social commentary, *Inside Job* is a mature work that takes cynicism and anger beyond bitterness, into knowledge and sorrow, and finally, offers cautious redemption through love. The love Henley sings about is never naïve, though; it's tempered with experience and a hard-won understanding of how fragile it is in this world.

This interview took place at Hollywood's Record Plant over two days while Henley took breaks from a hectic schedule that included laying down last-minute vocals and shooting a VH1 *Storytellers* segment. After stating up front that he dislikes being interviewed and didn't want to be asked any of the "same old questions about songwriting," he proceeded to answer all my questions thoughtfully and graciously, in that unmistakable voice that still retains

its East Texas lilt.

You worked at a few different studios on this album.

Well, I've been here at Record Plant for about two years on this particular album. [Laughs] We've been back and forth between this place and my studio in Malibu. Since I'm in town rehearsing the band every day, it's a lot closer to drive here, and also sometimes you really need a 9k [SSL 9000 Series console] to get the job done.

I like it here. The Record Plant has managed to maintain that family feeling that was present in the '60s and '70s. It's much more personal at this studio than it is at a lot of the others. It still feels sort of homey and warm. A lot of that is due to Rose [Mann] and the way she operates the place. She tries to get good employees, and she takes care of people. Also, it's centrally located, it's got lots of good restaura-

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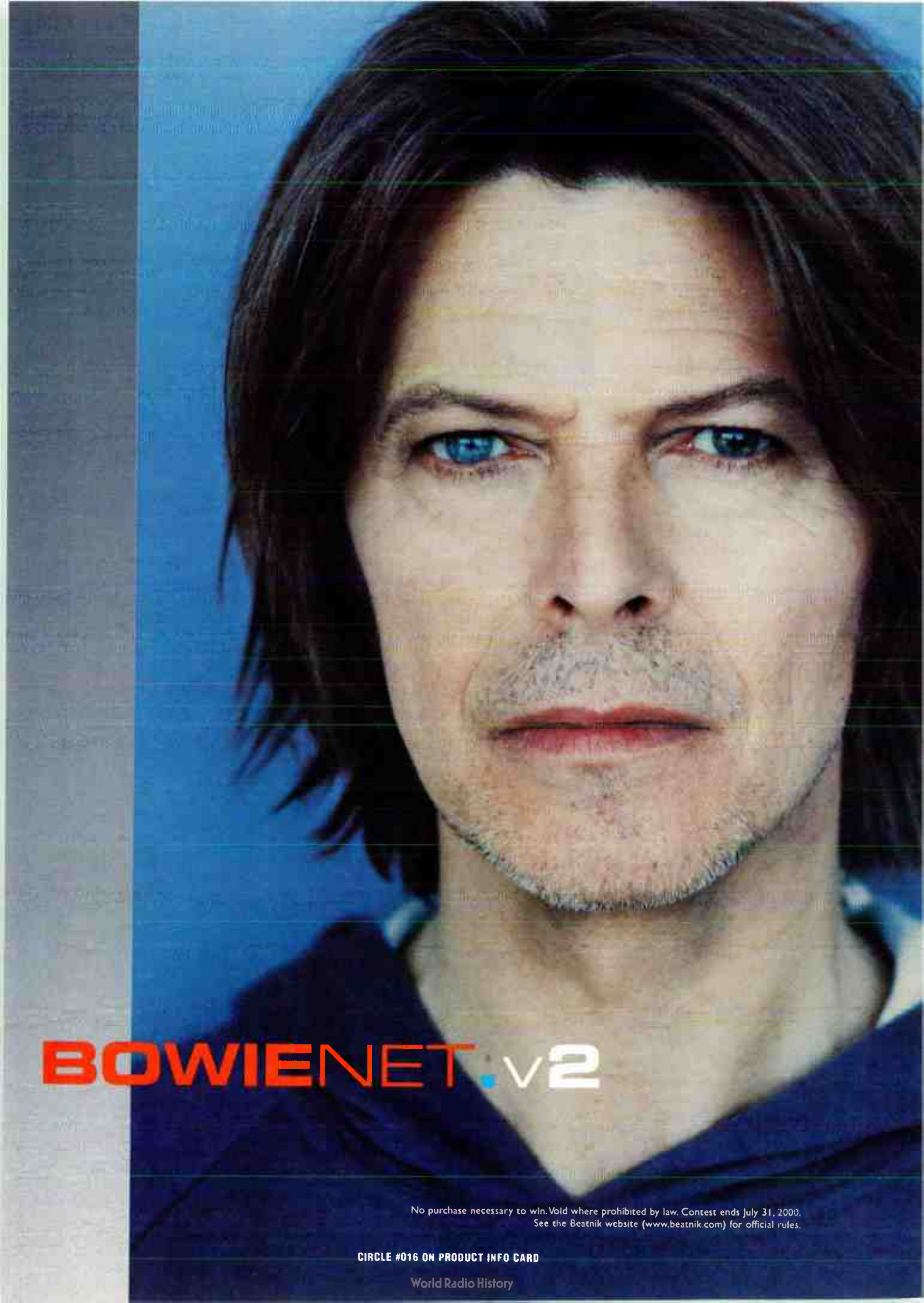
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rants around, and most importantly, it's near an In N' Out Burger.

What's your studio like?

Well, it took a little longer to build than anticipated, as these things always do. It took a little over two years to build it—not just the electronics but the decor as well. I always thought that most recording studios are creative places that look like factories. So I wanted my studio to be beautiful; I wanted the interior to have something of a spiritual aesthetic that included icons from different cultures.

Do you think that the objects you have in there have power to help make it a creative space?

I don't know if I'd use the word power. I think they help create an atmosphere of contemplation where one can think larger thoughts in a world where everything has been dumbed down to the lowest common denominator. I keep a lot of my favorite books there, and my favorite CDs. I have things from the Christian religion, things that pertain to Buddhism and Hinduism, things that pertain to the Muslim religion. I have pagan things in there, Celtic things—mainly they have aesthetic value.

How about equipment?

I have the original API board that was in the Sausalito Record Plant; I wish that board could talk! I bought it back in the early '80s and stored it for a long time. Then I had it rebuilt and stored it again. It was in storage for so long that I had it rebuilt a second time. It has a great, warm sound. The studio was designed by a team which included my engineer, Rob Jacobs, my technical support guy, Art Kelm, studio designer Vincent Van Haaff, architect David Sawyer, Stan Lynch and myself. Rob, Stan, Art and I decided what kind of outboard gear we were going to get. I purchased a Sony 48-track digital machine, and a Studer 24-track analog machine and I've got this great old 3M machine that I bought around the same time I bought the board. It's 24-track with interchangeable 16-track heads. Unfortunately, I really haven't used it much yet because we're having trouble finding some parts.

The studio owner's constant complaint these days. Do you run your recording equipment yourself sometimes or do you always use an engineer?

I'm not very technology-oriented. In fact, I don't even work on a computer. I don't have e-mail. My assistant does, but I don't. It's a matter of privacy with me. The phones and the fax machine



Henley drummed during The Eagles' most recent reunion tour.

are going all day long. I'm constantly undated, so I don't need another medium to make my life even more complicated.

But I have lots of smart guys who work with me who are very astute when it comes to computers and other electronic gadgetry. Rob Jacobs and Stuart Brawley are both extremely competent. Stuart did a large portion of the Pro Tools work on the album.

Would you say there's a theme to the new record?

I would. First of all, 11 years have gone by since my last studio album and a lot has happened in that time, including The Eagles' reunion. My life has changed a great deal. To use the vernacular, I was "getting a life" and I think this album reflects that.

I'm still deeply concerned about a lot of things and that concern is reflected on the album, but it's tempered. There's a song for my daughter, there are some environmental things and some political things: a song about the music business. Actually, it's kind of a combination song about the music business and the film business—the media in general, the arts/entertainment industry or whatever they're calling it this week.

The corporate thing is really bothering me: what it's done to the music business and what it's done to the nation in general. Not so very long ago, all of these mergers would have been called monopolies, but now our government just looks the other way. It's ripped the soul right out of everything as far as I'm concerned, with greed and bottom-line consciousness. My partner Stan [Lynch] was talking the other day about the ads on the Super Bowl. They were all about getting rich quick. If you do this "me" thing or this Internet thing

or buy this stock—it's all about getting something for nothing or doing little to no work to get rich. There's this sense of entitlement. The album deals with things of that nature.

Did you play drums on the record?

Not much. A couple of songs. There are a lot of loops and samples—all home-made primarily by Stan. He plays some drums on the record, as well as Gregg Bissonette and Scott Crago.

Did you play guitar on the record?

Nah, don't want to ruin a good thing. *Piano?*

Nah. I could, but it wouldn't be as good as somebody else doing it. I don't have that kind of ego; I don't need to do it just to say I did it. I'd rather have somebody come in and do it in an hour or two while I enjoy it and listen to it objectively from a distance. I see no point in insisting that I play a particular part if it's going to take two or three days. I feel the same way about drums. There are so many drummers here better than I am—I'd much rather let them do it, although as a producer, I might have something to say about the part and how it's played. On my solo tours I'm not going to be playing drums much either; I'd rather reserve that for The Eagles.

Is there a day that officially started this record? Or did it just kind of ebb and flow until finally you were in the middle of it?

It always starts in a more or less amorphous, hazy fashion. Then at some point, it becomes a more defined effort. It begins with a lot of conversations: "Who are we going to write with? Where are we going to record?" When I started the record, my studio wasn't finished and since we do a lot of writing in the studio, I had to find a place to

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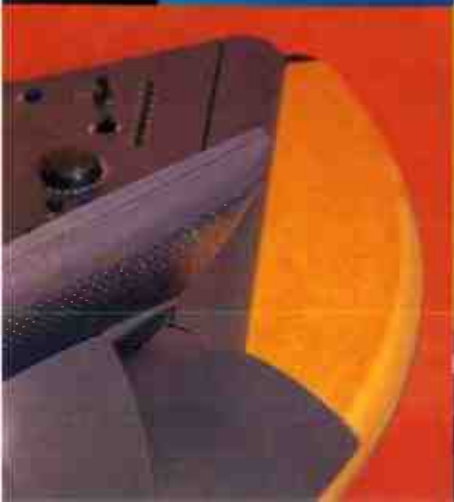
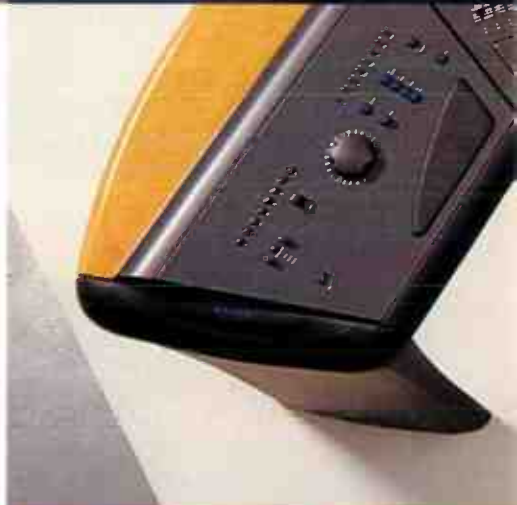
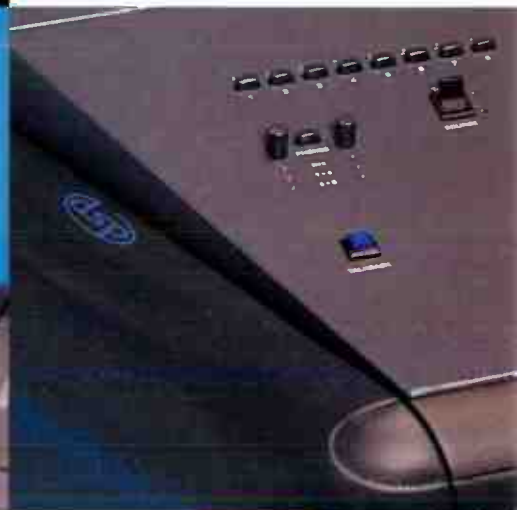
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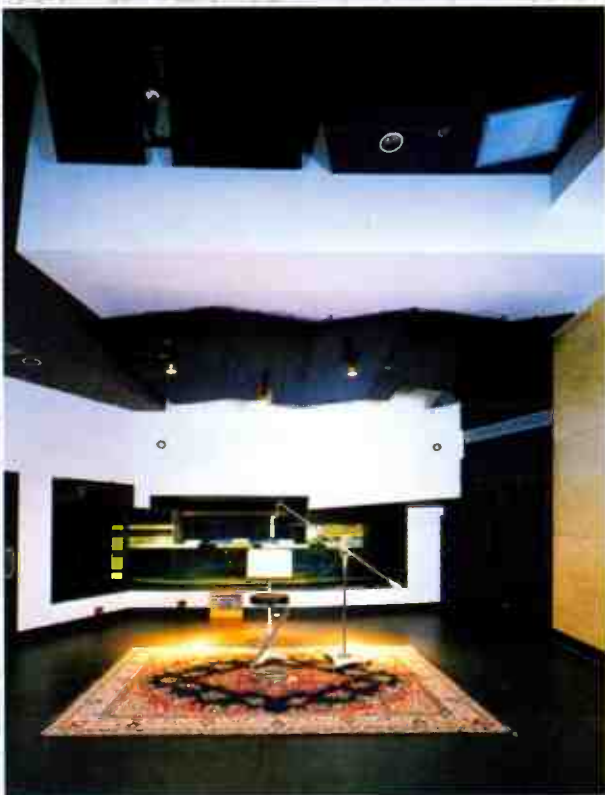


PHOTO: DAVE FREEMAN

Since 1968, The Record Plant Studios has provided a state-of-the-art recording environment for hundreds of top artists, from Barbra Streisand to Stevie Wonder to Nine Inch Nails, and everything in between. In the ongoing effort to meet changing client requirements, the facility's Studio SSL 3 was re-designed last December to accommodate 5.1 surround projects. Peter Grueneisen and Clayt Hudson of studio bou:ton (Los Angeles) collaborated with George Augspurger (also in L.A.) and Joe Birkman, the studio's chief technician, on the architectural and acoustical upgrades and custom monitors. "The surround speakers are designed to perfectly complement the front speakers," says Birkman, "and a custom dual 18-inch subwoofer completes the package." An 80-input SSL 9000 J console was fitted with surround panning and monitoring options. The control room is on this month's cover.



PHOTO: ROBERT AMES COOK

After New York's Quad Recording Studios acquired Quad Studios in Nashville, owner Lou Gonzalez redesigned the Nashville location so that the acoustics and equipment in the Nashville control room exactly match the control room in New York's Studio A (pictured on Mix's March 1999 cover). Acoustical treatments were also refurbished in this beautiful recording studio with 24-foot vaulted ceilings and a variable-acoustic drum booth. New equipment includes an SSL 9000 J console and Dynaudio M4 main monitors. The studio reopened in February 2000.



PHOTO: DAVE KING

Last fall, studio owner John King completed construction on Chung King's Gold Suite, a large, airy tracking and mixing room in New York City. In the design and construction process, King put an emphasis on natural light and built the subwoofers, with custom-built crossovers from Avalon, as part of the room itself. The focus of the room is an 80-input SSL 9000 J console with Ultimotion and Totol Recall. Recording is through a Studer D827 1/2-inch, Sony 3348 digital recorder, Studer A827 2-inch 24-track analog or Euphonix R-1 48-track hard disk recorder/editor. Augspurger dual 16-inch monitors are the studio's mains, and near-fields include Yamaha NS-10s and Auratones.



Overlooking a private lagoon on the Hawaiian island of Oahu, True Kiss Disc Studios (owned by Japanese artist/producer Tetsuyo Komuro) opened last August with a design by studio bau:ton and the company's affiliate, TEC:ton Engineering. Previously a restaurant in the Hawaii Kai shopping mall, the site was gutted, and since the building could not be altered significantly, designer, Peter Grueneisen says a series of soffit volumes were overlaid on the entire building to control sonic performance. The first-floor mix room features a 112-fader SSL 9000 J, and the upstairs tracking studio boasts a 96-fader 9000 J and three isolation booths (one is pictured), with different acoustical properties and views. Both control rooms are outfitted with custom TEC:ton TTH1 stereo and 5.1 surround monitoring systems.



Richard Oliver designed Electric Lady's Studio C (New York City), which opened in February. Oliver says the application in the control room—with his Tuned Vanes in mix position along with his integrated waveguide front wall, pre-compression ceiling and a composite-material relieved rear wall—improves bass response, dramatically and cleanly increases overall levels, generates a more accurate stereo image and phase, and creates a great sweet spot. The live room (pictured with studio mascot Jimmy) has wooden beams that are precisely tuned Sound Dams, which, Oliver adds, take care of standing waves and poor-order fundamentals and harmonics. The centerpiece of Studio C is an SSL Axiom-MT console, with vintage Studer A800 multitracks, a Sony 3348 multitrack and an array of vintage and new out-board equipment and mics. Main monitoring is via custom bi-amped Augsburgers, which Oliver made into the front waveguides with Bryston 7Bs for power—near-field from Yamaha NS-10s and Auratones.



The recently renovated Backstage Studio is a joint venture of Nashville facility Sound Stage Studios and noted engineer Chuck Ainlay. The acoustical redesign was done by Warren Rhoades (Nashville), and major equipment includes an SSL Axiom-MT console, a Sony 3348 recorder, ATC 300A main monitors and KRK E8 midfields. This studio reopened in September 1999.



The latest addition to SoCal's venerable Larrabee Studios is Studio Three, which opened in May 1999. This is Larrabee's third SSL 9000 J room, and the console is surround-capable with the SL 959 surround sound monitor panel. Monitoring is custom TAD. The room was designed by Studio 440 (L.A.).



Turtle Recording Studios has been hosting music clients for more than 13 years. Its new Ocean-Front Studio (White Rock, B.C.) was designed and built by owner/engineer Larry Anschell and his wife, Jodi Zak, and features a custom 72-input Neve 8108, Tannoy SGM-10B main monitors with Mastering Lab crossovers, a wide selection of new and vintage mics and out-board equipment, and a Yamaha Disklavier grand piano. Anschell also designed a 1,500-cubic-foot underground reverb chamber. The new studio opened in June 1999.



Designed by Steven Durr, Airborne Audio Productions, near Kansas City in Lenexa, Kan., took flight in the spring of 1999. Durr designed the 6,300-square-foot, three-suite facility with the intent of obtaining a flat response, with a large sweet spot for accurate mixing. Alabaster sconces light the large, deep-green Studio A, which includes a Mason & Hamlin 7-foot concert grand piano. Iso booths were laid out to ensure sight lines between bandmembers. The centerpiece of Control Room A is a vintage Neve 8014 with 1073 pre's and four 2254 compressors. Recording is done to a Pro Tools | 24 MIXplus with JBL DSM-1 main monitors and Genelec 1030A near-fields. The Backstreet Boys, Jay McShann and Elton John have worked at the studio.



John Arthur Design of Miami designed Big Dog Studios (also in Miami), which was featured in the "Miami Heats Up" story in Mix's May 2000 issue. This mid-sized studio is based around a Pro Tools 24 | MIX hard disk system and Tannoy DMT-215 main monitors. Owner Gary J. Baldaccini says that in the facility's first month in operation (August 1999), the studio was secured for a 45-day lockout by pianist Raul Dibalasio.



In January, The Plant Recording Studios (Sausalito, Calif.) opened its new Mastering Suite, designed by Manny LaCarrubba and Plant mastering engineer John Cuniberti. The spacious room with curved walls offers a SADiE Artemis 24/96, a Crookwood mastering console, Prism AD/DA-2 converters and B&W 801 Nautilus Speakers powered by Krell amplification. Weiss 24/96 processors handle all digital EQ and limiting, and Prism mastering units take on the analog processing. Recent mastering projects include Plant mastering engineer Michael Romanowski's work on a new Too \$hort album.



Formerly One on One Recording, Extasy Recording North (North Hollywood, Calif.) underwent a major renovation last year after it was bought by Japanese artist/producer Yoshiki. Technical consultant Gary Starr and Peterson/LaTouf Construction revamped Studio A's control room to showcase one of the world's largest SSL 9000 J desks, with 104 inputs. Starr also designed a back-wall treatment to create more even sound dispersion, and Genelec 1035B mains were installed. The control room includes a wall of patchbay-accessible 1081 and 1073 preamp/EQs taken from the previous console, and a large selection of new and classic mics and outboard gear is available. A Pro Tools MIXplus system with 32 channels of ProControl is on hand, along with vintage synthesizers and an Avid editing suite. The large tracking room includes four iso booths. The studio reopened in March 1999.



The Walters-Storyk Design Group (Highland, N.Y.) provided acoustic and interior design services for this 8,000-square-foot audio production facility on the 300,000-square-foot Electronic Arts campus in Vancouver, B.C. Pictured here is one of the three full production studios; this room is centered around a Euphonix 56 console and includes Westlake 5.1 monitoring. Design features include custom diffractals, variable acoustics and ceiling clouds, one of which contains a projector. This studio opened last fall.



studio bau:tan (Los Angeles) designed Luminous Recording Studios (Dallas) for producer/songwriter/composer Paul Loomis. The heart of the facility, the main tracking room, extends to the top of the second floor of its building, so that the room has a double-height space. Major equipment includes an SSL 6040E console, Genelec 1039A monitors and a Sony APR 24-track machine with Dolby SR noise reduction. The studio was completed in October 1999 and, at 6,500 square feet, is large enough to accommodate orchestral recording as well as rock groups.



Francis Manzella Design Ltd. designed this mid-sized studio for Deeper Rekords in New York City. The studio offers a "fully blown" 32-fader Digidesign ProControl digital recording system and a wide selection of modern and vintage MIDI sound modules. Main monitors are a custom four-way design from Joe Lodi, featuring all Focal components with Crown Studio Reference amps. Room acoustics include a reflection-free zone front end and solid cherry RPG diffractals at the rear. The main control room pictured shares a live recording area with a second, smaller control room equipped with a Pro Tools/MIDI setup. The studio opened in December 1999.



The New York Media Group's newest audio recording studio is Lower East Side, which was designed by the Walters-Storyk Design Group (Highland, N.Y.) and opened in the summer of 1999. This facility specializes in audio production for advertising. Featured equipment includes a Soundtracs DS3 digital console and JBL 5.1 monitoring. The space was designed to offer a "living room" feel and includes custom rear-wall diffusers and low-frequency bass control elements.



Chris Pelonis of Pelonis Sound & Acoustics designed Lava Tracks (Komuela, Hawaii), the personal studio of guitarist/composer/producer Charles Michael Brontman, to provide an ideal environment for recording classical and acoustic guitars. Opened in August 1999, the facility is equipped with an Oram BEQ 24-channel 8-bus mixing desk, a 24-channel ADAT XT system, a Sound Tools digital editing system, as well as Emagic Logic, Digital Performer, a variety of Roland, Yamaha, Korg, Kurzweil and Emu synths, and a 6-foot Steinway.



Bayside Recording Studios (Bellingham, Wash.) was designed by Studio Pacifico (Seattle). This multiroom complex features a 35x25-foot tracking room with two matched 5.1 control rooms. Equipment includes a Sony DMX-R100 Digital Surround Mixer in Control Room A and a Yamaha O2R in B. Both rooms feature Digidesign Pro Tools I 24 MIXplus systems and JBL monitoring, and a selection of outboard gear and mics. Custom artwork by Jim Ward Morris was integrated into the acoustic finishes. The studio opened in April 2000.



Gregg Field and his wife, Monica Mancini, have a new facility designed by studio bau:ton (Los Angeles). Located in Studio City, Calif., the studio has a large window in the recording booth overlooking the San Fernando Valley, providing plenty of natural light. The room is based around a Mackie D8B console with HUI controller and Pro Tools system. Monitoring is via Genelec 1031As. The project was completed in November 1999.



Hot House Professional Audio and Francis Manzella Design (both in New York City) collaborated on the design of Mirror Image Recorders (NYC), which opened last August. Manzella redesigned the control room around the 10-kilowatt, 140dB, custom-built Hot House High Output Series main monitors, installed by Richard Rose. The room features an SSL 4056 console, dual Studer A820 multitracks and a large live recording room.



New York City studio Threshold Music came online in May 1999 with a design by Steve Koontz of Artzen Consulting and construction by owners A.J. Maltese and James Walsh. Originally intended as a rehearsal space for Jeff Buckley, the control room was gutted, speaker columns were built, and the room was floated to create a balanced, tight and accurate sound. A Trident 80B console, Sony/MCI JH24, 3M56 16-track 2-inch, 3M 4-track 1/2-inch, 24 tracks of 20-bit ADAT and a Pro Tools 5.0 MIXplus system head the equipment list.



Downstream Sound's newly acquired audio post complex in Portland, Ore., was redesigned by the Russ Berger Design Group (Dallas) and reopened in January. The new design includes a major acoustical and technical upgrade. Quested surround monitoring is featured, along with Fairlight MFX3plus and Avid AudioVision/Pro Tools workstations. There are also Mackie Digital 8-bus and Yamaha O2R consoles and a wide selection of outboard gear.

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PHOTO: RICK SCHULZ/ITAL

Deschamps Recording Studios is a five-studio audio post-production complex built into a Victorian-style building in downtown Toronto, Ontario. The building was recently expanded to accommodate two new rooms, as well as a centralized machine room, all designed by Toronto's Pilchner Schoustal Associates. Studio 4 (pictured) features an AMS Logic 3 console, Genelec 1038 monitors and a range of outboard gear. Theatre 5 is a film/TV mix room with a Logic 2 board and surround monitoring via Genelec 1038 and 1032 speakers. It also features stepped acoustical treatments to create controlled reflection geometry, providing a uniform listening environment.



PHOTO: MARK FOSBER

The Cutting Room in New York City completed its redesign of Studio A in January. Owner David Crafa, Richard Oliver and Chris Harmony of Technibuilders all had a hand in the design. The process included the installation of a new SSL 4072 G-Plus. In addition, a new 48-track 2-inch tracking and mixing room, Studio B, was finished in February. It was also designed by Crafa, Harmony and Oliver, who incorporated his waveguide system and wiring. Studio B features a Soundcraft 3200, and Pro Tools |24 is featured in both rooms.



PHOTO: ROBERT WOLSCHE

Sound on Sound in New York City opened its third room, built for 5.1 surround, this past September. Designed by John Storyk of Walters-Storyk, the space showcases a 48-fader, 175-path AMS Neve Capricorn digital console. Other equipment includes a Sony PCM-3348 48-track digital recorder, two Studer A827 24-track analog recorders, a Studer A820 2-track master recorder with Dolby 363 SR/A and custom George Augspurger monitors with TAD components. Artists such as Whitney Houston, Prodigy and Noreaga have recently been in the studio.

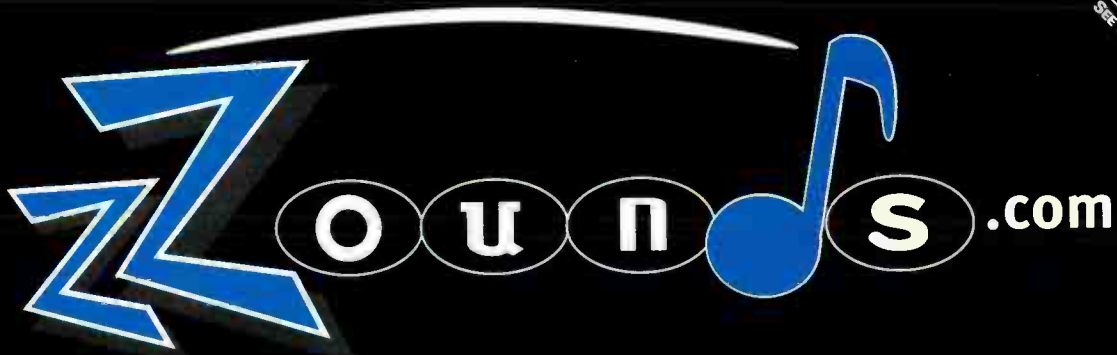


PHOTO: TREV NELSON

Artist/producer Richard Marx recently opened a new state-of-the-art project studio in the Chicago area. The owner-designed space showcases an Audient ASP 8024 analog console. Marx chose the console because he needed a compact analog desk with an impressive sound and four studio monitor outputs and 14 aux sends for his large setup of MIDI and outboard gear. Other equipment includes Studer and MCI analog 24-tracks, Alesis ADATs, Pro Tools and Genelec near-fields. Marx is currently working on his sixth album and recently started his own record company.

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about it in terms of a makeover.”

Other problems that may require more structural solutions, Augspurger says, include stereo imaging. “You need a room that, at least in the front part, is symmetrical,” he says. “You can’t really do too much about that in a makeover. And for smooth low-frequency response, the room has to have a reasonable amount of volume, so you can’t work in a closet. But once you get past those basic things, then

Right: Glenn Sound—a recent acoustic makeover designed by Studio Pacifica.

Below: USI before (left) and after (right), demonstrating a makeover that combined acoustic and aesthetic upgrades.

Bottom: Before (left) and after (right), a full conversion of a former audio post facility, Nod, to a film mix stage.

Photos by George Hallowell

nine times out of ten you can make a room workable within its existing structure.”

Rosati agrees, pointing out that “acoustical problems caused by unwanted reflections can be addressed relatively easily, without significant down time. And monitoring system problems can be solved rather quickly with good evaluation techniques.”

EARS AND ANALYZERS

While the range of sophisticated testing gear has grown in recent years, careful listening remains at the core of the evaluation process. “One of the most versa-

tile and robust testing devices is a trained and experienced set of ears listening to familiar program material,” says George Hallowell, vice president of Studio Pacifica in Seattle. The company’s projects include post suites for Mackie, Electronic Arts and Glenn Sound, as well as rooms at Ultrasonic Studios, Jungle Studio and Bayside Recording. “Listening is also often the least expensive approach. And in the end, it’s the engineer and client ears that will determine the success or failure of an improvement anyway.”

Augspurger puts his initial emphasis on listening, as well. “The listening al-



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Above, Eastern Sky Medio Services Inc. and, at right, the studio control room, designed by Robert Rosati

ways comes first," he says. "The point of measurements is to identify a problem that you can already hear. If you rely on measurements alone, you can easily be misled."

Augsburger illustrates the point with an example that he says is nearly universal. "If you have a mix or mastering room that looks beautifully flat and smooth on a 1/3-octave analyzer, the room will almost always sound as if it has no bass. So first I'll do a lot of playing around to try to get a tighter, punchier, heavier bass sound, and then I'll go back and see what I've done according to the measurements and use that as a guide for further adjustment."

For his analysis sessions, Rosati has built up what he calls his "standard" set of CDs. "They represent a wide gamut of musical qualities," he says, "including percussive sounds, acoustic piano, detailed cymbal and acoustic guitar work,



brass, strings, delicate highs, thunderous lows, and a wide range of imaging examples and highly dynamic passages."

Although listening comes first, testing also plays a vital role. The key, Rosati says, "is selecting the appropri-

ate measurements, properly quantifying the problems and interpreting the results. The precise analysis and measurement equipment depend on the situation. It may include a digital RTA [real-time analyzer], a TEF [time, energy, frequency], TDS [time delay spectrometry] machine, a digital SPL meter, an accelerometer for vibration pickup, a noise leakage tester, an oscilloscope, computer-based hardware, modeling software, and analysis software, both industry-standard and custom."

IS IT ACOUSTICS?

One benefit of test measurements is that they help convert the subjective experience of the room's users into something

objective and quantifiable. But the question of how to address the problems revealed requires not only measurements but also experimentation and troubleshooting. In some cases, the root cause turns out to have little to do with

If you have a mix or mastering room that looks beautifully flat and smooth on a 1/3-octave analyzer, the room will almost always sound as if it has no bass. So first I'll do a lot of playing around to try to get a tighter, punchier, heavier bass sound.

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tweeter and woofer as the engineer moves side to side. Also, the speaker-boundary effect between near-field monitors and the control room walls is often ignored, even though there are easily available software modelers, such as the RPG Optimizer, for predicting this effect."

Beyond the effect of near-fields placement on their own sound, there is also the effect of near-fields on the sound of the mains. "I always elevate the large monitors to at least 4 feet," Augspurger says, "because you know that the person is going to have one or

ward or back a few inches," Augspurger says. "Unless you have a trench and service loop that can accommodate that movement, however, you'll never know. As for large tape machines, people are getting those out into machine rooms or machine closets. But especially in production rooms, you still have piles of equipment that are partially blocking the speakers. It can be a real problem when you have a small work area with a ton of equipment that you are trying to operate."

Even if outboard gear isn't blocking direct sound it can still create a problem with reflections. "We've seen a number of rooms that have a large equipment rack directly behind the engineer," Hallowell says. "With the rack angled upward, the sound reflecting off the hard surface of the equipment comes back to the engineer immediately and undiffused."

TIME FOR TREATMENT

Once issues such as monitor misalignment or equipment placement have been eliminated or addressed, room treatment comes to the fore. "Some-



Sony Music room 316 designed by George Augspurger

two sets of near-fields, and otherwise, they can completely block the mains." He also advises designing oversized main-speaker soffits so that there is some flexibility for experimentation with speaker placement once all the gear is settled in the room.

Flexibility is also important in the placement of consoles, outboard gear and tape machines. "Sometimes you can make a dramatic difference in a room simply by moving a console for-

times the room is good, and the monitoring system is inadequate for the studio's needs," Rosati says. "More often, the room's acoustics require work, and very often, both the acoustics and monitoring system need tweaking. Extensive problems may require removing much of the existing treatments and traps and installing new absorption components, as well as adding diffusers and fabricating custom bass-management elements."

The truth is out there.

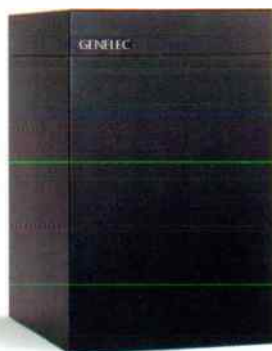


Twentieth-Century Fox, Newman Scoring Stage, Los Angeles, CA

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One of the most common acoustic problems, Hollowell says, is unevenly distributed frequencies of absorption, caused by designing reverb time as an average rather than as a smooth curve over the full audible frequency range. "We renovated one room several years ago that was primarily treated with carpet and 1-inch-thick absorption applied directly to the walls," he says. "There had been no thought given to mid- and low-frequency absorption. Needless to say, even though the overall reverb time average was about right, the room was very bass-heavy. Our solution was to design tuned mid- and low-frequency absorber areas to replace portions of

the 1-inch treatment."

While control rooms are most often cited as the area of concern, Rosati says studios are not immune to their share of problems. "If recording particular instruments is almost impossible without major hassles—changing mic types and positions, setting up many gobos, hanging blankets everywhere, moving around the room, patching in a rack of gear—then the room should be checked for acoustic problems. Of course, you should check your mics first, but some rooms do require acoustic signature modifications."

Hollowell adds that acoustic problems in studios may be less noticeable because engineers aren't always hearing a fixed position in the room. "The location and type of mic and instrumentation used in the studio will change the perception of the room acoustics," he says. "But use of the room over an extended period will begin to expose any problems of flutter echo, mode buildup or uneven frequency response in certain areas that were not obvious at first."

Noise leakage—in and out—is also a common studio problem, particularly with today's lower digital noise floors. And while isolation may be the toughest

studio problem to solve without a rebuild, it pays to first explore all the other possible solutions.

"We worked on a noise isolation concern several years ago that involved sound leakage between studios within the same building," Hollowell recalls. "Careful examination and testing showed that the walls between the rooms were performing up to their original design. But the noise was flanking these walls by traveling down a thin zone between the building exterior and the first isolation wall running the entire length of the building. Also, a number of penetrations had been made over the years in the ceiling of one of the studios, and they had not been properly sealed. In this instance, the solutions were fairly simple once the source of the problem had been tracked down."

As important as isolation is in commercial facilities, it can be even more of a concern in project studios, often located in residential settings. Unfortunately, isolation is only one aspect of studio design that is often found lacking in the project setting. "We are more likely to see poorly proportioned rooms and incorrectly applied absorption and diffusion in project studios," Hollowell says. "Budget and space constraints may be unavoidable, but there is no reason not to research and design your facility carefully, or to retain a designer that can help you in the process. It actually may not cost any more to achieve much better performance."

CHANGING WITH THE TIMES

While Hollowell says project studios seem to more often exhibit specific problems related to insufficient original design, commercial facilities are more often made over to adapt to new tastes or a new purpose. "We are most frequently called in because of changing desires, uses or technology," he explains. "Theories change, styles change, uses change and technology changes. In the mid-1970s, studios were often dark, moody, acoustically dead spaces. What was considered a good room acoustically in 1975 may not be appropriate today."

One common type of adaptation is adding sound-for-picture capabilities to an existing music room. "We have implemented significant design changes to accommodate video projection equipment," Rosati says. "Owners do not necessarily want to see the video gear at all times, so control rooms are designed to be easily convertible from audio-only to 'mix-to-pix.' Projector



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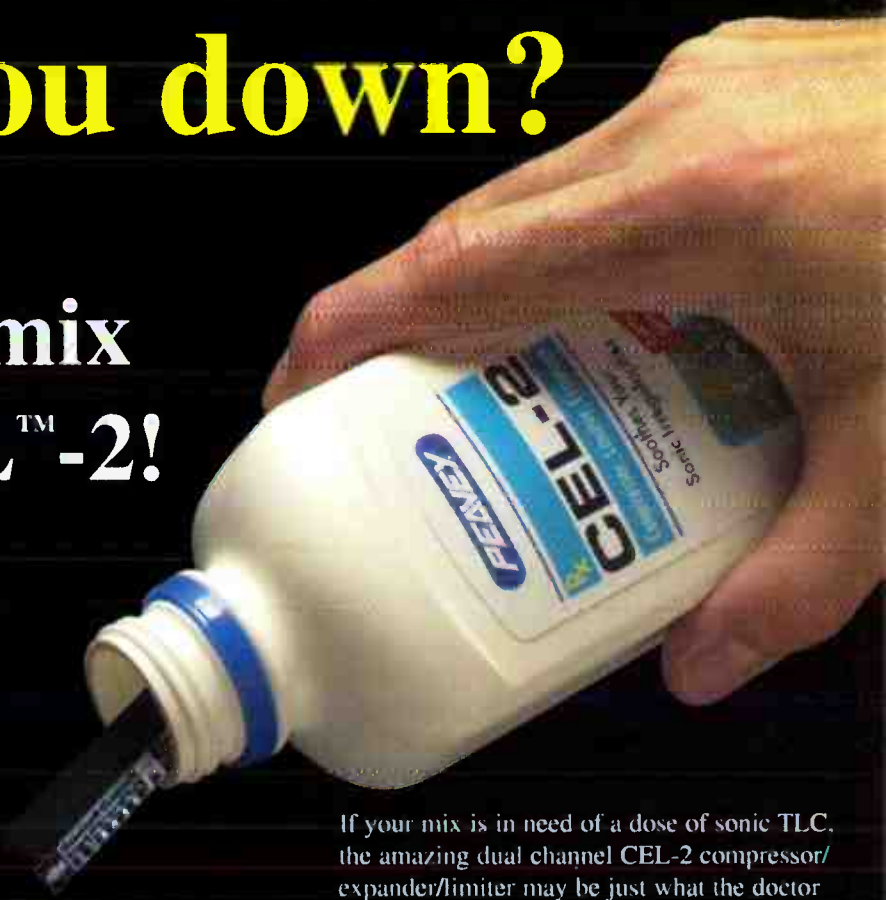


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noise emissions and placement of the speakers have come up as common issues to solve. Installing a surround speaker format is sometimes tricky due to the existing room geometry and equipment placement."

Hallowell agrees that 5.1 monitoring—for picture or pure music applications—can add to the challenge of reworking an existing room. "The ITU-R standards for multichannel sound systems call for placing surrounds at 110 degrees off the room axis," he says, "which coincidentally is a position often used for the door in stereo control rooms. A number of new commercial rooms are instead electing to place the surround monitors in the rear corners of the control room, making a sort of 'X' pattern with the front left and right speakers. In a large control room, that may require compensation for time delay in the distance from the listening position."

The bottom line is that the solutions to acoustic problems—new or old—are as varied as the rooms in which they are found. Consequently, there's no magic fix that yields "perfect" sound. The most important thing to keep in mind, Rosati says, is to "quantify the problems before you tackle the fix. Know exactly what you are dealing with. And don't throw money at a problem. Spend it wisely."

For his part, Augspurger says it is crucial that you spend some time experimenting before finalizing the room. "If everything is set in advance, it may or may not be as good a sound as you can get out of the space," he says. "But I can tune a room acoustically with some packing blankets and scraps of Masonite. Then once we know how to get the room to sound the way it ought to, you can worry about spending time on making it look good." ■

Phillip De Lancie is Mix's new-technologies editor.

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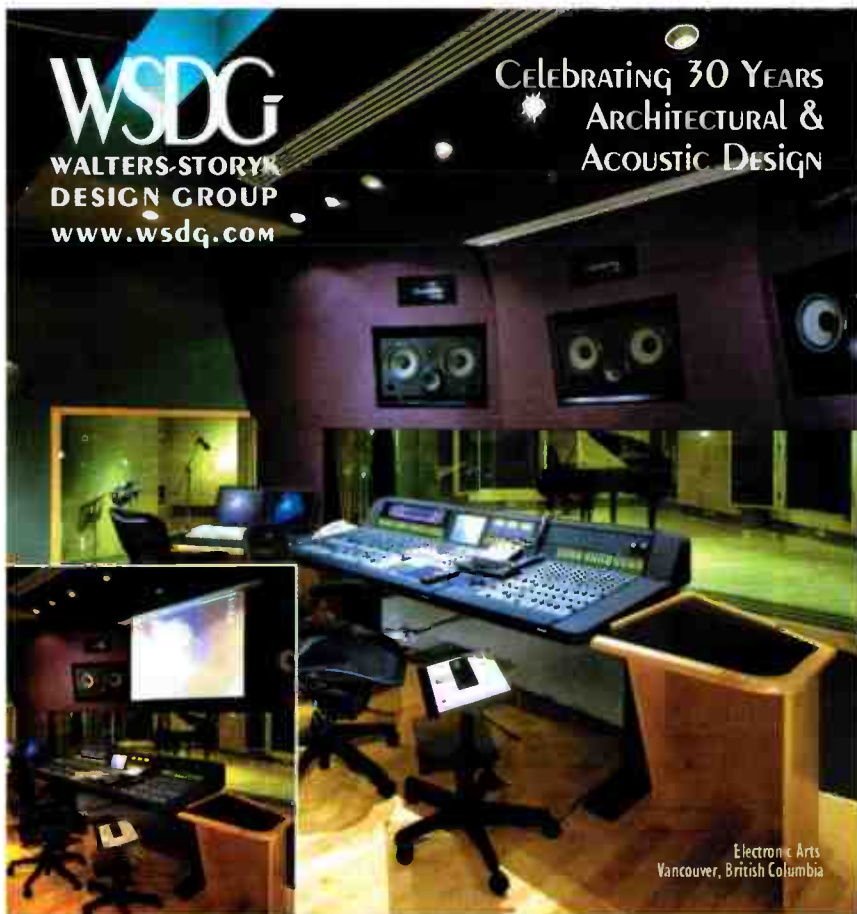
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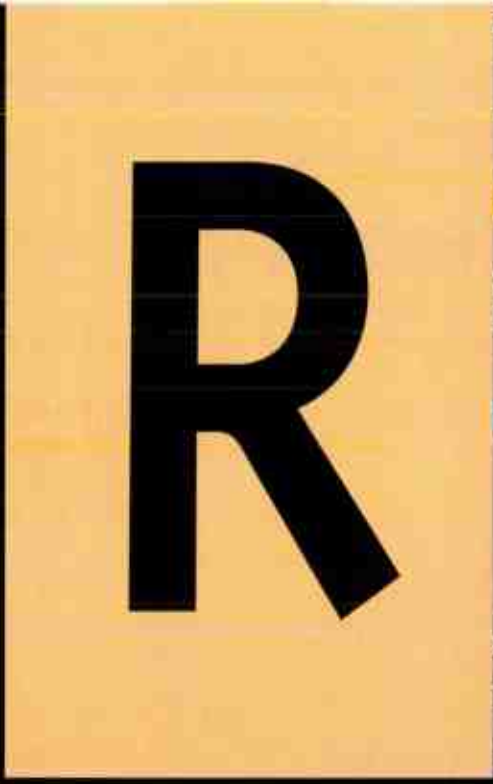
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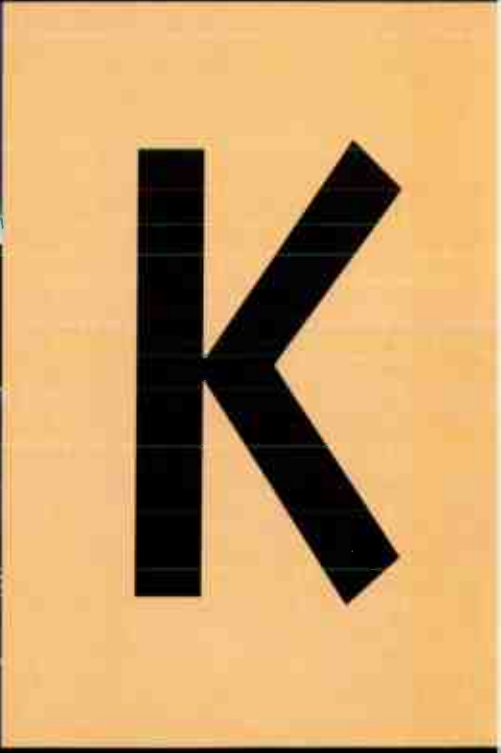
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Russ Berger

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Russ Berger's design philosophy, developed during 30 years of experience in the audio industry, is based on the theory that the perfect acoustic space is the one that's appropriate for the needs of the people who use it. That human touch has served him well in his work designing projects both large and small. His firm's credits include broadcast facilities all over the U.S., including production control rooms and support facilities for *Saturday Night Live* and *Late Night With David Letterman* in New York, and National Public Radio's 152,000-square-foot facility in Washington, D.C., as well as music-recording, video-editing, and mastering studios for Sony Music Entertainment's multi-room complex in New York, home studios for Whitney Houston and Michael Bolton, and even some acoustic design for Woody Allen's Manhattan apartment.

Known for architectural as well as acoustical design, Berger and his Dallas-based company, Russ Berger Design Group, have more than 1,000 studios on their resume. RBDG truly fits the description "full service"—their work encompasses site analysis, including evaluation of environmental noise, interior design, lighting, power and HVAC systems, wire management, budgeting, construction administration, and final testing and acoustic tuning.

Mix caught up with the constantly on-the-move Berger on a Sunday evening a few hours after he'd flown back home to Dallas from Tennessee. In addition to being immersed in several construction projects, he'd been teaching a seminar on studio acoustics, facility design and HVAC noise control.

Russ Berger, circa 1980

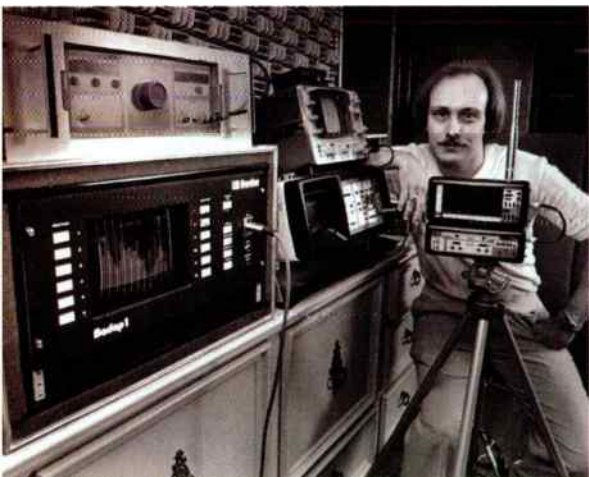


PHOTO: JAMES WILSON

BY MAUREN DRONEY



Right: Whitney Houston's studio and control room in New Jersey.

Below: MasterMix control room in Nashville.

PHOTOS: COURTESY RBDG



Which came first for you, music or electronics?

Both together, I guess. I've always loved music, and audio has been a passion of mine since grade school. My grandfather loved opera and my great-grandfather was chief recording engineer for Columbia Records in NYC during the '20s. Growing up, I'm the one that used our stereo system more than anybody else, wearing it out until I got my own. I was also fortunate to have a tape recorder to experiment with, which was a rare item to find in a home in the early '60s! Once, when I was 8 years old, I even tried to press my own record. At that time, when you bought a 45, oftentimes the flip side would be blank with unmodulated grooves. I thought I understood how records were pressed, so I hooked up the output of my tape recorder into the input of my amplifier, ran the output of the amplifier to the output of the turntable, then with a little propane blowtorch, I tried heating up the vinyl.

How'd it work?

Well, I ruined the cartridge, the head and, of course, the blank side of the record. So, I guess you could say my first attempt at mastering was a failure. I also had some experiences with a toaster and a lawn mower that I won't go into, but...that's how my childhood was.

How did you get interested in architecture and design?

My dad was an aeronautical engineer, and also an accomplished sketch artist. And my grandmother, on his side, was a well-respected artist. When I was 4 years old, she showed me how to make a box by folding and cutting a flat piece of cardboard. That was a whole new world for me, creating three dimensions out of two. So, I guess I got a love for design and drawing from my parents and grandparents.

Did you pursue those directions in school?

I started my direction toward physics in school, heading into oceanography to pursue my second passion, the ocean and scuba diving. But I got sidetracked into electronics when I found that to get into any of the good programs in oceanography you had to have, not only four years in the Navy, but also a doctorate in physics. I couldn't see spending an additional 20-odd years of my life in school, so I switched majors into electronics.

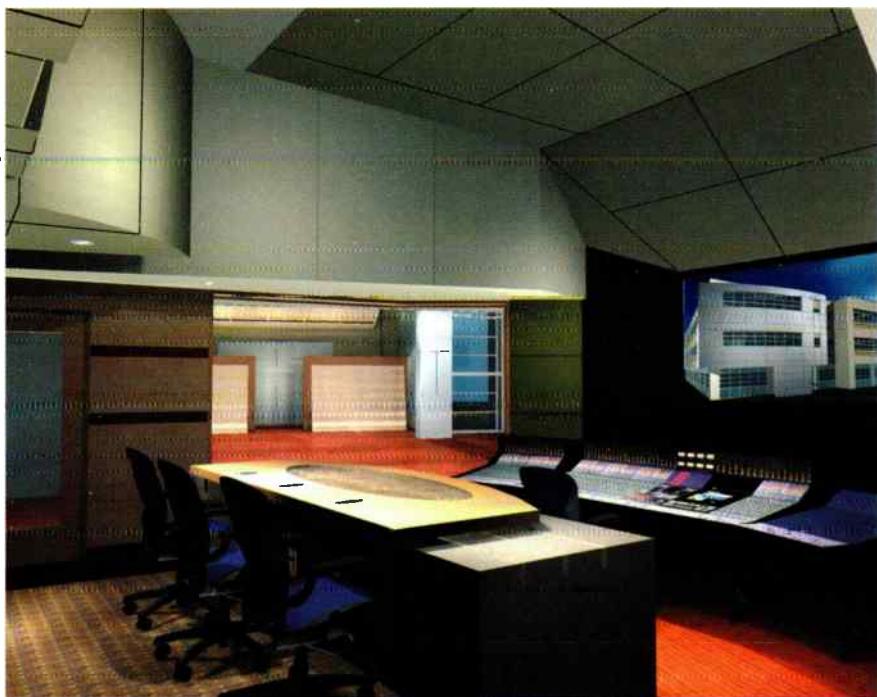
Meanwhile, you were also playing music.

I started playing piano in the second grade, but in fourth grade, I moved over to playing drums. My parents were saints to put up with it; they encouraged my drumming, and I played in a number of bands. In high school, I got hooked up with a band that was significantly older than I was; they'd actually cut some records that had charted. I traveled around with them on the weekends, and it opened my eyes to a new level of performance. All through college at the University of Houston and SMU, I continued playing drums and percussion, in a 12-piece orchestra, a jazz band, a three-piece power rock band, a country swing band...

Somewhere about my first year at college, I started getting involved with record engineering and really developed a love for it. I was working as a session musician and making pretty good money.

Wait a minute—you were making good money as a session musician in Houston?

You'd be surprised. Even way back then, there were quite a few studios in Texas. I did work with local bands, then I connected up with a producer who was doing this KTEL-type of product, called The Sound Alikes. For a while, I was in one of the bands that was called the Original Artists. Because they were marketing the music as by...



An architectural rendering of NFL Films' Control Room A in Mt. Laurel, N.J.

Oh, no! The Original Artists.

That's right. [Laughs] That was my first experience with session recording and also with creative marketing. It wasn't like cutting a record with the Stones, but I was working in the studio, and I was in heaven. I was very interested in the equipment and the recording process.

Were you one of those guys who are always going into the control room and making suggestions on how to improve the drum sound?

No, no, no! I went into the control rooms and sat at their feet, asking them, "Why are you doing that? How come it sounds this way?" And there were some patient people who put up with me. Then, some friends and I put together a little studio out in the country. We wired it up and put in a bunch of old 2- and 4-track hand-me-downs. From there, we got an investor and built a bigger place and had one of the first 3M 16-tracks and a 24-input Audiotronics console.

You were engineering while you were still in college.

I was carrying a load of courses in college, playing on weekends and sometimes evenings, and helping run a studio. It's like anybody who wants to break into this business—unless you really get some breaks, you have to work 26 hours a day to get anywhere. Some people have great talent; for me, it's always been more like competence gained through years of experience.

Eventually, I moved back to Dallas,

and started working at a company called Arnold & Morgan, which in the mid-'70s was something like the second largest music store in the country. I helped start up their pro audio division. I also built another studio in my house, just for myself and friends, and slowly but surely, people started doing steady work out there. Business also really built at Arnold & Morgan, to where the pro audio division got to be quite well-respected. And I started designing studios.

It's an obvious match: You were selling equipment, and people needed advice about the studios they were going to put it in.

I couldn't find anyone else to design my studios, because at that time acoustics was still an emerging science. At the universities that were offering course work, it was all about large-room acoustics—concert halls and theaters. I was interested in recording studios—small-room acoustics.

I was buying every book I could get and calling people on the phone—acoustical consultants, noise control engineers and architects—trying to expand my knowledge and get answers to questions. Also, I connected up with Synergetic Audio Concepts [Syn-Aud-Con] and Don and Carolyn Davis, who provided knowledge and encouragement that added new direction to my life and career.

Eventually, I joined Joiner Pelton Rose (that later became JRG), which was a classical acoustical consulting firm

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You're a proponent of side-looking "English-style" control rooms.

We've been building side-looking control rooms for about 15 years. Glass in front is problematic, functionally as well as acoustically, and only a few of our clients request it anymore. And now, of course, it's almost impossible to accommodate with all the equipment that wants to live in the front of the room. You've got LCR monitors, and you don't turn a monitor on its side and expect it to sound the same. It doesn't have the same polar response, and that means it won't sonically match the left and right monitors in timbre or frequency. Many manufacturers are coming out with new configurations of their center channel with a wide and short profile to sit above or below the video monitor. And although many sound surprisingly good, they still don't have the same character as their vertically oriented siblings. That center channel is absolutely critical to a successful surround experience. It's also critical to maintain an even soundstage across the front if we expect the mix to translate.

Another intractable problem is the video monitor in front; virtually all audio today has some video component to it. Either you want to see your Pro Tools up on the screen, or your console automation, or watch for the pizza delivery guy on the security monitor while you watch the football game. [Laughs] And that screen wants to occupy the same space as the center channel. So either you've got to fly that thing up in the breeze where you'll have a stiff neck from looking up or you've got to relocate your audio monitor to a place where you've compromised audio quality. This is why we've moved to using projection screens on the front wall.

Side-looking is wonderful from a technical sense, since now we've got all three speakers exactly where we want them. We're projecting an image that's easily read from the back of the room. And, our clients love the windows on the side that go all the way down to the floor. They feel like a part of the studio, and the studio feels like a part of the control room.

What projects are you working on now? The NFL Films project is very exciting. They're a long-standing client that

we've worked with for over 15 years. Now we're building their new national headquarters. It's a 200,000-square-foot, ground-up facility. We're doing it all, right down to the landscaping.

They actually shoot over 600 miles of film a year. All the film that's shot each week at every game is flown to their facility from all over the country. Then it's transferred to HD video and passed on to the producers who create the segments and shows. Editing and post finishes the product and marries it with graphics and audio, consisting of custom written, scored and recorded music, sound effects, dialog, and field production audio.

In the new facility, there are four main audio control rooms, with studios off of each, one sized for orchestral scoring. There are three SSL-equipped audio pre/mix control rooms, two large soundstages, a theater with 7.1 sound; in fact, all their rooms are able to monitor in surround, including the video edit suites and many of the 50 Avid rooms. We've been working with NFL Films on the design for over two years. It's under construction now and should be completed by the fall of 2001.

We're also currently working on a music production room for Patchwerk in Atlanta that's sporting an 18-foot-wide SSL 9k console. They have some very talented people working there that are just great to work with.

And we're working with the World Wrestling Federation, which is expanding their audio capabilities in Connecticut with a new ground-up facility to better support their existing video production capabilities. The only thing more amazing than their production operation are their people—it's a very clever and talented staff that can manage to generate the amount of broadcast hours each week that they do.

What are your goals for the future?

We're always testing our rooms, and we're always trying to find new ways of doing things better and less expensively. I want to find ways to make the design process more pleasant, fun and productive for our clients and the guys here in the office. But, you know, I just returned from the trip of a lifetime with my wife, Elisa, who runs RBDG with me and my daughter Danna. We were on a boat in the Galapagos, 600 miles off the coast of Ecuador, scuba diving with hammerhead sharks, dolphins, sea lions and whale sharks. And to be honest, right now I'm trying figure how I can find someone who wants to build a studio out there on Darwin Island. ■

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CIRCLE #037 ON PRODUCT INFO CARD

NAB 2000

Audio in the Age of Media Convergence

From April 8-13, a record-setting 113,000 attendees packed into Las Vegas for NAB2000, appropriately subtitled "The Convergence Marketplace." What a convergence it was, with traditional broadcasters, cable operators and new media types of all descriptions exploring technologies such as Internet distribution/transmission/Webcasting, all with an eye on getting a piece of the pie. Meanwhile, on the production side, the digital video revolution is in full swing, especially combining low-cost/high-performance DV camcorders with desktop editing/graphics systems that take full advantage of today's powerful, affordable computers and cheap data storage.

Squeezing (sometimes quite literally!) past the dozens of companies hawking PC-based video I/O cards and editing software packages—including Apple's (www.apple.com) wildly successful Final Cut Pro—it seems like NAB has almost become too big and too wild, a sensory overload. But there was no doubt that streaming media for the Internet was a dominant theme this year.

Microsoft (www.microsoft.com) was pushing its Windows Media Technologies as the only Internet broadband-ready platform designed for creation, distribution and playback of broadcast-quality digital media. The company was aggressively distributing its JumpStart CD, which includes the Windows Media Player, Windows Media Tools and Windows Media Services. Not to be outgunned, RealNetworks (www.real.com) was actively promoting its toolset for streaming media. With a suite of truly impressive software, the company was freely distributing CDs with its renowned Jukebox, Real Player, Real Presenter (beta), Real Producer, Slideshow and Real Server software.

One of the most exciting intros at NAB was Vegas Video from Sonic Foundry (www.sonicfoundry.com). Offering video editing and compositing, and audio recording, editing and mixing, plus a suite of encoding tools, Vegas Video takes the company's highly capable Vegas Pro multitrack audio software and combines it with various video technologies the company has developed. Supporting a wide range of file formats, real-time effects, keyframe-able transitions, video filters, and track motion, Vegas Video shows enormous potential for everything from DV production and corporate multimedia to broadcast production.

Coming right on the heels of Winter NAMM and AES Paris, NAB offered relatively little—at first glance—in terms of new audio products. Certainly, there were new audio innovations at NAB; you just had to look a

little harder to find the cool stuff.

WaveFrame (www.waveframe.com) announced FrameWorks/DX—developed with Merging Technologies—a versatile DAW for recording, editing, CD mastering and surround sound mix applications. The company also showed NetWave—a media file server for WaveFrame users developed in conjunction with mSoft. NetWave is a cross-platform, networkable audio retrieval system using a Web browser-based search interface for retrieving data over a local network or remotely over the Internet. On the sales front, industry vet John Mozzi joined the company a week before the show.

Hands down, the best demo at NAB was Soundscape's (www.soundscape-digital.com) presentation of two of its R.Ed 32-track DAWs interlocked with disk-based video, to show clips from the theatrical version of *The Omega Code* starring Michael York and the Taylor Array Process System—48 discrete playback speakers playing Alan Howarth's spectacular sound design work from the film. Forget 5.1. Bring on 48.1!

DSP Media (www.dspmedia.com) unveiled its second-generation Postation II, intended as a complete and fully integrated workstation for audio post. Features include the 24-bit DEP audio editor, disk-based video playback and a sleek Virtual Control Surface mixer interface. Its modular 32x32 digital mix processor is scalable to 96 inputs, with multiformat surround monitoring control. Fairlight (www.fairlightusa.com) celebrated the company's 25th anniversary at NAB by announcing the availability of a 48-track version of its disk-based Merlin digital multitrack. SADiE (www.sadie.com) showed RADiA, its new entry-level workstation, offering four inputs and up to 24 replay tracks at 48 kHz, supplied as either a single PCI card for user-configurable systems or as a full turnkey system with rackmount I/O and removable SCSI storage. Solid State Logic (www.solid-state-logic.com) introduced MixTrack, an integrated 24-bit, 96-track hard disk recording option for its Axiom-MT digital console. Sonic Solutions (www.sonic.com) announced the first professional mastering system for Internet audio. The new iMaster addition to its SonicStudio HD family of audio mastering systems will enable engineers to work in CD-Audio and DVD-Audio in high-resolution and simultaneously optimize the result for Internet delivery.

Midas (www.midasconsoles.com) launched the B2000 console for broadcast, video post and film applications. This new analog board supports mono/stereo/5.1/7.1 formats with



Sonic Foundry's Vegas Video

By Sarah Jones,
Roger Maycock
and George Petersen

SIX SLICK PICKS YOU MIGHT HAVE MISSED

There's no doubt that NAB is a huge show and with so much to see, there's also a lot you could miss, especially with 1,600 booths to cover in just four days. Here are some of my favorites. —GP

Audio Engineering Associates

(www.wesdooley.com) has taken the audio world by storm with its superb reissues of the beloved vintage RCA 44 ribbon mics. Now AEA is doing the same with RCA's model 77, available first as an empty shell (\$795) with an internal mount for inserting your mic of choice; the full-blown 77 reissue is planned for later this year.



Audio Precision

(www.audioprecision.com) showed a utility for its Dual Domain System

Two audio analyzer that runs a series of performance tests on sound cards. And with the proliferation of PC-based audio systems, this one is a winner all around.

Broadcast Monitoring (www.checkyoursignal.com) showed a full range of "must have" problem solvers for troubleshooting and signal monitoring of analog or digital audio signals in any production environment. My fave was "The Audio Pen," a digital audio monitor with a BNC at one end and a 10-segment LED meter along its highlighter-sized body.

Countryman Associates (www.countryman.com) is now shipping its B6, said to be the world's smallest lavalier, and with a capsule barely larger than the cable diameter, it can be placed in areas (such as behind a shirt button) where other lavs can't hide. Despite its tiny size, the B6 has a smooth, natural sound. This one rocks!

Magtrax (www.independentaudio.com) showed a variety of monitoring solutions and outboard controllers for helping your DAW, console or playback system seamlessly deal with LCRS, 5.1, 6.1 and 7.1 mixes in studio, mastering, broadcast or post-production environments.

Posthorn Recordings (www.posthorn.com) now distributes Stabilant 22, which—in a diluted form—was previously marketed as "Tweek" contact enhancer. As a Tweek fan for years, I'm glad that someone has brought Stabilant 22 back to the pro community where it belongs. ■

24- to 72-input frames. Features include limiters on each input, eight mix-minus buses, six aux buses and VCA sub-grouping; options include AFS/EBU I/O, AV routing interface and snapshot automation. No stranger to broadcast mixers, AMS Neve (www.ams-neve.com) showed its Libra Live Series II, which combines the ease of use of a conventional analog console with the advantages of a digital control/digital signal path.



AMS Libra Live II

It includes 24-bit analog and digital interfacing, along with various multiformat surround options with mix-minus, GPI and other broadcast-specific facilities. During a CBS TV demo, we saw them pull the plug and reboot in 10 seconds, while audio continued passing through. Not bad! And new Version 2 software updates were unveiled for the Euphonix (www.euphonix.com) System 5 and Studer (www.studer.ch) D950 digital consoles.

Speaking of updates, Digital Audio Research (www.dar.uk.com) demoed a compact remote controller for the DAR OMR8

rackmount digital 8-track recorder/dubber. The Remote Edit Controller offers access to all front panel controls, including jog wheel and dedicated function buttons, but best of all, enables machine room installation of multiple OMR8 transports.



DAR OMR8 Remote

Central Media Inc. announced Spot-

Taxi.com, designed to expedite the delivery of spots via the Internet for distribution to radio stations, ad agencies (for client approvals) or direct Webcasting. Based on an integrated software package, the system also allows central archiving of ads for those "Hey-I-need-that-spot-we-used last-month" situations, while removing costly overnight couriers from the process.

Dolby (www.dolby.com) previewed its DP570 Multi-channel Audio Tool, a two-rackspace solution that combines the features of Dolby Digital metadata selection and receiver emulation for creating audio metadata for multiple programs. The DP570 also offers multiple speaker selection, audio channel routing (eliminating the need for an external router), separate inputs for Pro Logic decoding and 5.1-channel monitor configuration. Deliveries are slated for Q4 2000, with digital-only and analog output versions planned. Dolby's new handheld DM100 Dolby E/Dolby Digital monitor lets engineers quickly test the integrity or composition of Dolby Digital, Dolby E and PCM signals in a studio, broadcast facility or home theater. The DM100 also generates Dolby Digital, Dolby E and PCM test bitstreams.

There was much more at NAB, and we'll present other product hits in our product sections in future issues. Meanwhile NAB returns to Las Vegas from April 21-26, 2001. Mark your calendars now. ■

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- 5 Band Variable Q Parametric EQ
- TYPE IV™ Conversion System with TSE™ Tape Saturation Emulation
- Sample Rate Conversion
- 48 bit internal signal path
- 16, 20, or 24 bit dither outputs
- AES/EBU or S/DIF digital outputs
- Dual Mono or True Stereo Operation
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Musikmesse 2000



PHOTO: HELMUTSTEIN

Hot News, Cool Products

By Sarah Jones

The 21st annual Frankfurt Musikmesse took place from April 12-16, and to say the event is huge would be an understatement: 10 exhibition halls housing more than 3 million square feet of exhibits; more than 2,000 exhibitors from 48 countries; a new Internet and Music Hall; and 200 concerts on seven stages. Elbowing our way past thousands of show attendees, many of them bleary-eyed from their red-eye flight from the NAB Convention in Las Vegas (see page 72 for our report), we found plenty of cool new products. Synthesizers, sound cards and analog-emulating software packages were everywhere; there was also a new crop of microphones and low-priced recording gear, as well as some significant sequencer version upgrades. Here are a few picks.

TC Electronic (www.tcelectronic.com) news: The company is joining up with **IVL Technologies Ltd.** (www.ivl.com) to create **Helicon Vocal Technologies**, which will develop vocal processing tools. The first product, a voice-formant and pitch processor, will be released in the third quarter of 2000. Helicon will be based in Victoria, B.C., and is made up of a team of engineers from TC and IVL. **TC Works** (www.tcworks.de), TC Electronics' software division, introduced **Spark I Modular** (\$99), which adds synthesis to the Spark environment with a group of building-block plug-ins. The open-ended, modular construction—patterned after analog sequencers—



TC Works Spark I Modular's oscillator screen

has three modules: **TCO** is a monophonic dual oscillator offering a variety of waveforms, pulse width modulation, an additional sub-oscillator, oscillator sync, ring modulation and LFO; the waveforms are generated, as opposed to being played back from sample memory. The **TCF** filter module provides lowpass and highpass filtering, envelope, key follow and single and multi triggering. **TCA** is an amp module with ADSR curve and analog emulation circuitry. **Spark I Modular** includes a VST version of the **FXmachine**, allowing use with any sequencer supporting VST instruments.

There was always a crowd ringing **CreamWare's** (www.creamware.com) prototype of its **Stage Frame One**, a synthesizer built around a complete PC with CreamWare's DSP cards, housed in a banana-yellow keyboard chassis, with a huge, full-color 14-inch LCD touch-screen and 14 parameter control knobs. Rather than being fixed to a single architecture, the synthesizer is designed to load a variety of configurations.

CreamWare Stage Frame One



Although the gear at Musikmesse was being used to house Pulsar and Scope systems, CreamWare says Stage Frame will ultimately incorporate synthesis, sequencing, mixing and recording. A production unit is slated to appear by the end of the year. CreamWare was also showing Pulsar II, which offers a 50% boost in DSP power, new effects and modules, a revamped interface, and a new stated ASIO latency of 2 ms. List price is \$1,398.



SEK'D Sequoia

Sequoia is the newest audio editing system from SEK'D (www.sekd.com). Highlights include a "4-point" operating mode, in which source material is visible in the lower half of the screen, destination tracks in the upper half, with independent navigation between parts. (Cuts can even be made between project windows.) Asymmetrical and symmetrical crossfades are possible and can be performed during playback; the system is able to move audio material and fades together or separately. SEK'D's new Comparisons color-coded audio content representation mode is also integrated. A host-based workstation, Sequoia offers 32-bit floating-point processing, support for sample rates up to 196 kHz, and network integration. Retail is \$5,000.

Steinberg (www.steinberg.net) made a splash with Cubase VST 5. This new version, available this month, offers scalable recording modes with up to 32-bit floating-point resolution on 128 channels in the flagship Cubase VST/32, which also has Apogee UV22 dithering technology, eight effects sends, four channel inserts and four master inserts. A new FX rack hosts new controls, and channel EQs can now be edited graphically or with virtual pots. Other features include folder tracks, which "fold away" an infinite number of MIDI and audio tracks, and a TrueTape mode that offers the choice of recording digitally or with analog emulation. The new MIDI Track Mixer offers VST-style MIDI control, system resolution up to 15,360 ppq, and more than 300 new scoring functions.



SPL Area 5.1

The upgrade from any previous version of Cubase is \$129.

Speaking of VST, the B4 from Native Instruments (www.native-instruments.com) is a VST tone-wheel organ combo designed to completely emulate—you guessed it—the Hammond B3 organ. The B4's sample-based software model is based on analysis of electromechanical sound generation and tube circuitry of organ and speaker cabinet combinations. The software interface reproduces the vintage keyboard, with upper-manual and lower-manual keyboards, pedal keyboard, expression pedal, draw bars, vibrato and velocity switches, and preset selectors. Of course, a rotary speaker control is built in. Other features include key-click adjustment, "tube distortion," and a "rear panel" for additional parameter adjustment.



Native Instruments B4: the screen

The C 2000 B is a new cardioid condenser mic from AKG Acoustics (www.akeg-acoustics.com). Housed in a silver-gray metal casing with a large wire mesh grille, the microphone is described as having a flat response with a slight high-frequency boost, and boasts a frequency response down to 10 Hz. Features include a switchable bass roll-off and 10dB pad. The C 2000 B comes with the AKG SA41 stand adapter; an optional H100 spider shockmount is available. List price is \$378.



AKG Acoustics C 2000 B

SPL (www.soundperformancelab.com) showed Area 5.1, a new miking and mixing system for 5.1 recordings.

Area 5.1 is a rackmount unit comprising five mic preamps that can be coupled with motorized controls. Each preamp delivers up to 70 dB of gain and has pad, phase reverse and phantom power controls, plus a stereo downmix section enabling simultaneous recording of both 5.1 and stereo. The Sub/LFE channel creates the sub signal from a selection of front, surround and center microphone signals. Area 5.1 combines with SPL's new Atmos 5.1 compact location recording and mixing/premastering console and Dirk Brauner's ASM 5 5-channel Adjustable Surround Microphone for a complete surround recording front end.

Novation (www.novationuk.com) introduced rack versions of its SuperNova II series. The Rack has all the new features of the SuperNova II keyboard except the master controller functions; it offers a dot-matrix display screen, front panel inputs and controls; optional 12 and 24 Voice Polyphony expander cards and an ADAT/SPDIF card for the SuperNova II Keyboard can be added. Three versions are available, ranging from 24 to 48 voices.

The Nord Lead 3 is the latest version of Clavia's (www.clavia.com) popular virtual analog synth. The Nord Lead 3 is a 20-voice synthesizer; the two oscillators per voice now offer six waveforms. Two multimode filters are built in, and the modulation section now offers three LFOs and envelope generators.

Sibelius (www.sibelius.com) was showing an Internet version of its notation package. Sibelius Internet Edition lets publishers create sheet music and turn it into a Web page; Scorch is Sibelius' free plug-in for playing, viewing, customizing and printing Sibelius scores on the Internet.

These are just a few of the hot products we saw at Musikmesse; look for more debuts in upcoming product columns. In the meantime, book your tickets now for the new Russian Musikmesse/ProLight + Sound, which will take place in St. Petersburg, June 20-23, 2001. And on the subject of next year, the 22nd Frankfurt Musikmesse takes place March 7-11, 2001. ■

NSCA EXPO 2000

CONTROLLERS, CONSOLES AND PLENTY OF SPEAKERS



The Level Control Systems CueConsole modular digital mixing control surface. After using the CueConsole to program the LCS Matrix3 LX-300, the operator can run the show on a minimum of CueConsole modules.

The 20th annual National Systems Contractors Association's annual Conference and Expo, held April 26 to May 1 at the Las Vegas Convention Center, attracted a record-breaking 10,000-plus attendees. With more than 500 exhibitors showing products for the contracting and live sound industries, there was plenty to see and hear. Here are some highlights from the show:

Level Control Systems (www.lcsaudio.com) unveiled CueConsole, a modular digital mix control surface that acts as a programming and control front-end to LCS's new Matrix³ LX-300 automated system. Each LX-300 accepts as many as 400 audio inputs and offers up to 512 outputs; 32 systems can be networked. I/O modules include CobraNet, ADAT and analog I/Os; AES/EBU digital I/O is promised. After initially programming the LX-300, the CueConsole modules can be removed, leaving only as many

modules as necessary to run the show. Theater producers should appreciate the savings on "seat kills" and the unique



Midas Heritage 1000 features a preamp design from the Midas XL4 and an EQ section from the XL3.

ability to place mixing and editing surfaces in multiple locations; Matrix³ has already been spec'd by sound designer Jonathan Deans for the new production of *Seussical*.

Peak Audio (www.peakaudio.com) previewed a new graphic user interface (GUI) for CobraNet. Peak's CobraNet system for distributing multichannel audio and control data over Ethernet is already licensed by Biamp, Crest, Crown, EAW, LCS,

Peavey, QSC, Rane and Whirlwind, and is becoming the *de facto* standard for long-distance distribution of digital audio in multivendor installations. Peak showed the CobraCAD GUI for designing and modifying complex CobraNet networks and the CM-1, a floppy disk-sized circuit board providing one-stop CobraNet connectivity for licensees' products.

ANALOG CONSOLES

Soundcraft (www.soundcraft.com) is now shipping its Series TWO compact live console. Available in 24/32/40-input formats (all with two stereo line inputs and four stereo FX re-

turns), the Series TWO has eight group buses routable to LCR main output buses, eight mono aux sends, an 11x2 output matrix and MIDI muting (both manual or via 128 MIDI-controllable snapshots). Inputs feature 4-band EQ and direct outs for live recording. Prices range from \$6,395 to \$9,395.

Midas (www.midasconsoles.com) showed the Heritage 1000 console, a cost-effective derivative of the Heritage 3000 and 2000. Features include a preamp design from the Midas XL4 and an



The new Matrix3 LX-300 from Level Control Systems accepts as many as 400 audio inputs and offers up to 512 outputs.

BY CHRIS MICHIE



Klark Teknik's DN9848 loudspeaker management system includes a digital processor.

EQ section from the XL3. The Heritage 1000 is available in 24- to 56-input frame sizes, priced from around \$45,000.

SIGNAL PROCESSING

Klark Teknik's (www.klarktechnik.com) DN9848 loudspeaker management system is a 4-in/8-out, single-rackspace unit configurable for any speaker system. Based around a digital processor, the DN9848 offers precise filter operation, extensive EQ and delay options on inputs and outputs, routing flexibility and full metering. The unit may be programmed either from the front panel or via RS-232/485 ports.

TOA's (www.toa.com) DACsys 2000 digital signal processor series includes the DP-2026, a 2-in/6-out rackmount unit offering crossover, multiband filtering, compressor/limiter, gate and delay functions in a software-controlled package. Expandable to 2-in/8-out, 2-in/10-out, 4-in/6-out or 6 in/6-out with optional modules, the DP-0206 features 24-bit DACs with 110dB-plus dynamic range.

ANALYSIS SYSTEMS

Gold Line's (www.gold-line.com) new portable sound level meter features an interface for PC-based sound monitoring software. Fitted with an XLR mic input and an integrated measurement mic, the meter provides sound level readings from 24 dB to 132 dB via a numeric display with 0.1dB resolution, in flat, A or C weightings.

The latest iteration of the Smart sound system analysis software from SIA Software (www.eaw.com), SmartLive offers a new interface and improved performance. In related news, Furman Sound

and Ultra Sound have formed a new venture called Interfacing Technologies (www.furmansound.com); the new company's first products include the compact AIS-10 2-channel line level router and signal preamp for use with computer-based analysis systems such as Smaart (\$179).

LOUDSPEAKERS

Meyer Sound (www.meyersound.com) showed the self-powered USM-1P and USM-100P wedge monitors, each featuring a 12-inch driver and a 3-inch diaphragm compression driver on a constant-Q horn. The UM-100P offers a 100°x40° (HxV) pattern; the UM-1P has a 45°x45° dispersion conical horn. Max SPL is rated at 133 dB (1m); response is 30 to 20k Hz.

The dV-DOSC speaker from L-Acoustics (www.coxaudio.com) is an active two-way arrayable enclosure with two 8-inch cone drivers and a single 1.4-inch compression driver mounted on a proprietary DOSC waveguide. With a frequency response of 100 to 18k Hz (± 3 dB) and weighing 73 pounds, the dV-DOSC is designed to be stacked or hung in a vertical column with an adjustable vertical splay; horizontal coverage is 120°.

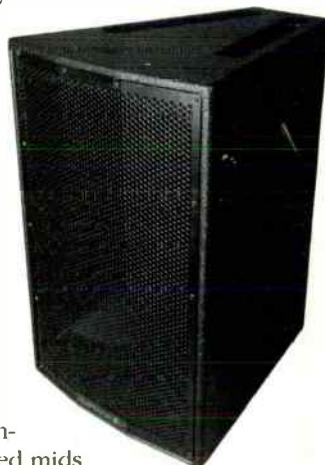
NEXO (www.nexo-sa.com) debuted the compact PS-8, a two-way passive system delivering a 63 to 21k Hz response from an 8-inch woofer and a 1-inch tweeter. Turbosound (www.turbosound.com) showed its TCS-35 small-format speaker, a trapezoidal, passive two-way loudspeaker with an 8-inch woofer and 1-inch titanium HF tweeter. The TCS-35 has 120°x120° dispersion, 55 to 18k Hz (± 4 dB) response and 400/500-watt program/peak handling.

In its first foray into pro loudspeakers, Crest Audio (www.crestaudio.com) introduced its CT Series. The CT Series can be driven pas-

sively or bi-amplified and includes three full-range systems, a subwoofer and two wedge monitor models. All CT models include B&C transducers and Speakon inputs; additional features include ¾-inch poplar plywood construction, cast aluminum horns and a trapezoidal full-range boxes.

The SPL-td1 from ServoDrive (www.servodrive.com) is a trapezoidal cabinet housing two 12-inch low-frequency

ServoDrive's SPL-td1, a full-range cabinet housing two 12-inch low-frequency drivers, four 5.25-inch compression loaded mids and a 1-inch HF horn.



drivers, four 5.25-inch compression loaded mids and a 1-inch HF horn. The SPL-td1 combines outputs from the seven different drivers in a single horn. The SPL-td1 is configurable for two- or three-way active or for passive (800W max) use. Response is 80 to 20k Hz (± 2 dB) in passive mode; sensitivity is 103dB SPL (1W/1m). Price: \$3,295.

ALSO NOTED

Wireworks (www.wirelux.com) showed its new Wirelux cables, including MusiLux microphone cable that uses a drain wire embedded in a continuous molded insulator to shield the two conductors, rather than traditional braided wire shielding.

Available from Tools For Stagecraft (www.toolsforstagecraft.com), Blinkits are colored LEDs (green, amber, red; flashing or nonflashing) that mount directly to a 9-volt battery. At \$10 each, Blinkits offer a low-cost, simple way to mark obstacles or other points of interest in the backstage darkness.

NSCA Expo 2001 will be in Orlando, Florida, next year (March 8-10). Bring the kids!



Meyer Sound's self-powered USM-1P and USM-100P wedge monitors. The UM-100P offers a 100°x40° (HxV) pattern; the UM-1P has a 45°x45° dispersion conical horn.



16th Annual TEC Awards Nominees

Listed below are the nominees chosen by the Nominating Panel of the 16th Annual Technical Excellence & Creativity Awards. A special TEC Awards nominees supplement and voting ballot will appear in the August issue of *Mix*.

The TEC Awards will be held Saturday, September 23, at the Regal Biltmore in Los Angeles. For more information, contact Karen Dunn at (925) 939-6149, or e-mail KarenTEC@aol.com.

OUTSTANDING INSTITUTIONAL ACHIEVEMENT

ACOUSTICS FACILITY DESIGN COMPANY

Russ Berger Design Group, Dallas, TX
Francis Manzella Design Ltd.,

Yorktown Heights, NY
studio bauton, Los Angeles
Waterland Design, Los Angeles
Walters-Storyk Design Group,
Highland, NY

SOUND REINFORCEMENT COMPANY

ATK-AudioTek Corp., Burbank, CA
Clair Brothers, Lititz, PA
Electrotec, Burbank, CA
Showco, Dallas, TX
Sound Image, Escondido, CA

MASTERING FACILITY

Future Disc Systems, Hollywood, CA
Gateway Mastering, Portland, ME
Georgetown Masters, Nashville
Bernie Grundman Mastering,
Hollywood, CA
Sterling Sound, New York City

AUDIO POST-PRODUCTION FACILITY

Complete Sound, Hollywood, CA
Skywalker Sound, San Rafael, CA
Sound One, New York City
Soundelux Hollywood, Hollywood, CA
Todd-AO Studios, Hollywood, CA

REMOTE RECORDING FACILITY

Design FX Audio, Los Angeles
Effanel Music, New York City
Le Mobile Remote Recording Studio,
Vista, CA
Record Plant Remote, Ringwood, NJ
Remote Recording Services, Lahaska, PA

RECORDING STUDIO

Conway Studios, Hollywood, CA
Quad Recording, New York City
Record Plant, Los Angeles
Right Track Recording, New York City
The Village, West Los Angeles

OUTSTANDING CREATIVE ACHIEVEMENT

AUDIO POST-PRODUCTION ENGINEER FOR FILM

Richard Beggs
Ben Burt, Skywalker Sound
Dane Davis, Danetracks, Inc.
Chris Jenkins, Todd-AO Studios
Wylie Stateman, Soundelux Hollywood

AUDIO POST-PRODUCTION ENGINEER FOR TELEVISION

Tamara Johnson Bolm, Complete Sound
Ken Hahn, Sync Sound
Sue Pelino, Sony Music Studios
Paul Sandweiss, Sound Design Corp.
Adam Sawelson, Todd-AO Studios

REMOTE RECORDING ENGINEER

Guy Charbonneau, Le Mobile
John Harris, Effanel Music
David Hewitt, Remote Recording Services
Kooster McAllister, Record Plant Remote
Steve Remote, Aura Sonic Ltd.

SOUND REINFORCEMENT ENGINEER

Robert "Cubby" Colby
Trip Khalaf
David Morgan
Tim Mulligan
Robert Scovill

MASTERING ENGINEER

Greg Calbi, Sterling Sound
Ted Jensen, Sterling Sound
Bob Ludwig, Gateway Mastering
Stephen Marcussen, Stephen Marcussen Mastering
Denny Purcell, Georgetown Masters

RECORD PRODUCER

Dallas Austin
Tony Brown
Rodney Jerkins
John "Mutt" Lange
Brendan O'Brien

RECORDING MIXING ENGINEER

Chuck Ainlay
Mick Guzauski
Alan Moulder
Jack Joseph Puig
Mike Shipley

OUTSTANDING TECHNICAL ACHIEVEMENT

ANCILLARY EQUIPMENT

Audio Precision System 2 Cascade
BSS "Jellyfish" SoundWeb controller
Lucid AD9624/DA9624 converters
MOTU MIDI Timepiece AV-USB
Neutrik Speakon NL2 two-pole connectors
TerraSonde Audio Toolbox2

AMPLIFIER TECHNOLOGY

Bryston 14B Pro
C-Audio Pulse Series
Hafner SR Series
Pass Labs X5
QSC Powerlight 2
Yamaha XM 4220

MIC PREAMPLIFIER TECHNOLOGY

Aphex Model 1100
dbx 386
Grace Designs Model 801R
Millennia Media HV-3D
PreSonus MP20
Summit MPE-200

COMPUTER SOFTWARE & PERIPHERALS

BIAS Peak 2.0
Cakewalk Pro Audio 9
Minnnetonka Mx51 v2.0
MOTU Digital Performer 2.61
Sonic Foundry Vegas Pro
TC Works Spark

MICROPHONE TECHNOLOGY

AKG C3000B
Audio-Technica AT4047/SV
Brauner/SPL Atmos 5.1 System
Earthworks SR77
Neumann KMS105
Soundelux U99

SOUND REINFORCEMENT LOUDSPEAKER TECHNOLOGY

Audio Composite Engineering 1160WR
L-Acoustics DV-DOSC
Mackie SRM150
Martin Audio WT3
Meyer Sound UPM-1P
Shure PSM700 Personal Stereo Monitor

STUDIO MONITOR TECHNOLOGY

Genelec 1036A
JBL LSR25P
Klein & Hummel 0198
KRK V-6
M&K MPS 2510P
Tannoy Proto-J

MUSICAL INSTRUMENT TECHNOLOGY

Akai MPC 2000XL
Alesis DM Pro Drum Module
Emu Proteus 2000
Korg Triton proX
Kurzweil K2600
Yamaha S80

SIGNAL PROCESSING TECHNOLOGY/HARDWARE

Avalon Design VT-747SP
Eventide Orville
Lexicon MPX 500
Sony DRE-S777 Sampling Digital Reverb
TC Electronic System 6000
Waves L2

SIGNAL PROCESSING TECHNOLOGY/SOFTWARE

Antares Microphone Modeler
Bomb Factory Classic Compressors
Cycling '74 Pluggo
Kind of Loud Technologies RealVerb 5.1
Serato Pitch 'n Time
Waves C4 Multiband Parametric Processor

RECORDING DEVICES STORAGE TECHNOLOGY

Akai DPS-16
360 Systems TCR-8
Alesis Masterlink ML-9600
Glyph Technologies Cobra/SAN
Roland VSR-880
Tascam DA-781R

WORKSTATION TECHNOLOGY

AMS/Neve AudioFile SC
Digidesign Pro Tools 5.0
Fairlight Fame 2
Soundscape R.Ed
Spectral Design Audio Cube 3
Waveframe 408+

SOUND REINFORCEMENT CONSOLE TECHNOLOGY

Audio Toys Inc. Paragon Monitor
Crest X-Monitor
InnovaSON Sensory Grand Live
Jim Gamble DCX Event 40
Midas Heritage 3000
Yamaha M3000

SMALL FORMAT CONSOLE TECHNOLOGY

API 7600/7800
Calrec M3
CM Automation MotorMix
Manley 16x2
Roland VM-7000
Tascam TM-D4000

LARGE FORMAT CONSOLE TECHNOLOGY

Amek DMS+
API Mini Legacy
Audient ASP-8024
Euphonix System 5
Otari Advanta Broadcast
Soundtracs DS-3

Hall of Fame
Sam Phillips

Les Paul Award
Paul
McCartney



Ultimate Plug & Play

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PIERRE MARCHAND

PRODUCING SARAH McLACHLAN, ON LAND AND ON SEA

Pierre Marchand calls his approach to production “disorganized” and “chaotic,” but his results sound the exact opposite. He is the producer who has made the difference on pristine recordings by singer/songwriters such as the McGarrigle sisters (*Heartbeats Accelerating*, 1990) and Sarah McLachlan, with whom he worked on five albums: *Solace* (1991), *Fumbling Towards Ecstasy* (1993), *The Freedom Sessions* (1994), *Rarities, B-sides, and Other Stuff* (1996), and *Surfacing* (1997).

During the past few years McLachlan’s albums have been amassing bucketsful of critical and commercial success—huge album



Pierre Marchand (pictured) developed Wild Sky Studios with Sarah McLachlan to accommodate her album work.

sales, lots of industry awards and a high media profile. *Surfacing* and *Fumbling Towards Ecstasy* went triple-Platinum in the U.S. and Canada. There have been songs for movies (for *Better Than Chocolate*, *Toy Story* and *Toy Story 2*, and *City of Angels*), and there’s even a Sarah McLachlan cookbook. It’s a bit surprising, therefore, that the man who has been instrumental in helping create her music has remained virtually anonymous.

So, let’s give credit where credit is due: Pierre Marchand plays many

of the instruments, including bass, keyboards and drum programming, on McLachlan’s studio albums. He also records, mixes and produces all her material and co-writes some of her songs.

Almost all of McLachlan’s material is recorded at Marchand’s studio, Wild Sky, in beautiful, forest-covered hills an hour’s drive from Montreal (see sidebar on page 90 for more on the studio). But getting a hold of him there proved difficult,

and the reason quickly became clear. Unlike many other producers who appear to have an eight-days-a-week attitude toward their work, Marchand spent some of his royalties on a 47-foot sailboat a couple of years ago, and he spends a fair amount of time sailing. “It gets very cold up here in Quebec,” he explains, “and after eight years here I had enough of freezing. Also, I burnt out at the end of *Surfacing*. I was going to turn 40, I had dreams of world travel and of pursuing my interests in visual arts. I ended up in California, found a boat and installed a small studio and a dark room in it. The idea was to get more creative, but being on a ship is just not conducive to writing. It’s too easy to just swim!”

Meanwhile, Marchand handed the running of Wild Sky Studios to two brothers, Dominique and Silvain Grand, who keep the studio running as a commercial facility. When I finally caught Marchand on the phone at Wild Sky in late 1999, he was back at the studio for a few months, because, he says, “At one point, vacation life gets a little boring. I wanted a little culture, and I’m considering doing some studio work again.”

BY PAUL TINGEN

—CONTINUED ON PAGE 86

MUTT LANGE'S SULLY SOUND

Tales From the Digital Trenches

Robert "Mutt" Lange would like nothing more than to be left alone—to refine his talents for a wide range of clients. But fans discovered where he and his wife, country singer Shania Twain, lived in rural upstate New York and made life difficult, despite good intentions. The solution? Relocate to a country that is known for its neutrality and privacy, where the couple would be able to set up house and a studio, Sully Sound, and lead a "normal" life in relative obscurity. Switzerland is the country, and that's all the creative team is telling anybody.

But wherever you call home, a high-end studio owner stills needs the services of a hot-shot tech to solve the inevitable problems that can plague creative life. For Mutt Lange, that technician is John Klett, who has been working with the producer since early 1996. "I was brought in to 'put a bow' on the New York facility," Klett says. The New York facility featured a Solid State Logic 9000 J Series console. "I walked into that room when it had been largely completed," Klett recalls, "and was asked to sort out some buzzes, hums and other interface problems. I worked at that facility off and on for a little over a year, sorting all the details."

Klett's firm, Singularity Enterprises, provides a range of technical engineering, consulting and design services for music studios, post facilities, producers and other audio professionals. Established in 1976, and now based in Carmel, N.Y., Singularity also works closely with Coral Sound and Purple Audio on custom work, rebuild and restoration projects. "I find that more and more project studio owners, like Mutt, need help in sorting out interface and sync problems, particularly with digital systems and workstations," Klett says. He was hired as technical director for a number of upgrades and enhancements to the Swiss studio.

Completed early last year, Lange's new facility was designed by Tom Hidley and features a 35x25-foot control room and a smaller MIDI production suite. The main control room houses an SSL Axiom-MT digital console—number ten off the production line—and several giant outboard racks. A 5.1-channel surround sound monitoring system uses KRK Exposé 8 powered speakers. Mix-down decks include two HHB Genex GX-8500 MO recorders, plus various DATs, CD-Rs and a Prism MR2024T/Tascam DA-88 combination for 24-bit mixing and playback.



Matt Marinelli (left) of Coral Sound did wiring, system prefabrication and integration. Also pictured are acting technical director/system designer John Klett (center) and facility manager Michael Gallone.

The MIDI programming room houses a pair of Mackie digital 8-bus consoles, a large array of MIDI synthesizers, sound modules and samplers, plus an assortment of vintage and classic keyboards. Stereo monitoring is also via KRK Exposé 8s.

"The two rooms are designed to work together as one," Klett explains, "and share a Digidesign Pro Tools 5 system, a Sony PCM-3348HR 24-bit/48-track and a trio of Tascam DA-88 MDM systems in a 24-track array. The Pro Tools rig features 48 I/O and 24 mix tracks. We recently added a larger Digidesign 72 I/O 24 MIX system that became the primary multitrack source for the studio and allows the smaller 48 I/O system to be used by a second programmer while the large one is being used for mixing with the Axiom-MT." The communal equipment is located in a small, air-conditioned machine room, together with the Axiom-MT tower. A newly installed NVision 256x256 NV-3512A asynchronous AES router handles digital interfacing and routing between the various multichannel sources and consoles.

"I was called in by Mutt when the new system was 'kind of working,'" Klett says. "I made sure that we eliminated the annoying ticks and pops you run into when clocks don't match, or because there are timing offsets between DSP racks. You can follow the manufacturer's advice from the manual—which tells you how it works by itself—but they rarely tell you what to do when you hook up to equipment made by other manufacturers."

Klett found that an NVision NV-5500 word clock generator had been specified as master reference for the facility. "The 5500 is certainly the right box. But problems [can arise] in the

BY MEL LAMBERT

priority selection of synchronization sources. AES Black works best as a primary source of sync, but many devices don't accept that. So we fall back to word clock, or Super-Clock, and then video black if that is the only choice. In many cases, we still need video to make time-code work. But AES sync is much higher-resolution than 60Hz video, and almost always works flawlessly for audio. Video requires a phase-locked loop to generate a high-resolution signal for digital clocks. While companies like Aardvark have got that process worked out very well, I find that the more I avoid video and PLLs [phase-locked loops], the better everything is for digital synchronization. You need the enhanced resolution but certainly not the stability problems associated with poorly done PLLs." Klett says that once the new synchronization scheme had been implemented, "all the pops and clicks went away."

"AES sync is based on a bit clock," Klett continues. "I set up a way of distributing AES Black from a master distribution amp, feeding an Aardvark AardDDA in each Pro Tools tower." The AardDDA is a 1-in, 6-out AES/EBU audio distribution unit that requires no relocking. "The AardDDA, with its de-jittered receiver, outputs a 'Super Clock' for the Pro Tools interfaces and is much more stable than the normal sync setup." The Master Clock reference is shared between the PCM-3348, Pro Tools systems and the Axiom-MT tower.

All digital multichannel sources and destinations are routed through the NVision NV-3512A router. Why asynchronous and not synchronous? "Because sometimes we need to varispeed the PCM-3348," Klett explains. "The Axiom-MT runs synchronously at a sampling rate of 48 kHz; it can sample rate convert on the inputs. Mutt likes to play around with tempo changes by altering sampling rates. We needed a router that would pass whatever sample rate we put through it. Simple."

The NV-3512A can accommodate up to 1,024 inputs and outputs—512 AES/EBU-formatted pairs. The router Klett specified is 512x512, 256x256 AES pairs. "The Axiom-MT takes 96 inputs, the PCM-3348 takes 48, the first Mackie D8B takes 24, the second Mackie D8B takes 24, and the Pro Tools rigs take 72 and 48. We also have a collection of Tascam DA-88s and master clock sources."

The PCM-3348 is interfaced via a Pro Bel MAD1-to-AES/EBU converter. "Of

the 256-by-256 stereo-pair capacity, we have used up around 208-by-208, with room to grow," Klett continues. "We have also added a remote-control system from Quartz Electronics that lets us store and recall a number of crosspoints and routing snapshots via a touchscreen. We are emulating the type of system you might have with a multipin patching system, using multiples of 12 AES/EBU-format pairs. That way we can quickly crosspatch using blocks of 24 signal paths via pre-programmed setups."

Analog sources are handled via the Axiom-MT's series of four RIO (remote input/output) boxes. "The first RIO accommodates the mix outputs and analog playback sources; RIO number two the auxiliary sends and returns; and RIO number three and number four the 96 channel inputs and insert loops."

Problems with processing delay or "latency" are inherent with all digital systems. Even the use of a humble analog-to-digital converter will introduce a small but invasive delay offset between signal sources. "And a console system like the Axiom-MT can introduce a lot of delay when you add up latencies through the converters and router," Klett acknowledges. "But you never hear that from the manufacturers. Mutt is particularly sensitive to delays during vocal overdubs and solos. If the live and off-tape cue feeds are not in sync, it puts everybody off in the studio and control room. One solution involves delaying all the signal paths, padding out the shorter ones to put them back in sync with the longest ones—something that is done automatically on the Sony Oxford. SSL has recently given us a good set of tools to work out these delays. I don't see that any of the console manufacturers have gotten this completely sorted. Delay is never going to go away; [the problem] has to be transparently managed so we don't have to think about it."

"One solution I proposed when we were seeing delays of around 17 ms from mic input to analog cue feed, was to set up a hybrid of a digitally controlled analog console and a digital console/mixer," he continues. "A cue mix from such a console would have fold-back to headphones handled totally in the delay-free analog domain. The practical solution is to split off the mic signal off and mix that with a cue mix of everything you want to hear—but yourself—from the console."

"For the mix/overdub engineer, the situation is more complex. Delay could potentially cause a shift in perceived 'feel.' If you route to an analog proces-

sor and back again, the signal can take between 1.2 and 1.8 ms to reach the mix path. This is not a small delay; you will hear a change in the snare sound when it's combined with other open mics. You can add delay to all the other channels to pad them out by the same amount, but where does the delay go in the signal path? If you add it as the first process in the chain, you'll find that some of the buses mixed off the console will be synchronized, and some will not be. Manufacturers have to figure out how best to apply delays so that all inputs to mix buses remain synchronized to within a half-sample, or better."

Klett offers that an automated delay management system would be nice, but he isn't holding his breath. "It's probably unrealistic to expect such a system to account for items external to the console. But with some form of user-defined database of delay times for each outboard unit, it wouldn't be impossible. A pulse generation and measurement routine would allow the engineer to 'zero out' these delays if necessary."

But overdubs remain a thorny problem. "The tape plays and a cue mix is generated to a pair of headphones 2.5 ms later," Klett says. "The new material is captured and takes 4 ms to get back to the tape machine. The new material will go to tape after the tracks that generated the cue mix have moved off the sync head. How do we manage that delay? Digital tape machines like a PCM-3348, or a hard disk multitrack like a Euphonix R-1 or Fairlight Merlin, can help, since we can take outputs from them in advance of the actual recording event, and then get back to the machine in time to ensure off-tape sync. Essentially, the console replaces the 3348's internal delay with its own so that a 'zero time' overdub can be accomplished."

Now that the new studio is up and running and fine-tuned, Mutt Lange has been busy working on new recordings for Shania Twain, plus sessions for Britney Spears and The Corrs. Upcoming projects for Klett include system design and consultation work on a new four-studio audio production annex designed by the Russ Berger Design Group for the World Wrestling Federation in Stamford, Conn. ■

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INTERNATIONAL UPDATE

keep it away from a Hollywood sound. By contrast, on *Fumbling*, we always tried to go in nonobvious directions, like with the song 'Hold On,' which was a very slow, jazzy, dark, quiet song. I tried to offset that with a rocking rhythm on the drum machine, taking the feel in a completely different direction."

So, while *Fumbling* is complex and technology-oriented, with a central place for the drum machine, *Surfacing* is more acoustic, organic and straightforward. On one song on *Surfacing*, in fact, the stripped-down arrangement consists of just an acoustic piano and acoustic bass, and on many others the only players are McLachlan, drummer Ash Sood and Marchand.

RECORDING FROM THE DRUMS UP

All of the albums that Marchand recorded with McLachlan after *Solace* were recorded at Wild Sky studio, following a similar approach. They begin with a lengthy pre-production process, with just Marchand and McLachlan sitting down and mapping out the songs.

"We get a mood and a direction for

the songs, and the musicians later tap into that," Marchand says. "Usually, we develop ideas that Sarah brings in, sometimes we write songs together. 'Building A Mystery,' for example, was a combination of some chords that Sarah played that fitted with a chorus melody line and some words that I had written. For *Fumbling Towards Ecstasy*, we enjoyed the first week of pre-production so much that we thought we could just stop there and put out a record. You can hear some of that stuff on *The Freedom Sessions* album, which was released two years after *Fumbling*. Some of the tracks on it are the result of that first week of experimentation. The rest is the live band improvising completely new versions of older songs.

"Once Sarah and I have the structure for the song," he continues, "my drum machine, the Akai MPC60, is my starting point for the arrangements. I've used the MPC60 for all the albums. The 808 on *Fumbling* was sampled into the MPC60, because you can do many more things with the sounds in the MPC60. I try to find a rhythm that goes with the song and take it from there—I find it easier to create original drum rhythms that way. Drummers have their set of drum beats,

and to play the kick drum in an unusual place may be unnatural for them. Ash Sood is really open to creating unusual things. He doesn't mind stealing from what I come up with on the drum machine, or me editing the things he does in the RADAR. He may improvise for four minutes, and I may find one fragment of that, loop it and use it as the basis for a song."

Marchand's drum-centered approach manages to offer continuously fresh perspectives that don't distract from the essence of the songs. And his methods can be original. "For *Fumbling* I also hired a local drummer who is legendary in Montreal, called Guy Nadon," he says. "He's very eccentric and funny, and a fast player. I asked him to play some rhythms, but it was sounding too much like a jazz big band, and I was afraid I could not loop any of his playing for Sarah's songs. So I got a whole bunch of CDs, randomly chose one from the pile, gave Guy a five-second taste of a rhythm, and asked him to do something similar. He would ask to hear more, but I refused, because my idea was that he wouldn't play exactly like the example, but just a similar tempo, feel and beat. I created three

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different loops in the E-mu IV from three dozen different beats, and one was used on the track 'Ice Cream.'"

TECHNOLOGY AND PERFORMANCE

Marchand has stated that he's "not big on sound," and it seems true that the engineering side of the recordings is secondary to Marchand's focus on production and performance. But the sumptuous sound of McLachlan's recordings clearly does owe quite a bit to the technical end. Technology, Marchand feels, not only gives him the ability to manipulate sounds, it increases his ability to get great performances out of McLachlan and her band.

During pre-production, Marchand and McLachlan do a lot of experimenting with vocals and instruments as well as rhythms. "I will sometimes record as many as 20 tracks of backup vocals," he says. "The advantage of working here in Wild Sky is that I can record her well from the start. Most of those early vocals are retained. We still try to get better vocals later on, but it seems that when there's little on tape, the vocal is more focused. If you record a vocal to a finished backing track, it often doesn't work. Moreover, this way of working means that everybody in the band plays to the vocal, which helps to keep them focused."

Marchand says that one of the tools that allows him to get strong performances is his Otari RADAR system. "When I started producing," he recalls, "I would tell a band exactly what to play. I was like a master dictator. This was in the days on analog, when it was much harder to play around with the performances after they were done. *Solace* was done on the 3M machine, *Fumbling* on a Studer 827, and *Surfacing* was all done on a RADAR. I love that machine. I can't live without it. It's made by some Vancouverites. I saw an advertisement about six months before it came out, and called them and said that I'd like to try one as soon as they had one. I wanted to be a guinea pig because of all the editing I can do with it. Flying things around, creating loops, offsetting the timing. It's practical and great fun.

"I managed to do edits with analog multitracks, as well, using two multitracks and the 4-track Akai D4, to have slave reels and fly things in," he continues. "But it often was a nightmare. Now I find that when the band or individual musicians come in, saying nothing is

the best thing. I allow myself to get surprised by what they do. I simply put the mics up, press Record, and if they're good musicians, they'll come up with something interesting, I tell them that it doesn't matter if they make mistakes. I just want them to get comfortable and play and enjoy themselves. If you saw the floor of the studio here, you'd understand that it's not about playing things right. It's a very cozy and fun place to work with a floor full of paint and wires, and that's what I like. It's like, 'Do whatever you want, and I can fix it later in the RADAR.' If a drum fill doesn't work, I can just take it out or put it somewhere else. This is where technology has opened up new creative possibilities."

Hard disk editing gives Marchand the same control over "real" audio that MIDI sequencing once gave him over synths and samplers. For *Surfacing*, he used the MPC60 purely for drum loops, whereas keyboards and samplers (Kurzweil K2000 and E-mu IV) were se-

quenced in Logic Audio for the PC, using an Aardvark 20/20 sound card. In his floating studio, he's now using PCs with Nemesis' Gigasampler software, "which is convenient because it takes a second instead of 30 seconds to load a bunch of sounds," he says, "and you can have a piano sound that uses one GB of memory, and so have every note fully sampled. I have an MPC2000 and an Ensoniq Paris system on the boat, as well."

MICROPHONES AND BEYOND

"I think microphones are a matter of experience and listening carefully," Marchand says. "I get mics that I'm told are good, try them all out on an instrument, and choose the one that sounds best. I spend the next three minutes with the headphones on loudly, moving the mic around the instrument until it sounds right and leave it there. Next I get a decent recording level, and that's where I stop. I don't add EQ or compression or effects, although I do compress vocals

WILD SKY STUDIOS

The collaboration between Sarah McLachlan and Pierre Marchand goes beyond her albums; they've also built a studio, Wild Sky. Marchand explains how the facility came to be: "The first album we did, *Solace*, was recorded on a 3M 24-track, in various places, including Vancouver and Daniel Lanois' place in New Orleans. During the pre-production for that album, we were looking for some quiet space to work and stumbled on this house here by chance. We rented it for a month or two, and everything we did sounded great, so after a year of going from studio to studio, I came back and rented this place permanently. It's a beautiful house on a hundred acres of woodland, with a cliff in front of it and lots of light inside. It's a good place to get away from it all and very pretty in winter. It's owned by a painter, and I set the studio up in the painter's studio, which has a lot of daylight. It also is a great-sounding room."

The room can be seen on the interview video that's part of multimedia section of the *Surfacing* CD. It's an atmospheric space, lighted with candles. A 32-channel Helios mixing desk is right in the recording room.

"I've never liked working in traditional studios," Marchand explains. "I prefer to be in the same room as the artist all the time. I never use iso booths or recording areas; everything is recorded around the console.

"The reason is that I don't like talkback," he continues. "I go for performance, and communication is better when there's not talkback and no isolation. In any case, I always record everything flat, so there's no need for me to twiddle knobs during recording. I put up a mic, and if it sounds good, wonderful, if not, I move the mic or try another mic. But I don't spend a lot of time trying out or putting up microphones. Most microphones here are set up permanently, and that works fine. I may change or EQ the sound during the mixing stage. Sonic perfection is not my primary aim, which is why I prefer to engineer things myself. I figure that if there are four technical people in a room, such as engineers and assistant engineers, the whole atmosphere gets so technical that it creates a laboratory mood. I'd rather have only people present who are making music, and capture that with the gear." ■

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INTERNATIONAL UPDATE

when recording because they're too dynamic.

"In Sarah's case, I recorded her [vocal] with a Neumann U47 until *Surfacing*, and then switched to Neumann 149, which has a sweeter top end—I don't have to EQ it later in the mix," he continues. "I compress her voice a little with the Tube-Tech CL1, just minimum compression, fast attack, medium release. I have also noticed that, as time passed, I started moving the microphones farther away from the source, because I found that the more room sound I got, the more interesting or natural the results were. When I first started with acoustic instruments, I made the mistake of recording everything with the microphones right up close, and I then had to do a lot of fixing at the mix. Although sometimes close-miking can sound excellent, and I still end up with microphones in the strangest places. There are no rules, although when I asked Daniel Lanois for advice on how to get a good acoustic guitar sound, his answer was, 'First get a good-sounding acoustic guitar.' I suppose that's a rule that goes for almost everything you record."

Marchand also gets a very beautiful piano sound, which starts with a 19th-century Steinway Concert B grand piano, recorded with two Neumann 150 microphones placed right above the strings. But Marchand says that microphone placement and selection are not the areas that really turn him on. Sonic experimentation is his passion—for example, the moving soundscape behind the track 'Black & White,' which is "a sweeping filter pad out of the K2000. I like putting these sounds through an amp. It gives them a new life, a bit of crunch, injecting some organic feeling."

Marchand also created an exquisite effect on "Sweet Surrender." The rhythmic sound at the beginning that resembles a hooting car is actually bassist Brian Minato going haywire with feedback on an electric guitar. Marchand says, "I asked him to put the amp at 11 and just go for it. He learned the chords as he went along, and he filled the track up with feedback. Later, I went through it with the RADAR and found bits of feedback that fitted with the chords, and put them in places that worked. I then created a rhythm using the mutes on the Helios, and to get this idea perfectly in rhythm I programmed the sequencer and keyed a noise gate with it."

THE MIX

Unlike many engineers, Marchand says he actually loves to "fix it in the mix." "I spend four days per song mixing," he says, "because that is when I make most of the decisions. There'll be a lot of EQ'ing going on, and I'll add effects and edit, and there may even be some additional overdubbing. Even the song structure may still change at this stage. A song may be six minutes long, and I'll have all sorts of ideas on tape, and then during the mix I'll narrow things down and select all the best moments. The song may get shorter and more condensed."

"I actually really like doing things like finding the good 30 seconds of music in 15 takes," he continues. "I like selecting the best bits and then comping them together. And, of course, I have a safeguard in Sarah. When I start a mix, I'll simply put up the faders and try to make everything fit. Once it starts sounding like a song, I start looking at making musical changes, like edits or overdubs. Sarah is fully involved at this stage, but she will let me work alone for long periods of time, and when I've achieved something, she'll come in with fresh ears to make decisions." Another effect that's added in the mix is tremolo. "If you hear tremolo on any CD I have produced, it's actually board automation and a fast wrist," he says.

Although Marchand records most sounds dry, he sometimes prints effects on a separate track to help create a mood for a song during recording. But at the mixing stage, these effects usually get erased. He then starts again from scratch to create a coherent soundscape. His favorite effects boxes include the Eventide H3000, Lexicon PCM 90 and PCM 80 reverbs, delays, echo, flanging, and most of all, the RADAR. "The solo in 'Building A Mystery' was created in the RADAR," he says. "I borrowed chords from the song and placed them in a different order, and Sarah's guitar solo, as well as her 'ooohs,' go into a multitude of reverse and forward modes. This took me a few hours of twiddling knobs before I was happy with this musical break. There were quite a few lucky mistakes involved. I love the fact that there's an Undo mode. This means that when I cut and paste, I can be deliberately careless. I'm always hoping that a mistake will turn out brilliant." ■

Freelance writer Paul Tingin is a frequent contributor to Mix.



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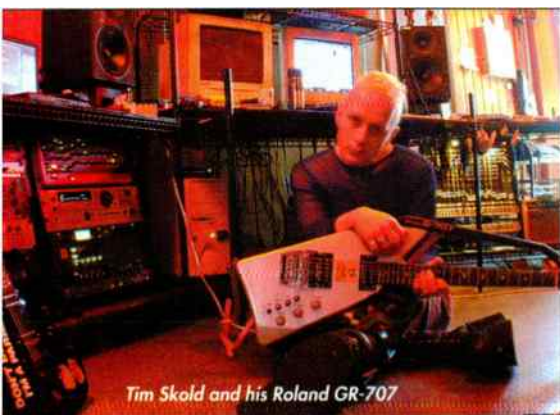


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CIRCLE #054 ON PRODUCT INFO CARD

MDFMK

ELECTRO-INDUSTRIAL PIONEERS SHED THEIR OLD SKIN



Tim Skold and his Roland GR-707

Electronic music is just a different beast altogether. Generally, anything that falls under the headings electronic or industrial is seen as the obsessive effort of a dark figure, locked away from the world performing unspeakable acts on otherwise innocent computers.

In actual fact, the current nature of electronic music allows bandmembers to exchange audio files easily, with the freedom to work on their own and at their pace: "We don't jam; there's no jamming whatsoever," insists MDFMK co-founder Sausha Konietzko. "It's really annoying to me when someone tries to get a guitar riff down. I prefer that Tim [Skold, the group's co-founder] does that by himself and vice versa. He's not interested in listening to me check out different compressor settings for like three hours. It's a waste of our time."

On the heels of the 1999 breakup of KMFDM (arguably one of the premier techno/industrial crossover acts of the '90s), the core songwriting team of Konietzko and Skold regrouped and launched their new enterprise, MDFMK—with vocalist Lucia Cifarelli later rounding out the lineup. To facilitate their unique songwriting and recording process, Konietzko and Skold built separate but fully compatible home studios for the recording of their self-titled Republic Records debut.

Both studios are centered around

identically equipped 350MHz Macintosh 9600s, which include an array of 9-Gig removable Seagate Cheetah hard drives, a Pro Tools 124 MIX Core card, two Pro Tools DSP Farm cards and two Digidesign 888 24-channel I/Os. Tracking and sequencing are done to Emagic Logic Audio 4.0, and Pro Tools 5.0 is reserved for editing. Konietzko explains that the matching computer systems make the exchange of

ideas almost effortless. "I would call him [Skold] up and be like, 'What are you working on?'" he says. "And he would just take his drive and stick it in like a lunch box and pop it in, and it's right there. If there were any MIDI files, I'd just dial up the program he used and there it was, or say for the Nord, he would record a string of Sysex into the sequencer and I'd just fire up the Nord and, boom, there is his sound. For the most part, though, we would turn everything into audio at a pretty early stage."

Konietzko and Skold's Seattle-based studios do differ in some major ways. Konietzko's room was a custom-built, soundproof addition to his home, boasting both a control room and a small iso booth where a good amount of the vocals on the new album were cut. Skold, on the other hand, approached home recording a little differently: "I'm not totally opposite, but I hate the padded walls. [Laughs] I like the windows. I'm much more into trying to find a good angle in an existing situation, moving my speakers until I'm happy with them as opposed to just going to town with the foam and the padding. Although it goes without saying that Sausha's room sounds better than mine."

The new album was assembled by both tracking to Logic and through computer-based sound

sculpting and editing where countless fragments and odd elements were refined, processed, tweaked and pieced together. The band's endless list of hardware and software synths, stomp boxes and outboard gear provided much of the Pro Tools fodder—some of their favorites included Propellerheads Rebirth 2.0, Jomox Air-Base, Akai S3000XL, Roland SH-101, Art MP-1 and the Manley Variable-MU. Guitars and bass were recorded dry, directly into Pro Tools, processed through Line 6's Amp Farm and sent to the Pro Tools "chopping block." "The curse of the hard disk recorder," Skold muses. "Some of the stuff was played at different times, different days, different frames of mind, different tunings, and through editing, becomes one riff."

The final stage of the recording process involved taking the finished tracks over to Studio X in Seattle for mixing and overdubbing vocals. The move to a larger facility, according to Konietzko, was done mainly to keep a fresh perspective on things and give the band a little more room to move around.

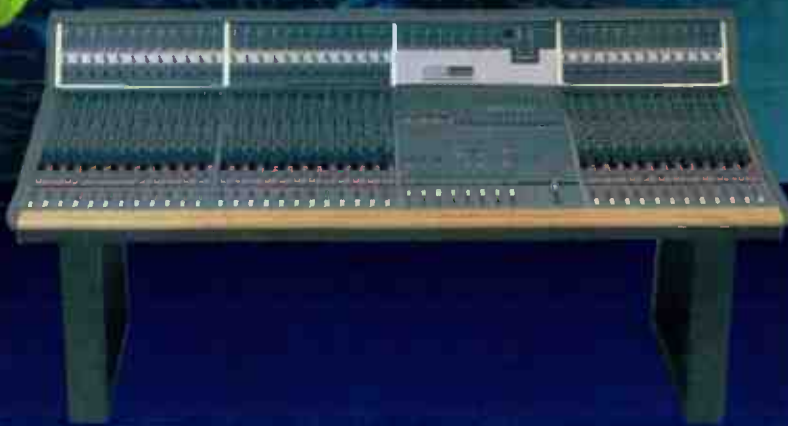
"It might be mental," Skold adds. "But I know I perform a shitload better vocally, if I'm standing in a booth, with a pop screen, and I know this room is costing me a grand and a half every day, and I better f—ing sing. But on the other hand, my guitar playing goes totally in the opposite. It's a double-sided sword."

Following the completion of the album, Konietzko and Skold left Seattle after living in the city for more than five years and set up new digs in New York and Los Angeles, respectively. Presently, a pair of CD burners and a hefty FedEx bill are helping them keep the ideas flowing, although T1 connections and file sharing over the Net are in the works. ■

Robert Hanson is a Mix editorial assistant.

BY ROBERT HANSON

the tide is turning



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World Radio History

CIRCLE #049 ON PRODUCT INFO CARD

What's New in

POWERED

S T U D I O

Monitors

By Roger Maycock

Not too long ago, powered monitors were considered unworthy of a place in the commercial or project studio environment. In recent years, however, this situation has reversed, largely because of the reduced size and weight of switching power supplies and the latest innovations in amplifi-



Miller & Kreisel MPS-2510/P



Event PS5, PS6 and PS8

cation circuitry. Active monitors, as they are most often referred to these days, are everywhere—with more coming our way. This design approach is intended to give the end-user greater monitoring control and better value, in addition to increased cost efficiency for the manufacturers.



Yamaha MSP10M



Alesis M1 Active



Hot House ARM 265



Fostex NF-1A



JBL LSR25P



Tannoy System 800A



PAD/Munro MA1

Whether your work is in music production, multimedia, broadcast or audio post-production, you can find an active monitor system that meets your needs. Since many audio professionals are involved with picture in some capacity, an increasing number of speaker systems are magnetically shielded to prevent image distortion on computer or video displays. Many systems also have provisions for subwoofer integration.

Another recent development has to do with the pricing structure of monitor speakers. With surround sound monitoring becoming increasingly important in audio production, many manufacturers are beginning to price their speaker systems on an individual basis instead of per pair.

The following information should provide a useful perspective on this rapidly expanding segment of the professional audio market, and data on subwoofers is included where applicable. Manufacturers are listed in alphabetical order. For more information on these or other models in any company's line, see the sidebar for contact information.

ALESIS M1 ACTIVE

Housed in a ported cabinet, the M1 Active Bi-amplified Reference Monitors use an eighth-order active crossover and custom-designed dual amplifiers. Designed to provide fast transient response in the low-frequency range while maintaining detail in the upper-mids, the 6.5-inch cone woofer is formulated from carbon fiber. The 1-inch silk dome tweeter has ferrofluid cooling, and a time alignment circuit in the crossover's tweeter section allows the frequencies from the high and low drivers to occur in sync. The speaker has a 75-watt woofer amp and a 25-watt tweeter amp.

Alesis also offers the \$599 companion S1 Active Subwoofer. MSRP: \$649 per pair.

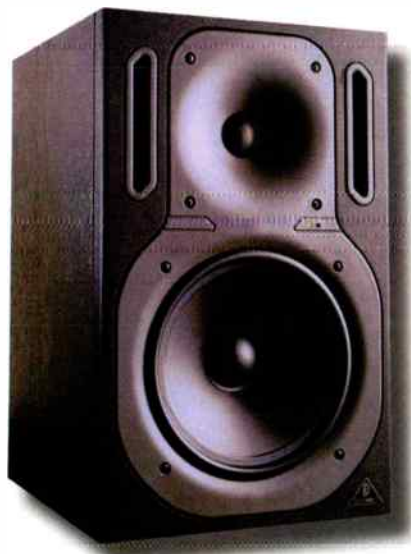
AUDIX PH250 ACTIVE PLAYBACK MONITORS

The Audix PH250 Active Playback Monitors employ a D'Appelido design and can be set up vertically as a mirror-imaged pair or horizontally with the tweeter on top. The monitors provide 30 watts per channel (RMS) with 60-watts peak power. The PH250 uses a two-way 5.25-inch poly woofer with a 1-inch dome tweeter. Features include an auto on-off function for energy conservation, magnetic shielding and unbalanced RCA inputs. The cabinet is a bass reflex design. MSRP: \$649 per pair.



PMC AML-1

inch polypropylene bass driver with a 4-inch aluminum-alloy voice coil. The Esotech 28mm Ferrofluid-cooled dome tweeter features a neodymium magnet and aluminum-wire voice coil. The LF driver uses a 200-watts-per-channel amplifier, and the HF driver is driven by a 100-watts-per channel amp. Each cabinet includes HF and LF trim pots. MSRP: \$3,599 per pair.



Behringer B2031

BEHRINGER B2031

The B2031 is a two-way active monitor featuring an 8.75-inch long-throw woofer and a 25mm dome Ferrofluid-cooled tweeter. This bi-amplified system has a 150-watt low-frequency amplifier and a 75-watt high-frequency amplifier. The crossover is defined at 2 kHz. The B2031 uses a phase-optimized waveguide for controlled sound dispersion. The monitor's frequency response ranges from 50 to 20k Hz. The B2031 is delivered in matched pairs. MSRP: \$599 per pair.

Dynaudio
Acoustics BM15A

DYNAUDIO ACOUSTICS BM15A

The BM15A is a two-way design featuring two discrete power amplifiers. The monitor has a 9.5-

EVENT ELECTRONICS PS8

Part of Event's PS Series, the PS8 is a two-way, biamped monitor. The LF power amp puts out 70 watts, and the HF amp puts out 30 watts. The cabinet has an 8-inch polypropylene cone woofer with a high temperature voice coil and a damped rubber surround, combined with a 1-inch silk dome, ferrofluid-cooled tweeter. The PS8 employs an active fourth-order asymmetrical crossover defined at 2.2 kHz. On the rear panel, the PS8 provides both a ¼-inch TRS jack and an XLR connector for input signals. These two inputs are hard-wired in parallel, enabling either input to be used as a pass-through connector. Additional models include the



PS5, PS6 and 20/20/15 subwoofer. MSRP (per pair): \$849 for PS8; \$699 for PS6; and \$599 for PS5. The 20/20/15 subwoofer is \$1,199.

FOSTEX NF-1A

This biamped system consists of dual 60-watt amps, an internal baffle configuration that uses HP sound reflectors to extinguish standing waves and two tuned 2-inch cylindrical ports for increased bass response. The NF-1A's 21mm-thick MDF (medium density fiber) material for the main enclosure widens to 33 mm where the drivers are mounted. The NF-1A employs a push-pull damper in the speaker's woofer as-



Genelec S30D

sembly, and the 6.5-inch woofer is coupled with a UDR tangential diaphragm edge that eliminates unwanted anti-resonance. The high-frequency UFLC tweeter uses a low-loss 6dB crossover. MSRP: \$899 each.

GENELEC S30D

Genelec's S30D Digital Monitoring System has a frequency response of 35 to 50k Hz and is available in vertical and horizontal versions. The S30D's 96kHz/24-bit digital interface accepts the AES/EBU format (or S/PDIF with an impedance adapter) and supports input word lengths of 16 to 24 bits. The monitor also provides analog and digital through connectors. The S30D has an 8-inch woofer, a 3.5-inch midrange cone driver and a ribbon tweeter. The tri-amplified (120W, 120W, 120W) system provides electronic crossover and protec-

tion circuitry. The S30D features built-in bass, mid and treble level controls, bass roll-off and bass tilt controls. MSRP: \$2,850 each.

HAFLER TRM6

Designed for close-field monitoring and surround sound applications, Hafler's TRM6 employs the company's Trans•nova amplifier technology in its design. The two-way, biamped system (50W for low frequencies, 33W for highs) is magnetically shielded and offers a free-field frequency response of 55 to 21k Hz, ± 2 dB. The TRM6 incorporates a 6.5-inch polypropylene cone woofer and a 1-inch soft dome tweeter high-frequency driver. The cabinet's front panel includes a Power/Clip/Thermal LED. The rear panel has a combination XLR $\frac{1}{4}$ -inch input jack, RCA input jack, unbalanced/balanced DIP switches, and bass and treble shelving DIP switches. A companion TRM10S subwoofer is available. MSRP: \$625 for each TRM6; \$695 for the TRM10S.

HNB CIRCLE 5 ACTIVE

The magnetically shielded Circle 5 Active is a biamplified system that uses an 8-inch bass-mid driver with an injection molded cone and a Ferrofluid-cooled soft dome tweeter. The Circle 5 has a 140-watt amplifier for the low-mid driver and a 70-watt amplifier for the tweeter. Solid-state Polyswitch protection circuitry prevents overloads. The cabinet's construction consists of a rigid, nonresonant material with a ported design that is finished in black. MSRP: \$1,399 per pair.

HNB Circle 5 Active



Hafler TRM6

HOT HOUSE ARM 265

The Hot House Active Reference Monitor 265 is a biamplified, mid-field speaker featuring twin 6.5-inch, long-excursion woofers and a 1-inch soft dome tweeter in a rear-vented sixth-order alignment. The ported cabinet has rounded edges to reduce diffraction, and a series of rear panel switches facilitate gain and response adjustments along with an XLR/TRS input connector. Each power amp is rated at 250 watts per driver. The ARM 265's rated frequency response is 30 to 20k Hz, ± 1.75 dB, and the signal-to-noise ratio is rated at 102 dB. The ASB (Active Sub-Bass) 115 subwoofer is available. MSRP: \$6,499 per pair. The ASB 115 is \$3,499.

JBL PROFESSIONAL LSR25P

Based on JBL's Linear Spatial Reference design, the LSR25P is intended for use with workstations, in edit suites and small control rooms. This biamplified monitor provides 80 watts of LF power and 40 watts of HF power. The system has a 5.25-inch nonwoven carbon fiber-composite woofer and a 1-inch titanium-composite diaphragm tweeter along with an Elliptical Oblate Spheroidal waveguide with 50° by 100° dispersion. The monitor has integrated mounting points for horizontal or vertical orientation, plus front panel volume and power controls. These speakers are magnetically shielded. The speaker also offers a built-in highpass filter for use with a subwoofer. MSRP: \$479 each.

KLEIN + HUMMEL O 198

The Klein + Hummel O 198 is a three-way, triamped monitor that



field frequency response is 45 to 20k Hz. MSRP: \$4,000 per pair.

KRK EXPOSE E8Di

KRK's Exposé E8Di monitors use an IEEE 1394 FireWire interface with DSP-based crossover and equalization software to eliminate phase errors and improve the overall accuracy and dynamic range of the monitor. The first such monitors to incorporate FireWire technology, the E8 includes a 1-inch Inverted Dome Kevlar high-frequency driver and an 8-inch Kevlar woofer. The biamplified monitor provides 120 watts to the HF driver and 160 watts to the LF driver. Maximum sound pressure level is rated at 114 dB for music and 123dB peak. MSRP: TBD.

incorporates an 8.25-inch polypropylene cone woofer, a 3-inch fabric soft dome midrange driver and a 1-inch titanium-alloy dome tweeter. The power for this magnetically shielded monitor is delivered by a bass amp providing 100 watts at 4 ohms, a midrange amp providing 50 watts at 8 ohms and a HF amp delivering 50 watts at 6 ohms. The O 198 has an integrated protection circuit to prevent damage to the drivers or overheating of the power amplifiers. The monitor's free-

MACKIE DESIGNS HR824

The Mackie HR824 is a biamplified monitor with an 8.75-inch mineral-filled polypropylene cone low-frequency driver and a 1-inch viscous edge-damped aluminum dome tweeter with a ferrofluid-cooled voice coil. The monitor's LF amp is rated at 150 watts to a 4-ohm load; the HF amp is rated at 100 watts into 6 ohms. The HR824 uses a modified Linkwitz-Riley crossover configured

at 24 dB/octave at 1,800 Hz. Its free-field frequency response is rated at 39 to 22k Hz (± 1.5 dB). The HR824's rear panel provides both 1/4-inch and XLR input jacks plus switches for acoustic space, LF roll-off and HF adjustment. MSRP: \$749 each.

MEYER SOUND LABORATORIES X-10

A decade after developing its landmark HD-1 powered monitors, Meyer ups the ante with X-10, a new system designed for high-SPL/high-accuracy performance in a large-format package. Retail is \$15,000 each. For detailed information on the Meyer X-10, see the "Technology Spotlight" on page 146.

MILLER & KREISEL MPS-2510/P

The Miller & Kreisel MPS-2510/P is a powered monitor using the same 5.25-inch woofer and 1-inch tweeter drivers as the passive MPS-2510, with an Active Phase-Focused Crossover. User-selectable vertical directivity allows for optimization in various monitoring environments. The Narrow position has controlled directivity for focused sound. The Wide position covers a deeper seat-

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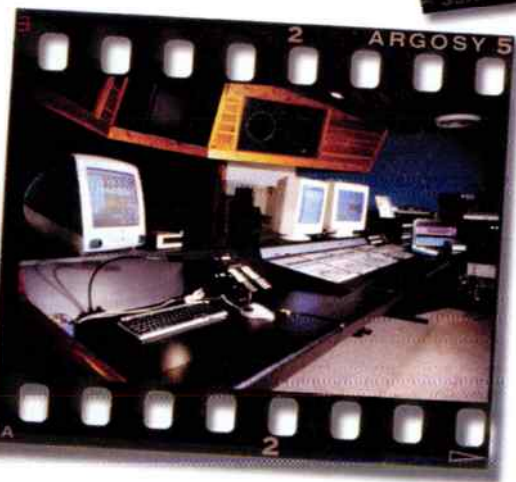
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ing area for listeners at a producer's desk behind the mixer. The MPS-2510's LF and HF transducers are each powered by 150-watt onboard amplification. Five of these monitors, along with an M&K Pro subwoofer, combine to create a 5.1 music monitoring system, providing the reference level playback required by Dolby and THX. MSRP: \$1,699 each.

PROFESSIONAL AUDIO DESIGN/MUNRO ASSOCIATES MA1

The MA1 is a compact, high-power, three-way active studio monitor ideally suited for stereo and multichannel applications requiring accurate and full-range monitoring. The system may be used freestanding or flush-mounted. The speaker contains a dedicated 600W power amplifier package and is equipped with extensive onboard variable equalization and level trims to allow fine-tuning to any situation. The monitor provides two 9.5-inch bass drivers, one 2.75-inch midrange dome and one Esotar tweeter. MSRP: \$7,950 each.

PROFESSIONAL MONITOR COMPANY (PMC) AML-1

The AML-1 features a 6.5-inch carbon fiber and Nomex honeycomb flat piston bass driver, which allows large, controlled linear excursions. A 1.25-inch high power-handling soft dome unit is used for the monitor's high frequencies. The two drivers are integrated by discrete, low-noise active crossovers. The AML-1's amplifier and crossover designs are licensed from the high-end manufacturer Bryston. The speaker's bypass controls provide for input level adjustment, LF roll-off, LF tilt and HF tilt. This biamplified monitor uses a 100W RMS LF amplifier and an 80W RMS HF amplifier. MSRP: \$4,995 per pair.

QUESTED MONITORING SYSTEMS VS3208

The Quedsted VS3208 is a three-way monitor that houses two 8-inch bass drivers, a 3-inch soft dome midrange driver and a 1 1/4-inch tweeter. The VS3208 is only 19 inches wide, which makes it possible to place the speaker above 19-inch rackmounted equipment. The built-in amplifier provides in excess of 400 watts RMS, a three-position EQ switch on each of the LF, MF and HF bands, and an input sensitivity switch with an 18dB range. MSRP: \$3,700 each.

ROLAND DS-90

Roland's DS-90 24-bit digital reference



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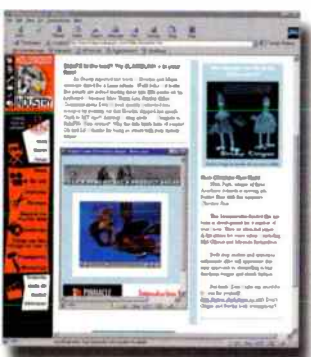
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CIRCLE #053 ON PRODUCT INFO CARD

World Radio History

monitor provides both optical and coaxial digital inputs. The two-way, biamplified monitor houses a 6.5-inch polypropylene cone woofer and a 1-inch soft dome tweeter in a bass-reflex enclosure. The DS-90 uses a 2.6kHz active fourth-order crossover. Powering the monitor is a 60-watt amplifier for the LF driver and a 30-watt amplifier for the HF driver. Controls include Level, LF Trim, HF Trim, an analog/digital input select switch, a Left/L&R/Right assign switch, a digital in (coaxial/optical) switch and a power switch. The DS-90 has both balanced and unbalanced analog inputs terminated in XLR and TRS connectors. MSRP: \$595 each.



Quested VS3208

TANNOY SYSTEM 800A

Tannoy's System 800A employs an 8-inch dual concentric driver with two 90-watt amplifiers for the LF and HF plus an electronic crossover. Tannoy's Dual Concentric Point Source technology creates a coherent wavefront that is consistent both on- and off-axis, and provides audio engineers greater freedom of movement in the mix position. The System 800A's free-field frequency response is rated at 44 to 20k Hz. This magnetically shielded monitor can accommodate both -10dBu and +4dBu

signal levels on its XLR/jack connector. Retail: \$1,895 per pair.

VERGENCE C-20 (FORMERLY NHT PRO)

The C-20 active center-channel speaker is designed to mate with the A-20 monitor loudspeaker system and, in combination with the optional B-20 Stereo Subwoofer System, expand it into a 5.1-channel monitoring suite. The C-20 provides an exact sonic duplicate of

the A-20 speakers, but given its role, features a non-angled, perpendicular enclosure front and vertically centered, magnetically shielded drivers. The one-rack-space, 250W monaural control amplifier includes boundary proximity, distance proximity, and switchable input sensitivity as offered on the A-20 2-channel set. MSRP: \$1,250 each.

YAMAHA MSP10

Yamaha's MSP10 is a biamplified system with a 120-watt amp for the low-mid driver and a 60-watt amplifier for the high-frequency driver. The magnetically shielded MSP10 provides an 8-inch woofer and a 1-inch titanium dome tweeter. The tweeter operates in conjunction with a waveguide horn to achieve broad, uniform HF dispersion regardless of listening position. The MSP10 has three-position low and high trim switches plus a low-cut filter. The rear panel includes XLR inputs. In addition to the black-finish MSP10, there is also the maple-sunburst-finished MSP-10M and the SW10 powered subwoofer. MSRP: \$749 for each MSP10; \$799 for each MSP10M; and \$849 for the SW10. ■

Roger Maycock is a Mix technical consultant.

POWERED STUDIO MONITORS MANUFACTURER CONTACTS

Alesis Corporation
310/255-3400
www.alesis.com
Circle 201 on Product Info Card

Audix
503/682-6933
www.audixusa.com
Circle 202 on Product Info Card

Behringer USA
425/672-0816
www.behringer.de
Circle 203 on Product Info Card

Dynaudio Acoustics
(distributed by TC Electronic)
805/373-1828
www.tcelectronic.com
Circle 204 on Product Info Card

Event Electronics
805/566-7777
www.event1.com
Circle 205 on Product Info Card

Fostex
310/921-1112
www.fostex.com

Genelec
508/652-0900
www.genelec.com
Circle 206 on Product Info Card

Hafler/Rockford Corporation
602/967-3565
www.hafler.com
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www.hhb.co.uk
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Hot House
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www.hothousepro.com
Circle 209 on Product Info Card

JBL Professional
818/894-8850
www.jblpro.com
Circle 210 on Product Info Card

Klein + Hummel (distributed by Transamerica Audio)
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www.transaudiogroup.com
Circle 211 on Product Info Card

KRK
714/373-4600
www.krksys.com
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Mackie Designs
800/898-3211
www.mackie.com
Circle 213 on Product Info Card

Meyer Sound Laboratories
510/486-1166
www.meyersound.com

Miller & Kreisel
310/204-2854
www.mksound.com
Circle 214 on Product Info Card

Professional Audio Design
781/982-2600
www.proaudiodesign.com
Circle 215 on Product Info Card

Professional Monitor Company (PMC)
800/632-8217
www.bryston.com
Circle 216 on Product Info Card

Quested Monitoring Systems
608/251-2500
www.quested.com
Circle 217 on Product Info Card

Roland Corporation U.S.
323/890-3700
www.rolandus.com
Circle 218 on Product Info Card

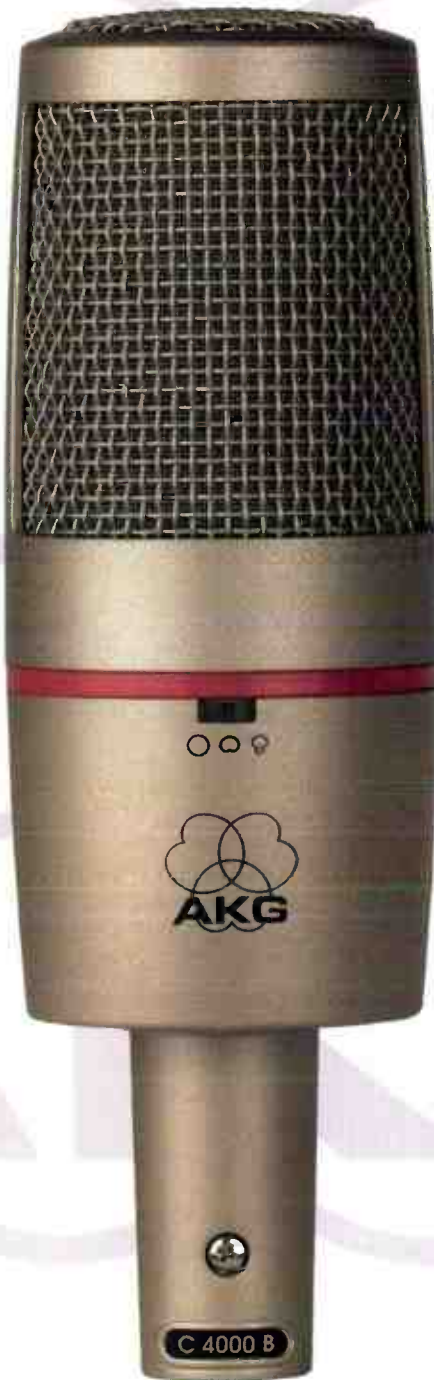
Tannoy (distributed by T.G.I. North America)
519/745-1158
www.tannoy.com
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Vergence
707/751-0270
www.vergenceaudio.com
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Yamaha Corporation of America
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CIRCLE #048 ON PRODUCT INFO CARD



RECORDING NUPTIALS

SOMETHING OLD, SOMETHING NEW IN NETWORKING YOUR STUDIO

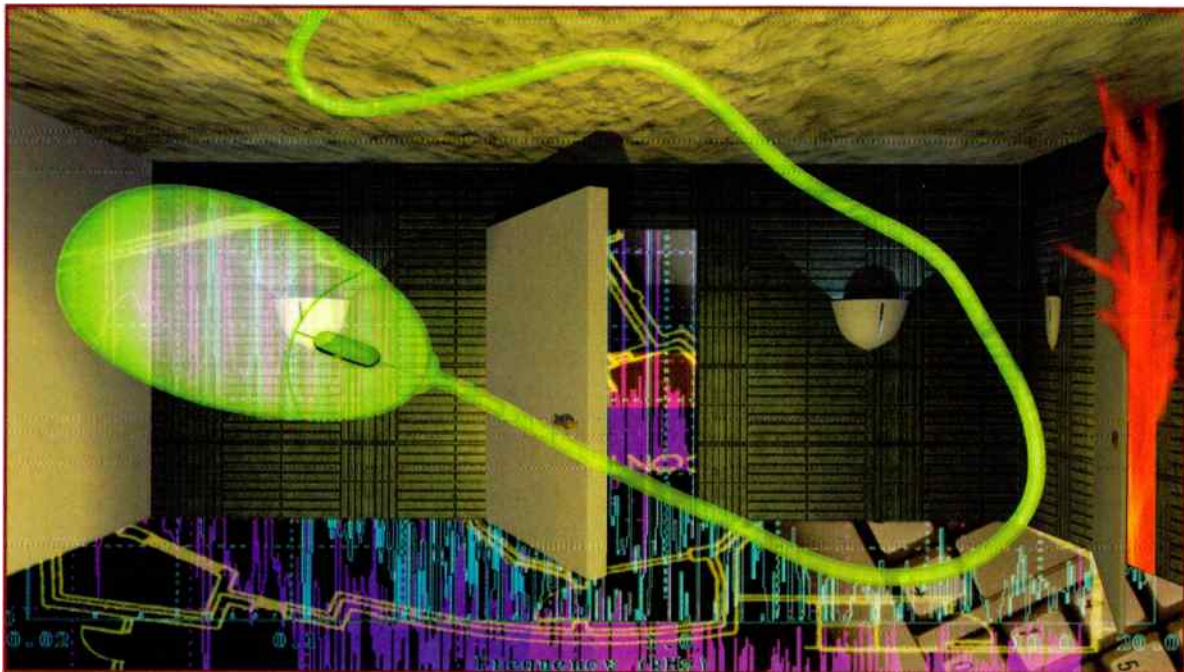


ILLUSTRATION: TIM GLEASON

Ye olde saw about wedding accoutrements, “something old, something new...” loosely fits our theme this month. Not that I’m planning on tying the knot. I’m just grooving on some things for your facility that could make life better.

First the old thing: You already know about extensions for your keyboard, monitor and mouse to keep the acoustic noise bottled up somewhere, anywhere, as long as it’s not in the control room. If you’re lucky enough to have a machine room adjacent to the control room, you can simply use good-quality, low-capacitance cable. For example, Alpha, Belden and Gepco sell triple and quad minico-ax for your RGB analog video and separate low-cap twisted pairs for your keyboard and mouse. If the piney smell of solder makes you queasy, then Network Technologies can fix you up with a clean, prefab job that will set you back only \$110 for a 50-foot run. And, they have passive cable assemblies that go out to 100 feet.

But hey, what about my 50-meter run down to the spare bathroom where I keep my CPU?

A passive extender won’t cut it there, Bucko. You need an active answer to your KVM cravings. KVM stands for “keyboard, video and mouse,” and there are several devices that take an active approach to “remoting” your computer. Most audio geeks would go for one of

Gefen’s solutions because that’s all they know. But, we can borrow KVM concepts from pocket-protected Information Techs. KVM switches provide a one-to-many connection, allowing you to park your butt in the control room’s sweet spot and control multiple “servers” or CPUs. If you don’t need the switching capability, you can simply extend your KVM connection and leave the other server port unused until needed.

Everyone needs Category 5 wiring for general networking. So, given a run of CAT5 cable and a KVM switch, you can purchase two- or four-server, single-console KVM switch versions that let you handle several CPUs from your favorite perch. Providing extension as far as 600 feet, the price jumps up from the passive solution into the \$1,000 to \$2,000 range.

VIRTUAL PRIVATE NETWORKS (VPNS)

Many of these firewall offerings, along with routers, offer features such as Virtual Private Network (VPN) support to sweeten the deal. VPNs are software-enabled secure connections between LANs that use the Internet to safely and inexpensively span long distances. Traffic between LANs is encrypted, sent and decrypted seamlessly, making the remote connection appear to be part of the local network. ■

BY OLIVER MASCIAROTTE



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World Radio History
CIRCLE #055 ON PRODUCT INFO CARD

Competition often leads to consolidation or cooperation. Is your facility partnering (No. 1 doofy gerund of the last millennium) with some local vidiots to better serve your local market without duplicating facilities? Hmm, I thought so. Well, wouldn't it be nice to connect your LANs, instead of sneaker-netting, while maintaining control over

access and permissions? Uh-huh. Would be nice, huh?

This leads us to our next topic... Something new that you may not be aware of, unless you've had a car fire recently, is a firewall. Firewalls are products that confine network traffic to predetermined pathways, keeping hackers out of your LAN while allowing bidirectional traffic that originates from your local network to pass unimpeded.

They used to be fancy software

packages, running on big iron and requiring a team of IT dudes to keep it all together. In 1996, appliance-level devices began appearing from vendors like Netopia, providing inexpensive Internet service, via ISDN, for small office environments. Had one. loved it. The need for cost-effective, high-speed Internet connections has ballooned considerably and, with the acceptance of xDSL for home and business, the range of offerings has increased in kind.

NEWSBYTES

NAB SUES RIAA OVER WEB BROADCAST ROYALTIES

In March, the National Association of Broadcasters sued the Recording Industry Association of America (RIAA) in an attempt to block the group from charging royalties to radio stations that also broadcast online. The RIAA claims that Internet radio stations and on-air stations that Webcast are both required to pay royalties, according to the Digital Millennium Copyright Act passed in 1998. Broadcasters counter that they are already paying performance rights agencies, and that historically, radio stations have been ex-

empt from paying royalties to record labels, and that this law extends to Internet broadcasters. The RIAA says that these royalties now pertain to sound recordings, rather than public performances of song compositions and lyrics (which are paid to ASCAP and BMI). The claim was filed with the U.S. District Court in New York.

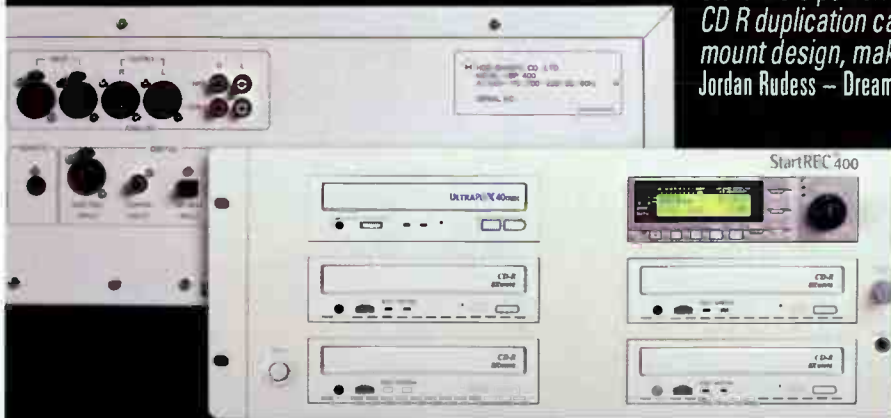
PLUG-IN NEXT MONTH

The fifth annual Plug.In: the Jupiter Online Music Forum will take place next month, from July 24-25, at the Sheraton Hotel and Towers in New York City. The event, which focuses on the future of the music on the Internet, features seminars, workshops and a technology showcase; visit www.australia.jup.com/jupiter_events for details. ■

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CIRCLE #056 ON PRODUCT INFO CARD

APOGEE DIGITAL. THE SOUND OF MOVIE MAGIC.



Photo: R. Neilson/D. Young

Alan Meyerson shows off the AD-8000s at Media Ventures' facility in Santa Monica, CA.



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CIRCLE #057 ON PRODUCT INFO CARD

Today, Netopia is one of many companies selling DSL routers with built-in firewalls. Inexpensive, fairly easy-to-configure firewall appliances, known as "personal firewalls," have also appeared to address Internet security issues, especially those stemming from DSL's inherent lack of security protocols. For less than \$200, you can pick up an "Internet sharing device" that allows multiple LAN clients to use one dial-up account and V90 modem. Perfect for the one- or two-person office. Another option for

you home studio types is Open Door Networks' DoorStop software firewall for Mac OS, starting at \$60. For personal firewall, antiviral detection and network filtering in one software product, Intego sells packages for Mac OS starting at \$150. Network Associates, makers of Virex and Pretty Good Privacy freeware, also sells cost-effective VPN (see box on page 106) and firewall software for NT and UNIX.

For \$300, you can grab a hardware hub from Dr. Bott to expand a DSL modem's access to your whole in-house tribe. It lacks full-blown firewall services, but you can't beat the price. For

\$400 to \$800, you can get a full-featured, expandable hub from WatchGuard Technologies.

Finally, the blue item, 'cause I couldn't find anything borrowed. That would be the "Cocktail Blue" SM-SX100, the most interesting thing I witnessed at Winter CES. (By the way, the second most important happening was when Philips showed that a DVD+RW disc created in its prototype DVD-V recorder would play in consumer DVD-V players. Fascinating, Captain.)

Sorry, back to the SM-SX100. At the LVCC, along with the 1394 Trade Association (which I'll get to after the developer's conference), home networking booths and Taser International, makers of Electro-Muscular Disruptors (won't be going there, sorry), was the large, retro spread of Sharp Electronics Corporation. Tasteful dioramas of lifestyle products, humongous TVs, your basic cool CE gear. Ah, but hiding in a niche, all by itself, was a strange, dare I say, homely critter that caught my attention. The front panel said "1-bit amplifier," which in and of itself is no big thing. Your basic "digital" power amp is fairly common these days, this one being 100 watts stereo into 8 ohms. But the back panel possessed the high groove factor-connectors labeled "SACD." Yup, DSD inputs presumably being fed from the forthcoming companion SX-DX1 SACD player shipping in August. A baby version, the SM-SX1 50-watt, 1-bit amp, will also ship along with the player. Both the SM-SX100 and SM-SX1 have the proprietary 13-pin connection on the back for direct bitstream coupling of the SX-DX1 player to either amplifier.

No matter what you may think about SACD as a distribution format, one listen to a live performance skillfully recorded on DSD should convince you of the merits of the underlying technology. Then again, have you had your hearing tested lately? Oops, we won't go there either.

So, old and new, borrowed and blue (and chrome). Stuff to make your facility more ergonomic and more secure. As usual, keep the e-cards and letters comin', and stop by the site for links to all the companies mentioned and a good bit more. ■

Oliver Masciarotte is an engineer and new media consultant. While contemplating the Byzantine implications of Y2K, he secretly wishes more DVDs showed up in his monthly NARAS list. He can be reached at hitstream@seneschal.net.



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tracks: 24
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 sample rate: 48 kHz
 project: 10 songs
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CIRCLE #059 ON PRODUCT INFO CARD

NEW SOFTWARE/HARDWARE FOR AUDIO PRODUCTION



MEDIAFORM SMARTDRIVE2 ▲

MediaFORM's (www.mediaform.com) newest CD-R technology, SmartDRIVE, offers features to protect against piracy. MediaFORM's SmartSTAMP encodes manufacturer's information into each disc, including the date and time the disc was recorded, a user-definable system number and SCSI

channel and SCSI ID of the drive that wrote the disc. The info is encoded outside the data, so it's transparent to the end-user. A RID (Recorder Identification Data) option allows the user to record a unique drive identification number on audio discs. Both SmartSTAMP and RID data can be read back on SmartDRIVE-equipped MediaFORM duplicators. Other features: support for all CD formats, media condition check, audio verification with frame-accurate copying and 12x CD-R and 4x CD-RW copy capability.

Circle 338 on Product Info Card

M AUDIO PCI ADAT OPTICAL CARD ▼

M Audio's (www.m-audio.com) Lagoon is a half-size PCI card offering ADAT 8-channel and S/PDIF optical I/Os, which can be mixed and matched for different input and output configurations. An ADAT sync input can alternately be used for MIDI I/O; processing is based around a high-speed Motorola chip and 768K DRAM. The card is compat-

ible with up to 24-bit word widths and all ADAT sampling rates including 44.1 and 48 kHz, plus S/PDIF rates as high as 96 kHz. Lagoon's onboard DSP supports downloadable audio effects and processing, and the card allows for MTC or MIDI clock sync via user application software.

Circle 339 on Product Info Card

STEINBERG NUENDO SURROUND EDITION ▶

Steinberg's (www.steinberg.de) Nuendo Surround Edition is a collection of six real-time surround plug-ins with 8-channel capability, designed for post-

production. Developed by Steinberg Spectral Design, the suite includes the single-band OctoComp, which offers eight discrete channels of compression per plug-in, and OctoMaxx, an 8-channel loudness maximizer. The

an edit controller option for its OMR8 multitrack. The latest version includes native Pro Tools compatibility, segment-based EQ, and CD Mastering and Fine Edit functions. Accessible from within the OMR8's editing



LFE Splitter extracts the frequencies of chosen channels and generates the bottom-end signal. The LFE Combiner feeds the extracted signal back and distributes it over the chosen channels. Other plug-ins include an OctoVerb reverb and OctoQ, a 7-band parametric EQ. Retail: \$1,295.

Circle 340 on Product Info Card

DAR OMR8 UPDATES ▲

Digital Audio Research (www.dar.co.uk) announces new software add-ons and

software, the CD Mastering function prepares tracks for mastering, with the OMR8 controlling CD-R burning. The Fine Edit function allows two alternative takes to be viewed side by side and edited at the waveform level. Also new is the optional OMR8 Edit Controller, a remote hardware unit offering controls for editing functions, including a weighted-action jog wheel, transport controls, fader and dedicated function keys.

Circle 341 on Product Info Card



BEOS VERSION 5

Now available, Version 5.0 of the BeOS multimedia operating system from Be Inc. (www.be.com) is offered with a free programmers development kit (BeIDE, or Be Integrated Development Environment) and a library of demonstration applications. Be has also opened access to its Tracker desktop and Deskbar trackbar by publishing a software developers' kit along with source code. Version 5 features support for more SCSI and IDE drives and broader PCMCIA and USB support, including digital camera and FireWire support. BeOS 5 can read virtually all major audio and video formats, and dial-up and LAN-based TCP/IP networking are available. The OS comes with an Internet browser, FTP and telnet server, and AppleTalk support. In addition, a scaled-down BeOS 5 Personal Edition, BeOS Developer Kit and demo packages are available for free download, at <http://free.be.com>.

Circle 342 on Product Info Card

AKAI MPC2000XL ▲

Built with MPC2000 technology, Akai's (www.akaipro.com) new MPC2000XL combines a sampling drum machine and sequencer with expanded features. The unit offers 16-bit stereo sampling and 32-voice polyphony, and has 2 MB of RAM, expandable to 32 MB. The 16 drum pads are velocity- and pressure-sensitive, and can



be programmed to four banks providing as many as 64 sounds per program. Each voice has dynamic resonant filters, time stretch, and graphic cut-and-paste sample editing/resampling. Other new software features include multitrack recording, simultaneous playback of a second sequence and enhanced file management. The MPC2000XL is compatible with all MPC2000 disks and can load samples from the Akai S-Series library, MPC60, MPC60-II and MPC3000 libraries, E-mu EIII and Roland S750/S760 CD-ROM libraries. It also supports 16-bit/44.1kHz uncompressed .WAV files. Retail: \$1,649.

Circle 343 on Product Info Card

UPGRADES AND UPDATES

E-mu (www.emu.com) announces the E-mu PC, an integrated computer, sampler, sequencer, editor and publishing system, including computer. The system includes extra RAM, disk storage, CD-RW drive, modem, MIDI interface, multichannel I/O and VST software. It sells for \$2,495 (\$2,695 with 17-inch monitor). In other E-mu news, the new Xtreme

Lead XL (\$895) is a 64-note polyphonic MIDI sound module designed for dance music with 32 MB of ROM, with 12th-order filters, programmable arpeggiators and more...The Sonic Time-works CompressorX effect is now available for Soundscape Red and SSHDR1-Plus systems and the Mixtreme card. Apogee MasterTools with UV-22 is also available for Soundscape. Visit www.soundscape-digital.com for details...Emagic (www.emagic.de) announces Logic Audio Version 4.2 for Mac and Windows 98. Features include sample-accurate sync, Roland VS support and enhancements to the Score Editor, sequencer and audio engine...Official Software LLC (www.officialsoftware.com) releases version 1.5 of Official Copyright Software, designed to simplify copyright filings with the U.S. Copyright Office. Features include new and updated copyright forms and fee information, contacts and publications and the ability to register works and Web sites online...Syntrillium's MP3 plug-in (\$29) for Cool Edit Pro enables CEP users to read and write files direct-



ly. Visit www.syntrillium.com...Check out Onadime's "see the music" interactive Mac application that blends audio and video synthesis technologies to generate images from audio. (The software was a light-show feature at the California Music Awards.) A free player is at www.onadime.com...The BIAS biasDECK software is Apple OS9-compatible. See www.bias-inc.com for more information...mSoft (www.msoftinc.com) has a software module for its Server-Sound media retrieval system. Pro/Spotter-TV Version is automated effect spotting software, based on ServerSound's Pro/Spotter-Film Version. Also new, Pro/Master automates the process of digitizing audio from CD or DAT, splitting it into track and index and linking it to a database...Metric Halo's (www.channelstrip.com) Channel-Strip processing software is now available for MOTU's MAS and Digidesign's RTAS and AudioSuite platforms...Gefen (www.gefen.com) offers ex*tend*it mini PC/Mac cross-platform KVM Switch, which enables the switching between two CPUs without swapping monitor, keyboard or mouse...Canford debuts a new MIDI mains switcher and a MIDI distribution amp. Get details at www.canford.co.uk...ASACA (www.asaca.com) introduces new TeraCart libraries, which offer 3.9 and 7.5 TB of storage and are SAN-ready. ■

AUDIO BASICS & TROUBLESHOOTING

PART TWO: STUDIO MONITORING SYSTEMS

T rue monitors are necessary tools in any studio. Yet, as with any component in the signal chain, monitors need attention, and occasionally a tweak or two to optimize the signal chain. Taking your diagnostics to the next step, your goal is to confirm basic monitor performance, through a process that starts at the console to confirm channel balance across the audio spectrum. The path must be followed all the way to the monitor components to confirm that signals are equally distributed, cleanly and evenly.

Evaluating a monitoring system is not easy. Comparative analysis will only reveal a difference if one monitor is damaged and a spare set of "mains" is unavailable. Otherwise, comparing an equally new or tired pair of monitors won't be much help. Do consider buying spare components, especially if the manufacturer can provide drivers in matched pairs. Drivers are subject to fatigue, overexcursion or voice coil damage (usually through overloading) as well as aging, where cones, diaphragms and rubber (or foam) surrounds break down or become brittle with time or extended exposure to heat/light/smoke conditions.

BEFORE YOU BEGIN: REVIEWING THE BASICS

We know that audio and power outlet juices are measured in AC volts and that batteries produce DC volts. Wire "continuity" is measured in ohms. Cables and connectors that are doing their job will measure 0 ohms, although most meters do not have the resolution to say exactly how close to 0. It is easier, although more expensive, to measure level differences in dB rather than in volts. Keep in mind that the decibel is not a voltage but the logarithmic ratio of two voltages. All gear operates at a "nominal" level: professional (+4 dBu) and consumer

(-10 dBV) equipment are referenced to 0 dBu (.775 VRMS) and 0 dBm (1 VRMS), respectively.

Most oscillators do not continuously sweep from 20 to 20k Hz. Since a Range switch typically selects a band of frequencies, be sure to confirm with your ear that the switch is at the correct position. If you see level on the console meters but do not hear it, you may have selected a frequency outside the range of human hearing (above 20 kHz), one that is potentially dangerous to tweeters. (See last month's "The Tech's Files" for a suggested list of audio

frequencies. (The Tenma 72-505 does a decent job for \$59.) Note: At any step in the procedure, it is okay to adjust the signal level to produce a voltage or dB reading that is easy to read and compare. Having an assistant to confirm the readings (and write them down) will make your job easier. Provide ear protection for anyone invited to the "audio tone party."

CHECKING CHANNEL BALANCE

To confirm left and right channel balance, begin at the console. Set the oscillator to 500 Hz (sine), and

VOLTAGE AND DB RELATIONSHIPS

REFERENCE VOLTAGE LEVELS	RELATION TO NOMINAL	DB DIFFERENCE
1.75 VRMS	+7 dBu	+3.0 dB
1.3 VRMS	+4.5 dBu	+0.5 dB
1.226 VRMS	+4 dBu	0.0 dB
1.15 RMS	+3.5 dBu	-0.5 dB
0.870 RMS	+1 dBu	-3.0 dB

Table is referenced to the nominal console operating level (+4 dBu). This table is for voltmeters without a dB scale. The examples are ± 0.5 dB and ± 3 dB, relative to nominal.

tools. You can also view the complete article online, at www.tangible-technology.com.)

Chasing down intermittent switches, faders or connections (such as the master fader, monitor source switches, Dim attenuator buttons, or mono playback switch) is easier when using a 40Hz sine wave, exercising each of these components to identify the problem component. Sometimes pulling the board's master module, combined with a couple of well-placed spurts of contact cleaner can work wonders toward improving the signal pathway. A pure bass tone makes it easy to spot intermittent fuzz, but be aware that not all oscillators produce pure sine waves at low fre-

connect to a single channel of the mixer, panned to the center. Place both the channel fader and the stereo master fader at the nominal position and adjust the oscillator output until the console's stereo bus meters are at nominal, which could be labeled 0 V, or somewhere between -12 and -20 dB.

Measure the console's left stereo output, then the right stereo output. (It might be helpful to make a few adapter cables to facilitate the connection to the voltmeter.) The monitors need only be loud enough to confirm that the oscillator is generating the correct frequency range.

If the two channels are not within 0.5 dB, pan hard left and then hard right, measuring each time. (See the table above for voltage and

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dB relationships.) If the hard-panned difference is within 0.5 dB, the stereo fader is probably okay. (If the stereo fader is actually two mono faders, make the channels agree.) Center the panpot and try again. A difference greater than 0.5 dB but less than 3 dB may indicate a defective panpot. Compare this result with a number of other console channels. If the balance improves, you can thank comparative analysis.

FREQUENCY TEST

Check left and right balance at 20 Hz and 10 kHz. Remember, the monitors are low or off. (Headphones can also be used to confirm oscillator settings, but do not force-feed these tones to your ears.) If channel balance at extreme frequencies is worse, capacitors are suspect. If not, return the oscillator to 500 Hz.

ACTIVE LINE AMPS

In all tests, a channel mismatch of 6 dB is a sign of a wiring error or a failed (active balanced) output amplifier. If the channel balance is within 0.5 dB, leave the faders and panpots where they are and proceed to the Control Room Monitor output. Raise the control-room level to the 9-o'clock position. If this is hair-raising, there is a gain structure error that is most likely to do with the console being referenced to +4 dBu while the power amp (or powered monitors) are referenced to -10 dBV. See both the console and the power amp (powered monitor) literature to determine the output level and input sensitivity options. Once that's solved, kill the power to the monitors.

Measure both control-room outputs, with the control at 9 o'clock, writing down each value. Now raise the control-room monitor pot straight up, measure and note each channel. Repeat with the control-room pot at the 3-o'clock position. The balance should ideally match at all levels, but it is likely to be better at higher settings and worse at lower settings. If errors are greater than 1 dB, repeat the frequency test.

POWER AMP/DRIVER TEST

By now it should seem obvious that each component in the signal path will be tested. Assuming the control-room pot passed the low-level test, set it to minimum, fire up the power amps, then raise the control-room level until the

tone is audible but not life-threatening. (Resume use of earplugs.)

Measure the control-room output again to confirm balance, then measure the output of each power amp using a 500Hz sine wave. For powered monitors, remove the woofer from the cabinet, leaving it connected, and measure at its terminals.

Adjusting the gain pots on the power amps should solve level discrepancies. If these controls do not seem in the same ballpark, repeat the frequency test to rule out the power amp. Signal to the tweeters can be confirmed using a 5kHz sine wave—using ear protection, of course. (When measuring within a monitor, it's okay to sweep the crossover region to confirm its existence, but when measuring left/right balance, use a frequency that's centered within the usable range of each driver.)

Drivers can be removed from the cabinet and measured with the voltmeter set to ohms. This is a static DC resistance test, so don't expect to be closer than within 2 ohms of the stated impedance, which is the speaker's dynamic resistance averaged over the audio frequency range. A dead driver will either be open (infinite ohms) or shorted (0 ohms). Note the values and return the color-coded wires to their respective positions.

BRING THE NOISE

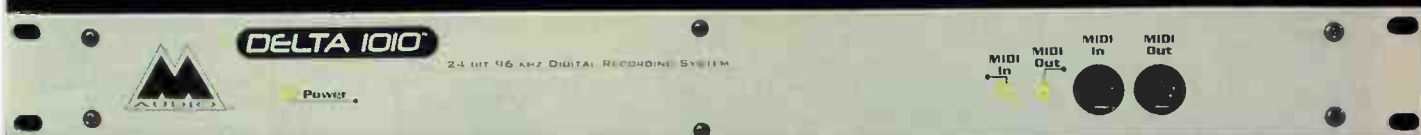
To balance a multiple monitor system, route pink noise (from a generator, test CD or another source) to your console's bus at 20 dB below maximum. Place an SPL meter equidistant from each monitor, feeding one channel at a time. Raise the control-room level until the meter reads 85 dB SPL using the slow, C-weighted curve. Mark the position of the monitor knob. Check the next monitor, adjusting the power amp level (if necessary) to match the first until all channels have been tested.

In the studio, the importance of hearing a faithful representation of the source or tape is essential, and hopefully these suggestions will help keep your system at optimal performance. Additionally, simple maintenance, basic routines—such as cleaning and tightening connections, checking your amp-to-speaker (or mixer-to-powered-monitor) cabling for kinks, damage and proper hookup polarity—should be a regular part of any studio checkup. ■

Eddie Ciletti, now a Twin Cities resident, can be reached at www.tangible-technology.com.

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PREVIEW



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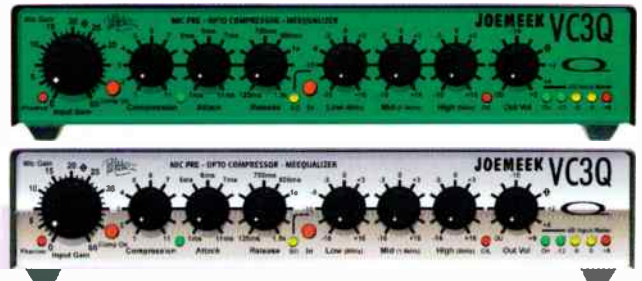
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The VC3Q from Joemeer (www.joemeer.com) is a mic preamp/compressor

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Circle 337 on Product Info Card



HOT OFF THE SHELF

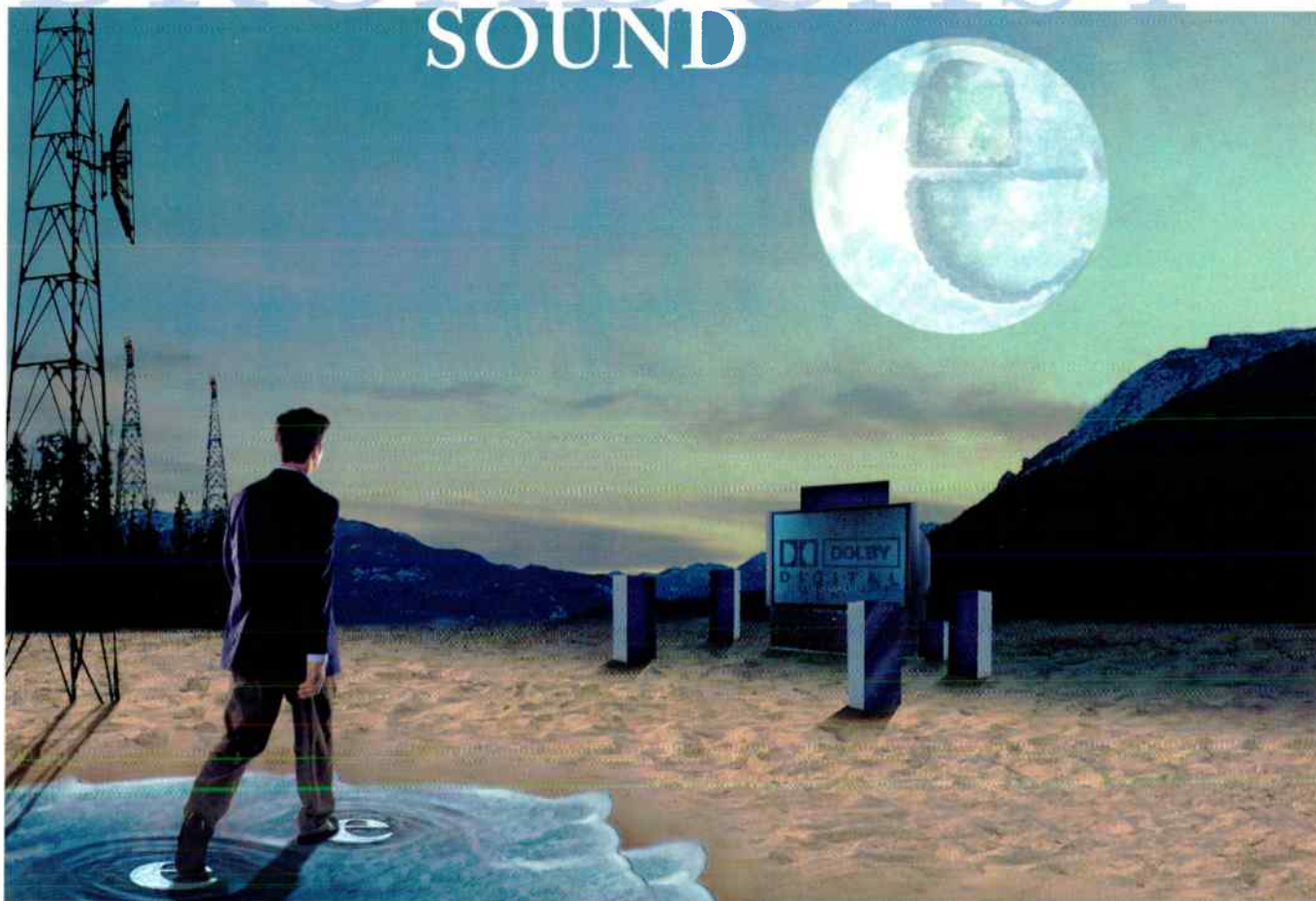
New Version 1.5 software for the Spirit by Soundcraft Digital 328 mixer can be downloaded free of charge from www.spiritbysoundcraft.com. The update includes such features as 32-channel MIDI control, 64 MIDI memory locations and 64 dynamic memory locations. A free CD-ROM contains step-by-step details on how to set up the Digital 328 with the most popular PC-based and stand-alone digital audio recording systems. For the Digital 328 CD-ROM, call 800/255-4363 or order it at the Web site...A new release in the Video-Helper Music library of "alternative" production music is "The Drama Sutra," a 2-CD set with 50 themes per disc,

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EUPHONIX SYSTEM 5

DIGITAL MIXING CONSOLE



Known primarily for its large-format, digitally controlled analog mixing consoles, Euphonix unveiled the System 5, its first all-digital console at the Fall '99 AES convention. Fully equipped for 24-bit, 96kHz operation and surround mixing, the first System 5 was installed at One Union Recording in San Francisco, and there are now around 26 in operation worldwide. For this review, *Mix* visited Nicasio, Calif., where a System 5 was being evaluated for purchase by Skywalker Sound. [Editor's note: The facility has since purchased two System 5s.]

We encountered a well-designed and engineered platform with impressive first-release features and silky smooth sound. Although still missing some important functions, the System 5 is clearly a product Euphonix intends to grow. Functionally, Euphonix has designed a control surface that leverages the flexibility and comprehensiveness offered by assignability while also benefiting from an intuitive, "one knob/one function" approach.

ARCHITECTURE

The most common hardware architecture for large-format digital consoles is based on three sub systems: Surface (including software), Core and I/O. The System 5 essentially fits this model, except that some control functions have been split off to an outboard computer. The hardware has been designed as a mission-critical device, with reliability, fault-tolerance and minimal downtime as primary goals. Examples of this are a backup power supply with automatic switchover facility and DSP frames that automatically switch to a spare DSP or controller card in the event of a card failure. Failed cards may be "hot swapped" and channel strips are also hot-swappable in self-enclosed "buckets."

Rather than having everything in the system under the control of a single computer, the System 5 takes a distributed processing approach employing a number of pilot computers, a strategy intended to prevent an entire system

crash because of the failure of one component. One pilot tends to the mic/line interfaces, monitor interface, machine control and MIDI. Each frame also has a pilot computer. Finally, the Studio Computer, a single-board Intel computer running Windows NT, drives a monitor (a 15-inch flat-screen comes with the system), keyboard and trackball and runs the software that configures the System 5 (Euphonix eMix). The Studio Computer also sports a CD-RW drive for data backup. (Once the system is up, the Studio Computer is not in the critical path; the system will function without it.) The pilot computers and the control surface communicate via a network switch using Euphonix's EuCon networking scheme, a variant of 100BaseT Ethernet.

MADI is fundamental to the System 5's audio bloodstream, running in and out of a large MADI router hub. The hub receives 28-channel 44.1 to 96kHz MADI ports from a selection of 24-bit/28-channel audio interfaces (Lightpipe, TDIF and S/PDIF audio interfaces and are slated for release this month.)

On the other side, the hub feeds the Digital Core, which comprises multiple frames containing the DSP cards, and handles all the mixing and processing. (A dedicated MADI output feeds the monitoring.) Each frame holds up to 10 active DSP cards. (One can be designated as a spare that is automatically and seamlessly brought into play if one of the others fails.) Each DSP card holds six Analog Devices SHARC chips. The frames output MADI streams that feed the router hub.

Audio moves in and out of the System 5 at 16-, 20- or 24-bit resolution; the internal signal path is 32-bit floating-point and the DSP uses 40-bit floating-point math. Euphonix recommends using the MADI-to-AES interface for sending

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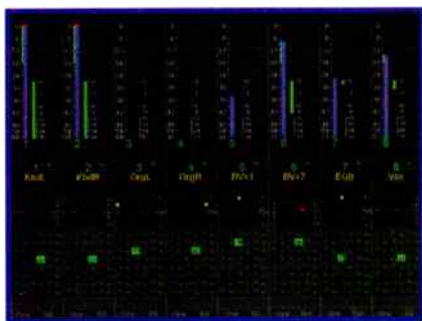
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16- or 20-bit data to ensure that it is properly dithered.

CONFIGURATION

The number of available channels and buses (Group, Mix and Aux) is determined by choosing a fixed configuration, called a "Mixer Model" in eMix. The eMix screen for selecting a Mixer Model clearly shows the available options and details channel, mix, bus and aux numbers and how frames are allocated in order to provide those facilities.

The choice of Mixer Models offered depends on the number of frames and



Three typical System 5 screen displays (l to r): The channel screen includes high-resolution metering, alphanumeric channel ID, EQ/dynamics curves or surround panning and track routing. The center section screen indicates aux and 5.1 bus levels, automation and timecode data. The master fader panel shows group levels, dynamics (including sidechain levels) and EQ displays.

DSP cards installed; the largest model available allows 226 channels. Up to 48 group (multitrack) buses, 48 mix buses and 24 aux buses are available depending on the Mixer Model. Operating at 96 kHz obviously requires more processing power than the more traditional 48/44.1 rates, so the maximum number of channels is reduced. Mixer models can be changed at any time, allowing reconfiguration from a stereo broadcast setup to a multichannel surround stem mixing environment for film.

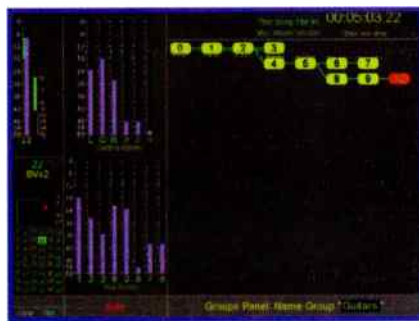
Once a model is selected, the mix buses can be formatted into mix stems as needed. For example, a Mixer Model with 24 mix buses would accommodate four 5.1 mixes. This assignment is very easily executed from the System PC screen. One need only drag the 5.1 icon from the pop-up menu of mix stem sizes onto six unused mix buses in the matrix. The mix buses will instantly be identified as belonging to that stem, which can then be named. Auxes can be defined as mono or stereo, and complex configurations can be set up extremely quickly.

Patching is executed in another pat-

tern of eMix called PatchNet. All of the channels running in and out of the Studio Hub's I/O ports, which include interface I/O and console channels, group, mix and aux buses, appear in PatchNet and can be connected as flexibly as in a traditional analog patchbay. Patching is performed by dragging in a matrix of inputs and outputs to select and then connect. I found PatchNet both unimimidating and fast, and the simple, intuitive and powerful interface makes it easy to create complex setups very quickly on-the-fly.

CONTROL SURFACE

The control surface is available in multiple frame sizes and is laid out in the tra-



ditional fashion: X number of identical channel strips and a center section with the master facilities. No audio passes through the control surface.

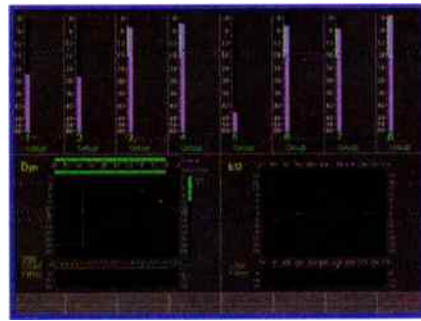
Channel strips come eight to a module. Each module section has its own IP address and is connected via an Ethernet CAT 5 cable to a port of the EuCon 100BaseT switch, the other side of which goes to the pilot computers. The control computer in each module section divides the labor, avoiding the processing bottlenecks that can result when three film mixing operators share a single central computer.

Each channel strip has two signal paths, main and swap (generalized from the traditional "channel" and "monitor"), which have identical facilities and share the channel strip's controls. Audio sources, mixes and buses can be arbitrarily mapped to the channel strips, generalizing the layer model used by many digital consoles but retaining the flexibility and space savings of a control surface with fewer channel strips than the console has audio channels. In place of layer flipping, the System 5 stores Layouts, which are simply maps of channels to strips. In essence, every

layer is a custom layer, which is a powerful feature.

The controls on a strip are toggled between the inputs either locally or globally as part of a full layer change. The high-resolution channel display on the meter bridge puts graphic and status information for the currently active channel in front of the user.

Each channel strip has eight knobs of a patent-pending design. The knobs are rotary encoders with a switch operated by pressing on the top of the knob. A ring of 21 LEDs on the knob's top displays parameter values. Typically, an arc of LEDs glowing dimly will indicate the range or excursion of the parameter while one of the LEDs will

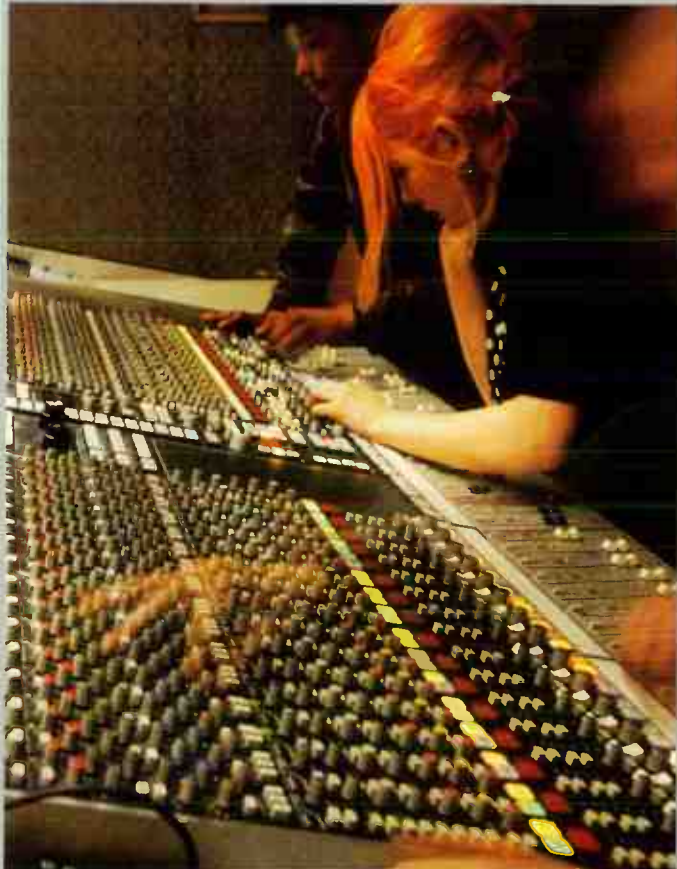


glow brightly to show the actual parameter value.

Additionally, each knob has four LEDs on top showing knob and switch automation status, and one more LED in the center that serves to color code knobs into functional groups. Next to each knob are two switches, one usually acting as an on/off and the other as a select, plus a four-character "scribble strip" display. Euphonix calls this collection of knobs, buttons and displays a "knobset." Stylish, elegant and exquisitely functional, these knobs are one of the System 5's true wonders. Sound like I've gone nuts for knobs? Just try these once and their efficiency and intuitiveness are instantly clear.

One of the pluses of a digital console is the ability to bring the functionality of any channel from an extreme end of the board to a strip in the sweet spot. Euphonix takes this one better by offering a centered channel that includes an array of 24 knobs, allowing all of a channel's parameters to be exposed at once, eliminating the need for paging. Many engineers, possibly even most, will only ever use this "glory" channel strip, bringing whatever channel they

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FIELD TEST

need to work with in front of them and using the knob array.

The Strip Expand feature allows several channel strips to be used for a single channel. This makes it possible to have all parameters instantly available on several channels at once.

CHANNEL STRIP FACILITIES

Each signal path has identical A and B inputs. The choice is input A, input B or sum of A+B. The selected input passes through a delay, phase reverse (with onscreen indication) and a ± 15 dB trim control. On an analog console, a 30dB gain range would seem insufficient, but once a signal has been digitized, drastic gain adjustment is rarely necessary. The analog Mic Line Interface provides greater analog gain range with -12 to +72 dB, and offers a Hi-Z mode.

The standard channel display shows channel level and gain reduction metering in high resolution. An alternate mode restricts the display size for the channel to the bottom half of the display but simultaneously shows the level of the unselected channel (the "swap" channel if the "main" channel is currently active) in the top half.

Each path offers four bands of fully parametric EQ, a comprehensive dynamics section, two filters and an insert loop (which shows up in PatchNet where it can be patched to be either a digital or analog insert), which can be easily routed in any order. The arbitrariness with which these facilities can be routed is clearly a valuable utility.

The knobset is used for editing all channel parameters and is assigned by pressing the appropriate function select button (input, dynamics, EQ & filters, aux, pan) in the group found just above the fader. As each function is selected, the knobset's first page is assigned to show the most commonly used parameters, while the presence of deeper, tweakier settings is indicated by a dim glow in one of the page forward/back buttons lying between the knobset and the function select buttons. Pressing the indicated button brings the hidden page to the knobset.

In the EQ section, a single page of eight knobs is used for the 12 parameters of the parametric bands (gain, frequency and Q) by using two knobs per band and toggling one between frequency and Q with the top "knob-side" button.

When EQ is selected, the channel display shows the EQ curve and

changes it in real time as parameters are adjusted. Assigning this channel to the glory strip in the center section brings up a larger version of the EQ curve in the center display.

Meanwhile, the frequency/Q knob for each band indicates the bandwidth by the width of the arc of LEDs on the knob's skirt, with a bright segment designating the frequency. The gain knob emulates the 7 o'clock to 5 o'clock rotation of a typical analog pot by showing an arc from 7 o'clock to the current gain setting, which is shown by the bright LED. The visual cues provided by the onscreen graphic and the LED knob skirts allow one to assess the state of the EQ at a glance.

The second EQ page controls the two filters, which can be HP, LP, notch or band types. The EQ section gain is adjustable in $\frac{1}{4}$ -dB steps, a useful facility for critical applications.

The dynamics section, consisting of a compressor and an expander/gate, is equally well implemented. The first page has the Big Four setup parameters (threshold, attack, release, ratio) for both the compressor and the expander/gate, and uses color-coded knobs for easy differentiation between compressor and expander/gate functions.

The dynamics display that comes up shows an input/output graph illustrating the dynamics settings. The "Gain Ball" (a bouncing red dot) shows the input level.

Page two has more compressor settings: knee, continuously variable between hard and soft; depth, which is the maximum allowable gain reduction; and up to 30 dB of makeup gain. Page three has more expander/gate settings (including the size of the hysteresis window), and page four contains the side-chain settings, which include a filter configurable as HP, LP, bandpass or notch. Of course, you can always have access to all functions at the same time on the glory channel.

The superb flexibility and hearty feature set of the System 5 make it a natural for surround mixing, especially post-production, and the panning section does not disappoint. With the pan section selected and the display showing the current position in an X-Y display, panning can be manipulated from the console's trackball or by using three knobs (front L/R, front/rear and rear L/R). Personally, I prefer direct X-Y control such as provided by a trackball, or even better, a joystick. At the time of writing, no joystick is available, but film monitoring and motorized joystick pan-

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FIRST WE LISTEN

CIRCLE #066 ON PRODUCT INFO CARD

World Radio History

FIELD TEST

els are under development.

The panning section also includes controls for focus (the L/R pan law), divergence (leakage to other speakers), and separate send levels for the LFE channel and the other ("non-boom") channels.

Any of the processing settings (EQ, dynamics, pan) can be easily copied and pasted to other channels, although it is not possible to copy settings to multiple destinations in one operation. Thus copying EQ settings to several vocal takes requires repeating the copy

operation once for each destination track.

Up to 48 channel groups can be defined. Instead of separate group master faders, groups are mapped to strips just like channels. There are eight assignable Master faders in the center section.

THE CENTER SECTION

The left side of the center section has eight assignable faders, the glory channel and an array of channel select buttons, which allow one to grab any channel and immediately bring it to the center.

The right side of the center section has monitoring, machine control, automation (including timecode and locator displays) and communications controls. Monitoring and machine control are discussed more completely below. The talkback mic can be selectively routed to any of the monitor mixes.

The aux, group and mix bus masters share a knobset in the center section; buttons below the knobset switch the knobs' functions between the three.

A lot of activity will stem from the Main Panel Viewer, a display with 12 buttons running down each side and four at the bottom. Just beneath the Main Panel is a small strip display with another six buttons. A small panel lined with five buttons on either side does not yet have any function, but the Main Panel and the strip below it are heavily used for controlling master functions, such as metering, soloing, snapshots, cues and monitoring.

MONITORING

The System 5 provides extensive monitoring facilities. There are three speaker sets available: the main set (which accommodates up to eight channels for 7.1 SDDS surround), alt 1 (up to 6 channels for 5.1), and alt 2 (2-channel stereo). CR Monitoring can be accessed in the Main Screen and any individual speaker output may be muted. Unfortunately, there is no speaker solo, so soloing must be accomplished by muting all the outputs other than the one you want to hear.

A crucial task in surround mixing is fold-down monitoring to formats with fewer channels (e.g., 5.1 to LCRS or stereo). The System 5 provides configurable fold-down between monitor formats. An input/output matrix in the eMix software allows gain to be set for the summing of each channel that is being folded down. For instance, you could specify a gain of -3 dB for the LS and RS channels when folding 5.1 down to LCRS to keep the surround channel from ending up too loud after LS and RS are folded into the mono surround. You may want to actually develop separate, tweaked mixes, which can be done simultaneously using the System 5's mix buses. The System 5's fold-down feature will undoubtedly be useful for checking in different monitor formats while mixing, as well as for compensating for different room acoustics.

As with downmixing, bus and mix assignment and patching, sets are creat-

GAIN

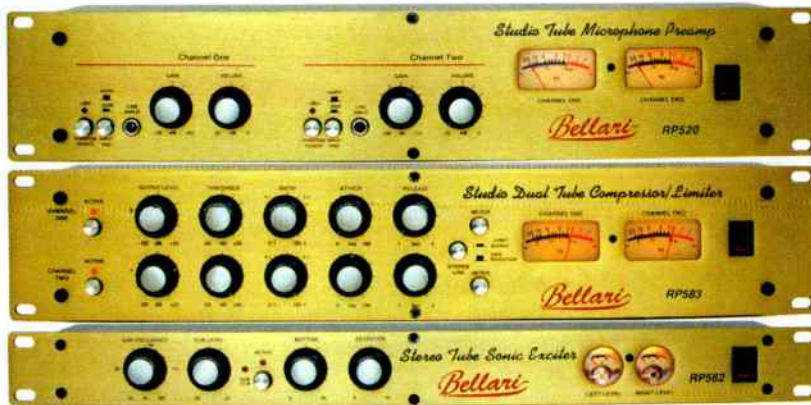
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ed in an eMix matrix with rows of devices and columns of channels. In the spirit of "waste not, want not," any DSP not used in the currently selected mixer model is made available as additional external channels.

SNAPSHOTS & AUTOMATION

The System 5's got 'em both. Snapshots store the console state in whole or part, *not* including patching (which is stored with the Title). Any combination of automatable parameters can be selected and stored; when the snap is called, only those parameters are changed. This simplifies things like spot EQ changes or effects accents. As the System 5 is fully digital, no manual resetting is necessary; all parameters are restored as soon as the snapshot is called, and the knobs update to indicate the new values. The largest System 5 could store around 80 snapshots of all parameters, but selecting a subset of parameters can save significant amounts of memory.

The System 5's dynamic automation is comprehensive and powerful, as almost every parameter on the console can be dynamically automated. Pairs of red and green LEDs in strategic spots on

the control surface indicate the automation status of parameters. The automation panel in the center section provides dedicated buttons for most major automation functions, as well as select buttons for major sections (EQ, dynamics, auxes, etc.).

Most of your favorite automation features are implemented: join (remember last parameters selected for automation and allow them to be punched in again), glide (fade back to existing level after punch-out), and autotakeover (punch out when existing level is reached). Other functions: touch-sensitive faders (allow punch-in/out when a fader is touched/released), fader hold (*don't* punch out on release) and Knob Pickup (the rough equivalent of touch-sensitivity for knobs—they punch when they are moved).

The utility automation functions are particularly well-implemented: There are five different fill modes (in which automation data is filled in automatically), including a region fill, isolation modes for channels (in which they are functional but disconnected from the automation) and, one of my favorites, Preview (in which one essentially can punch between automation and isola-

tion, making it easy to set up and rehearse spot punches).

Another great utility, Group Coalesce, allows users to temporarily group faders, write automation to the group master, then transfer the automation to the group members' faders and dissolve the group.

Mix passes are stored in a tree configuration that can be viewed and accessed graphically, which simplifies the process of going back to an earlier mix. There are also several functions for managing this tree, including the ability to eliminate any mixes not in the direct line from the original pass to the present.

Like most large-format systems, the System 5 automatically stores mix passes when the timecode source is stopped. Although this is a useful configuration, I often wished that I could disable this automatic store function and have a pass only be stored if I hit a Keep or Store key after the pass is stopped.

What doesn't the System 5's automation have? Well, at the moment there are a couple of key things missing, the biggest one being any kind of offline automation. Additionally, mix and group bus masters cannot be automated in this release.

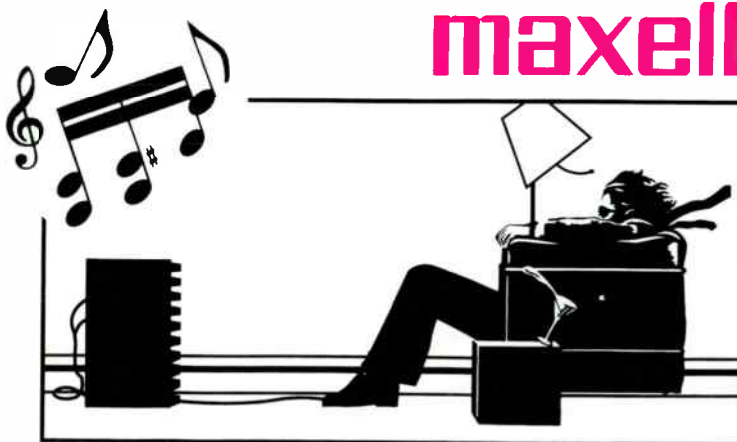


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MACHINE CONTROL

The System 5 uses Euphonix's TT007 unit, originally developed for the CS Series consoles, for controlling external transports. The TT007 supplies Sony 9-pin (P2), TimeLine Lynx and MIDI Machine Control interfaces and supports all formats of SMPTE and MIDI timecode.

A panel provides a jog/shuttle wheel, transport control buttons, and appropriate buttons for storing, recalling and configuring. Cue points are the System 5's locate markers, and up to 99 can be stored per title. Although they can be grabbed on-the-fly, it is a two-step process where the current timecode value is captured into a register and then assigned with the Cue button or other locate function. It would be faster if one could put the console in a single-keystroke mode where every punch of the Cue button grabs the current value and puts it in the next available Cue.

COMMENTS

The System 5 is a superb piece of design and engineering. This console left me impressed, in fact, exhilarated.

Three primary functional issues in a digital console are configuration, available facilities and access. As for configuration, the System 5 architecture emphasizes fault-tolerance, use of off-the-shelf components and scalability, and is quickly reconfigurable from software.

The System 5 offers extensive and extremely flexible facilities, with particular strength in busing, a valuable asset for film and broadcast operations.

In terms of access, the software works very hard at feeding a lot of information to the user in a form that can be comprehended and is neither overwhelming or intimidating. The control surface is the best of its type I've yet seen. The knobsets and, most especially, the knobs themselves are, quite simply, a brilliant stroke. From an operational standpoint, it is difficult to overstate their effectiveness and visibility in the middle of the workflow. Operation of the System 5's features is intuitive and fast, making the system easy to learn and work on quickly.

Soundwise, the System 5 was, subjectively, clean as a whistle with an interesting and pleasing quality to it. To try to put it into the common vernacular, it was not at all "cold" and "ster-

ile," but the EQ didn't quite have the fat, warm sound of a Neve or Pultec EQ. The thing that puzzled me at first listen was that I also didn't hear it as a "neutral" sound. On the cold-to-warm scale, it sounded to me like the System 5 was a bit to the warm side of neutral, but transparent enough for surgical work.

The user interface, on the whole, is excellent. There are some rough edges that need to be smoothed out, like the inability to name hubs and potentially confusing terminology like "Device Inputs" and "Device Outputs" (How about "To Devices" and "From Devices"?), but it is a solid design.

But those rough edges were the only things I found, and I believe that Euphonix will address the most grievous of these problems quickly. This is not to say that there aren't some big things missing from the Version 1.0 software I saw, like offline editing for the automation and stereo channels, but make no mistake, this is very much a fully-functional console.

There are many directions Euphonix could take the System 5. Intended to mate with the company's R-1 recorder, it will be interesting to see whether some sort of hybrid mixer/workstation emerges. With a control surface this good, it would behoove Euphonix to consider leveraging it as a "HUI-ish" front-end to other workstations by adding more extensive MIDI capabilities.

Though near the top of the price range for its genre, it is hard to see the Euphonix System 5 at this moment as being anything less than the new high-water mark in large-format digital consoles.

[As *Mix* was going to press, Euphonix announced Version 2.0 software for the System 5. Major new features include an on-screen diagnostic function that constantly monitors system status, providing both a confidence check and a troubleshooting tool. The System 5's Integrated Patch-Net I/O Router has been expanded to accommodate 672 by 672 sources and destinations at a sampling rate of 48 kHz (or 336 by 336 at 96 kHz). Also, some multiformat monitoring and control facilities have been added for broadcast applications.]

Euphonix, 220 Portage Ave., Palo Alto, CA 94306; 650/855-0400; fax 650/855-0410; www.euphonix.com. ■

Larry the O is currently upgrading his Toys In the Attic studio. Special thanks to Tim McGovern of Skywalker Sound.

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GTC INDUSTRIES TONE AND NOISE PLUGS

COMPACT TEST GENERATORS

The Tone Plug—essentially a tiny audio generator built into a Neutrik XLR connector—is a dream tool for live sound engineers. And for project studio owners who have no test equipment, the GTC Industries Tone Plug could be the best preventive maintenance investment they could ever make.

This small unit generates five individually selected or automatically stepped sine waves at frequencies of 100, 250, 400, 1k and 10k Hz. Additional test signals include: a VLF 40/2400Hz combo tone for testing crossovers and subwoofers; a multifrequency pulse that's perfect for adjusting speaker time delays and tweaking reverbs or delay units; an amplitude sweep function for adjusting compressor/limiters; plus a unique sweep tone for tracing wiring in racks and buildings.

The Tone Plug operates on phantom power and has a bright LED that glows when phantom power is present, the cable is working and the preamp is, well, preamping. It couldn't be easier.

On power-up, Tone Plug generates a 1kHz pulse. Each time you press the small button on the XLR body the unit steps to another frequency, offering five choices (100/250/500/1k/10k Hz). If Tone Plug only delivered those five tones, it would be worth \$49.95, but as late night TV always promises, "Wait! There's more!" By hold-

ing the button down for two seconds when any frequency is selected, the unit enters a second-tier mode, offering five other functions: Multi-Frequency Pulse; an Auto Sequence (this steps through all five of the Tier One sine waves); Amplitude Sweep (a 1kHz tone that varies in amplitude over a 20dB range); Trace Tone (car alarm); and a VLF test signal—essentially a 40Hz sine wave superimposed with a 2,400Hz tone. The 2,400Hz signal is 20 dB lower in amplitude than the 40Hz tone—a good thing as the ear is very sensitive to midrange.

In the Pulse mode, a "pop" automatically repeats every four seconds or you can manually press the button to hear this environmentally friendly version of Chinese water torture. I have never had to adjust speaker cluster delays, but I am always trying to tweak reverb programs to make small rooms sound better, and a repeating pulse is a useful test signal.

The 20dB Amplitude Sweep is handy for checking threshold and ratio settings on dynamics modules. But one feature that reminded me of



what I didn't miss about New York City was the dreaded

Sweep Trace Tone. Easily recognizable as the world-renowned car alarm sound, this tune makes millions of people wake up in the middle of the night. If you've ever used an inductive-type telephone line tracer, you know this signal makes wire tracing almost as much fun as snake charming.

LET'S MAKE SOME NOISE

An equally useful product is GTC Industries' Noise Plug. Anytime you're jonesin' for some good old "pink" noise, there's no need for smelly old seashells to hear the rush of the ocean: Just add phantom power, and you won't believe how much continuous sound can come from a single XLR connector. While not as sophisticated as the Tone Plug, the Noise Plug is an ideal companion for use with a Sound Pressure Level (SPL) meter or a Real-Time Analyzer (RTA), which unfortunately can't be squeezed into an XLR connector.

The Tone Plug and the Noise Plug are each priced at \$49.95. I should also mention that the output of both of these units is a balanced mic-level signal and that no batteries are required. You'll just have to feed the Energizer Bunny some carrots from now on and keep a Noise Plug and a Tone Plug in each pocket. Woof!

GTC Industries Inc., P.O. Box 2493, Naperville, IL 60567; 630/369-9815; fax 630/369-9198; www.gtcindustries.com. ■

BY EDDIE CILETTI

TIER ONE	TIER TWO
100 Hz	40/2400Hz VLF Test Signal
250 Hz	Multi-Frequency Pulse
400 Hz	Auto Sequence of 100 Hz/250 Hz/400 Hz/1 kHz/10 kHz
1 kHz	20dB Amplitude Sweep
10 kHz	Trace Tone (car alarm)

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RØDE CLASSIC II

LARGE DIAPHRAGM TUBE MICROPHONE

Designed and manufactured in Australia, RØDE microphones have earned an enviable position among recording professionals. The company's Classic, NTV, NT1 and NT2 models can be found in leading studios worldwide, and with the recent introduction of the new Classic II, RØDE could once again be on the road to repeating its earlier successes.

The RØDE Classic II is a tube condenser mic developed from its popular original Classic model. In developing the Classic II, RØDE's goal was to elevate the mic to the next level, while retaining the character of its predecessor.

Everything about the Classic II points to the fact that it is a high-end recording tool. The microphone ships in an industrial-strength, foam-lined aluminum flight case, which houses the various system components. In addition to the microphone, the package includes a dedicated power supply, a 30-foot, double-shielded, oxygen-free multicore cable with custom-tooled military-grade gold-plated connectors, a stand-mount adapter, and a shock-mount suspension.

Weighing in at just over two pounds, the Classic II is a heavy, magnificently crafted instrument. The microphone's body is machine-tooled from solid brass and encapsulates two grille meshes—a finely woven inner headscreens and a heavier gauge, outer screen. A gold dot indicates the front of the microphone. The combination of a new capsule and further refinements to the microphone's electronic circuitry are the principal factors that distinguish the Classic II from the original.

The Classic II features a 1-inch dual-pressure gradient capsule with an edge-terminated, gold-sputtered diaphragm. Further, the microphone incorporates a low-noise, 6072 twin-triode tube preamplifier

that feeds into a custom Jensen output transformer. There are no controls on the microphone, yet the Classic II provides a wealth of options for securing your desired sound.

The Classic II has both -10dB and -20dB pads, along with a two-position highpass filter—both of which are remotely switched from the microphone's power supply. The highpass filter offers -15 or -21 dB of roll-off at 20 Hz. Similarly, there are nine polar patterns that range from omni with the control in the counterclockwise position to cardioid at the midpoint to figure-8 pattern when turned fully clockwise.

Specs include a stated frequency response of 20 to 20k Hz, with a sensitivity rating of 13mV/Pa. Maximum SPL handling is 130 dB, noise is less than 22 dB and impedance is 250 ohms.

INSTRUMENT SETUP

Like the microphone, the Classic II's external power supply is solidly built and comes factory-set for 120V current in North America. The unit can also be set for 220-240V operation. A ground lift switch is provided should you encounter a ground loop hum.

A multicore 12-pin cable connects the mic and its power supply by aligning a series of notches on the connectors. A white dot is also provided for visual assistance. All connectors are gold-plated to ensure optimum signal quality. Audio output is routed via a standard XLR connector on the rear panel of the power supply.

After powering the unit on, you need to allow several minutes for the microphone to warm up and stabilize. The power supply's LED drive circuit feeds off the filament voltage of the tube, becoming brighter as the instrument approaches optimum operating level,



thus providing visual indication that the Classic II is ready for use.

IN SESSION

With nine polar patterns to choose from, the Classic II provides considerable timbral variation. Overall, the instrument's frequency response is generally flat, but as is typical for a figure-8 pattern, high-end performance appears slightly diminished when placed into this mode. For vocal recording, the cardioid pattern exhibits a mild boost in the mid to upper midrange—a quality that does wonders for delivering presence to the human voice. In omni mode, the mic exhibited roughly a 6dB bump at around 10 kHz. With a variety of intermediate positions between these three main polar patterns, combined with the two-position highpass filter and the -10dB and -20dB pads, this microphone provides ample opportunity to find the right sound for numerous recording applications.

I used the Classic II on a number of vocal and instrumental recordings. I recorded a series of dialog tracks, vocal tracks, solo

BY ROGER MAYCOCK

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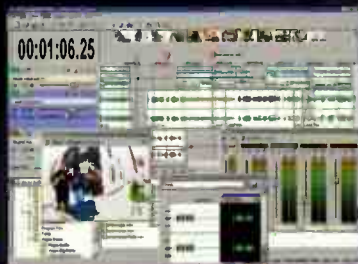
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FIELD TEST

flute and acoustic guitar. I also miked a Fender Stratocaster played through a Yamaha guitar amp.

For both close-proximity dialog work and the recording of vocal performances, the Classic II was absolutely terrific. For dialog, I used the cardioid pattern with the talent placed roughly 7 to 8 inches from the mic with a sheer nylon pop filter placed between. The Classic rewarded me with big, detailed and full-sounding takes that were "ready to go." Using a pop filter to help reduce the occurrence of high-level plo-

sives is recommended: The same material without the pop filter exhibited quite a bit more plosive sounds and sibilance, which would have required more effort after the fact to fix.

Vocal performances were met with equal success, exhibiting a warm, natural texture with a rich lower end. The microphone's off-axis response is exemplary, delivering even-sounding performances even as the vocalist moved somewhat in order to hit the high notes and generate the vocal inflections we were looking to capture.

This was similarly the case with the flautist. The Classic II delivered a very

even, full-sounding tone, yet with an open, "airy" quality that made the instrument sound extremely musical—even with a fair amount of movement from the player.

The Classic II delivered exceptional results with acoustic guitar. The instrument was recorded on a hardwood floor with the mic placed just far enough away to capture both direct and reflected sound. The Classic II picked up a detailed composite sound where finger movement, room ambience, harmonics and fundamental tones all blended together with astonishing accuracy.

For a tube mic, I found the Classic II's self-noise to be low. While the Classic II wouldn't be my first choice for critical classical recordings, it's not likely to be an issue for any other application.

On electric guitar, the Classic II delivered its best performance when it was placed roughly 18 inches and slightly off-axis from the speaker enclosure. This mic is very sensitive, and with the high sound pressure levels generated by the cabinet, the -10dB and -20dB pad settings were called into service to more effectively manage signal levels. The Classic II sounded really big, with loads of detail and an awesome sheen to the overall sound.

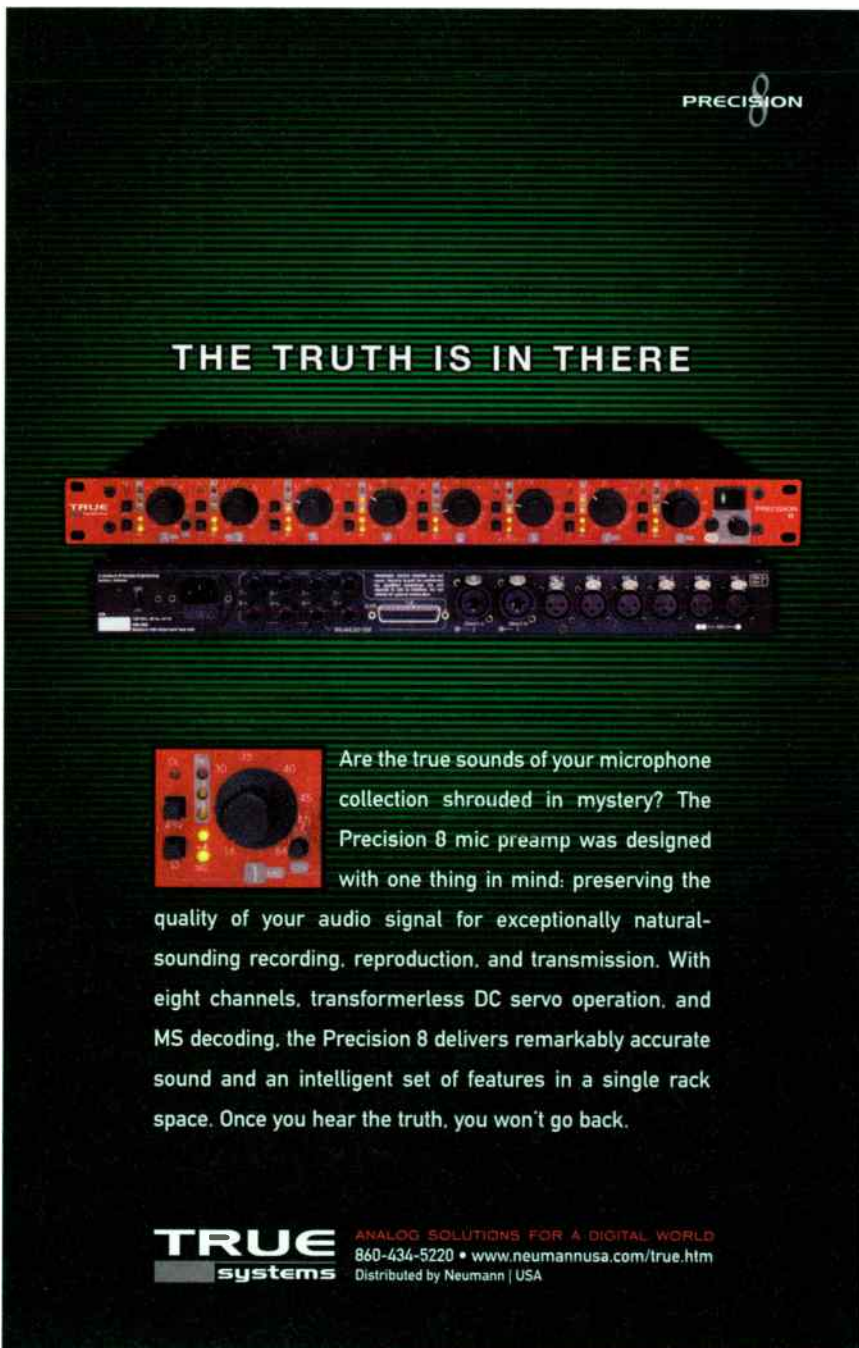
CONCLUSION

The Classic II's ability to capture all the nuances of a performance makes it an outstanding choice for instrumental and vocal recording. Its off-axis response is excellent—delivering uniform, consistent sound quality—and its ability to handle relatively high sound-pressure levels makes it that much more versatile.

The RØDE Classic II has a world-class look and feel and comes with first-class accessories—all packaged in a beautiful flight case that could probably withstand a Volvo driving over it. With nine polar patterns, two pad settings and its two-position highpass filter, it has the flexibility to tailor the instrument to deliver the sound that best suits your needs. Further, the microphone's \$1,995 price tag strikes me as quite modest. Bottom line: The RØDE Classic II is a full-featured microphone with a big, full sound that delivers stellar results.

RØDE, distributed in North America by Event Electronics, P.O. Box 4189, Santa Barbara, CA 93140-4189; 805/566-7777; fax 805/566-7771; www.event1.com. ■

Roger Maycock is a Mix technical consultant.



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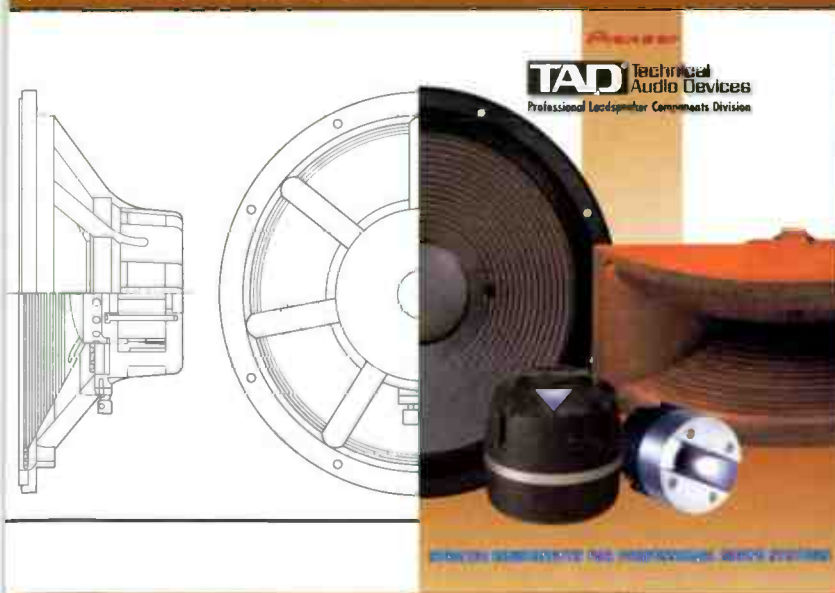


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DIGIDESIGN SOUNDREPLACER

AUDIOSUITE PLUG-IN FOR PRO TOOLS

The number of mind-blowing, incredibly useful plug-ins flooding the market continues to amaze me. It seems there are plug-ins for almost every task, from basic dynamics to outlandish effects and invaluable editing tools. Although it's hard to pick a favorite, I particularly appreciate software that helps automate mundane, laborious editing tasks. Digidesign's new AudioSuite plug-in, SoundReplacer, is just such a plug-in.

As its name implies, this software can take just about any sound and replace it with another. Pretty straightforward, nothing that exciting here, right? But SoundReplacer is deeper than its name implies. For this "Field Test," Version 1.1 was put through the paces on a 24 MIXplus system running Pro Tools 5.0.

Installation of SoundReplacer is completely routine—you simply run the installer program on the CD. The plug-in is plunked into your DAE folder's Plug-Ins folder, and a Presets folder is put into the Plug-In Settings folder. The Settings folder is a bit larger than most (324K), as it contains actual audio files, the samples that go along with its demo presets.

The tutorial session, which takes up about 15 MB of disk space, is also dropped into your hard drive. It's nothing to write home about, but it's helpful if you have no idea what the program is good for—probably not the case if you actually went out and bought it. However, this plug-in is a breeze to navigate, and most folks will be able to get right to work on it with hardly a glance at the manual. If you need the SoundReplacer manual, however, it is one of several in the Digidesign Plug-In User's Guide; a copy of the booklet comes with the program. It's well-written and has some solid user tips. I recommend flipping through it.



SoundReplacer loads up to three samples simultaneously (represented by color-coded trigger points and fader controls).

Copy protection is via key disk, as usual. You get one install, so don't lose it.

HAPPY TRIGGERS

As many as three samples can be loaded into SoundReplacer simultaneously. Each sample can be set to trigger at a different threshold. Dedicated sliders, one per sample, allow easy adjustment of the thresholds. The threshold zones are visible in scales of gray, from light (most sensitive) to dark (least sensitive). Individual trigger points are delineated by different colored horizontal lines: yellow for sample 1, red for sample 2, and blue for sample 3. The colors and controls combine to make a user interface that's a breeze to work with.

A dynamics slider controls how new samples trace the original track's velocities. Settings range from 0.25:1 (¼ the original veloci-

ties) to 4:1 (four times more dynamic than the original velocities). A 1:1 ratio is the plug-in's default setting. The dynamics control is global, affecting all three sample zones. (Discrete control over each zone, via individual sliders, would be particularly cool—maybe in the future.) The ability to tweak the velocities of your replacement samples is invaluable for music production. For example, replacing a live snare with a 909-type snare, but without the velocities of the live track, will produce a more electronic, drum machine-like, sound.

The mix ratio between the original track and the replacement samples is fully adjustable from zero to 100%. The mix function, like the dynamics function, is global, affecting the wet/dry ratio of all the samples. (Discrete mix control of each sample would be a nice feature to include.) The ability to blend the original track's

BY ERIK HAWKINS

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FIELD TEST

sound with the replacement samples is a nice option, opening the door to some great creative sound mangling possibilities.

SoundReplacer can drop phase-coherent samples. That is, the program will actually align the peaks of the replacement samples to match the peaks of the waveforms in the original track—don't try this with conventional MIDI triggering! No time compression or expansion is used; it's simply a matter of how the program places the samples. Of course, this effect can be detrimental to timing, especially with music or really tight cues. Because SoundReplacer is concentrating on phase coherency over a sample-accurate start time, waveforms with radically different attacks may not line up properly. If, say, you want to replace a percussive clave sound with a whooshing vocal "aah" sound, you should disable Peak Align so that only the sample start times are aligned (the default setting is Peak Align On).

Samples from different threshold zones can be automatically crossfaded. With this function on (another default

that's on when you open the plug-in), the samples are seamlessly blended together, even if one sample's attack triggers before the end of another's decay. You can turn crossfading off if you prefer having everything hard-cut. However, I found crossfading generally gave the smoothest results. It was active most of the time when I used the plug-in because it created very natural-sounding percussion tracks as samples with different velocities were crossfaded back and forth. The crossfade time, unfortunately, is not adjustable.

TIME AND REPLACE

To load a sound into the plug-in, you use a button labeled Update. There's no import track button, which, at first glance, is the only really confusing thing about the interface. Select a region in Pro Tools' Edit window, hit Update, and the audio is sent to SoundReplacer. An associated button, Auto Update, makes this entire procedure automatic. Turn Auto Update on (its default setting is off), and every time you select a region, SoundReplacer automatically imports it. I'm not sure what the point of this is, but I

guess it could come in handy for something.

Loading samples is a simple matter of clicking on a floppy disk icon beneath the threshold sliders. (There's one icon per slider for each of the three samples.) After clicking an icon, a Load File window appears through which you can search your hard drive for suitable samples. SoundReplacer reads SDII and .WAV file formats. The addition of .AIFF would be most appreciated; I have a lot of samples in this format, and I'm sure other folks do, too. However, there's no way to audition samples from the Load File window, which is a disappointment. This is a big inconvenience, because you often need to audition a bunch of samples in order to find just the right one. Note to Digidesign: Add a way to listen to files before loading them, please.

Because samples are an essential part of SoundReplacer's presets, which contain threshold levels, mix, dynamics, associated samples, etc., the program has its own Audio Files folder inside its Plug-In Settings folder for storing samples. This is very convenient, as it helps keep the presets' sound bites from getting misplaced. If, for example, you like



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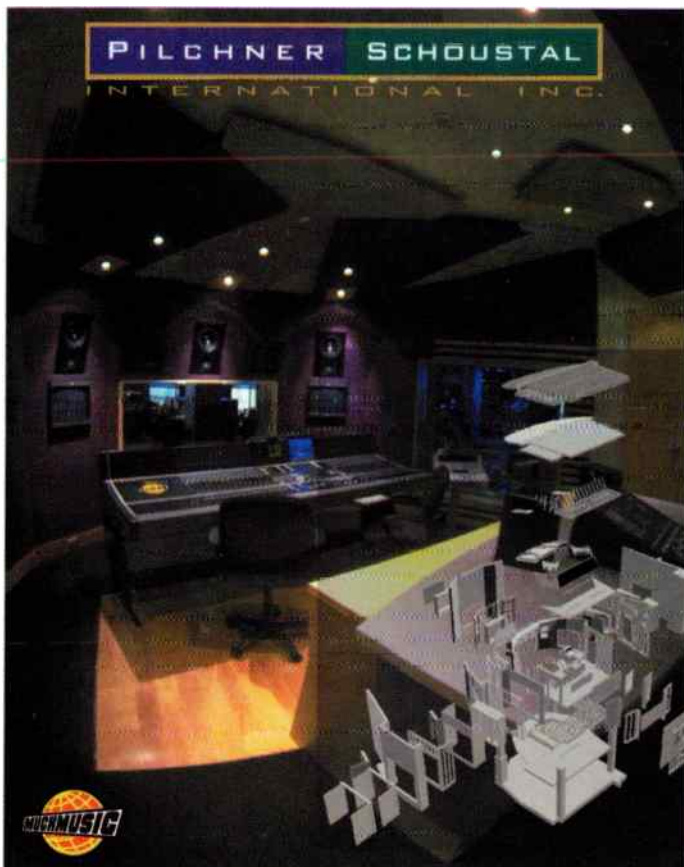
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FIELD TEST

to augment your kick tracks with a particular 808 kick sample, keep that sample in the Audio Files folder for quick access. At install, the sample storage folder is 324K (the program comes with a few samples as part of its demo) but has the potential to grow to enormous size. In order to avoid filling up your system drive, you may want to keep only your most often used samples in the folder.

The final processed track is a contiguous file of all three samples, along with the dynamics, mix and other parameter settings. It can be written to any track in your session. No need to write over the original audio, just open up another track and drop the new file there. This also gives you the added option of mixing the processed track with the original track to taste, in real time.

REPLACER-MAN

One of my favorite production tricks is to beef up weak recordings by layering them with samples, but I find that traditional MIDI triggering methods produce awful timing. My solution, which is to place each replacement sample manually for spot-on timing, is way too tedious, although it does yield excellent results. My kicks are always phat, and my snares totally snap. I'm almost embarrassed to admit that SoundReplacer does in the blink of an eye what used to take me hours—what a time-saver!

But there's no reason that SoundReplacer should be limited just to music production applications. You could get seriously creative with this plug-in and cook up some killer sound effects by layering samples endlessly atop each other. And, since replacement samples can be dropped back into your session at exactly the same spot as the original waveform, it's perfect for replacing your tired old cues with one of your new humungous ones. Be still my beating heart. At \$395, it's not a bad deal either—definitely a worthy plug-in to keep in your audio production toolbox.

Digidesign Inc., 3401-A Hillview Ave., Palo Alto, CA 94304; 650/842-7900; fax 650/842-7999; www.digidesign.com. ■

Erik Hawkins is a musician/producer working in Los Angeles County and the San Francisco Bay Area. Visit him at www.erikhawkins.com for more equipment chitchat and tips on what's hot for the project studio.

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CIRCLE #079 ON PRODUCT INFO CARD

World Radio History

MEYER SOUND X-10

HIGH-RESOLUTION LINEAR CONTROL ROOM MONITOR

Long established as a supplier of cutting-edge sound reinforcement systems, Meyer Sound has also made a significant impact in the realm of studio monitors. In 1991, Meyer's landmark HD-1 speakers defined the model of the modern powered near-field studio monitor. Nearly a decade later, the company has now set its sights on revolutionizing the large-format monitor market.

In the most basic sense, the X-10 High-Resolution Linear Control Room Monitor is a two-way system, combining a 15-inch woofer and HF compression driver in a vented 30x31x21-inch (HxWxD) enclosure.



A bar mounted across the woofer keeps a pressure sensor placed in optimal position.

Internal biamplification is capable of pushing the system to SPLs as high as 136 dB (at 1 m). Although this description is technically accurate, it could easily lead one to believe that the X-10 is ordinary. And the X-10 is anything but ordinary: It's a two-way system that delivers extended bandwidth (22 to 17k Hz, ± 2 dB). It's a horn system that doesn't have a characteristic "horn" sound. It's a large, high-SPL system that offers transient response that rivals (or bests) the performance of electrostatic panels, and by using a single LF driver, the designers have sidestepped the lobing and comb-filtering problems associated with dual-woofer designs.

Ironically, the key to the entire project came not from pro or consumer audio, but from an advanced feedback circuit developed by the University of California at Berkeley and licensed to Meyer Sound. "Normally, in designing loudspeakers, the industry works in small incremental improvements," explains company president John Meyer, "but working with the university gave us a chance to try something completely new. They approached us with a technology based on computer-driven hydraulics [that had been] developed to help control jet fighters moving at three times the speed of sound. They

thought the high-speed, multi-input servo systems they developed could be applied to loudspeakers."

Meyer engineers took the concept and developed it into Pressure Sensing Active Control (PSAC), which places a pressure sensor—essentially a calibrated condenser microphone—in front of the woofer. The information picked up by the sensor is then sent to the PSAC comparator circuit inserted before the LF power amplifier, which compares the sensor data to the input and puts the two signals in precise alignment. The original project was designed and prototyped entirely in the digital domain, yet interestingly, a high-speed *analog* computer circuit was selected for the X-10 because of its real-time speed and wide dynamic range.

The other challenge in the X-10 project was designing an ultrahigh-output woofer that could keep up with the SPL requirements typically associated with dual-woofer designs. "We spent about two-and-a-half years trying to implement this prototype," says Meyer. "We used about 28 neodymium magnets to build the magnet structure so we'd have a long 1-inch throw where the voice coil always stayed within the magnetic field. It's not like some woofers, which have a low-gauss big coil—ours is a small coil/high 16k-gauss [magnetic flux equal to 1.5 million Maxwells] design. We can get as much power out of a single 15 as we could from a double 18, producing 118 dB from a tone outdoors at 30 cycles at some reasonable distortion figure."

On the HF side, the X-10 uses Meyer Sound's 2010, a 4-inch compression driver with an aluminum-alloy diaphragm paired with a neodymium magnet and a ferrofluid-cooled voice coil. The driver is coupled to a 90°x45° constant-Q waveguide designed to provide a wide, even sweet spot. Both LF and HF drivers are powered by Class-AB/H MOSFET amps, with 1,200 watts for the woofer and 620 watts for the compression driver.

For applications requiring an additional subwoofer (such as some 5.1 installations, very large listening spaces, monitoring bass-heavy program material at loud SPLs, etc.), Meyer offers the X-800, a conventional (non-PSAC) ported, double-18 driver enhancement system. As the X-10s are designed to operate as full-range speakers, the addition of the X-800 to a system does not extend the overall LF response, but does increase the system headroom by at least 5 dB. When the X-800s are used, a companion X-01 processor provides the necessary phase compensation and high/lowpass filters, working as a system to maintain the X-10's excellent electroacoustic response, yet in a higher-SPL package.

Since last fall, Meyer has hosted listening sessions at top UK studios including CTS, Abbey Road and AIR Lyndhurst, as well as at

BY GEORGE PETERSEN

private off-site auditions during the AES convention in New York last fall and at Meyer Sound's demo room in Berkeley, Calif. Additionally, a beta 5.1 system has been in use since last fall at Ex'pression Center for New Media's large Studer 950 studio (pictured on the *Mix* cover, March 2000). According to company executive Helen Meyer, the responses have been "very positive," but I wanted to hear for myself, firsthand.

I spent time listening to various CD-Audio and DTS 5.1 releases in a stereo environment at Meyer and also in surround at Ex'pression, and found the X-10s to be accurate and extremely natural at both ends of the frequency spectrum. The tight, solid bass, unhyped highs and smooth midrange were more reminiscent of all-cone systems with large, soft-dome mid drivers than any horn system I've heard. Transients reproduced more like electrostatic drivers but with power and *ooooomph*. Listening to speakers individually, I found some HF attenuation when I was more than 40° off-axis, but even at these extremes the mids remained largely intact. In a surround playback, the dispersion was wide enough to offer a seamless transition without "holes," while localization and imaging (in stereo and surround) was impressive, with a finely detailed soundstage. Although I only had a few hours total on the speakers and didn't have the opportunity to track or mix on them, projects that I had recently mixed played back on the X-10s with clarity and correct tonal balance. The X-10s' response was also very consistent, whether played at low or high levels.

With their sizable enclosures, far-field design and retail price of \$15,000 a piece, the Meyer X-10s are hardly the monitor for every studio. However, anyone in the market for a large-format system would do well to put the X-10s on their list of options to explore.

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WAVE MECHANICS ULTRA TOOLS

PLUG-IN SUITE FOR PRO TOOLS

UltraTools is a suite of plug-ins by Wave Mechanics that works with Digidesign's Pro Tools TDM system, as well as third-party programs that utilize the Pro Tools |24 MIX hardware. The suite consists of four different plug-ins: PitchBlender, TimeBlender, Pure Pitch and Pitch Doctor (each plug-in may also be purchased individually). I tested the UltraTools suite with Emagic's Logic Audio (using Digidesign's Pro Tools |24 MIX hardware and DAE) and Pro Tools.

SOUNDBLENDER

Wave Mechanics groups two separate plug-ins called PitchBlender and TimeBlender into a single module dubbed SoundBlender. PitchBlender and TimeBlender are based on the same architecture and feature similar user interfaces. A lot of DSP power is required to run these plug-ins, and the hit on your TDM farm cards will be substantial—each instance of either PitchBlender or TimeBlender takes up one entire chip on a farm card. However, when I began to tap into the number of tweak options available, I understood why these plug-ins are so DSP-hungry.

The DSP "engine" of the SoundBlender module shared by both plug-ins is a 2-channel effects processor that combines delay, filtering, panning and modulation. Many of the parameters within these features are identical within each of the plug-ins. The main variable component is that pitch-shifting is utilized in the PitchBlender plug-in, and reverse pitch-shifting is used in TimeBlender.

The Main parameter page contains the most frequently used parameters for quickly tweaking the sound of a particular preset. Most of the functions on this page act as master controls, and their functions are related to parameter settings found on other pages. The functions are Mix, Feedback, Master



UltraTools' SoundBlender module contains the PitchBlender and TimeBlender plug-ins, which are based on the same architecture and have similar interfaces.

Pitch, Master Delay, Mod Rate and Mod Depth. A BPM and Trigger control function with a variable threshold are identical in both plug-ins, and trigger sources include sidechain, input, output 1, output 2, mod 1 output, mod 2 output or mod 3 output. You can also trigger a modulation manually with the mouse, and mods can be recorded as automation events. An "expert" section contains parameters for reconfiguring the signal flow and optimizing the audio processing.

Both plug-ins have a nearly identical modulation engine, with the only difference being the pitch range (± 2400 cents in PitchBlender vs. ± 3600 cents in TimeBlender). The modulation control panel is very complex and feature-filled, and I'm sure that an entire article could be written about this feature of SoundBlender alone. The basic structure is based on three modulation sources that can be mixed and routed to dozens of effects parameters. Mod rates can be adjusted as

units of frequency or bpm, and a wide range of modulation waveform and trigger options are available.

The filter section is a good way to really mangle an input source by altering the frequency of the audio, much like the filter of an analog synthesizer. The filters can be programmed to reduce high or low frequencies, eliminate or enhance a band of frequencies, or create highly resonant effects. Modulating the filter frequencies can create many synthlike effects. The parameter controls are quite extensive, and tweakheads will have a ball morphing the most basic sound into complex timbral masterpieces with a click of the mouse.

The delay section of SoundBlender contains two digital delay lines; typical delay effects include echo, slap delays and rhythmic effects. Delay values can be modulated to create chorus, flange, vibrato and other extreme modulation effects. Delay time parameters can be adjusted in milliseconds or bpm; the maximum delay time in PitchBlender is 700 milliseconds and 1,000 milliseconds in TimeBlender.

BY WALT SZALVA

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PITCHBLENDER

The PitchBlender plug-in is a 2-channel effects processor that combines pitch-shifting features with the delay, filtering, panning and modulation components that are shared by both plug-ins. The actual implementation of PitchBlender consists of two pitch shifters, two digital delays, two filters, a mixer and a feedback matrix. The basic effects modules can be "rewired" and modulated in many different ways, allowing for endless varieties of signal-processing effects. The signal-processing parameters are grouped into pages, easily accessible via a mouse click.

Two channels of pitch shifting are available and can be used to create detune and chorus effects, harmony generation, arpeggiation and some pretty wild pitch modulations. The pitch shifters in PitchBlender do not preserve the formant structure of source material (unlike PurePitch, as explained below). The shift parameters have a ± 2400 cent resolution and can be modified in one-cent increments. The output of the two pitch shifters may be panned anywhere

within the stereo field, and a constant power panning algorithm will maintain a constant loudness across the stereo field. Level parameters adjust output levels of the two pitch shifters, with 0 dB representing unity gain.

The Pitch Mapper adds harmony and arpeggiation features to the two pitch shifters. For harmony generation, Pitch Mapper analyzes the pitch of the input signal and dynamically adjusts the pitch shift interval depending on the detected pitch, the selected key and the selected pitch-shift interval. Arpeggiation patterns are created by modulating a pitch mapper with one of the various modulation sources. A series of scale patterns available as presets ranging from Western diatonic to microtonal Eastern can be used to build harmonically interesting and rhythmically complex arpeggiations based on whatever aural building foundation is used as a modulation source. Pitch-based arpeggiation material can be adjusted to whatever key is desired.

TIMEBLENDER

TimeBlender is a 2-channel plug-in that combines reverse pitch shifting with the

delay, filtering, panning and modulation components shared by both plug-ins. The Pitch and Delay section of TimeBlender replaces the pitch-shifter section found in PitchBlender, and as mentioned above, TimeBlender uses two channels of reverse pitch-shifting as its main component feature.

Each reverse pitch shifter continuously samples small segments of audio and plays back the sampled segments in reverse. The length and the playback pitch of the segments can be varied and routed throughout the different sections of the plug-in (Mix, Feedback, Master Pitch, Master Delay, Mod Rate and Mod Depth as described previously).

How do they sound? The manual describes SoundBlender as "radical effects for creative audio production," and this is definitely not an understatement. Options abound for everything from the seemingly mundane (such as chorusing, flanging, vibrato and delays), to the profound (check out the "Nightmare Sequence" preset in PitchBlender or the "Crystallizer" effects in TimeBlender), and the results can be stunning. I used the filter section of PitchBlender on a remix I was working

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FIELD TEST

on, and the client was literally jumping up and down with glee. A large number of interesting presets have been programmed by the engineers at Wave Mechanics, but don't be afraid to tweak—the results will never fail to yield surprises.

One problem I discovered involves Logic Audio and is *not* the fault of the SoundBlender plug-ins: Automating plug-in activity (which works flawlessly in Pro Tools) consistently causes a hard crash in Logic. Although this is caused by shortcomings in Logic's automation

(I have the same problem with other plug-ins), it's an issue to consider if you plan on implementing esoteric automation movements while using Logic. I hope this problem will be addressed in future versions of Logic Audio.

PUREPITCH

PurePitch is designed to detune or transpose vocal or instrumental tracks over a wide pitch range while retaining the original, natural sound of the source material. A wide variety of harmony, detuning and other assorted processing is available. PurePitch also allows for independent control of pitch and for-

mants and has a built-in delay and LFO.

PITCH KEYS

The Pitch Key section of the interface is laid out like a vertical keyboard with intervals labeled to reflect a chromatic scale, and the unison key corresponding to middle C. A pitch-bend slider allows for microtonal pitch-shift options, and a set of keyboard shortcuts will quickly toggle through key centers.

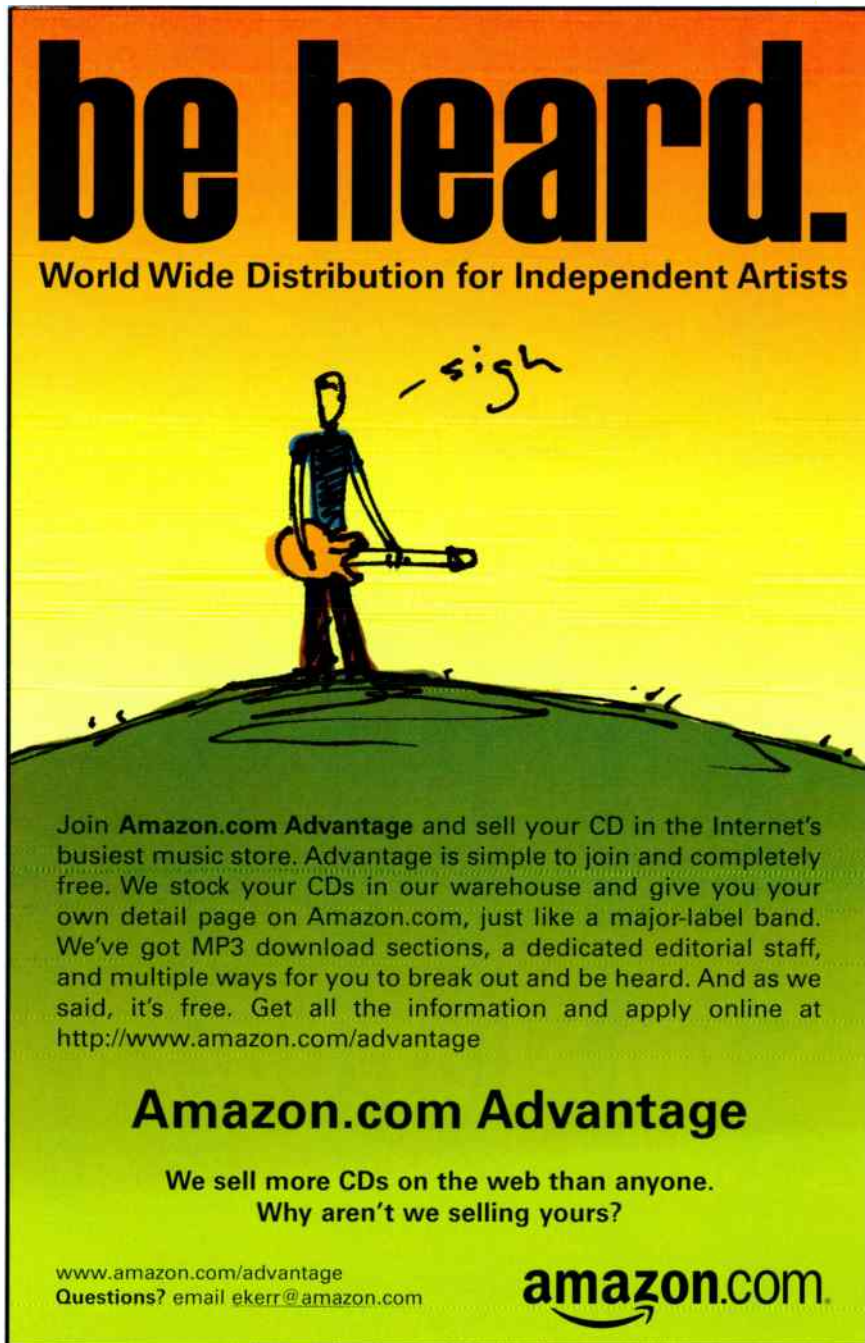
PurePitch can shift the pitch using one of two different pitch shifting algorithms, depending on the setting in the Shift Mode control panel. The "conventional" mode is the cleanest of the two algorithms, but will result in the "chipmunk effect" with large amounts of pitch shift. The "formant preserving" mode attempts to maintain the original character of the source material for larger shift amounts than the conventional mode.

The Mixer Control Panel has separate controls for the wet/dry ratio, dry-signal delay time, wet-signal delay time and feedback (amount of pitch-shifted, delayed signal that is fed back into the input).

The Expression processor in PurePitch manipulates pitch inflections of vocal tracks by compressing or expanding the pitch envelope of the voice. In theory, it's similar to what a dynamics processor does to the level of a signal, except the part of the signal effected is the pitch envelope. By compressing the pitch envelope, the pitch inflections are reduced, creating a more monotonous performance. By expanding the pitch envelope, the pitch inflections are enhanced, creating a more expressive track. A fairly complex, but easy to use group of settings include a ratio setting, rotation frequency and shift limit.

The Modulation Control panel accesses a scaled-down version of the modulation engine used in PitchBlender and SoundBlender. Various wave shapes can be used to modulate the signal. Pitch, rate, formant and level are also controllable. The Tweak Control panel provides a set of frequency-based controls designed to optimize (or mangle) the apparent quality of pitch-shifted vocal material.

I used PurePitch in a variety of vocal settings ranging from background vocals to lead vocals to dialog. It was quite successful in providing effects that ranged from the otherworldly to foreboding. As with SoundBlender, Wave Mechanics provides a number of presets. While PurePitch may have been designed for use primarily in vocal situations, I also used PurePitch on a variety of source



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material besides vocals, and sometimes the resulting artifacts worked in context of the current project (especially while pitch shifting some drum loops used within a remix). As an option for use as an effects plug-in, it's a good addition to a well-stocked TDM arsenal.

PITCHDOCTOR

The evolution of pitch-correction hardware and software in the last few years is something that can't be ignored, even by audio purists. PitchDoctor offers yet another option for correcting intonation problems in recorded vocal or instrument tracks. The interface is simple, intuitive and easy to use. It can be used in three different modes, depending on the type of material being corrected and the severity of the problems: Manual Correction, Note-Based Correction and Automatic Correction. If necessary, all three modes can be used at once.

The interface includes a chromatic representation of a keyboard, with the function of the keyboard depending on the setting of the auto-correct enable button. When auto-correct is enabled, the keyboard will display the notes corresponding to the selected scale and key, with notes in the scale appearing

as green and notes outside of the scale showing up as gray. Global control of the key is set by the user.

The scale setting, together with the key, determine how the pitch of the input track can be altered. Manual correction allows you to use a slider control to alter the pitch manually in one-cent increments within a range of ± 200 cents. The Correction Amount displays the total amount of pitch correction applied to the input signal within ± 200 cents. The amount of pitch correction can be "quantized," allowing for small deviations from perfect tuning. Other parameters include smoothing (used to limit the rate of change of the pitch correction amount), capture (used to control the range within which pitch correction affects the input signal), and sensitivity. As is the case with PurePitch, PitchDoctor provides two different pitch-shifting modes—conventional and formant-preserving.

I ran through some tests using PitchDoctor and another popular pitch correction plug-in, Auto Tune by Antares. I tracked some vocals dry, duplicated the tracks and ran them through each respective plug-in on two separate tracks, allowing us to A/B them side by

side on the console. In this particular case, PitchDoctor tended to sound a bit more natural and unaffected, although an overall effect was definitely noticeable with both plug-ins—especially with the vocals soloed.

CONCLUSION

At \$895, UltraTools is loaded with options for people who want a range of plug-ins in the same league with hardware such as Eventide's Ultra Harmonizer series of outboard gear. As mentioned above, each plug-in is available individually for users who don't need all the features in the complete package. For my working environment, PitchBlender and TimeBlender offer top choices for out-of-this-world effects, with PurePitch as an option for tweaking around with pitch. PitchDoctor is a plug-in I hope I won't get to use, but I feel safe knowing that it is available when needed.

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UNIVERSAL AUDIO 1176LN

COMPRESSOR/LIMITER REISSUE

Most engineers of a certain age can name a favorite piece of outboard gear from the “good old days,” and one perennial favorite is the Universal Audio 1176 Peak Limiter. Starting in 1967, about 12,000 to 15,000 1176s were manufactured (the initial retail price was \$489), but more than 30 years later, the number of good examples still in fine working condition has shrunk to the point that there is now a market for a replica product.

The original 1176 design went through many revisions (see sidebar for an exhaustive survey), but most connoisseurs of vintage gear agree that the “black-face” D and E versions sound the best. The new Universal Audio 1176LN reissue is based on the D and E revisions and comes as close as you can get to “the sound of ‘67” without a time machine. MSRP is \$2,295.

USING THE 1176

The newly reissued 1176 operates in exactly the same way as a good, working vintage 1176. The only visible changes are the new XLR input and output connectors in parallel with the original terminal strip connections. I have always liked the 1176’s simple operation; there are just four preset compression ratios: 4:1, 8:1, 12:1 and 20:1. Attack time is adjustable from 20 to 800 microseconds, and release time goes from 50 milliseconds to 1.1 seconds. (Remember, attack and release were nonadjustable in compressors such as the Universal Audio LA-2 Leveling Amp; control over these parameters was a relatively new concept in 1967.)

Once you have decided on ratio, attack and release settings, you just crank up the large Input knob and set the amount of gain reduction—the threshold control is internally set for least distortion. The single large, lighted VU meter measures either RMS gain reduc-



tion or output level and offers a choice of either +4dBm or +8dBm calibration. After arriving at the required amount of gain reduction, it may be necessary to readjust attack and release times.

The Output knob adjusts make-up gain and, hence, the final output level. However, cranking up the Input knob also affects post-compression output levels, so setting the 1176 is a two-fisted operation: Wind up the Input with your left hand to increase compression and adjust the Output with your right hand.

Instead of a regular bypass switch, the 1176LN has an Off switch engaged by turning the Attack knob fully counterclockwise. In this mode, the unit becomes a straight-ahead line amplifier; some engineers like to run signal through the 1176 in the Off mode just for the sound.

OLD VS. NEW

I was able to compare the sound of a single new 1176LN reissue with four different vintage black-face 1176LNs, two D and two F revs, all in pristine condition and sounding as good as any 1176s I have ever heard.

It is important to note that all vintage 1176s sound slightly different from each other, even ones with sequential serial numbers. This is generally because many units are now out of calibration and produce higher levels of distortion than normal (a good thing for some applications). Aging capacitors and/or other problems may also contribute some differences in sound. Since the 1176 uses a mic-level input transformer and a FET

for gain reduction followed by a mic preamp, it always has a “hot” sound. No matter what sound you put into it, you are going to get an edgier and more aggressive sound out of it. This makes sense to me—look at the 0.5% THD specification with 45 dB of gain. You don’t usually see those kinds of numbers on modern VCA compressors.

For my test, I used recorded sound sources from an all-analog recording session. After calibrating all five 1176s with a 1kHz tone and setting the same amount of compression on each unit, I tried different amounts of squash to find a starting point. For critical sonic comparisons, I eventually chose a ratio of 4:1, medium attack and release times and just -3 dB of gain reduction (set with a steady tone). On all four vintage compressors, I wound up using the same numerical setting on the Input knob to achieve the same amount of compression. This indicates that the Q-Bias and compression threshold pots on all units were all well-calibrated.

For the listening test, I used recordings of a single lead vocal, a bass guitar track, a snare drum track as well as the entire live kit and a single grand piano track. The revision F models, with their AB output amps, had a lot more output level and a “hotter” sound than the rev D models; to match loudness I had to crank up the Output control on both the 1176LN reissue and the rev Ds.

As expected, the rev Ds sounded the closest to the 1176LN reissue, with one of the old Ds sounding extremely close. Because it was cleaner than the vintage units, I liked the sound of the new unit better for bass or low frequencies. Vocals sounded pretty much

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the same between the two Ds and the reissue, but also sounded very good through the Fs. Drum kits and individual drums were smoother going through the 1176LN reissue. The piano makes an excellent test of harmonic distortion characteristics, and the reissue won—it was the cleanest. Maybe it's just the brand-new components instead of old leaky capacitors in the 30-year-old units, but in general all sounds were clearer and less grindy through the

1176LN reissue.

However, according to Bill Putnam Jr., the 1176LN reissue has slightly less gain and the taper of the Output pot is different, and I had to turn up the Output knob more to match loudness of the older units. And, yes, you can still push all the ratio buttons in at once on the reissue—just pushing in the 20:1 and 4:1 buttons together has the same effect.

Two 1176LNs can be stereo coupled by using the 1176SA or Stereo Interconnect Accessory. The stereo-coupled

setup needs to be calibrated, and the attack and release controls on each unit interact: changing the controls on either unit will affect both units. In stereo coupling mode, the attack time is doubled, so the fastest attack time in stereo is 40 microseconds.

Universal Audio, Box 3818, Santa Cruz, CA 95063; 831/454-0630; www.uaudio.com. ■

Barry Rudolph is an L.A.-based recording engineer. Visit his Web site at www.barryrudolph.com.

1176 REVISION HISTORY

Founded by the late Bill Putnam in the attic of Universal Recording in Chicago, Universal Audio later moved into the attic of United Recording in Hollywood (which later became Ocean Way). One of UA's early products was the 108 tube microphone preamp that was used in both the Chicago and L.A. studios' consoles. This amplifier formed the basis for the tube UA 175/176 compressor and is thus the forefather of the Universal Audio 1176 Peak Limiter.

The original 1176 emerged in 1966 after Putnam had successfully designed and built a remotely controlled amplifier around the newly invented Field Effect Transistor (FET) and his successor to the 108 amplifier, the transistorized 1108 mic preamplifier. For minimal distortion, FETs require careful circuit design so that they operate within their narrow linear range. In the case of the 1176, the FET is used as a voltage variable resistor in the bottom leg of a voltage divider. The resistance between the Drain and Source leads of the FET will change in response to voltage applied to the Gate lead. The FET shunts more and more audio signal to ground as compression is increased. This is in sharp contrast to the UA 175/176s variable-Mu design in which the actual voltage gain of an amplifier is changed.

The FET gain reduction stage is followed by the 1108 amplifier, which consists of a Darlington pair of transistors as a preamp stage and a Class-A line output amplifier that incorporates a special matching transformer to drive 600-ohm line impedances. The 1176 is a feedback-style compressor, as the signal level is sensed after gain reduction and used as a constant reference to improve stability. Feedback is used in each of the amplifier stages, and in order to reproduce the original 1176 faithfully, Universal Audio had to replicate the original integral output transformer, complete with the additional windings that provided a feedback signal to the final line output amplifier circuit. Putnam specified this transformer specially for the 1176 and his son, Bill Putnam Jr., was fortunate to find extensive design notes that enabled him to re-create and further improve the original design.

The extremely rare Rev A (first produced on June 20, 1967) with serial numbers 101-125 is the original 1176 design and features a silver brushed-aluminum face and blue stripe. It has a 600-ohm input transformer made by Peerless that was later replaced with a UTC unit. The signal preamp after the gain reduction FET uses a FET followed by a

bipolar transistor amplifier circuit and the Output level control. The Output level control feeds essentially the same circuit again, but follows it with a 2N3053 transistor line amp operating in Class A. The original UA-5002 output transformer has a split secondary, a tertiary winding for negative feedback and a separate emitter winding. This transformer was revised in following units to the improved UA-5002A and is the same transformer that is used in the 1176LN reissue.

Rev AB (November 20, 1967, serial numbers 125-216) features several changed resistor values in the signal preamp stages, which improve stability as well as noise. Also added are bypass capacitors around the resistor feeding the gain-reduction FET.

Rev B (November 1967 to January 1970, serial numbers 217-1078) includes an all bipolar design to replace the FET-based circuit in the signal preamp section. A tap off the emitter of the first transistor of this stage provides feedback back to the FET gain reduction stage.

Rev C (January 9, 1970, serial numbers 1079-1238) introduces the first of the black-face models and the LN suffix, which stands for low noise. An additional circuit designed by Brad Plunkett (and epoxy-encapsulated to keep it secret, pending a patent filing) reduces the drain-to-source voltage on the gain-reduction FET to keep it within its linear range designation. The LN circuit epoxied module and the Q-bias pot are soldered and mounted directly onto a Rev B circuit board.

Rev D (into 1973, serial numbers 1239-2331) has no circuit changes but features a redesigned main printed circuit board incorporating the LN circuitry and Q-bias pot.

Rev E (up to March 15, 1973, serial numbers 2332-2611) adds a power transformer that can be switched between 110V and 220V mains operation.

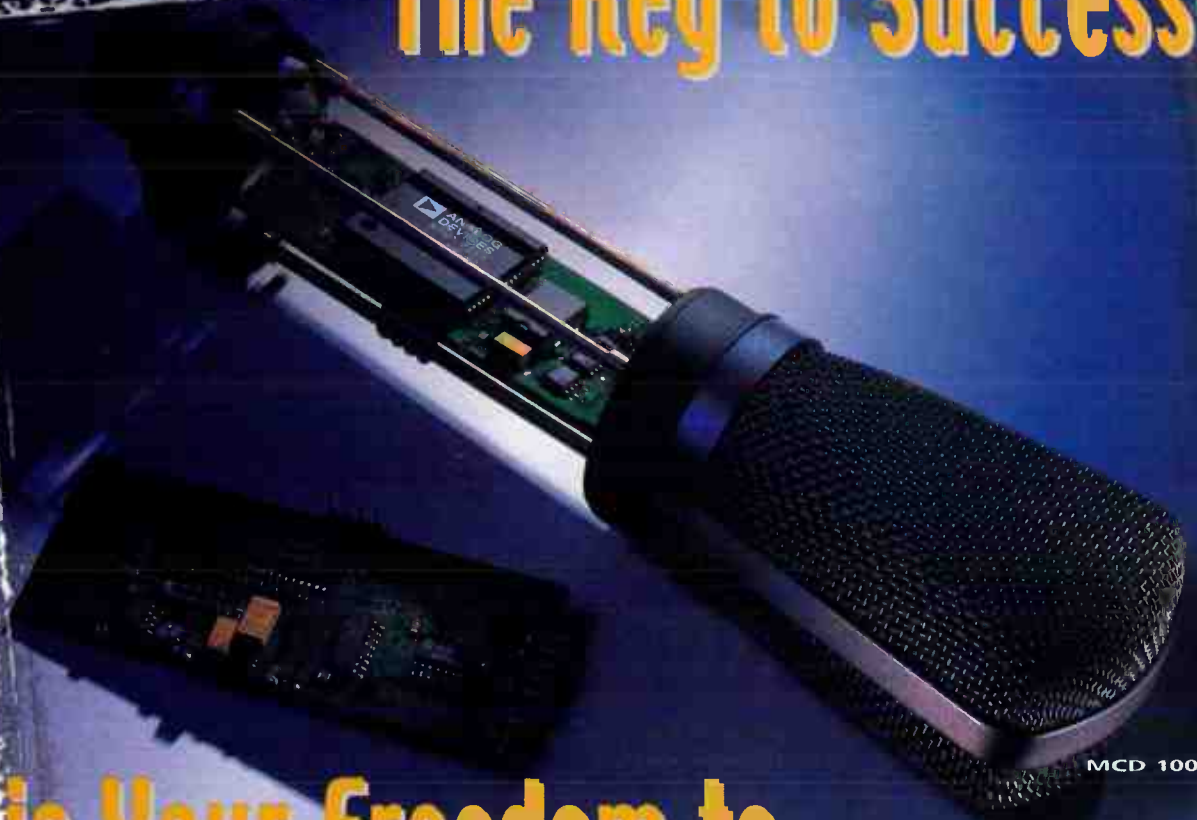
Rev F (March 15, 1973, onward, serial numbers 2611-7052) changes the output amplifier from the original Class-A design to a push-pull configuration (based on the 1109 preamp) that provides more output drive. Also, the metering circuit uses an op amp that simplifies meter calibration and final testing.

Rev G (production dates unknown, serial numbers 7053-7651) replaces the input transformer with a differential amplifier. (Op amps lowered manufacturing costs and were very popular solutions for audio manufacturers at the time.)

Rev H (production dates unknown, serial numbers 7652 and above) changes the front panel to silver.

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FOCUSRITE ISA 110

MICROPHONE PREAMP AND EQUALIZER



The Focusrite ISA 110 Original Mono Mic-Pre & Equalizer is a limited-edition version of the famed single-channel ISA 110 EQ module. The original ISA 110/130 units were developed by Rupert Neve, who had been commissioned to supply 16 extra inputs for a Neve console at AIR Studios. These 1984-era ancillary input modules fitted vertically into a rackmounted card cage that required an external power supply. Around 1986, Focusrite began selling outboard racks containing two, four or eight ISA 110/130 modules, and in 1989 the module became the basis of the Focusrite Studio console (of which only ten were made). The Focusrite Red Range products and the ISA 215 units are also derived in part from the original 110 module.

The new ISA 110 differs from the original in that it is packaged in a horizontal one-rackspace unit with an internal power supply. However, the electronic circuit design, the componentry and the performance specifications are all exactly the same as the original ISA 110. The original printed circuit board has been extended to include the integral power supply and accessible rear panel insert jacks, both new features.

Popping the hood reveals why this preamplifier sounds and works the way it does. Focusrite has designed proprietary transformers specifically for the ISA 110, for both line and microphone level inputs. The mic input transformer and the high-capacity power supply transformer both use mu-metal shielding for maximum low-noise performance. All the rotary switches are U.S.-made gold-plated switches,

the push buttons are Swiss-made, and all the pots are manufactured in France using conductive plastic for maximum accuracy and smooth feel. The equalizer's shelving bands use rotary switches with individual capacitors for each frequency and one op amp for maximum fidelity and minimum distortion. Because rotary switches are much more expensive than pots, this qualifies as a costly "audiophile" design; switching individual capacitors are usually replaced by a cheaper single-capacitor circuit design and another pot.

All circuit functions are switched in and out of circuit by way of relays featuring gold-plated silver levers sealed in inert gas containers (compared to FET switching, relays are best for preventing breakthrough and distortion). The main audio op amp used through out the ISA 110 is the 5534.

MIC PRE SECTION

The ISA 110 has four sections: mic preamp, highpass and lowpass filters, shelving equalizer and a separate parametric equalizer. The preamp has up to 60 dB of gain, which is switchable via the mic rotary switch in 6dB steps. There is also a gain trim control for additional gain from 0 dB to 10 dB. THD is measured at 0.0008%, and noise is measured at -123 dB with a 150-ohm input termination and 60 dB of gain. With an input impedance of 1.2 kilohms and a maximum input level at +26 dBu, there is not much to complain about. However, I wish the trim control had a center detent at 0 dB and a larger knob like the equalizer sections, which would make it easier

to manually "ride" mic gain up or down while recording widely dynamic sources. Individual front panel buttons engage +48 phantom on/off and phase reverse.

FILTER AND EQUALIZER SECTIONS

The highpass and lowpass sections provide 18 dB per octave roll-offs. The rotary switch for the lowpass filter has 3.9, 5.6, 8.2, 12 and 16kHz corner frequency choices and an Off position that switches the section completely out of circuit. Likewise, the rotary highpass has settings for 30, 60, 105, 185, 330 Hz and Off.

The two bands of the parametric equalizer section each feature continuously variable boost/cut controls (± 18 dB) with center detent. The two selectable frequency ranges overlap, and there is a variable Q (bandwidth) control. Each of the two bands also has a yellow X3 button that triples the indicated frequency. The tripled frequency is read on a yellow-colored scale. The first band is sweepable from 40 to 400 Hz (which triples to 120 to 1.2k Hz). The second band goes from 600 to 6k Hz (triples to 1.8 to 18 kHz). A slightly larger control for EQ frequency would have been a nice touch.

Variable Q is selected by a single knob that is the same size as the frequency select knob and is positioned directly above it. This is a smooth pot, and I would have preferred it being placed below the EQ frequency knob. I also found it difficult to read EQ frequency as the silk-screened legend for the two concentric frequency ranges is in small type and somewhat obscured by the Q knob.

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FIELD TEST

(Because it was a vertical unit and the two controls sat side by side, this wasn't a problem on the original ISA 110.) Q is adjustable from 0.8 at the broadest to a tight 3.0, sharp enough for most surgical needs. The entire section has its own bypass button that is globally controlled by the master All EQ bypass switch.

For me, the defining difference that characterizes Focusrite EQ is the combination of the shelving and parametric equalizers, and the shelving equalizer sells this unit all by itself. The shelving EQ offers both high- and low-frequency shelving sections with six-position frequency selection switches and section bypass button. Low-frequency choices are 33, 56, 95, 160, 270 and 330 Hz. High-frequency positions are 3.3, 4.7, 6.8, 10, 15 and 18 kHz. The shelving EQ shape is 6 dB per octave with a maximum boost and cut of 18 dB.

MORE FEATURES

The ISA 110 also has a line input with a rotary line gain switch that adjusts ± 18 dB in 6dB steps. The same trim control used for the mic preamp doubles as additional line gain adjustment from 0 to 10 dB. There are both Mic and Line selector buttons, and toggling one button untoggles the other—I tend to use the Line button as a “mute” button when directly recording vocals. All switching as well as all knob changes on the ISA 110 are dead-quiet and seamless—no pops, clicks or buzzes.

The rear panel Insert Send jack provides a +4dBu output (up to +20 dBu) after the mic pre and before the equalizer. The companion Insert Return jack requires a +4dB signal (up to +26 dBu). The original ISA 110 unit had the insert point electronics on the printed circuit board but no front panel switch or rear panel connectors. Therefore, there isn't an insert in/out button, but the All EQ switch disconnects the insert along with the equalizer, allowing you to A/B the entire chain—EQ and insert processing—*together*.

Focusrite's decision to remain faithful to the original in every detail also reproduces what I would call a quirk—the Overload indicator looks just like another button and is placed between two real buttons.

USING THE ISA 110

I found using the new ISA 110 no different from the original model, except that everything is horizontal. For this re-

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view, I used the line input to equalize program sources and instrumental tracks from a multitrack.

The equalizer sounds very musical. When boosting high frequencies, I got all the "air" or openness I wanted without shrillness or peakiness. I used the parametric section to reduce a narrow band of "not so nice frequencies" that the shelf had brought up. Brightness can be "tailored" to suit a singer who may begin to get a little "essy" when top end is boosted. I liked this approach better than just raising the frequency of the shelving EQ; that fixes the problem but doesn't sound as good.

The same approach works with low frequencies. If you boost bass with the shelf and then reduce the fundamental of the bass with the parametric, you'll get more bass level but less peakiness. This is all Basic Engineering 101, but the ISA 110 comes closer to realizing some of my sonic concepts/ideas than other equalizers.

Finally, the shelving equalizer works better than any other shelving equalizer I have been around lately. A large amount of low-frequency boost doesn't sound boomy but more like turning up the bass knob on a really good stereo system.

The ISA 110 also shines in operational terms. When I'm using a Neve module as a mic preamp for vocals, I invariably find that once the singer warms up and sings louder, the mic gain setting ends up being one click too hot and I have to readjust the subsequent signal chain. Adjusting the mic gain on the Focusrite is less touchy, and the trim control feature helps out tremendously. Otherwise, the ISA 110's mic pre section is very much like a Neve module, except I find the Focusrite less likely to overload since the exact gain setting is less critical. And, compared to a Neve module, the ISA 110 is cleaner, quieter and has more dynamic range. The overload indicator lights when the signal reaches 6 dB below clip, but occasional short-duration peaks that blink the LED do not necessarily result in audible distortion.

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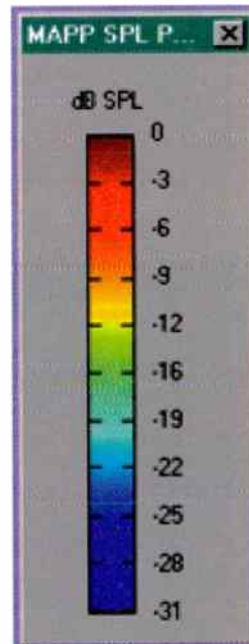
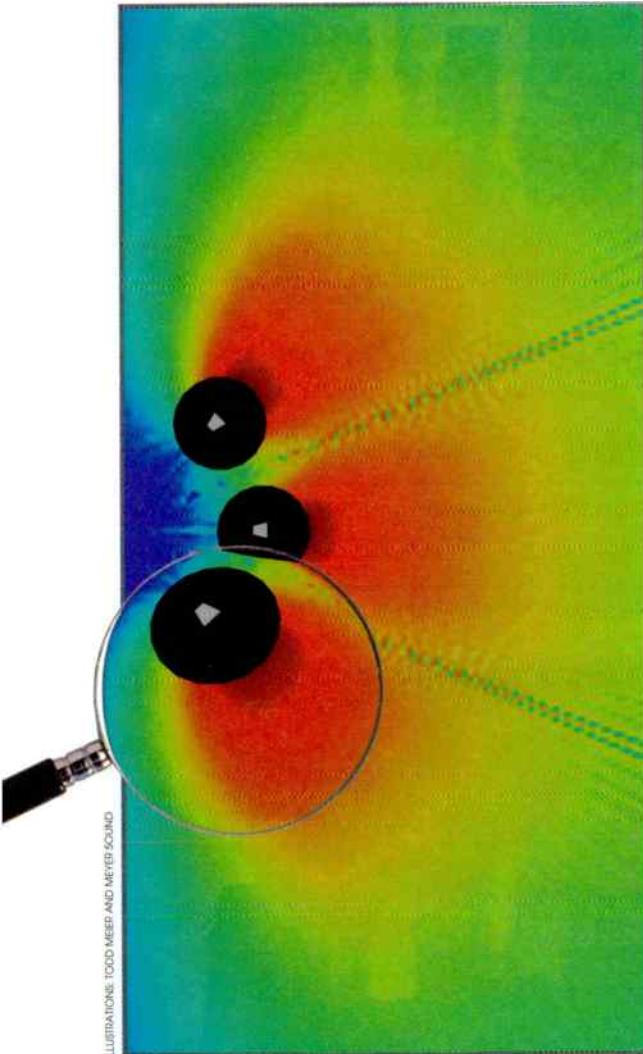
World Radio History

JUNE 2000, MIX 161

The Truth About Loudspeaker Arrays

Part II

By Bob Mc Carthy



The accompanying figures were generated by Meyer Sound's Multipurpose Acoustic Prediction Program (MAPP). The color of the shading indicates the approximate relative sound level. A color bar is shown for reference. The frequency range for the series is 4 kHz at $\frac{1}{2}$ octave.

In last month's article, we defined the seven different array types and examined their strengths and weaknesses in terms of power and uniformity. In this second part, we will illustrate how array elements interact in the listening area.

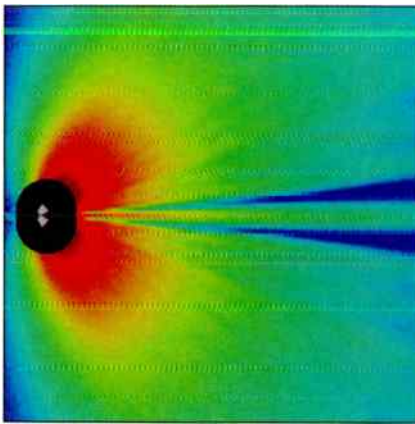
ARRAY INTERACTION ZONES

The coverage area of a single speaker is defined simply as the angle between the 6dB down points relative to the on-axis point. The transition from on-axis to off-axis of a single speaker is a gradual continuum, with no major points of interest along the way.

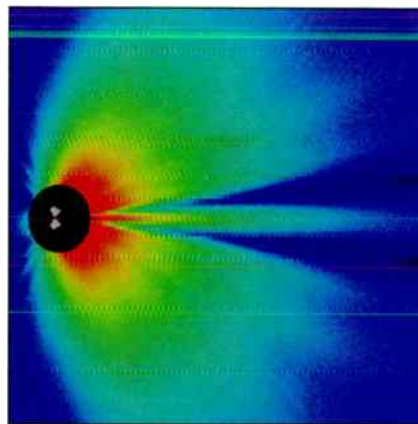
The coverage area of an array is quite different.

While an array's overall coverage angle is defined in the same way as a single speaker's, there are distinct transition points along the way that divide the array's overall coverage area into three different types of zones: seam, combination and isolation. These zone types, based on the level of interaction between the array elements, are indicative of the extent of power addition and frequency response and level uniformity of the array. The performance of the array largely depends on how these zones are managed. The three zones are described as follows:

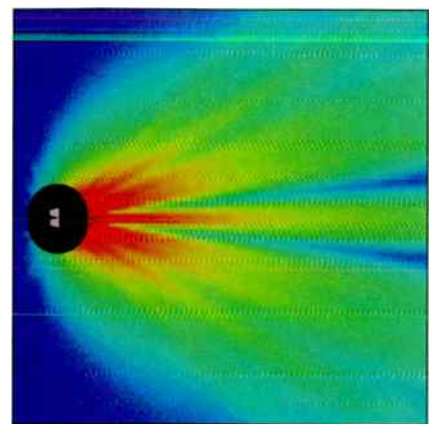
1) The Seam. This is the area in which two array elements meet at equal power. In cases where the elements are identical, the seam will be at the geometric midpoint between any two elements. If elements are run at different levels, the seam will shift from the geometric center toward the quieter device. The seam has



Optimized point source array: Two speakers with a 100° horizontal pattern are played at an angle of 85°. This creates a wide pattern with high uniformity. A 1-meter circumference of the individual speakers is blacked out because of the lack of predictability at such close range. Sequential shadings show the amplitude variations in the coverage area. Notice that the overall shape of the shadings strongly resembles the shape of the blackened area, indicating that positions equidistant from the array will have equal level. The huge majority of the covered area would be considered an isolation zone with variations in the 3dB range. Notice also the rapid changes of up to 13 dB in the seam area near the center of the array.



Crossfire array: Two speakers with a 100° horizontal pattern are played at an angle of 85°, the same angle as the optimized point source array. However, the angle is achieved by spreading the rears instead of the fronts, and the resulting uniformity is clearly inferior to the optimized response. Notice the increased size of the seam area and the fingering in the response of the combined outer areas.



Parallel array: Two speakers with a 100° horizontal pattern are played at an angle of 0°. This creates a fringed pattern with extremely low uniformity. The overall shape of the shadings does not resemble the shape of the blackened area, but instead has nine distinct fingers of high and low intensity. The entire covered area would be considered a seam zone with a highly variable response. The variations in response become more severe as the center seam is approached. At each frequency, the quantity and position of the fingers will change, creating nonuniform response at all midrange and high frequencies.

the largest acoustic power addition in the coverage area but also suffers from the highest degree of frequency response nonuniformity (except at the exact center point). The seam is both a powerful and dangerous place, with 6dB peaks and 30dB dips moving around with every step you take. Attempts to equalize the system from a position in the seam will be very unsatisfactory because of the large frequency response changes at each position (and the radical amount of equalization that each seems to require).

2) The Combination Zone. As we move away from the seam, we come to a point at which the signal from one element in the array is 3 dB louder than the other. Because the two array elements no longer meet at equal power, the maximum possible addition is diminished to +4 dB while the cancellation is 10 dB. The combination area has a higher degree of uniformity than the seam and exhibits less extreme combing, so it will be more representative as an equalization reference point. The size of the combination zone is frequency-dependent because of low-frequency pattern widening. Therefore, at low frequencies, the coupling seen at the seam continues while the mid and high frequencies move into a combining mode.

3) The Isolation Zone. As we move farther away from the seam, we reach a point at which the signal from one element is 10 dB louder than the other.

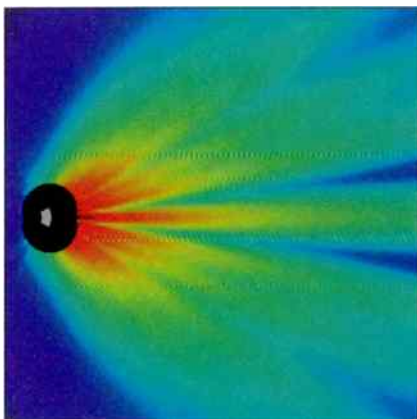
This level differential reduces the maximum possible addition to less than 2 dB while the maximum cancellation is limited to less than 3 dB. The isolation area has the highest degree of uniformity, approaching that of the single array element measured alone. Combing in the isolation area is greatly reduced, and the system response will therefore respond favorably to equalization. Due to low-frequency pattern widening, the size of the isolation zone is also frequency-dependent. At low frequencies, the coupling seen at the seam is typically reduced to a few dB of combination while the mid and high frequencies move into an isolation mode.

ZONE VARIATIONS FOR THE ARRAYS

Visualizing these different zones is simple for coupled arrays. The coverage is divided into radial slices, like pieces of pizza. Each of the different array types has different mixes of the above three zones. The wide point source array has only a small percentage of seam and combination zones, and a majority share of isolation. This gives the wide point source the lowest acoustic addition and the highest uniformity. The narrow point source and crossfire arrays are similar to the wide, except that seam and combination zones are increased and the isolation zone is decreased. This gives the narrow point source and crossfire arrays greater power and less uniformity. The parallel array is almost entirely seam—every measuring position sees nearly equal levels from the elements. The result is maximum power and total disarray (pun intended) in the frequency response.

The split arrays have a very different zone topography. The degree of isolation is greatly affected by the depth of field of the listening position. In the coupled arrays, once you have gotten far enough away to be in the far field of the system, further changes in depth will have only minor effects upon the angular relationship to the speakers. In split arrays, the picture is quite different. The depth factor dramatically changes the relationship. You can move from isolation to combination to a seam position by simply moving away while still maintaining the same axial relationship to a speaker in the array.

A simple example of this is the split parallel array. Let's begin at a position close to one speaker of a row of four evenly spaced elements of a split parallel array. At the near position, we are isolated; the other elements are 10 dB or more down from the on-axis speaker. This isolation is due to a combination of the large difference in path length between the speakers and the axial attenuation of the off-axis elements. As you move back, you move into the on-axis area of the other speakers, while maintaining the same axial relationship to the original unit. In addition, the difference in length is reduced proportionally. These two factors combine to remove the isolation, and you enter a combined zone. This combined zone differs from the coupled arrays in that the time offsets are now very large because of linear differences in distance. Remember that level offset



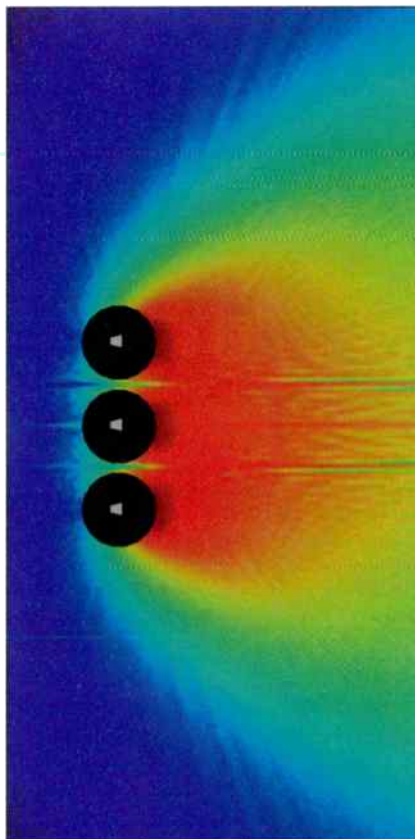
Overlapping point source array: Two speakers with a 100° horizontal pattern are splayed at an angle of 30°. This creates a fringed pattern with low uniformity. Notice that the overall shape of the shadings does not resemble the shape of the blackened area, but instead has nine distinct fingers of high and low intensity. The huge majority of the covered area would be considered a seam zone with highly variable response. The variations in response become more severe as the center seam is approached. At each frequency, the quantity and position of the fingers will change, creating nonuniform response at all midrange and high frequencies.

is logarithmic, a factor of the proportional difference in path lengths, while time offset is linear.

DESIGN CONSIDERATIONS

Which array type is best for a particular application? This can be determined in two steps: Decide whether a coupled or split array is needed, and then choose from the seven array types.

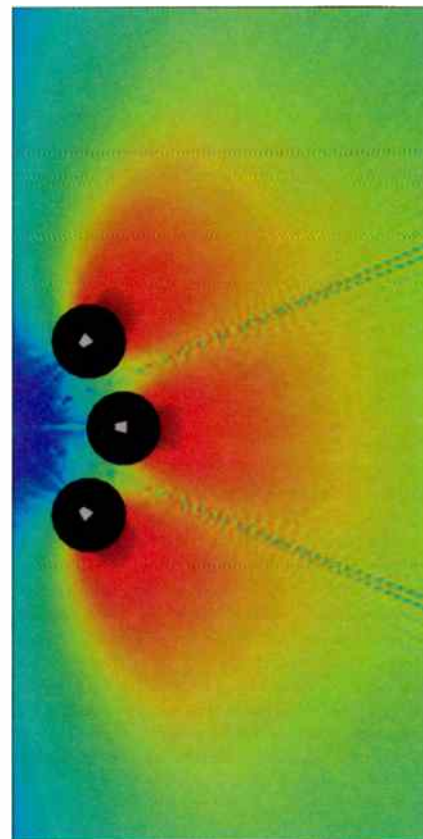
The principal factor for choosing between the coupled and split arrays is the proportion of depth-to-width of the array's intended coverage area. This factor is termed the "aspect ratio" of the array. An array that needs to fill a space that is 100 feet long and 50 feet wide has an aspect ratio of 2:1. Such a space will have the maximum level uniformity when covered by an array with a coverage angle of 60°. This is determined by the fact that the equal level contours of a 60° pattern most closely fit a 2:1 aspect ratio. The equal level contours are found by mapping the points of equal pressure between the on-axis and off-axis points at half the distance of the on-axis reference point. In such a case, the 6dB loss from moving off-axis is compensated by the 6dB gain from approaching the source. This creates a balloon-like shape that represents equal pressure. If you were to walk along this line, you would experience level uniformity. In a typical room, the response in the far-field on-axis area would have low-frequency buildup due to room reflections. In the off-axis near-field posi-



Split parallel: Three speakers with a 100° horizontal pattern are split apart by 10 feet and splayed at an angle of 0°. The individual isolation zones are clearly visible in front of each speaker. At a distance of about 7 feet the zones merge to create a seam. Notice that a line running parallel to the array at this distance shows nearly perfect uniformity. Closer than this line, the on-axis areas are louder. Yet behind this line, the response becomes increasingly irregular as the interactions cause nonuniformity.

tion, there would be HF attenuation because of the axial loss. These two opposing factors come together to create a high potential for frequency response uniformity, depending upon the particular room and array design factors. Therefore, the contour lines represent both level and (potentially) frequency response uniformity, two of our primary goals in array design.

As the aspect ratio changes, the array's directional pattern must change accordingly. An aspect ratio of 4:1 is best served by a 30° array, whereas an aspect ratio of 1:1 needs a 120° array. Coverage areas with aspect ratios of 1:1 and below are best served by coupled arrays, and the best choices are nonoverlapping or overlapping point source arrays. The best selection for a particular application will depend upon the power requirements and the available devices. For example, 100° of coverage could be achieved in several ways: (A) a single 100° speaker, (B) a nonoverlapping point source array of



Split point source: Three speakers with a 100° horizontal pattern are split apart by 10 feet and splayed at an angle of 45°. This is the best of the split arrays in that a reasonable measure of uniformity is found in the isolated areas. The seams between the speakers contain noticeable irregularities that vary over distance. Even though the spacing between the speakers is the same as the split parallel above, the differences in response are extensive. The area where coverage converges is much deeper. The depth of usable coverage is much deeper except for in the seams, where the variations are less severe.

two 50° speakers, or (C) an overlapping array of three 50° speakers, or (D) a highly overlapped point source with four 40° speakers. The options above are in ascending order of power and descending order of uniformity. The best choice will be the one that provides sufficient power without sacrificing too much uniformity. This is related to the zone topography in that the nonoverlapping point source is predominantly isolated and combined with very little seam. By contrast, the overlapping choices have lesser degrees of isolation with higher proportions of seam. This is the mechanism behind the uniformity/power trade-off.

When the aspect ratio is less than 1:1, it is best to use split arrays, which are best suited for wide coverage over a shallow depth. One example is an underbalcony array; the coverage area is only a few rows deep but spans the entire hall, a 1:10 aspect ratio. By contrast, a center coupled

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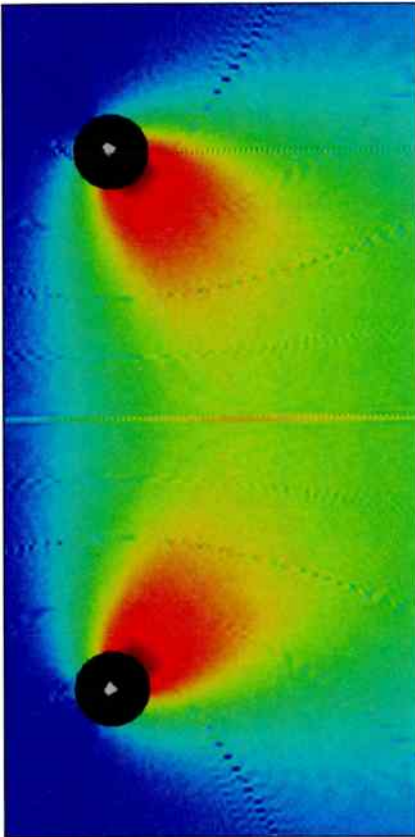
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Point destination array: Two 100° speakers are spaced 40 feet apart and turned inward 45°. The result is two isolation zones near the speakers and a seam area in between. The bright straight line in the center is due to the perfect addition that occurs at this spot and happens at all frequencies. The cancellations next to it are substantial as well. Notice the various radial chains of peaks and cancellations. The position and quantity of these will vary over frequency.

array would create huge differences in level from the center to the sides.

For this underbalcony example, we will use a split parallel array. A split parallel array allows for level uniformity to occur along a line. This line runs parallel to the array at the distance where the coverage angles from neighboring speakers meet. As you move across this line, you will move between the isolation zone (on-axis to one unit), through the combined zone, to the seam (the point between the two speakers). The responses from the individual speakers at the seam are each 6 dB down. Therefore, they combine to create an equal level to the on-axis area. The optimal spacing of the devices is a factor of the distance to the first group of audience members and the directionality of the devices. As the distance to the audience increases, so does the spacing. As the directionality of the devices increase, so the spacing must decrease. A 60° device is the easiest example and can be envisioned as an equilateral triangle. In this case, the distance to the audience and

the spacing between the speakers are the same. The optimal coverage area consists of a wide but shallow strip. Beyond its depth, the coverage area suffers from excessive overlap and its uniformity is severely compromised.

If the shape of the coverage is a shallow arc, the best choice is a split point source array. All of the factors that affect the underbalcony example above are applicable, but the lines of uniformity run as parallel arc shapes rather than as straight lines. Also, a third factor must be considered in the spacing formula: splay angle. As splay angle increases, it is possible to bring the units closer together while maintaining the same coverage.

When the coverage is shallow and the only available speaker positions are at the sides, you will need to resort to the point destination array. This array type is effective in the side areas (isolation zones) but hazardous in the center (seam zone). As the depth increases, uniformity is lost as the isolation zone shrinks and the seam grows.

The coupled and split arrays can be used in combination. Typical installations contain many different types of arrays for the different coverage zones within the room. In addition, split arrays may be made up of a series of coupled point source arrays. This is typical in stadium delay systems.

A typical arena touring cluster is a hybrid of array types. For any signal that is panned to the center, the left and right stacks are a combination split parallel (deep in the hall) and point destination (in the front center). The individual arrays are point sources in both the vertical and horizontal planes.

ALIGNMENT CONSIDERATIONS

The alignment process for a typical arena touring cluster is related to the interaction zones discussed above. The uniformity of the array is proportional to the amount of coverage in the isolation and combination zones. The seam areas are volatile, exhibiting highly variable response over frequency and position. Since uniformity is the main priority of system alignment, the zonal topography is a critical factor. Alignment microphones need to be placed in the isolated and combined zones, and equalization decisions must be made based on response within the priority locations. Since the frequency response is highly variable in the seams, equalizing the system's response for such an area will not work.

To recap, the seams are the areas where the two elements arrive at the

same level; response variations increase in step with the time offset between the sources. Where the seam falls can be "steered" by adjusting the level of one of the elements, and the nature of the interaction can be controlled by delaying one of the elements. A typical example is a cluster with separately equalized, delayed and level-adjusted vertical sections. The goal is to equalize each subsystem in its isolated area, adjust relative levels for maximum uniformity, and delay them in order to synchronize at the seam for optimal frequency response uniformity.

Split arrays also need to be equalized in their isolated zones. The seams have the same problems as above. The goal of maximum uniformity is the same, as are the techniques for level and delay setting.

PRACTICAL CONSIDERATIONS

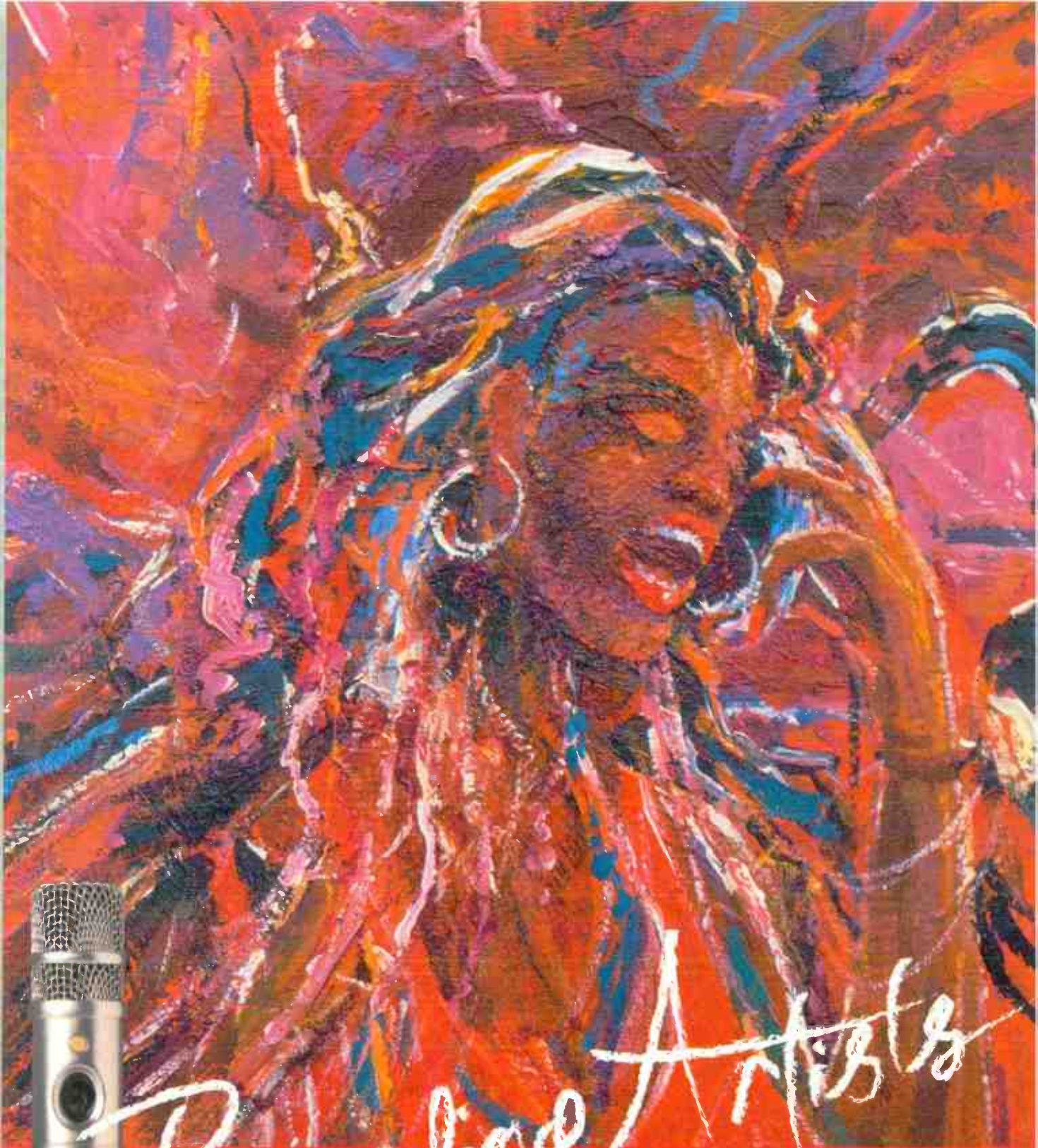
There are a number of ways to get the rig up in the air. Faster is better, but some designs sacrifice response uniformity for convenience and appearance. Hanging speakers in straight vertical or horizontal lines can get a loud rig up in the air quickly, but the resulting lack of uniformity is devastating. Arranging point source arrays in both dimensions is more labor-, hardware- and time-consuming, but well worth the effort if you have goals beyond winning an SPL contest. The key is to provide maximum flexibility so that the array can be optimally steered into the space. Overlapping point source arrays are particularly sensitive, and changing splay angles by a few degrees can cause the combined array to exhibit a major beam steering effect. In practical applications, it is typical to lock off one of the array planes with fixed hardware, while still allowing flexibility in the other plane. For example, a fixed-frame horizontal row can be vertically adjusted either by adding spacing hardware or pullback straps.

The practical permutations of array design are endless, but they inevitably lead to an array that creates a coverage pattern of a particular shape. How well that shape fits into your listening area, the power capability it contains and the uniformity of experience for the listeners will depend upon your ability to choose the right array type.

•••

The author would like to thank Todd Meier and Meyer Sound for the MAPP graphics. ■

Bob McCarthy specializes in sound system design and alignment and can be reached at bobmcc@primary.net.



Recording Artists

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sound becomes music, is
where your art, your dreams, and
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**TOUR
PROFILE**

MARIAH CAREY



FOH engineer Trip Khalaf



Monitor mixer Glen Collett

The biggest-selling female artist of the '90s is Mariah Carey, and she closed out the record-breaking decade with both her ninth release and her first tour in eight years. After a string of performances in Europe and the Far East, Carey's Rainbow Tour hit U.S. shores last March.

While Carey's sales and airplay figures are astounding—more than 128 million albums and singles sold worldwide; 84 Gold, Platinum and multi-Platinum certifications; and more Number One singles than any other female artist in history—her touring experience has been surprisingly limited, making pressure on the Rainbow Tour intense.

The show, which plays in 270° with an upstage video screen, showcases material that ranges from the shimmering pop and lush ballads of Carey's early efforts to the hard-edged, hip hop sound of her more recent recordings. That fact, combined with her remarkably wide vocal range and notorious vocal pyrotechnics, makes the already difficult task of getting good sound in multiuse venues, such as L.A.'s Staples Center, the San Jose Arena and Madison Square Garden, even more daunting.

Tour sound provider Clair Bros. pulled it all together with a veteran crew headed by FOH engineer Trip Khalaf and including monitor mixer Glen Collett, crew chief Bob Weibel and assistants Tom Ford and Gene Phillips. Rainbow is a highly crafted and staged show that required plenty of pre-production: three weeks of band rehearsals at North Hollywood's Power Plant, as well as production rehearsals at the new Raleigh Studios in Manhattan Beach. "The actual tour came together kind of unexpectedly," explains Khalaf, whose FOH credits include Madonna, Michael Jackson, Queen and Roger Waters. "Last winter, we did about six weeks with the same band on a press tour that included *Oprah*, *The Today Show*, and the Video Music Awards. We thought we were done when, late

in December, we got a call that said, 'Can you be ready to go in two weeks?' So we threw this thing together pretty quickly."

The hip hop element and the size of the venues dictated a sound package that Khalaf describes dryly as "big—about three-quarters of an acre" to handle the nine-piece band, which includes drums, bass, guitar, percussion, keys, four backing vocals and lots of computerized drum samples and loops. The P.A. system comprises 74 Clair Bros. S4 Series 2 cabinets, powered by Carver 1.5 amplifiers, and it includes seven TC Electronic 1128 programmable EQs and four Clair Bros. CTS system processors.

"People come to hear her voice, so number one is getting the voice out," stresses Khalaf. "And let's get this straight from the get-go, Mariah sings every note. But there is a guy over in the corner (not onstage) who does all the hip hop rhythm stuff on computer."

That combination of acoustic and computerized drums is a recipe guaranteed to bring on mixing headaches. "It's easy to do a show

BY MAUREN DRONEY

—CONTINUED ON PAGE 172

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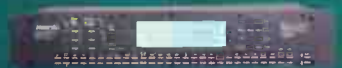
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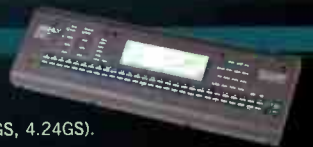
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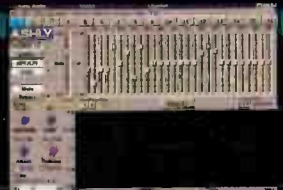
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TEXT AND PHOTOS BY STEVE JENNINGS

A touring band since 1973, KISS is out on a farewell tour doing what comes naturally—giving their fans what they want. “You wanted the best, you got the best—KISS!” yells the announcer, the curtain drops, and all four original members—Gene Simmons, Paul Stanley, Ace Frehley and Peter Criss—descend to the stage on hydraulic lifts.

Mix caught the eye-popping production at the Oakland Arena in Oakland, Calif.



Gene Simmons



Paul Stanley



Peter Criss



Ace Frehley



From left, Matt "Fluffy" Hartman, guitar tech for Paul Stanley, pictured with John "Larry" Cromer, guitar tech for Ace Frehley. Stanley's guitar rig includes custom Randall heads and four cabinets, three of them positioned offstage in iso cabinets. A GCX switcher selects among four Shure UHF U4 transmitters. Similarly, Ace Frehley's rig includes four Marshall JC900 SLXs run into 1x12 cabinets.



FOH engineer Ken Van Druten is using a 60-channel A&M Langley Recall board, with 52 inputs fed from the stage and the remaining channels dedicated to effects. "A lot of the effects are the band's signature sound," says Van Druten. "When Gene does 'God of Thunder,' there's a real important Harmonizer vocal an octave below him." Van Druten makes extensive use of the Langley Recall's internal gates and compressors, with tube compressors assigned to vocals and some Summit TLA 100s and 200s on the guitars. "For effects, I have a Lexicon 480, a TC Electronic M5000, a TC 2290, an H3000 and two Ultra Basses," he adds.



Mike "Spike" Rush, bass tech for Gene Simmons. Simmons' gear includes SVT amplifiers and SVT 8x10 cabinets. The bass models include the signature Punisher.



Monitor engineer Mike Adams mixes from under the stage on a Yamaha PM4000 with 52 channels "and not a spare one left." All four band members use in-ear monitors, but Paul, Ace and Gene all use only a single earbud on the left and have wedges to the right. "I've got 28 Showco Prism SRM wedges hung under the deck, under grids, and I'm using four Showco SS sidefills driven by 1015 crossovers," Adams explains. "I don't use any graphics, because you don't need them with the Showco wedges. I'm using all dbx gates and compressors and just a couple of effects processors. That's about it—straightforward, very noncomplicated." For eye contact with the band, Adams relies on monitor systems engineer John Sheldon.



Mics for drummer Peter Criss' kit are all Audio-Technica models: ATM25s and 23s, 4050s and 4051s. Criss is using the Shure PSM600 Series in-ear monitor setup with UE Pro elements and also has a 50-watt Orashaker drum seat thumper.

—FROM PAGE 168, MARIAH CAREY

with a drummer," Khalaf continues. "It's the same sound all the time; you hone your drum kit and there you go. But when you're dealing with hip hop, everything changes all the time. One tune sounds absolutely nothing like another. The challenge is to make it all make sense, to make it flow as smoothly as you can. One of the stark things is that in the older material the drums are pretty far back and on the newer stuff they're right in your face. So you do have to change it a bit from the records

to keep the drums at some sort of recognizably consistent level."

Countryman directs are used on bass, guitar and keys; the acoustic drums are miked mostly with Shure products: a Beta 52 on kick, SM57s on snare top and bottom, and SM98s on toms. Milab 96s for overheads round out the kit. No compressor is used on the drums themselves, and no overall stereo compression is used on the mix.

BANDPASS CROSSOVERS ARE MORE FORGIVING

"We use bandpass compression instead of overall compression—the CTS

processor, the system controller for the S4s, has really wonderful compressors built in," Khalaf explains. "In a live situation if you use overall compression you wind up having the kick drum or the vocal modulate everything. If you break it up into system bandpass crossovers, it's a lot more forgiving: The kick drum will modulate only the lows, the vocals usually will determine the compression of the mids and the highs. And," he laughs, "if I get really out-of-lunch on the hi-hat or somebody's got a real sibilance problem, it will drag the highs down a little bit. But that's the most noticeable—you don't really want to get into that."

The computer drums, fed from MOTU's Sound Designer, come up on the main 56-input Midas XL-4 console, which, not surprisingly, has all inputs occupied. "The XL-4 is automated to the point where you can assign any of the inputs to any one of ten VCAs which are motorized and have programmable levels," continues Khalaf. "Besides that, on/off switches are programmable. But since only the VCAs are programmable in level, I drop all of the channels down into ten VCAs and use them like sub-masters."

A Yamaha 02R sidecar run by Opcode's Max software is used for effects returns. SMPTE sent from the stage is fed into a MOTU MIDI Time Piece, then into a Macintosh laptop that runs the XL-4, the 02R and Max. "With all these different drum sounds, you have to not only make the different sounds work together but also deal with levels that are all over the place," says Khalaf. "With the system we're using, a SMPTE number signals the program changes to the XL-4 and the 02R, as well as opening up a window of notes for whatever tune comes around."

TIGHT PATTERN, SMOOTH RECORDING

Lead and background vocal mics of choice are Shure wireless models fitted with Beta 87 capsules. "We do a lot of recording in very different environments," Khalaf explains. "Mariah's studio engineer needs to be able to take the tapes into the studio for overdubs and fixes if necessary. The 87 has the tightest pattern we've found, so he can just put an 87 in front of her in the studio and match it up."

Board EQ is used on the lead vocal when necessary, along with a Tube-Tech limiter and reverb from a Lexicon 480L hall program. "You don't want to jazz this vocal up too much," comments Khalaf. "She really does have an incredible

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instrument, and it's fine just like it is."

Dealing with those famous dynamics? "I just kind of goose it a little bit with the limiter to keep it under control somewhat, and then it's down to riding the fader a lot. Not only does she have an incredible range, she has a number of voices which she uses; a lot of them very breathy, a lot of them very deep. They all react to the microphone differently, and sometimes it's a challenge."

Reverbs of choice are the 480L, "plates for drums, halls for the vocals," and "a nice layered shift from the Eventide 3500 Harmonizer for backing vocals, which fattens everything up."

WEDGES AND IN-EARS

Only Carey and her four backup singers use wireless mics, with two additional wireless ready for various guest artists such as Missy Elliott and Da Brat, who sometimes drop in for the show.

There's plenty of other RF flying around the stage, however; although Carey herself relies on traditional monitor wedges, the rest of the band use Ultimate Ear UE5 two-way monitors, three of them wireless.

"I try and keep it to a minimum," notes monitor mixer Collett, a Nashville resident whose credits include Bette Midler, Julio Iglesias and 16 years with Bryan Adams. "The people that are stationary I try to keep wired in order to keep the total number of radio frequencies onstage down as much as possible. On this tour, only the bass player and two of the singers are wireless.

"Reception problems are always of paramount concern. The airwaves are getting more and more jammed, and, once you put a pair of little monitors inside your ears, any kind of bad reception is a real problem. Essentially, you have a little stereo FM radio station on your belt. It just happens to be turned to a frequency that, hopefully, isn't being broadcast by TV, or radio or anybody else."

RF isn't the only problem Collett faces; the use of both in-ear monitors and wireless microphones increases many of his other equipment requirements. For example, his 52-input Yamaha PM4000 is overextended.

"The console does a maximum of 22 mixes; I'm using them all and I could use many more. When you go to in-ear monitors, the requirements go way up. First of all, you're now supplying each person's mix with their primary instrument as well. Usually, for instance, the

guitar player would get a lot of his instrument's sound out of his own amplifier. Now, he gets nothing of that; you supply it all. And, not only do you need more mixes, you also need more inputs, because that guitar player might want to hear his guitar EQ'd very bright. When you send that bright guitar to anybody else, they don't like it. So I have to split off the guitar, or any other instruments where someone wants to hear drastic EQ that nobody else wants to hear.

"It's funny," he laughs. "People, or at least the accountants, thought when we went to in-ear monitors we'd lose all these amplifiers and speakers and we'd save all this money. But it didn't turn out that way."

For Carey's monitoring, Collett runs six mixes into eight Clair 12 AM wedges and eight Clair Bros. R4 sidefills, all powered by Carver Clair CVA 1000s. "It's a very wide stage," he comments. "I use a pair right in the center, then, as she walks to either side there's a group of three in an arc, then four sidefills on each side. When you get a whole lot of wedges that have to cover all the way across the front of the stage you can't just put them all in one mix. When you get off-center and you're in front of wedges that are closer to the sidefills, those wedges need to sound a little different than the ones that are all by themselves in the center. The idea being, of course, to make the voice sound the same everywhere you go."

Collett uses numerous compressors in the console inserts, mostly dbx 900 and 160s. Reverbs are a TC M5000 dual engine, with one stereo side used for Carey and the other for the backup singers, and SPX900s for acoustic guitar and snare drum. "Reverb is another requirement that goes up with in-ear monitors," he adds. "You can't have one reverb and put a bunch of things into it; if someone needs a reverb, it has to be discrete on their instrument and in their ears."

And so it goes. There's that French saying that translates into something like "the more things change the more they remain the same." Our rising sound technology curve hasn't changed the need for more and more equipment, and better and better sound engineers.

"Theoretically I suppose a show should work by being computerized," concludes Khalaf with a laugh. "But that's the thing about live music. You can never just sit back. You'll never be able to phone it in. We are actually forced to ply our trade over and over again every evening." ■



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ETA RACKMOUNT POWER DISTRO ▲

Two new rackmount power distribution units from ETA Systems (www.etasys.com) connect to either two or three legs of 120/208-volt three-phase or 120/240-volt single-phase power sources. The PD260 Series is a 120-amp capacity unit with six 20-amp circuits, each with a dual U-grounded Edison, NEMA 5-20R outlet receptacle and a 5-bus terminal block. The PD260 is supplied with a 6-foot pigtail with five 8-gauge wires and 90° elbow or straight pass-through conduit connector. The PD66 Series is a 140-amp capacity unit designed to accommodate two 30-amp and four 20-amp circuits with dual U-grounded Edison outlets and a 5-bus terminal block. Both systems are priced at \$750.

Circle 314 on Product Info Card

SAMSON HANDHELD CONDENSER ►

The new Q1 handheld condenser mic from Samson Technologies Corp. (www.samsontech.com) offers a tight cardioid pattern, frequency response from 50-20k Hz and a shock-mount element to minimize handling noise. The Q1 is designed to withstand high sound-pressure levels (134dB SPL) and requires phantom power. Price: \$399.99.

Circle 315 on Product Info Card

SERVODRIVE 3-WAY SYSTEM

The SPL-td1 loudspeaker from Servo-Drive (www.servodrive.com) com-

bines the outputs from seven different drivers through a single horn, designed to provide a seamless time/phase-correct transition across the frequency range. Its trapezoidal cabinet houses two 12-inch LF drivers, four 5.25-inch compression mids and a 1-inch

HF horn in a patent-pending Unity Summation Aperture arrangement. Weighing 130 lbs. and measuring 29x19x23 inches (HxWxD), the SPL-td1 can be configured for passive or 2-/3-way active operation. Frequency response is 80-20k Hz (± 2 dB) in passive mode, and sensitivity is 103dB SPL (1W/1m). Passive-mode power handling is 800 watts RMS. The Baltic birch cabinet has

two NL8 (active) and two NL4 (passive) connectors, ATM AMFS Series recessed track hardware, a pole cup and four handles. Black catalyzed texture coat is standard; white and natural wood finishes are optional. Price: \$3,295.

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NADY'S 4-CHANNEL VHF DIVERSITY SYSTEM

The 402 VHF Wireless System from Nady Systems (www.nadywireless.com) features four independent wireless receivers in a single-rack-space component. The 402 operates on four different frequencies in the VHF high band (170-216 MHz) and features DigiTru Diversity for enhanced range and dropout protection; a four-LED AF display monitors received volume. All four channels feature specialized companding circuitry and dynamic range is

120 dB. The 402 is available with any combination of Nady handheld, lavaliere or instrument transmitters.

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DLQ QUICK RELEASE MIC CLIP ▼

Italian company DLQ (distributed by Olsen Audio Group, Scottsdale, AZ) offers the Rapido quick-release mic stand attachment to speed setup/tear-down. The Rapido products are available thread-

ed for U.S. or



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AUDIO-TECHNICA UHF WIRELESS ▼

Audio-Technica's (www.audio-technica.com) new 1400 Series UHF wireless can operate with up to ten systems simultaneously. The 1400 Series offers a choice of ATW-T51 body-pack transmitter (with both mic and hi-Z instrument inputs) or the ATW-T52 handheld dynamic microphone/transmitter, and both include the ATW-R14 half-rack, true diversity receiver featuring balanced XLR (with ground lift switch) and unbalanced ¼-inch jack outputs. All transmitters feature dual-power switching for either maximum range or extended battery life. Price: \$429 for the body-pack system; \$499 for the handheld system.



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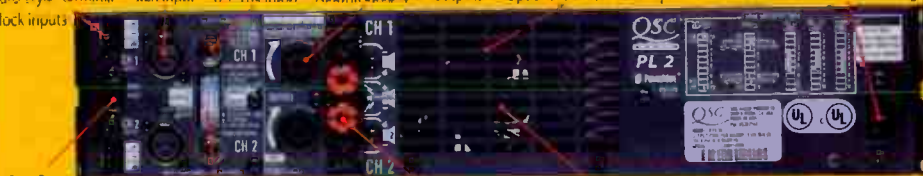
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SUPERTRAMP'S "THE LOGICAL SONG"

by Tim Morse

"When I was young, it seemed that life was so wonderful..." That's the memorable opening line of Supertramp's "The Logical Song," an ode to the forgotten simple joys of life that managed to embody the British band in a mere four minutes. Over an insistent electric piano rhythm, Roger Hodgson sang his distinctive, high tenor vocal that urged listeners to reevaluate the way they looked at life. The crystalline production of the song was almost as important as its writing, arrangement and performance. Supertramp, like Pink Floyd, were known as an audiophile's band, and they produced records that salesmen would use to demonstrate stereo systems and young men would in turn use to show off car speakers. Their brand of progressive pop music was the perfect fit for musical climate of the late '70s and early '80s.

The origin of Supertramp began with



the unusual arrangement: Swiss millionaire music fan Stanley August Miesegaes agreed to finance keyboardist/vocalist Rick Davies' vision for a band. Davies held auditions to recruit suitable musicians and soon settled on the lineup of Richard Palmer (guitar), Bob Miller (drums), and Roger Hodgson (vocals/bass). The group was originally called Daddy, until Palmer convinced them to change it to Supertramp, after the 1910 book *Autobiography of a Supertramp* by R. H. Davies. Hodgson and Davies quickly became the creative force of the band, and they agreed to an equal split of the songwriting royalties (à la Lennon/Mc-



Left to Right: Bob Siebenberg, John Helliwell, Dougie Thompson, Roger Hodgson and Rick Davies

Cartney). The band's first two albums, *Supertramp* (1970) and *Indelibly Stamped* (1971), were undistinguished affairs, their main feature being long-winded soloing common at the time. After *Indelibly Stamped* was released, Miesegaes decided to pull the plug and severed his involvement with the group. By this time, members Palmer and Miller had departed and were replaced by Kevin Currie (drums), Frank Farrell (bass; Hodgson had moved to guitar and keyboards) and Dave Winthrop (saxophone). Without financial support, the band began to truly pay their dues and slogged through poverty and awful gigs. In fact, it got so bad that Farrell, Winthrop and Currie all left, and new members Dougie Thomson (bass), Bob Siebenberg (drums) and John Helliwell (woodwinds) joined the band. This lineup proved to be their most stable, and Supertramp's sound began to change, out of necessity, to more commercial pop music.

The group's next album, *Crime of the Century*, was a hit featuring the singles "Dreamer" and "Bloody Well Right." Additionally, the sound of the band was transformed by producer Ken Scott and Russel Pope (their concert sound engineer) into the lush but precise approach that it became justifiably famous for. *Crime of the Century* also began an intense work cycle for Supertramp of spending months carefully crafting a sonic masterpiece in the studio and then embarking on huge tours of the world. However, the following albums *Crisis? What Crisis?* and *Even in the Quietest Moments* weren't as artisti-

cally or commercially successful as *Crime of the Century*. After the long tour to support *Even in the Quietest Moments*, the tired group agreed to take a well-deserved break before working on their next project.

"The Logical Song" was written by Hodgson during this period and, as he relates, was a very personal lyric for him: "You can't preach to people, but you can stimulate their thoughts, and I think that this song does do that. I hate to use the word 'message,' but the thought here is that throughout childhood you are told so many things, and yet you are never told who you really are; you are not told anything about your real self. Very rarely, anyway. We are taught how to function outwardly, but not told who we are inwardly, and no one explains it to us."

When Supertramp regrouped, it was decided that the band would rehearse and demo the album with a mobile recording at their rehearsal space in Burbank, Calif. They worked on the arrangements and recorded the songs on eight tracks and even determined the running order. After demoing the album, they moved to the Village Recorder to begin the actual recording. The sessions were done in Studio B, which featured a Harrison console and two Ampex 1200 24-tracks. The standard procedure was to record the backing track and make a slave, bounce down the backing track from 10 tracks of drums on the first machine to four on the second, and so on. They would then put them away until they mixed. Surprisingly, the backing track consisted

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of quite a few instruments: Wurlitzer electric piano, drums, bass, saxophone and Clavinet (later mixed out). As producer/engineer Peter Henderson recalls, "We were really trying to get performances out of the backing track. So we would go for as much as we could get, and then we'd always keep the main keyboard, bass and drums and then replace whatever we needed to. In this particular case, the sax solo was all live with the backing track, and the vocal at the end section was kept as well."

Hodgson played the Wurlitzer; signal was taken as a DI and then split through a Boss chorus pedal to give it

that half-straight and half-modulated chorus sound. Helliwell remembers the electric piano part as being a good example of Hodgson's style: "We call him 'Hammerhands,' because he's got pretty big hands and he really whacks the keys. Roger has never had any lessons at all, and he doesn't care about technique or anything like that; he just gets the sounds he wants out of it."

The synthesized strings were a combination of an Oberheim 4 voice (for the low cello sounds) and an Elka Rhapsody string ensemble, which was also put through the Boss chorus pedal (for the high parts). The Hammond

Cool Spins

The Mix Staff Members Pick Their Current Favorites

Elliott Smith: *Figure 8* (DreamWorks)

Onstage, Elliott Smith cuts a deceptively slight and scruffy figure, resembling your friendly, unwashed neighborhood busker, hunched over his acoustic guitar in a worn



metal T. Then hauntingly familiar classic rock melodies take over, tug at your attention with their distinctive minor-key undertow and gently prod with their incisive lyrics. *Figure 8* proves Smith is anything but a minor figure on disc. The first song and single, "Son of Sam," for instance, shows the former Heatmiser widening his world view, tells the story of a serial killer against a lush and detailed sonic backdrop of ragtime piano chords, C&W-style fingerpicking and ragged electric guitar. "Junk Bond Trader" preaches to a short-sighted businessmen amid swooping strings and glockenspiel peals, and "LA" embraces sinewy guitar lines straight off '70s AOR radio while Smith, a recent transplant, makes the less-than-angelic city rhyme with, "Things I'd never done/Cars parked in the sun/Liv-

ing in the day/Last night I was about to throw it all away." Although *Figure 8* still includes Smith's characteristically quiet yet tough-minded songs ("Somebody That I Used to Know," "Easy Way Out"), there's an ambitious, cinematic expansiveness to the music and lyrics that makes one suspect that Smith's contributions to films like *Good Will Hunting* and *American Beauty* have had an effect. Seems like a fair trade: Hollywood used his naked singing and songwriting to add a prickly authenticity to its light and shadow, and after squinting in the hazy glare, Smith learned how to write about the world outside of his navel.

Producers: Tom Rothrock, Rob Schnapf and Elliott Smith. Engineers: Rothrock and Schnapf. Studios: Abbey Road, Capitol, Sunset Sound and Sonora studios. Mastering: Don C. Tyler/Precision Mastering (Hollywood, CA).

—Kimberly Chun

The Persuasions: *Sunday Morning Soul* (Bullseye/Rounder Records)

Whether or not you're a Christian, old-



fashioned gospel music stirs the soul, and *The Persuasions* have been singing a capella soul music—both secular and spiritual—

—CONTINUED ON PAGE 198



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organ's Leslie was miked with two Neumann U47s on the top and one on the bottom, then compressed through two UREI 1176s. The arpeggiated guitar part was two double-tracked Guild 12-strings combined with two Les Paul electric guitars fed through Leslies (both left and right). The guitar amps were miked with Neumann U87s. The bass was pure DI with a lot of EQ on it. Henderson remembers that Thomson "used to play with flat-wound strings, and the Harrison always had a really nice low end, even though the EQ wasn't very good on that desk. It probably had as much as +12 dB at 100 and 200. [The bass] had an awful lot of low end to it, and it, too, was put through an 1176."

The saxophone was recorded with an STC 4038 (an English ribbon mic) in the bell and a U87 a couple of feet away for an overall sound. Because they recorded the backing live, there was concern about bleed from the saxophone. As Henderson relates, "At the time in the Village, there was only one booth, and Roger was singing live in it, so John was recorded in the toilet; he was playing the solo in the toilet. He used to complain about it a lot, but I

think he was actually quite happy being in there."

The percussion intro for the song was a montage that had to be assembled. Siebenberg hit a very small cymbal and played the castanets, and Helliwell provided the heavy breathing. Actually, the main stumbling block for this part of the piece was that it took some time for Siebenberg to learn how to play the castanets correctly.

The band also had some fun with the end section of the song, piling on overdubs of wah-wah Clavinets, timbales, cowbell and a Mattel digital football game sound (after the "d-d-digital" line, of course). The game belonged to an engineer who was working in the other studio (who, Henderson jokes, "is still waiting for his royalty check for its use").

As was common in late '70s recordings, they spent a few days selecting the right drums and tuning them—Siebenberg ended up playing a Ludwig kit and used Fiberskins on the toms. Henderson recalls, "I'm not sure I've ever used this combination of mics again, actually. The snare [mic] was a KM84, which was trying to do what Alan Parsons was doing at the time with *Dark Side of the Moon*—it's a very soft sound, but a very

hi-fi sound, and that's what we were going for. The kick would have been a 421 Sennheiser, and all the toms as well. The hi-hats would have been the 84s again, and the overheads were 451s, which I certainly wouldn't use again, but I think they helped the tom sound."

The lead vocals were cut with U47s and recorded through an 1176, as well. Henderson says he would normally have used a Fairchild on vocals during that era, but they didn't have one at the Village. He observes that the vocals were done without a pop shield, very close to the microphone, which caused some grief, but gave them the proximity effect they were looking for. Hodgson frequently did double-tracking for his lead vocal lines and also did backing harmony vocals. Davies' counter vocal on the track was recorded late in the process; as Henderson remembers, "That was something that didn't appear until probably seven months into recording. Roger was very, very pleased with that, because he was always looking for something to lift it, and Rick came in with that idea."

As is often the case in a long-term recording project, Supertramp found themselves with almost too much

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choice in the mixdown stage. Siebenberg remembers, "The album went pretty smoothly until we got into mixing, and then we ran into the problem of who was going to decide when we had the final mix of the LP. It was just a case of too many cooks. We were pulling our hair out because we couldn't decide."

One thing they could agree on was that they should mix the record somewhere other than the Village. As Henderson explains, "We got to the end of seven months, and we tried to mix it at the Village, and we found the Harrison EQ to be very harsh-sounding, so you couldn't brighten anything up without it sounding very electronic. We made a decision to go to Crystal, which had a custom desk. And that was quite a lucky break for us. But when you've worked on something for quite a time, it's hard, because over that period of months you hear something in your head and you're trying to get back to that point. You often drive yourself crazy, and we probably mixed each song three times. During the last three days of the album, there was a lot of pressure to finish. And on the last day, we remixed four songs again and went straight from working all night to mastering."

The long hours and the hard work paid off. "The Logical Song" became one of the fastest breaking singles in A&M's history and helped propel the band into superstardom. It reached Number Six on the *Billboard* singles chart and remains a classic rock radio staple to this day. *Breakfast in America* was the high-water mark for Supertramp, spawning four hit singles and going on to sell 18 million copies worldwide. Siebenberg says he had no doubts about the album's success: He bet Davies \$100 that it would break the Top 10. In fact, it was Number One for six weeks. Davies was undoubtedly happy to lose the bet; however, he framed the Ben Franklin with a plaque reading: "You'd better not spend it, you rat!" Henderson was honored by his peers with the well-deserved Grammy for the best engineered album of 1979.

Unfortunately, all was not well with the band. Tensions within the group began to flare up during the *Breakfast* tour, and after its follow-up, *...famous last words...*, Hodgson left the band to pursue a solo career. Davies was left to helm Supertramp, and the band continues to release albums and tour, although they have never again reached the exalted heights of '78-'82. ■

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The Mix Place, NYC - Photos: Gedige Roos

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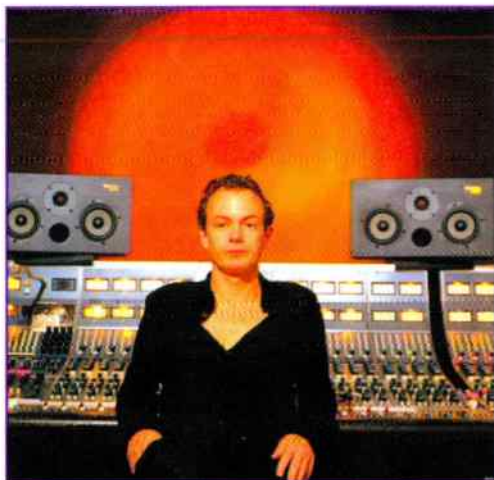
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—FROM PAGE 178, THE STOOGES

ories of the two participants *Mix* interviewed—producer Gallucci and Stooges guitarist Ron Asheton—differ somewhat. Gallucci recalls small, club-style P.A. speakers of some sort in the room with the band, but does not believe the speakers were miked or baffled. Asheton says that there was a large Electro-Voice Eliminator-style P.A. cabinet in the room, which was heavily baffled and possibly miked.

Gallucci believes that any vocal sounds resembling those from a miked P.A. system probably came from the visceral, live-onstage manner of the singer's interaction with his microphone and from the bleeding that was encouraged by the lack of baffles. "Iggy was using the mic just like he did onstage, and you're going to get distortion that way," he says. "We used limiters, but there is only so much they can do! We didn't think it hurt for this record to have distorted vocals." He adds that the primary reason for having the vocal P.A. speakers in the room was that "no one wanted to wear headphones, except for Ron Asheton."

Whatever the precise setup, taking the live-in-the-studio recording approach to this extreme degree was highly effective. Running directly counter to the industry's standard isolated and meticulous vocal recording process, Iggy held the mic in his hands and romped about as he sang, Gallucci says. He indeed regularly put out too much sound pressure, giving certain passages a nearly frightening, distorted emphasis. This, coupled with the band's confidence after a year on the road, and their comfort with this highly unorthodox recording style, contributed to a ferocious sound.

Musically, *Fun House* took the simplicity and garage-band sound of the band's relatively tame debut Elektra release, *The Stooges*, and revved it past the redline. The precise and imaginative playing of lead guitarist Asheton; the dead-on rhythm section of his brother, drummer Scott Asheton, and bassist Scott Alexander; and the provocative avant-jazz wailing of tenor saxophonist Steven Mackay all leap off the record and into your solar plexus. Oh, and the riotous songs are good, too.

The Stooges would make one more record (for Columbia), 1973's David Bowie-produced *Rau' Power*, and Iggy Pop would go on to a roller-coaster solo career that found him doing many other albums for a variety of labels, often under Bowie's aegis. He also



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fought a long, semipublic battle with the serious substance abuse problems that reportedly began prior to the *Fun House* sessions.

In the past decade, however, Pop has become a solid, professional, worldwide touring success and has recorded several albums in a row for Virgin. His records still avoid hit status domestically, but his wild live performances showcase his energy, bold theatrics and unmistakable command of the stage.

Meanwhile, *Fun House* has sold fewer than 89,000 copies in the nearly 30 years since its release (according to a recent *New York Times* article), so few

ever expected to hear more from those May 1970 sessions, especially not the 30 takes of "Loose" and the dozen each of "Dirt" and "T.V. Eye" found on *The Complete Fun House Sessions*. However, the direct-sales capability and affordable marketing reach of the Internet have made this highly unusual documentary release practical.

One should not expect to see other well-regarded albums receive this exhaustive archival treatment, however. Again, the way *Fun House* was recorded led directly to the label's ability to produce such an unusual set. Had *Fun House* been made like a normal record

of the era (with the instrumental tracks cut first and the vocals added later) the session's multitracks would've probably been discarded after the final takes were spliced into a comp reel for mix-down, opines the remastering engineer, Rhino staffer Bill Inglot.

But each of the more than 100 takes on *The Complete Fun House Sessions* was recorded complete, final lead vocals and all. (Inglot calls Pop's consistently strong vocals on take-after-take "a Herculean effort." Minimal overdubbing was added to some of the album's tracks, mostly Mackay's sax and a second track of Asheton's guitar.) And the dozen 1-inch, 8-track multis that comprised the session "took up little more than a 12-inch cube of space in Elektra's vaults," Inglot notes, perhaps explaining why all of the multitracks survived.

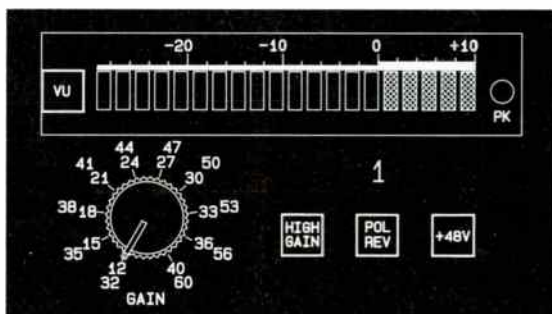
The recording technique of *Fun House* isn't the only thing about the record that is unusual. Like other seminal rock groups from the 1960s, including The Byrds and The Doors, The Stooges loved the work of the innovative jazz saxophone giant John Coltrane. (The surviving Doors have often noted that their hit "Light My Fire" was built around the chord changes of Coltrane's acclaimed and popular version of "My Favorite Things.") Detroit-area rock bands of the time embraced avant-garde jazz with particular fervor. In addition to Coltrane, The Stooges were also enamored of the atonality and fragmented melodies of Archie Shepp and, on the pop front, James Brown.

"We all loved John Coltrane," explains Asheton in *The Complete Fun House Sessions'* liner notes. "When we heard The Doors' record [*The Soft Parade*, with sax solos by Los Angeles jazz stalwart Curtis Amy], we thought we could do it better—so we got Steve Mackay, who was a cool guy and a great saxophone player."

"I was listening to James Brown and a lot of Coltrane," Iggy Pop adds in the liner notes. "What James Brown was coming up with at that time, with 'Say it Loud, I'm Black and I'm Proud,' 'Make It Funky' and 'I Can't Stand Myself,' was just minimal, high-steppin', badass rock music, and that upped the ante...I wanted something badder based on that."

Gallucci, the suit-and-loafer-wearing badass at the helm, was a young Elektra staff producer who had just scored an AM radio hit with Crabby Appleton's "Go Back." Gallucci accepted the assignment after seeing a chaotic New York City Stooges performance at the behest of Elektra's founder, the enthusiastic and

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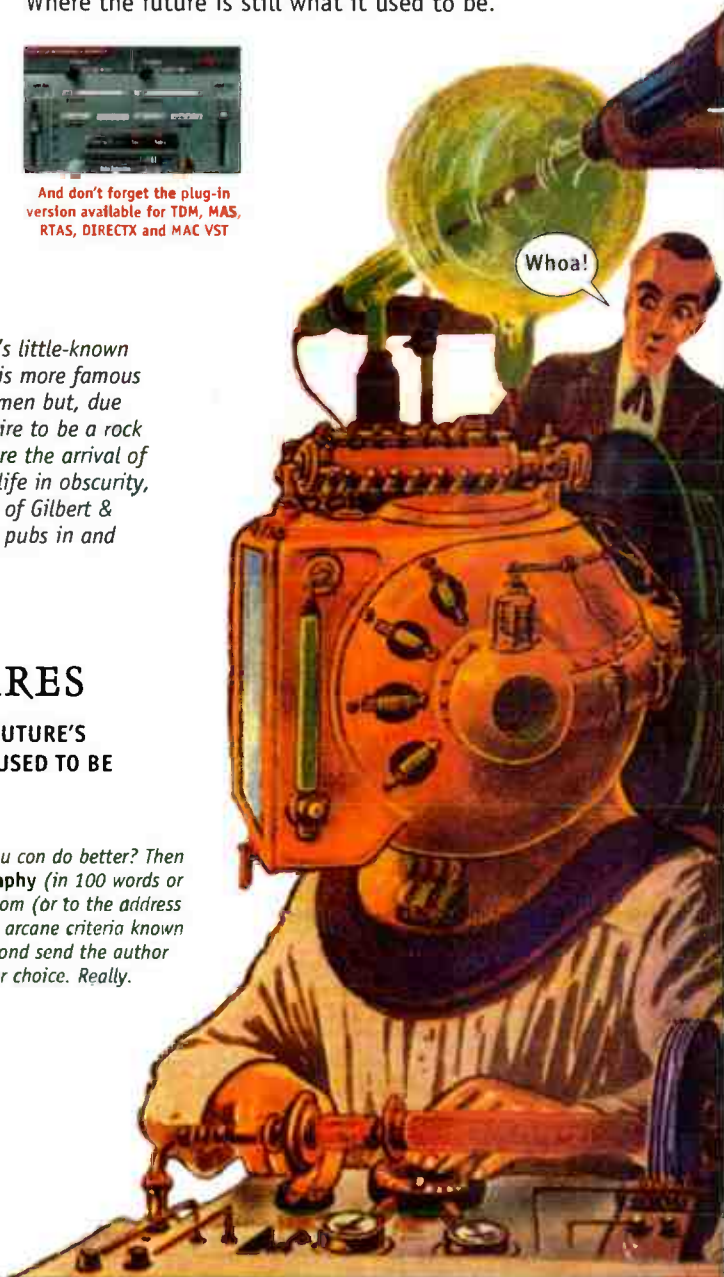
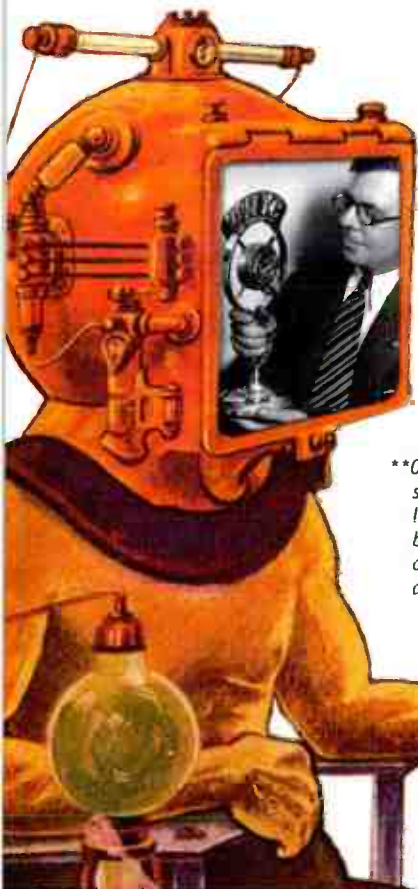
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apparently visionary Jac Holzman. (Gallucci won himself a place in the hearts of The Stooges early on when they learned that at the age of 14 he had played keyboards on The Kingsmen's infamous recording of "Louie Louie.")

And so the sessions began in early May 1970. First, the quality of the room sound was addressed. Gallucci and The Stooges rearranged the various Oriental carpets and pillows Holzman had decreed for the new room, which had been designed to be nonreverberant, as was the general studio design trend then, Inglot says. (The studio was designed by Allan Emig and acoustic designer Paul Veneklassen, according to the liner notes.)

"We took out all those carpets and pillows, and we thought, 'This room is really going to jump now!'" explains Gallucci. "But it was still so dead and so clean! The room sounded like a transistor radio, with no funk. The sound had been eunuched."

The Stooges had exclusive use of the studio for a two-week period, so the re-arranging only had to be done once, Asheton says. Once the furniture was rearranged, the tunes were run through using a conventional live approach, with the amps and drums heavily baffled, the singer using a studio-style microphone on a boom and everyone wearing headphones. The results were extremely disappointing.

"We all knew it was awful," says Gallucci. "However, there was no subsequent big discussion about a different recording technique. Iggy was clearly frustrated. He wanted to have close contact with his guitarist. He wanted to be able to lean over into Ron's amp and hear the guitar jump out at him. I knew nothing could sound worse than what we had, so we got rid of the baffles, set the band up just as they would be on-stage and brought in the P.A. speakers [and split the singer's mic feed between the P.A. amplifier and the recording console]."

"That way Iggy could be comfortable and have the live sound experience he was used to, and he didn't need headphones. We absolutely wanted everything to bleed. That gave us the much-needed natural sound quality and the familiar aural environment the band wanted," Gallucci says. "I think some of the best recordings—at least in terms of fatness, texture and warmth—were made with one microphone at the back of a bar, so I thought it was at least worth a try."

Asheton confirms the close quarters.

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"My amp was right next to my brother Scott's drum kit, and the bass amp was right next to mine, and Iggy was right there with us. The really cool thing was that Gallucci wanted the sounds to bleed together," Asheton says.

Iggy indeed treated the studio as a stage, only somewhat restraining his infamous, energetic and idiosyncratic performance antics as they recorded, Gallucci says. Reissue engineer Inglot notes that the instruments bleeding onto the single vocal track vary from take to take and even during individual takes. "About 30 percent of the modulation on the

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vocal track is drum hash," says Inglot.

The instrumental tracks were much less corrupted by bleeding. "Ron Asheton's guitar is pretty clean, like the mic was right in front of his cabinet, and the bass is exceptionally clean," Inglot adds. He confirms Gallucci's recollection that the temporary modifications did little to liven up the room. "Overall, the sound was quite dry" despite the temporary room modifications, Inglot explains. "So for the boxed set we tried to create a room, using Lexicon's 480 and PCM70 reverb units."

As for the extraordinarily punchy, center-stage quality of the instrumental sound, Gallucci says there were two contributing factors aside from the live approach. "One, the sound was unique to the time and the sensibilities of the band," he explains. "And our engineer, Brian Ross-Myring, came from the old school, when recording was an elegant gentleman's business, when engineers were men who wore French cuffs."

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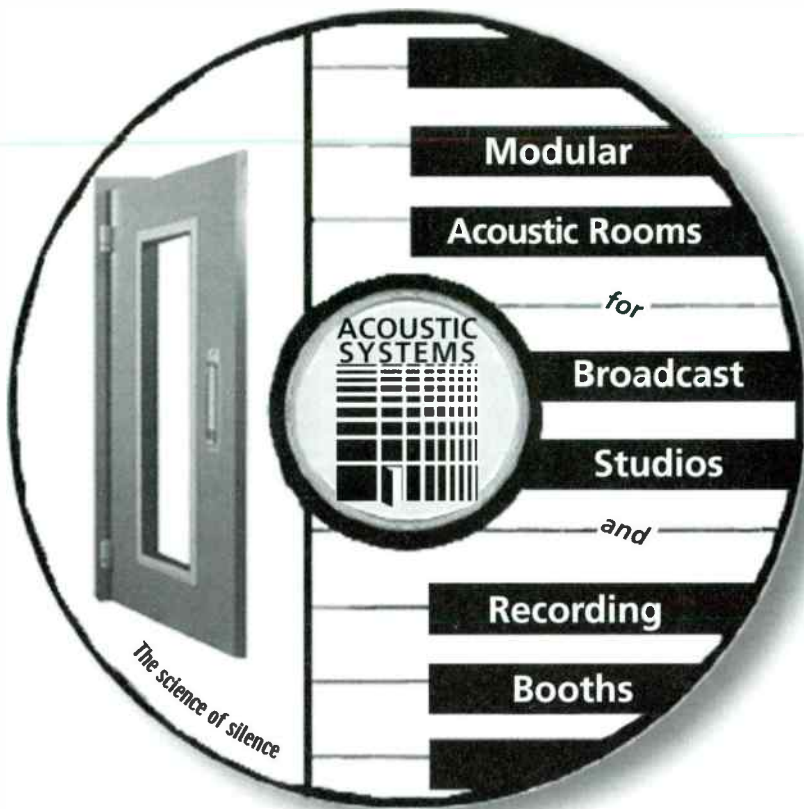
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Ross-Myring's traditional background dictated that no matter how outrageous the music, one should not lose sight of the basics. "A guitar should sound like a guitar and a sax like a sax," says Gallucci. "Brian accomplished that and also enhanced the warmth we were after."

(Ross-Myring, who was middle-aged in 1970, and whose session previous to *Fun House* is said to have been with Barbra Streisand, is deceased, as is saxophonist Mackay.)

For the remastering, Inglot tamed some of the wilder dynamics with peak limiting compression, employing "an old '50s-era LA-250 tube limiter on the vocals. Say the dynamic range was 60 dB; I'd pull it down to 50 dB," he says. The original *Fun House* 1-inch, 8-track 3M multitracks were pulled from Elektra's vault and played back on a 3M-1 8-track machine at Penguin Recording in Eagle Rock, Calif., and mixed on a small Neotek board. "We used a bit of outboard EQ, and mixed to quarter-inch tape on an Ampex 100 deck at 15 ips. We used Dolby A, to lose some of the noise floor, rather than Dolby SR, because we thought Dolby A would be more authentic in relation to the original sessions' sound. We didn't mix to half-inch at 30 ips, because we wanted the benefit of a bit of tape compression, plus we felt that bigger, faster tape would just be overkill for a raw-sounding project like this."

The entire compilation process and remixing took only about 20 hours, Inglot says. "It is virtually a live record. Once you get your sound, you're rolling with it, changing things a little here and there, mostly to make yourself feel better," he quips.

Ashton is quite pleased to have been a central part of The Stooges and *Fun House*, and is proud of the extensive archival reissue. "I've heard of a lot of young bands brandishing the *Fun House* CD in the studio, saying, 'We want to sound like The Stooges.' Gallucci had a very cool concept. He wanted to find another aural direction for The Stooges, to capture a total live feeling, one where the sounds would encompass themselves like onstage. And that's the beauty of that record, because it was as close to our live sound as could be captured in a studio."

Fun House should be seen in the context of the times and the tenor of the music business, Gallucci says. "Everything in music had gotten so fey. At around the same time as *Fun House*, I went to this big Columbia Records din-

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ner, and the main event was Simon & Garfunkel performing 'Bridge Over Troubled Water.' That's a beautiful song, but to The Stooges, taking rock and pop and making it so acceptable and refined was sacrilegious. Their whole thing was to go Zen, to cut the music right back to its essence."

Some copies of the limited edition *The Complete Fun House Sessions* may still be available from rhinohandmade.com.

•••

Essential reporting for this article was provided by Brian Zabauski, who tipped the author to The Stooges in 1970, when both men were NYU freshmen. ■

—FROM PAGE 179, DAVID LOWERY

sometimes I just don't want to know anything about what happens with recording; I just want to work on the songs," he explains. "Lately I'm on this trip of playing bass. I'm working with Kristin Asbury, who sings backup vocals on the last Cracker record, on some songs, and I'm doing it playing bass." He pauses for a second and then adds, "I don't think I have any methods, and I

enjoy not having any methodology, I guess."

Yet, one of the first things he tries to do is get a hand on a schedule. It's his way of avoiding those unproductive studio afternoons. "I'm serious, there is this dead time from about 4 o'clock to about 5 o'clock," he says. "I don't think there has ever been a note played on any record that stayed, that actually made the final mix on any record, that was recorded between 4 and 5 in the afternoon. That's when the phone rings, and everybody's too wired on coffee, and there's no drinking yet. So it's like that transition time between coffee and beer. Nothing good happens in that time period."

Work on the Counting Crows' latest, *This Desert Life*, was pushed much further into the evening. "I doubt anything remained on the record that wasn't recorded after 10 o'clock at night," he recalls. "Some of the best stuff was done at 2 in the morning."

The Counting Crows sessions, which took place in a house in the Los Angeles hills (as had their two previous studio albums), taught Lowery a lesson about mixing and matching takes. He points to the catchy, radio-friendly song "Mrs. Potter's Lullaby," which contains vocal and guitar takes from sessions months apart.

Lowery believes that it works because they didn't obsess on the minor tempo and performance differences. "I don't get into all the tiny little details. I hate it when the song is dependent on that," he says. "If you're worried about the bass being a little bit out here, and a little bit out there, that's not going to make the song great. Lots of people get lost in that, like you're worried about these little details, and the problem is that there's some bigger flaw in the song."

Looking back on his varied production credits, Lowery notes he's interested in fairly specific types of bands. "When I come to produce something it's got to be very eclectic," he says. "It's got to be something with a story, that's told well, and also played with some kind of conviction and some kind of emotion that I believe. So that leads me into a lot of different areas. I would have a hard time recording the coolest band in the world if I just thought that they were making a bullshit record. I think I would get fired, because I would probably be quite unhappy."

And whether it's a Platinum mainstay like the Counting Crows, a cult favorite like Sparklehorse, or even an unknown band like The Seymores, Lowery says the most frustrating thing for him is when an artist won't push the envelope. "The only thing that ever bugs me about producing a record, and it happens quite a bit even with the most underground bands, is that I find I want to take more chances than the artist does," he explains. "Somehow I end up where the artist is saying, 'I don't know—that's kind of a weird note.' And I'll explain, 'It's a passing note, it sounds beautiful and then it changes key in the next verse.' I'll have all kinds of explanations, but sometimes the artist thinks it's too weird. It doesn't matter who it is or whatever kind of music they're playing; that's the role I like to be in. If I'm not in that role, I feel like I'm not working on the right project."

"I just have to feel like there's a real strong artistic vision with the artist, and if there is, then it's fun to make a record," he says. "If there isn't, it's like assembling furniture or something." ■

—FROM PAGE 182, COOL SPINS

for more than 35 years. If you're not familiar with them, The Persuasions mix the religious passion of the Five Blind Boys From Alabama with the on-the-corer harmonies and patter of doo-wop. Their latest effort is all gospel, and delightfully old-school, including songs such as "That's My Desire," "Dry Bones" and the

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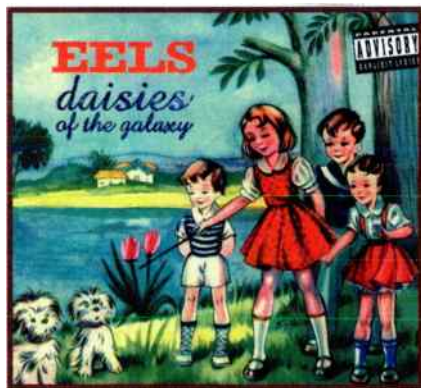
beautiful bass-led "Walk in Jerusalem." The Persuasions' voices have gained character but seem to have lost no range or fervor since they started out in the '60s, and this album is good enough to garner them another generation of believers. And though this album is one of their more traditional-sounding efforts, they are not ones to simply rest of their laurels—recently they put out a CD consisting entirely of Frank Zappa songs, and another of Grateful Dead tunes is currently in the works.

Producers: Jerry Lawson and Chris Rival. Engineer: Rival. Studio: My Generation Studio (Somerville, MA). Mastering: Jonathan Wyner/MWorks (Cambridge, MA).

—Barbara Schultz

Eels: *Daisies of the Galaxy* (DreamWorks)

Mark Everett, better known as A Man Called E, and frontman of a sort-of group called Eels, is developing into one of pop music's most interesting eccentrics. He writes and arranges the songs and plays most of the instruments on Eels records; in that way, he's sort of a folkier, stranger version of World Party's Karl Wallinger. He has strong pop instincts and a knack for writing catchy hooks, but there's also a weird streak in of E that prevents him from approaching any song in a "normal" way. This often brilliant, sonically adventurous CD is loaded with unusual arrangements and juxtapositions of instruments—a fuzzed bass and an organ might dominate one tune beneath E's insistent capo'd acoustic guitar; a sumptuous string group or a somber horn section shape



other songs. Think Van Dyke Parks, think Smile-era Brian Wilson, think Beck without the funky beats. Sunny but dark under the surface; a little disquieting, like the suburban robot birds at the end of David Lynch's *Blue Velvet*. It's considerably brighter than the death-obsessed '98 Eels release, *Electro-Shock Blues*, but there's an underlying sadness here, too, even though the veneer is often so pleasing. Most of the songs clock in between two and three minutes, yet there is an awful lot going on under the usually simple melodies and straightforward vocals. It's a disc that clearly will reveal much more with repeated listenings.

Producer: A Man Called E. Engineer: Wally

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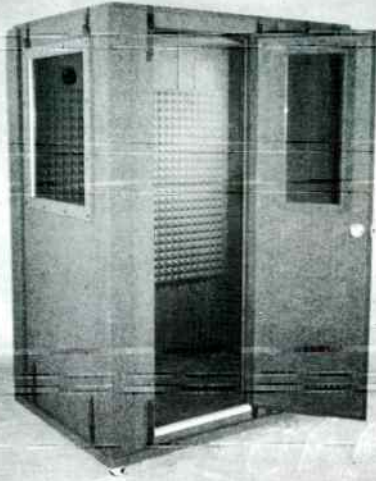
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Gagel. Additional engineering: Jim Lang, Michael Simpson, Robert Caranza, Mickey Petralia, Jeff Shannon. Studios: Chateau E, Knobworld, the Bomb Factory and O' Henry. Mastering: Bob Ludwig/Gateway Mastering. —Blair Jackson

TheThe: *Naked Self* (Nothing/Interscope)

The world only has enough patience for one David Bowie, which is unfortunate if you're Matt Johnson, the creative force behind The The. Johnson, like Bowie, has the same unmistakable penchant for deconstructing comfortable musical formats and for painting scathing pictures of a world on the brink of apocalypse. Sonically, *Naked Self*, while drawing from a diverse palette of sounds, references albums like NIN's *The Fragile* and PJ Harvey's *Is This Desire?* in equal parts. Layers of cut 'n' paste guitars, odd samples and synths churn about in a constantly changing, while at times sparse, sound

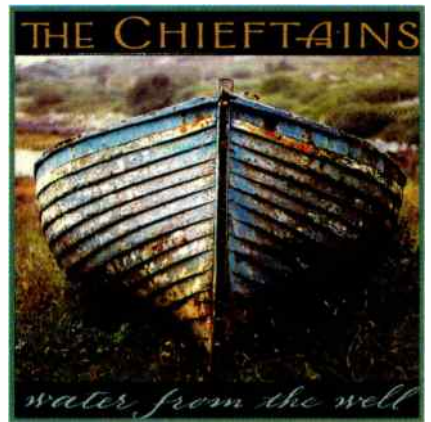


scape. The glue in this sonic collage is Johnson's presence as a vocalist, which always manages to cut through, even when heavily distorted or buried in the mix. *Naked Self*, in a more subdued way, hints at the same future that Trent Reznor has been nailing into our heads for a decade now. For those who cling to the notion that rock isn't dead, *Naked Self* demands a listen.

Producers: Matt Johnson and Bruce Lampcov. Engineers: Lampcov and David Lee. Studio: Harold Dessau's Recording Emporium. Mastering: MasterDisk. —Robert Hanson

The Chieftains: *Water From the Well* (BMG Classics)

What's left to say about The Chieftains? Lovers of Irish music already know that they are the most virtuosic, energetic, entertaining and beloved traditional group of the past almost-40 years. While many of their recent efforts have featured a gala array of pop and folk stars, *Water From the Well* is a return to form: the band's first all-traditional album in too long. It's a journey through the different melodies and styles of Ireland's many music centers. The only guest-stars are fellow trad musicians. It's as if The Chieftains spent the past several years making a case for Irish music's validity in a pop- and rock-dominated



music industry, and this album serves as a closing argument. As might be expected, the real thing is much more beguiling than any crossover.

Producer: Paddy Maloney. Engineers: Jeffrey Lesser and Michael Secher. Digital editing: Adam Rosen. Studio: Soundtrack (Boston). Mastering: Greg Calbi/Sterling Studios (NYC). —Barbara Schultz

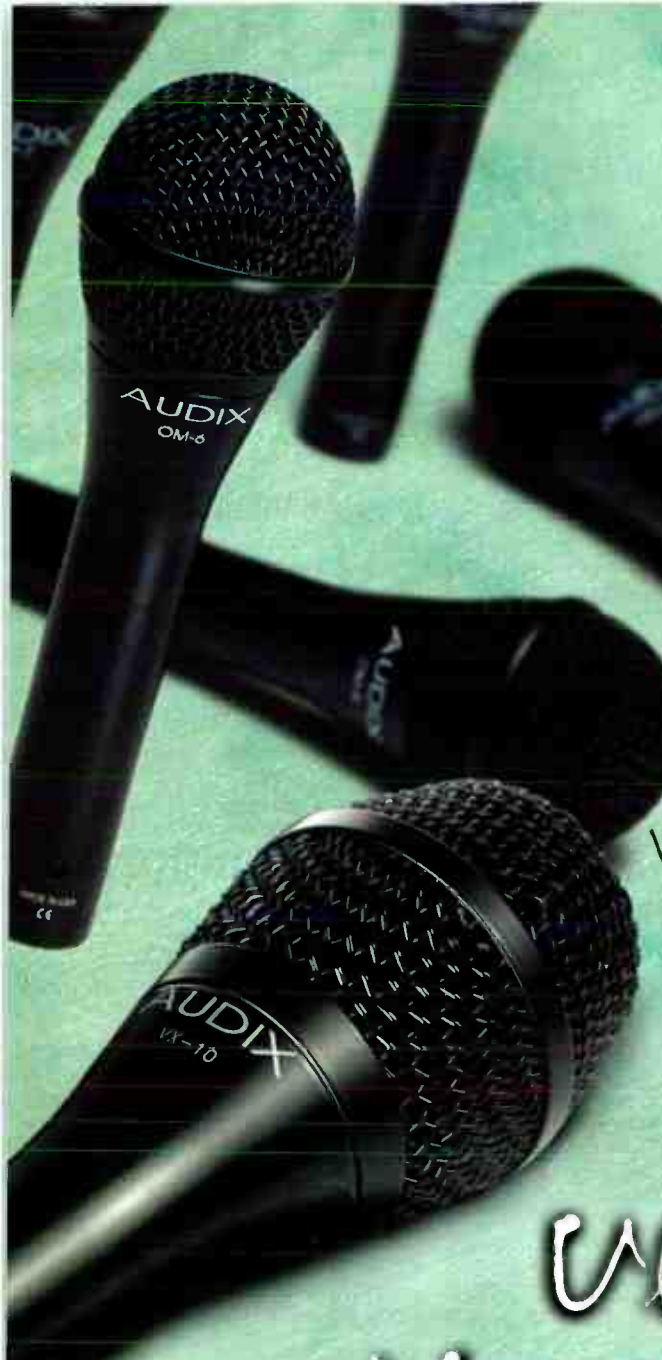
James Hardway: *A Positive Sweat* (Streetbeat)

It's tough to know what exactly to make of James Hardway, the alter ego of London-born (and current citizen of the world, it seems) programmer/multi-instrumentalist and drum-'n'-bass specialist David Harrow. The groove is the thing, for sure, and the 14 excursions on this disc are all cool explorations of various beats and rhythms—bopping, fizzing and sizzling above some jazzy horn and sax breaks, bold acoustic bass lines and assorted electronic percussion and other textures. There's something vaguely disturbing and decadent going on here—or perhaps my



listening has been influenced by the album artwork, which has a sort of Weimar-transplanted-to-the-seedy-side-of-Vegas look to it. Anyway, there's some strange and fascinating music on here, and on a handful of tunes, a hypnotic singer/lyricist who certainly deserves a mention—Amanda Ghost.

Production engineering, mastering: James Hardway (David Harrow). Studio: Harrow's home studio and in various halls along their European tour, on his laptop. —Blair Jackson



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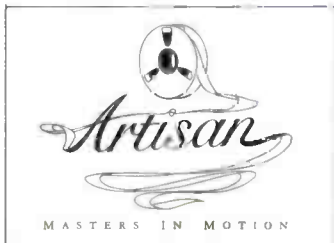
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For over 20 years, Artisan Recorders has been providing excellence in remote recording and broadcast. Along with an extensive array of equipment in a comfortable aesthetic environment, our "Mobile Red" studio boasts an expert staff of technicians with a love of music and a desire for perfection. Currently touring with ABC's *Tom Joyner Morning Show*. When you rock, we roll.



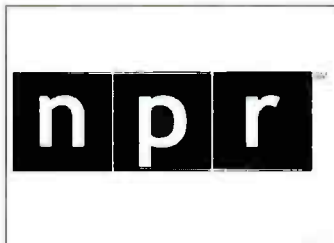
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Record in South Beach, Miami. Strictly specializing in Pro Tools. Described in *EQ* mag as, "The best Pro Tools studio in the world." We transfer from 24-track 2", ADAT or Tascam DA-88/98 using the highest-quality Apogee AD8000 converters for the very best sound.

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Located in downtown Washington, D.C., Studio 4A offers a spectacular recording environment well-suited to all music genres. Studio 4A, at 2,600 sq. feet, is one of the largest recording facilities on the East Coast. We offer digital and analog multi-track recording, an extensive mic collection, digital editing suites and CD mastering. NPR also offers satellite uplinking, fiber-optic and ISDN capabilities worldwide.



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HARD DISK RECORDING



DIGI001 Digital Audio Workstation For Mac And PC

A completely integrated digital recording, mixing and editing environment for the Mac and PC, the DIGI-001 offers a 24-bit multi I/O breakout interface along with Pro Tools LE software—based on Digidesign's world renowned Pro Tools software. The DIGI-001 interface features 18 simultaneous I/Os made up of 8 analog inputs and outputs—two of the inputs are full featured mic preamps with phantom power, and digital I/O including standard S/PDIF as well as in ADAT optical interface that can also be used as a S/PDIF I/O. Pro Tools LE supports 24 tracks of 16 or 24-bit audio and 128 MIDI tracks and also features RealTime AudioSuite (RTAS) effects plug-ins. For ease of use, MIDI and audio are editable within the same environment and all mixing parameters including effects processing can be fully automated.



- FEATURES—**
- 18 simultaneous, 24-bit ins and outs with support for 44.1 and 48 kHz sample rates
 - 20Hz - 22kHz freq. response \pm 0.5 dB
 - 2 channel XLR mic/1/4" line inputs with -26 dB pad, 48V phantom power, gain knob, and HP Filter at 60Hz
 - 6 ch. line inputs (1/4") TRS balanced/unbalanced w/ software controlled gain
 - +4dB balanced 1/4-inch Main outputs
 - Balanced 1/4" monitor outs with front panel gain knob
 - 1/4-inch unbalanced line outputs channels 3-8
 - Headphone output with independent gain control knob
 - 2 channel S/PDIF coaxial digital I/O
 - 8 channel ADAT optical I/O can also be used as 2 channel optical S/PDIF

processing—Real-Time AudioSuite (RTAS) is a host-based architecture that allows an effect to change and be dynamically automated in realtime as the audio plays back. —AudioSuite is a file-based format, that renders a new file with the processed sound.

- Bundled RTAS plug-ins include: 1 and 4 band EQ; Dynamics II—compressor, limiter, gate and expander/gate; Mod Delay—short, slap, medium, and long delays with modulation capabilities for chorus or flange effects and dither. AudioSuite plug-ins include Time Compression/Expansion, Pitch Shift, Normalize, Reverse.

MIDI Functions

- MIDI functions include graphic controller editing, piano roll display, up to 128 MIDI tracks and editing options like quantization, transpose, split notes, change velocity and change duration.
- MIDI data can be edited on the fly

Pro Tools LE

Supports 24 tracks of 16 or 24-bit audio and 128 sequenced MIDI tracks

Sample-accurate simultaneous editing of audio & MIDI

Real-time digital mixing capabilities include recall of all mixing parameters, support for edit and mix groups and complete automation of all volume, panning, mutes and plug-ins.

Route and mix outboard gear in realtime

MP3 and RealAudio G2 file support (Mac)

Two plug-in platforms offer multiple options for effects



MOTU AUDIO Hard Disk Recording Systems

The MOTU Audio System is a PCI based hard recording solution for the Mac and PC platforms. At the heart of the system is the PCI-324 PCI card that can connect up to three audio interfaces and allows up to 72 channels of simultaneous I/O. Audio interfaces are available with a wide range of I/O configurations including multiple analog I/O with the latest 24-bit A/D/A converters and/or multi channel digital I/O such as ADAT optical and TDIF I/O as well as standard S/PDIF and AES/EBU I/O. Each interface can be purchased separately or with a PCI-324 card allowing you to build a system to suit your needs. Includes drivers for all of today's hottest audio software and AudioDesk, multitrack recording and editing software for the Mac.

THEY ALL FEATURE—

- Mac OS and Windows compatible
- Includes software drivers for compatibility with all of today's popular audio software plus AudioDesk, MOTU's sample-accurate audio workstation software for Mac OS
- Host computer determines the number of tracks that the software can record and play simultaneously, as well as the amount of real-time effects processing it can support
- Front panels display metering for all inputs and outputs
- AudioDesk Audio Workstation Software for Mac OS features 24-bit recording, multi-channel waveform editing, automated virtual mixing, graphic editing of ramp automation, real-time effects plug-ins with 32-bit floating point processing, crossfades, support for third-party audio plug-ins (in the MOTU Audio System and Adobe Premiere formats), background processing of file-based operations, sample-accurate editing and placement of audio, and more

2408 mkII FEATURES—

- 7 banks of 8 channel I/O: 1 bank of analog, 3 banks of ADAT optical, 3 banks of Tascam TDIF, plus stereo S/PDIF
- Custom VLSI chip for amazing I/O capabilities
- Format conversion between ADAT and DA-88
- 8x 24-bit 1/4" balanced analog I/Os
- 24-bit internal data bus for full 24-bit recording via digital inputs
- Standard S/PDIF I/O for digital plus an additional S/PDIF I/O for the main mix
- Sample-accurate synchronization with ADATs and DA88s via an ADAT SYNC IN and RS422

1224 FEATURES—

- 24-bit analog audio interface
- State-of-the-art 24-bit A/D/A
- Simultaneous record and play back 8 channels of balanced (TRS), +4 dB audio
- 24-bit balanced +4
- XLR main outputs
- Stereo AES/EBU digital I/O
- Word clock in/out
- Dynamic range of 116 dB (A-weighted)
- Front panel displays six-segment metering for all inputs and outputs
- Headphone jack with volume knob

308 Features—

- 8 channels of coaxial S/PDIF using 4 RCA input and 4 RCA output connectors
- 8 channels of optical S/PDIF using 4 tosink input and 4 tosink output connectors
- 8 channels of AES/EBU using 4 XLR male and 4 XLR female connectors
- Word Clock I/O allows the 308 to synchronize with digital audio environments

24i Features—

- 24 high quality, 24-bit analog inputs
- Balanced 1/4" analog outputs
- Optical and coaxial S/PDIF outputs
- Front panel headphone output with level control
- Word Clock I/O
- Connect up to three 24i rack I/Os to a PCI-324 audio card for a total of 72 inputs and six outs

CD RECORDING/MASTERING



MasterLink ML-9600 High-Resolution Master Disk Recorder

The Alesis MasterLink ML-9600 is a 2-rack 24-bit recorder that combines hard disk recording, CD burning, digital signal processing, and mastering functions to create compact discs in the standard "Red Book" 16-bit/44.1kHz format, or high resolution CDs that utilize Alesis' revolutionary CD24 AIFF-compatible technology. MasterLink is capable of recording and playing up to 24-bit/96kHz resolution CDs using the expensive, readily available CD-R media. The amazing sonic quality, powerful built-in tools and CD24 technology offers a uniquely versatile and affordable solution for everyone from large commercial audio facilities to project studios and recording musicians.



- FEATURES—**
- 24-bit 128x oversampling analog to digital and digital to analog converters
 - Supports 44.1, 48, 88.2, 96 kHz sample rates and word lengths of 16-, 20- and 24-bit
 - 20Hz-20kHz frequency response at 14.1/48 kHz sample rates
 - 20Hz-40kHz, frequency response at 38.2/96 kHz sample rates
 - 113dB signal-to-noise ratio (A-weighted)
 - Matsumita ATAPI CD-ROM drive allows up to 4x CD burning using standard CD-R discs
 - Built-in sample rate conversion and noise shaping to change sample rates and bit resolution as needed
 - Reads and Writes 16-bit 44.1kHz Red Book Audio CDs

- Alesis' exclusive CD24 is a high-resolution mastering format that reads/writes files up to 24-bit 96kHz in the ISO 9660 disc format. AIFF compatible file format that can be read by MacOS, Windows and Unix computer platforms.
- Built-in 3.2GB IDE hard drive
- Hard disk max recording times 95 min. @ 24-bit/96kHz, 310 min. @ 16-bit/44.1kHz
- Create and store up to 16 playlists containing as many as 99 tracks

Analog Inputs and Outputs

- Balanced XLR connectors (+4dBu input and +19dBu max. output)
- Unbalanced phono (RCA) connectors (-10dBV input and +5dBV max. output)
- 1/4-inch TRS headphone output

- with level control
- Digital Inputs and Outputs
- AES/EBU balanced XLR inputs and outputs
- S/PDIF unbalanced phono (RCA) inputs and outputs

Editing

- Gain control
- Cropping allows adjusting start and end points.
- Join and Split features allow combining and separating song sections.

DSP Finishing Tools

- Equalization, Compression, Normalizing and Peak Limiting

Includes

- Infra red remote control and rackmount brackets

marantz CDR 640 CD Recorder

Marantz' flagship CD recorder benefits from 10 years of CD-R experience. Designed without compromise aided with the help of professional end-users ensuring maximum flexibility and stability in the most rigorous studio environments.

Features—

- Balanced XLR Analog in/out
- Analog RCA/Phono in/out
- AES/EBU & S/PDIF in/out
- Records on CDR and CD-RW audio and data disks
- High resolution 20 bit Sigma/Delta AD conversion
- Full SCMS Copy bit manipulation
- 0.5 dB accurate level metering
- Variable Audio Delay (0-4sec): Offset your audio to compensate for late track ID's
- Preset function stores personal settings
- Optional RC640 Wired remote control



MICROBOARDS

StartREC Digital Audio Editing/ CD Duplication System

The Microboards StartREC is the first digital audio editing system combined with a multirack CD recordable duplication system for professionals. Audio is recorded to the internal 6.2 GB IDE hard drive using analog or digital inputs. Sample rate conversion is automatic. Tracks can be edited and sequenced using the StartREC's user friendly interface and up to 4 CDs can be recorded simultaneously. StartREC is the ideal solution for studio recording, mastering, post production or any pro audio environment requiring digital audio editing and short run CD-R duplication.

Features—

- 2X, 4X, or 8X recording speeds
- 6.2GB IDE hard drive
- Editing functions include move, divide, combine or delete audio tracks, add or drop any index or sub index, and create track fade in or fade out
- Coaxial S/PDIF or AES/EBU digital input plus optical S/PDIF I/O
- XLR balanced and RCA Line inputs and outputs



- Automatic sample rate conversion from 32 and 48kHz
- Automatic CD Format Detection feature and user friendly interface provide one touch button operation
- Front panel trim pot and LCD display provide accurate input signal and time lapse metering
- SCMS (Serial Copy Management System) is supported, regardless of the source disc copy protection status
- StartREC Models Include: ST2000 (2) 8x writers, ST3000 (3) 8x writers and ST4000 (4) 8x writers

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DIGITAL MULTI-TRACK RECORDERS

TASCAM

MX-2424 24-Bit 24-Track Hard Disk Recorder



Co-designed by TASCAM and TimeLine Inc., the MX-2424 is an affordable 24-bit, 24-track hard disk recorder that also has the editing power of a digital audio workstation. A 9GB internal hard drive comes standard as well as a SCSI Wide port that supports external LVD (Low Voltage Drive) hard drives from up to 40 feet away. An optional analog and several digital I/O cards are available so the MX-2424 can be configured to suit your work environment. SMPTE synchronization, Word Clock, MIDI Time Code and MIDI Machine Control are all built in for seamless integration into any studio.

- Records 24 tracks of 24-bit audio at 44.1 or 48 kHz, or 12 tracks at 88.2 or 96 kHz. Up to 24 tracks can be recorded simultaneously using any combination of digital and analog I/O.
- Supplied 9GB internal drive allows 45 minutes of audio across all 24 tracks.
- Wide SCSI port on the back panel allows you to add multiple drives. A front 5-1/2" bay available for installing an additional drive, or an approved DVD-RAM drive for back-up.
- ViewNet MX, a Java-based software suite for Mac and PC offers DAW style editing of audio regions, dedicated system set-up screens that make set-up quicker and easier and track load screens that make virtual track management a snap. Connects to a computer via a standard Ethernet line.
- Can record to Mac (SDII) or PC (WAV) formatted drives, allowing later export to the computer. The Open TL format allows compatible software to recognize virtual tracks without have to load, reposition and trim each digital file.

Transport Controls-

- Jog/scrub wheel
- MIDI In, Out, and Thru ports are built-in for MIDI Machine Control.

Editing-

- Built-in editing capabilities include cut, copy, paste, split and ripple or overwrite
- 100 levels of undo
- Supports destructive loop recording and non-destructive loop recording which continuously records new takes without erasing the previous version.

Build-in Synchronization-

- TBUS protocol can sample accurately lock 32 machines together for 384 tracks at 96kHz, or 768 tracks at 48kHz.
- Can generate or chase SMPTE timecode or MIDI Time Code.
- Word Clock In, Out, and Thru ports

I/O Options-

- Optional analog and digital cards all provide 24 channels of I/O. There is one slot for analog and one for digital.
- IF-TD24- T/DIF module
- IF-AD24- ADAT Lightpipe module
- IF-AE24- AES/EBU module
- IF-AN24- A-D, D-A I/O module with DB-25 connectors

Software Updates-

- System updates are made available through a front panel Smart Card slot or via computer directly from the TASCAM web site.

DA-78HR Modular Digital Multitrack

The DA-78HR is the first true 24 bit tape-based 8-track modular digital multitrack recorder. Based on the DTRS (Digital Tape Recording System) it provides up to 108 minutes of pristine 24-bit or 16-bit digital audio on a single 120 Hi-8 video tape. Designed for project and commercial recording studios as well as video post and field production, the DA-78HR offers a host of standard features including built-in SMPTE Time Code Reader/Generator, MIDI Time Code synchronization and a digital mixer with pan and level controls. A coaxial S/PDIF digital I/O allows pre-mixed digital bouncing within a single unit, or externally to another recorder or even a DAT or CD recorder. Up to 16 DTRS machines can be synchronized together for simultaneous, sample accurate control of 128 tracks of digital audio.



Features-

- Selectable 16 bit or 24 bit High Resolution audio
- 24 bit A/D and D/A converters
- >104dB Dynamic range
- 20Hz - 20kHz frequency response \pm 5dB
- 1 hr. 48 min. recording time on a single 120 tape
- On-Board SMPTE synchronizer - chase or generate timecode
- On-Board support for MIDI Machine Control
- Internal digital mixer with level and pan for internal bouncing, or for quick mixes
- Track slip from -200 to +7200 samples
- Expandable up to 128 tracks (16 machines)
- Word Sync In/Out/Thru
- Analog output on DB25 balanced or RCA unbalanced
- Digital output on TDIF or 2 channels of S/PDIF

A TO D CONVERTERS

APOGEE Rosetta 24-bit A to D Converter

The high-end quality analog to digital solution for the pro/semi studio. With support for both professional and consumer digital formats you can now record your audio at a higher resolution and with greater detail than standard converters found on MDM's, DAT's and DAW's. Ideal for mastering or tracking.



FEATURES-

- 24-bit, 44.1-48, 88.2-96 kHz Sample Rate (\pm 10%)
 - 116dB dynamic range (unweighted)
 - Improved UV22HR for 16 and 20-bit A/D conversion
- FRONT PANEL:**
- Power switch • Sample Rate (44.1, 48, 88.2, 96kHz) selector • 16-bit (UV22), 20-bit (UV22) and

- 24-bit resolution selector • S/PDIF-ADAT optical selector • Soft Limit on or off • 12-segment metering w/ over indicator & Meter Clear switch • Level trim
- REAR PANEL:**
- XLR balanced inputs • 2 x AES/EBU for 88.2/96kHz 2 channel path, Coaxial S/PDIF, switchable S/PDIF or ADAT optical outputs • Wordclock out

LUCID AD 9624 24-bit A to D Converter

Transparent analog to digital conversion designed to bring your music to the next level. XLR balanced inputs feed true 24-bit converters for revealing all the detail of the analog source. 16-bit masters can take advantage of the AD9624's noise shaping function which enhances clarity of low level signals.

FEATURES-

- 24-bit precision A/D conversion • Support for 32, 44.1, 48, 88.2 & 96kHz sample rates • Wordclock sync input • Selectable 16-bit noise shaping •



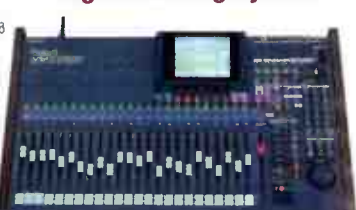
Simultaneous AES/EBU, coaxial and optical S/PDIF outputs • 20-segment LED meters w/ peak hold & clip indicators • **ALSO AVAILABLE:** DA9624 24-bit D/A converter

DIGITAL MIXERS

Roland

VM Basic 72 Digital Mixing System

The all digital Roland V-Mixing System, when fully expanded, is capable of mixing up to 94 channels with 18 stereo (32 mono) onboard multi-effects including COSM Speaker Modeling. Utilizing a separate-component design, comprised of the VM-7200 console and VM-7200 rackmount processor, allows the V-Mixing System to be configured to suit your needs. Navigation is made easy via a friendly user interface, FlexBus and EZ routing capabilities as well as a large informative LCD and ultra-fast short cut keys.



- 94 channels of digital automated mixing (fully expanded)
- Up to 48 channels of ADAT/Tascam T-DIF digital audio I/O with optional expansion boards and interfaces
- Separate console/processor design
- Quiet motorized faders, transport controls, total recall of all parameters including input gain, onboard mixer dynamic automation and scene memory
- 24 fader groups, dual-channel delays, 4-band parametric channel EQ + channel HPF
- FlexBus and "virtual patchbay" for unparalleled routing flexibility
- VS8F-2 Effects Expansion Board -- Provides 2 stereo effects processors including COSM Speaker Modeling. Up to 3 additional boards can be user-installed into the VM-7200 processor, for 8 stereo or 16 mono effects per processor
- VM-24E I/O Expansion Board -- Offers 3 R-Bus I/Os on a single board. Each R-Bus I/O provides 8-in/8-out 24-bit digital I/O, totalling 24 I/O per expansion board.

- Up to 16 stereo (or 32 mono) multi-effects processors using optional VS8F-2 Effects Expansion Boards (2 stereo effects processors standard)
- COSM Speaker Modeling and Mic Simulation technology
- 5.1 Surround mixing capabilities
- EZ Routing allows mixer settings to be saved as templates
- Realtime Spectrum Analyzer checks room acoustics in conjunction with noise generator and oscillator
- Digital cables between processor and mixer can be up to 100 meters long - ideal for live sound reinforcement
- OIF-AT Interface Box for ADAT/Tascam -- Converts signals between R-Bus (VM-24E expansion board required) and ADAT/Tascam T-DIF. Handles 8-in/8-out digital audio. 1/3 rackmount size.
- VM-24C Cascade Kit -- Connects two VM-Series processor units. Using two VM-7200 processors cascaded and fully expanded with R-Bus I/O, 94 channels of audio processing are available.

EFFECTS & PROCESSING

Lexicon

MPX-500 24-Bit Dual Channel Effects Processor



The MPX 500 is a true stereo 24-bit dual-channel processor and like the MPX100 is powered by Lexicon's proprietary Lexchip and offers dual-channel processing. However, the MPX 500 offers even greater control over effects parameters, has digital inputs and outputs as well as a large graphics display.

- 240 presets with classic, true stereo reverb programs as well as Tremolo, Rotary, Chorus, Flange, Pitch, Detune, 5.5 second Delay and Echo
- 4 dedicated front panel knobs allow adjustment of effect parameters. Easy Learn mode allows MIDI patching of front panel controls.
- Tempo-controlled delays lock to Tap or MIDI clock

t.c. electronic

M-One Dual Effects Processor



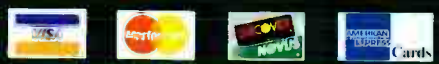
- The M-One allows two reverbs or other effects to be run simultaneously, without compromising sound quality. The intuitive yet sophisticated interface gives you instant control of all vital parameters and allows you to create awesome effects programs quickly and easily.
- 20 incredible TC effects including, Reverb, Chorus, Tremolo, Pitch, Delay and Dynamics
- Analog-style user interface
- 100 Factory/100 User presets
- Dual-Engine design
- 24 bit A/D-D/A converters
- S/PDIF digital I/O, 44.1-48kHz
- Balanced 1/4" Jacks - Dual I/O
- 24 bit internal processing

D-Two Multitap Rhythm Delay



- Based on the Classic TC2290 Delay, the D-Two is the first unit that allows rhythm patterns to be tapped in directly or quantized to a specific time and subdivision.
- Multitap Rhythm Delay
- Absolute Repeat Control
- Up to 10 seconds of Delay
- 50 Factory/100 User presets
- 24 bit A/D-D/A converters
- S/PDIF digital I/O, 44.1-48kHz
- Balanced 1/4" Jacks - Dual I/O
- 24 bit internal processing

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MICROPHONES



C414 TLII "Vintage TL"

Combines the best of old and new: legendary C12 acoustics and the latest generation of C414 transformerless FET electronics. Although similar in design and shape to the C414BULS, the TLII features a capsule that is a faithful sonic recreation of the one used in the classic 212 tube mic combined with computer-aided manufacturing techniques that assure greater uniformity in response from microphone to microphone.



FEATURES-
 Cardioid hypercardioid omnidirectional and figure 8 polar patterns
 Warm, smooth microphone that is suitable for high-quality digital recording.

Frequency response 10Hz to 20kHz

C4000B ELECTRET CONDENSER

This new mic from AKG is a multi polar pattern condenser microphone using a unique electret dual large diaphragm transducer. It is based on the AKG Gold Tube design, except that the tube has been replaced by a transistorized impedance converter/preamp. The transformerless output stage offers the C4000B exceptional low frequency response.



FEATURES-
 Electret Dual Large Diaphragm Transducer (1st of its kind) • Cardioid, hypercardioid & bidirectional polar patterns • High Sensitivity
 Extremely low self-noise • Bass cut filter & pad switches • Requires 12, 24 or 48 V phantom power
 Includes H-100 shockmount and wind/pop screen
 Frequency response 20Hz to 20kHz

RØDE NT-2 Condenser Mic

The RØDE NT2 is a large diaphragm true condenser studio mic that features both cardioid and omnidirectional polar patterns. The NT-2 offers superb sonic detail with a vintage flavor for vocal and instrument miking. Like all RØDE mics the NT-2 is hand-assembled in Australia and is available at a breakthrough price.



FEATURES-

- Dual pressure gradient transducer
- T capsule with gold-sputtered membranes
- Low noise, transformerless circuitry
- Omni and cardioid polar patterns
- 135dB Max SPL
- High pass filter switch and -10dB pad switch
- Gold plated output connector and internal head pins
- Shockmount, Flight Case, and Pop Filter included
- 20Hz-20kHz frequency response

audio-technica AT4047 Cardioid Condenser

The AT4047 is the latest 40 Series large diaphragm condenser mic from Audio Technica. It has the low self noise, wide dynamic range and high sound pressure level capacity demanded by recording studios and sound reinforcement professionals.



FEATURES-

- Side address cardioid condenser microphone for professional recording and critical applications in broadcast and live sound
- Low self noise, wide dynamic range and high SPL
- Switchable 80Hz Hi Pass Filter and 10dB pad
- Includes AT8449/SV shockmount

MICROPHONE PREAMPS

AVALON DESIGN



VT-737SP Mono Class A, Vacuum Tube-Discrete Preamp-Opto-Compressor-Equalizer



The VT-737SP is a vacuum tube, Class A processor that combines a mic preamp, instrument DI, compressor and variable 4-band equalizer in a 2U rack space. Like all Avalon Design products the VT-737SP utilizes a minimum signal path design with 100% discrete, high-bias pure Class A audio amplifiers and the best active and passive components available. Used by renowned artists and studios world wide and the winner of the Electronic Musician 1999 Editors' Choice Award for Product Of The Year.

FEATURES-

- Combination of TUBE preamplifiers, opto-compressor, sweep equalizer, output level and VU metering in a 2U space
- Four dual triode vacuum tubes, high voltage discrete Class A with a 10 Hz to 120kHz frequency response ± 0.5 dB
- The Preamp has three input selections- The first is a high performance XLR balanced mic input transformer with +48V phantom power, the second is a high impedance instrument DI with a 1"4 jack located on the front panel and the third is a discrete high-level Class A balanced line input.
- High gain switch boosts overall preamp gain and a massive- variable high pass filter, hardware relay bypass and phase reverse relay is available for all three inputs
- The Opto-Compressor uses a minimum signal path design and features twin Class A vacuum tube triodes or gain matching. A passive optical attenuator serves as a simple level controller. Variable threshold, compression ratio and attack and release offer dynamics control from soft compression to hard-nee limiting.
- The dual sweep mid-EQ can be side chained to the compressor allowing a broad range of spectral

control including de-essing. The EQ can be assigned pre and post compressor from the front panel to add even greater sonic possibilities.

- Two VT-737 SPs can be linked together via a rear panel link cable for stereo tracking
- The Equalizer utilizes 100% discrete, Class A-high-voltage transistors for optimum sonic performance.
- The low frequency passive shelving EQ is selectable between 15, 30 60 and 150Hz with a boost and cut of ± 24 dB
- The high frequency passive shelving EQ is selectable between 10, 15, 20 and 32 kHz with a boost and cut of ± 20 dB
- The low-mid frequency is variable between 35 to 450 Hz while the high-mid frequency is variable from 220Hz to 2.8 kHz. Both mid-band frequencies offer a boost and cut of ± 16 dB and a hi-Q/lo-Q switch.
- When the EQ to side chain is used, the low and high EQ is still available for tonal adjustment
- The Output level is continuously variable and utilizes an another dual triode vacuum tube driving a 100% Class A, high-current balanced and DC coupled low noise output amplifier.
- Sealed silver relay bypass switches are used for the most direct signal path

POWERED STUDIO MONITORS



VERGENCE A-20 Studio Reference Monitor System



Incorporating a pair of 2-way, acoustic suspension monitors and external, system-specific 250 watt per side control amplifier, the A-20 provides a precise, neutral studio reference monitoring system for project, commercial and post production studios. The A-20's control amplifier adapts to any production environment by offering control over monitoring depth (from near to far field), wall proximity and even input sensitivity while the speakers magnetic shielding allows seamless integration into today's computer based studios.

- Type Modular, self-powered near/mid/far-field monitor.
- 48Hz - 20kHz frequency response @ 1M
- Peak Acoustic Output 117dB SPL (100ms pink noise at 1M)
- XLR outputs from power amp to speakers
- Matched impedance output cables included.

- 6dB LF Cutoff 40Hz
- 5 position wall proximity control
- 5 position listening proximity control between near, mid and far-field monitoring
- Power, Overload; SPL Output, Line VAC and Output device temperature display.

Amplifier

- Amplifier Power 250W (continuous rms/ch), 400W (100ms peak).
- XLR, TRS input connectors
- Headphone output
- 5-position input sensitivity switch with settings

Speakers

- 2-way acoustic suspension with a 6.5-inch treated paper woofer and a 1-inch aluminum dome tweeter
- Fully magnetically shielded with an 18-inch recommended working distance



PS-5 Bi-Amplified Project Studio Monitors

The PS-5s are small format, full-range, non-fatiguing project studio monitors that give you the same precise, accurate sound as the highly acclaimed 20/20 series studio monitors. The use of custom driver components, complimentary crossover and bi-amplified power design provides a wide dynamic range with excellent transient response and low intermodulation distortion.



FEATURES-

- 5-1/4-inch magnetically shielded mineral-filled polypropylene cone with 1-inch diameter high-temperature voice coil and damped rubber surround LF Driver
- Magnetically shielded 25mm diameter ferrofluid-cooled natural silk dome neodymium HF Driver
- 70 watt continuous LF and 30 watt continuous HF amplification per side
- XLR-balanced and 1/4-inch (balanced or unbalanced) inputs

- 52Hz-19kHz frequency response ± 3 dB
- 2.6kHz, active second order crossover
- Built-in RF interference, output current limiting, over temperature, turn-on transient, subsonic filter, internal fuse protection
- Combination Power On/Clip LED indicator
- 5/8" vinyl-laminated MDF cabinet

Hafler

TRM-6 Bi-Amplified Studio Monitors

Offering honest, consistent sound from top to bottom, the TRM-6 bi-amplified studio monitors are the ideal reference monitors for any recording environment whether tracking, mixing and mastering. Supported by Hafler's legendary amplifier technology providing a more accurate sound field, in width, height and also depth.

FEATURES-

- 33 Watt HF & 50 Watt LF amplification
- 1-inch soft dome tweeter and 6.5-inch polypropylene woofer
- 55Hz - 21kHz Response
- Magnetically Shielded
- Electronically and Acoustically Matched

Also Available- TRM-8

- 1-inch soft dome tweeter and 8-inch polypropylene woofer
- 45Hz - 21kHz frequency response ± 2 dB
- 75 Watt HF, 150 Watt LF amplification



TRM-10s And TRM-12s Active Subwoofers

Combining Hafler's legendary amplifier technology with a proprietary woofer design, the TRM10s and TRM12s active subwoofers provide superb bass definition required in today's studio and surround sound environments.

TRM-10s

- 10-inch cellulose fibre cone down firing woofer
- 200 watt low frequency amplifier
- 30Hz to 110Hz frequency response ± 2 dB
- 24dB/octave Linkwitz-Riley crossover variable (40Hz to 110Hz)

TRM-12s

- 12-inch cellulose fibre cone down firing woofer.
- 200 watt low frequency amplifier
- 25Hz to 110Hz frequency response ± 2 dB
- 24dB/octave Linkwitz-Riley crossover variable (40Hz to 110Hz)



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THE FAST LANE

—FROM PAGE 20, *EQU*

that after you have spent all Sunday morning tweaking your record and play head EQ curves so they are as flat as the hills of West Virginia (for those of you who have never been there...not so flat), they are really only trimmed for one signal level. As you push the heads (and, of course, the tape) harder, they both get "soft" and begin to "droop" at the top and get a bit strange at the bottom, as well. You know this. But do you think of it as the nonlinear EQ that it truly is?

We now come to the end of the fun. To go along with our newly understood concept of different EQ curves applying to different signal levels, I offer the fol-

And, say, boys and girls, do you remember exactly why 15 ips stayed so popular even after the much quieter 30 came along? Why, it was that warmer, fuller bottom end. Remember?

Did you ever think about vinyl and its RIAA curve? How it gives the surface noise that characteristic, almost pleasant sound?

And, after that, every listening space—every space, every room and every car interior—applies its own EQ signature to all heard within. But enough about the secret life of hidden EQ.

NOT TO FREQ YOU OUT, BUT...

Let's have a look at the EQ you *do* apply on purpose, the EQ that you use to boost and cut. We are using that EQ

Next Month

COMING IN MIX
JULY 2000

LOW-COST DIGITAL

Summer NAMM Issue

FEATURES

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Digital Recording Cards

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Shopping to Equip the
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at Three Different Price
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Giving Voice to Disney's
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**Amazingly, all this error, all this
nonsignal garbage, does turn out to be very nice
when softened by playback EQ.
Lucky for us. It is a large part of that wonderful
analog tape sound, that nonlinear, squishy, warm,
friendly, organic, cohesive and, yes, even
musical sound that so eludes some digital users.**

lowing: Of course, the amounts of both intermodulation and harmonic distortion change dramatically as the signal levels (and content) change. Very nice. Here's why: These distortion components, along with basic system and tape noise are themselves equalized by all the same factors—the heads and the electronic compensation (Band-Aid) EQs.

Amazingly, all this error, all this nonsignal garbage, does turn out to be nice when softened by playback EQ. Lucky for us. It is a large part of that wonderful analog tape sound, that nonlinear, squishy, warm, friendly, organic, cohesive and, yes, even *musical* sound that so eludes some digital users.

YOU JUST CAN'T WIN FOR TRYIN'

From the microphone to the speakers, system EQs that we, ourselves, hardly thought of and definitely didn't set up for the session are contributing profoundly to "our sound."

And transient response, one of those magic terms used to explain why one console sounds so much better than another, is really a form of dynamic, level-dependent, variable-distortion EQ.

today as a true special effect without ever having faced it. No one even comes close to admitting it.

We talk about the sound of various EQs—how certain mild-slope analog boxes sound smoother or sweeter than others, how some consoles' EQ "cuts" through the mix better than others, and even how some companies make EQs that are more "musical." And although there are obvious considerations such as curve shapes and frequency choices, and even the less blatant distortion and noise factors, it's really all about one thing: phase shift.

The truth is that 99.9% of all EQ that takes place in our world today has severe phase shift. Hell, that's how EQ is actually *done*—by phase-shifting audio and mixing it back with itself, causing frequency-selective cancellation or reinforcement. Pretty crude, pretty nasty, but *until now*, it was virtually all we had.

Next month: how to break the laws of physics for fun and profit. ■

SSC hears most EQ the way people with perfect pitch hear sour notes: with great pain. If you do, too, read next month...

COAST TO

PHOTO: MAUREEN DRONEY

The Ventures recorded their latest disc at Front Page Recorders. L to R: Bob Bogle, Leon Taylor, Gerry McGee and Don Wilson.



L.A. GRAPEVINE

by Maureen Droney

Musicians worried about how to make a living in today's uncertain music business climate should sign up for lessons from the remarkable Ventures, whom I found recording their latest CD at Front Page Recorders in Glendale.

Now in their fourth decade, the group has built a solid career by maximizing every opportunity with what's been called "Ventures' Capitalism." Acknowledged to be the best-selling pop/rock instrumental group in the world, they have released more than 150 albums globally, and have sold more than 85 million albums worldwide, collecting six Gold albums and four Gold singles. They're the only band ever to have had two Top 10 hits with different versions of the same song: "Walk—Don't Run" and "Walk—Don't Run '64," and their *Play Guitar With the Ventures* series, are the only instruction albums ever to appear on the national *Billboard* charts. Although

most of the bandmembers are in their 60s, they still tour regularly, including an annual three-month stint of almost-daily sold-out shows in Japan. They're credited as an influence by artists such as Jeff Lynne, Eddie Van Halen and The B-52's. And, perhaps most amazingly after all these years, they're still friends.

I found all four Ventures—founding members Don Wilson (rhythm guitar) and Bob Bogle (bass, lead guitar), member since '68, Gerry McGee (guitar, bass), and drummer since 1997, Leon Taylor (son of the original drummer, the late Mel Taylor)—ensconced in Front Page's Studio C, touching up final mixes on a Euphonix System 5 console.

These guys have actually managed to do something they haven't done before: The new release, *Acoustic Rock*, engineered by Craig Nepp and featuring guest performer Jeff "Skunk" Baxter, is an all-acoustic album featuring remakes of hits, originals, classic covers and Venture-

—CONTINUED ON PAGE 212

NY METRO REPORT

by Gary Eskow

Musicians move through life-cycle patterns as other tradesman and professionals do. Talent gravitates to large cities where the artistic output is high, and then moves to quieter surroundings when it's time to marry and raise children. Chuck Loeb and Jeff Pevar grew up in the greater metropolitan area, made their mark as guitarists and writers while living in Manhattan, and are now living close to where they were brought up. Thanks to the project-studio revolution, they are able to write, record and produce much of their work without leaving their homes.

Listen, Loeb's ninth solo album, is currently riding high on the smooth jazz charts. Following on the heels of

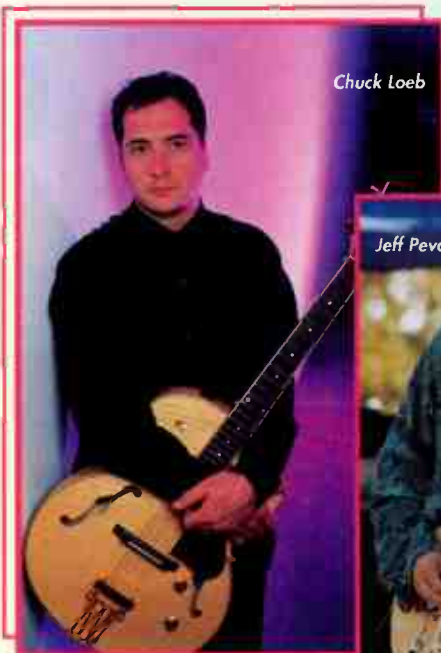
"High Five," Shanachie Records has just released "Silver Star," a second single from the album. On the day I spoke to Loeb at his home in Irvington, N.Y., he and engineer Phil Magnotti were working on a pair of Pro Tools rigs, mixing one tune from his latest project on one system while the second workstation was being used to edit another.

"Phil is my favorite engineer. He also lives in Westchester," said Loeb, who then laughed and asked Magnotti if he even knew the way into Manhattan.

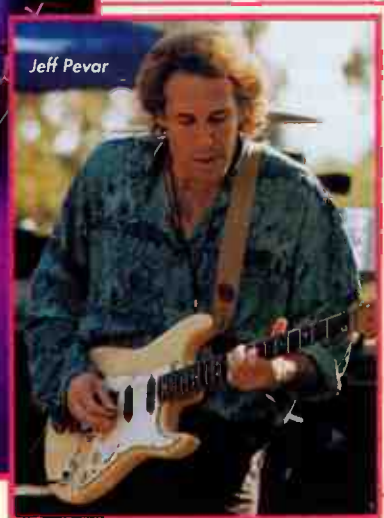
Loeb also plays in the group Metro with keyboardist Mitchel Forman, bassist Victor Bailey and drummer Wolfgang Haffner. Their third album, the first released by Hip Bop Records, was occupying Loeb and Magnotti when we spoke. So what tasks could he execute in his home studio, and which ones demand a more acoustically perfect environment?

"My rig centers around a Pro Tools

—CONTINUED ON
PAGE 213



Chuck Loeb



Jeff Pevar

PHOTO: ISAMI LEE

PHOTO: TIM OWEN

COAST

PHOTO: ALAN MAYOR



Larry Carlton met Berklee students while they were visiting Nashville. He was also cooking on his latest CD, *Fingerprints*, at Sound Kitchen, above. L to R: Engineer Don Murray, studio owner Dino Elefante, drummer Vinnie Calaiuta, Carlton, keyboardists Rick Jackson and Matt Rollings, and bossist Abraham Laboriel.

NASHVILLE SKYLINE

by Dan Daley

I Was So Much Older Then; I'm Younger Than That Now: This past March, students from the Berklee School of Music in Boston came to view the inner workings of the Nashville music machine. Seeing this town through their fresh eyes, I was reminded how resilient and attractive Nashville still is, in spite of the significant changes the business has experienced in the last 18 months.

This was Berklee's 13th annual pilgrimage to Nashville, a trip underwritten in part by Warner/Reprise Records and BMI, which, along with ASCAP and SESAC, provided the venues for the events that took place during the course of nearly a week. The first 40 students who signed up for the voyage were given seats on a bus rented by Warner; the rest—and the total number of Berklee students roam-

ing Music Row that week was about 100—had to find their own ways down.

March 18 started with a tour of Warner/Reprise's offices on Music Row, followed by a panel representing most of the piston types in the Nashville music machine, including producer Kyle Lehning, guitarist Larry Carlton, publisher David Conrad and *Grand Ole Opry* director Pete Fisher. That was followed by a producers panel in which Lehning was joined by Josh Leo, Chuck Ainlay, Matt Rollings and Kyle's son Jason, who had just released his own non-country record.

The following four days were filled with a combination of panels made up of songwriters, musicians, publishers and engineers, and studio tours of several facilities, including Ocean Way (where I'm told that chief engineer Sal Greco charmed many students into considering careers as techs), Starstruck Studios, Emerald Studios (which probably

—CONTINUED ON PAGE 216

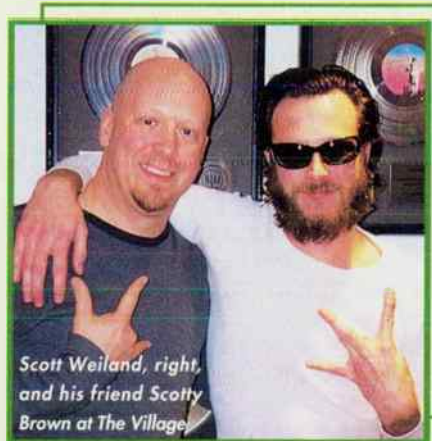
SESSIONS & STUDIO NEWS

SOUTHERN CALIFORNIA

Scott Weiland could be found, feeling right at home at The Village (West L.A.) recently. Stone Temple Pilots recorded their latest release, *No. 4*, there last year, and Weiland was behind the console this time, producing up-and-coming rap group The Underdogs with engineer Doug Ryder... Star power at Signet Soundelux Studios (L.A.): Stevie Nicks cut a track in Studio A with guitarist Waddy Wachtel. Sheryl Crow produced, Ed Cherney engineered, and Mamie

Lehmann-Riely and Wade Childers assisted. Destiny's Child were in, recording vocals with Pink, engineer Bill Malina and assistant Childers. The Royal Crown Revue also swung in and tracked a song for *Buffy the Vampire Slayer*. Armin Steiner engineered, and Brian Dixon assisted... Crow and Nicks were also in at Studio D at Westlake Audio

(L.A.), working on tracks with engineer Brian Schuble and assistants Cesar Ramirez and Donna Gay. In Studio A, Limp Bizkit got busy, writing songs for their upcoming Interscope release with engineers Jesse Gorman and Kevin Guarnieri. Run DMC also joined LB to collaborate on a track for their next disc. Makus Ulibarri engineered, and Kevin Guarnieri assisted. Lenny Kravitz dropped by to



Scott Weiland, right, and his friend Scotty Brown at The Village

lay down guitar tracks for Ultra Nate's *Strickly Rhythm* release. Brian Morgan produced... Eve 6 recorded their next RCA CD at NRG Recording Services in North Hollywood. Producer Don Gilmore oversaw the session with help from assistant engineer Matt Griffin... Queens of the Stoneage tracked and mixed

—CONTINUED ON PAGE 216



From left: Eve 6 vocalist Max Collins, drummer Tony Fagenson, producer Don Gilmore, guitarist Jon Siebels and engineer Matt Griffin at NRG, North Hollywood.

—FROM PAGE 210, L.A. GRAPEVINE

ized versions of current chart-toppers like Ricky Martin's "Livin' La Vida Loca" and Fastball's "The Way." The common thread, as in all of The Ventures' work, seems to be an appreciation for great songs.

"After 41 years of recording, we're just doing our very first acoustic album," Wilson commented. "And we're having a lot of fun! It's a little bit different than what we're used to, so we're spending a lot of time at it. Sometimes we plugged in; that's why we don't want to call it 'unplugged.' We don't want to fool anybody with that, and anyway 'unplugged' is a pretty overused term."

Although some pickups were used on the new CD, there were no amps, and it's basically acoustic, with none of the band's trademark solid-body guitars in evidence. The idea for the album came from the popular acoustic segment that the band has been performing on their Japanese summer tours. As endorsers of Aria, The Ventures use almost exclusively that manufacturer's guitars and basses, with a few Fender guitars and amps thrown in. When queried about the difficulty of getting their acoustic chops up for a whole record, McGee laughed and said, "You just put lighter strings on." The band did admit that Wilson's signature "tika, tika, tika" rundowns were a bit harder to do on acoustic guitar. "We probably used ten or more different acoustic guitars to get different sounds," he said. "If I wanted to double a rhythm, I'd get another guitar."

Taylor is also into Japanese equipment. His kit is DW, but he uses custom Canopus snare drums, including a very heavy model hand-carved out of a single piece of Japanese hardwood. Another favorite Canopus snare is his father's signature "Mel Taylor" model.

Since the group prefers to rehearse and record at the same time, little pre-production was done for *Acoustic Rock*. "We used to rehearse and rehearse before we ever came into the studio," recalled Wilson. "In 1970, when we did our tenth anniversary double album, we rehearsed for something like three months. Now, we come in, take over the studio, rehearse, and once we've got a song, we record it."

"Sometimes when you rehearse, you use up all the ideas," McGee interjected, "then when you get to the studio, you don't have a lot to add. Working this way, there's a lot of spontaneity. We're at the point now where we listen to a song, rough out a chart and sit down and run through it a time or two. Then



Recently purchased by Paramount, Ameraycan hosted a session with producer/engineer Darryl Swann, — foreground. Rear, L to R: new owners Adam Beilenson and Michael Kerns.

we kick a few ideas around and cut it. It usually takes us a full month on each album."

The Ventures are no strangers to Front Page Recorders. They've recorded several previous albums there and have known owner Biff Vincent for decades. In fact, Vincent himself put in a stint as the Ventures' keyboardist on the road. Later, the band was among his earliest clients at his first home-style 4-track studio, and he's engineered and co-produced several of their albums. Times have changed: This album was recorded on Front Page's SSL 4000 Series desk to a 32-track Otari DTR-100, then transferred to a Euphonix R1 for mixing through the System 5. According to Nepp, who called the System 5 "awesome—the fastest thing I've ever worked with, and even easier to run than a Euphonix CS3000," the tracks were also mixed to two tracks of the R1.

As the group heads toward its fifth decade, they show no signs of stopping. *Acoustic Rock* will be released first in Japan, as many of their albums are. They've signed with Pat Boone's new Gold Label, and a June 20 release is scheduled for their appropriately titled *Gold*, combining tracks released only in Japan with four previously unreleased titles and updated versions of signature hits, including "Walk—Don't Run" and "Apache."

Obviously, these musicians love their work and will continue to crank out "the ultimate in twang" for a long time to come. "It's show business, and we love it," said McGee. "It's a way of life. Music keeps you young. It keeps you vital."

"Well, at least we keep telling ourselves that," Wilson said with a laugh. "But consider the alternatives. Bob and I started out as construction workers, so we know what that's all about. I don't think any of us have ever seriously con-

sidered retiring."

Paramount Studios, that Hollywood hotbed of up-and-coming recording artists, has expanded and added a second location in the San Fernando Valley with the purchase of Ray Parker Jr.'s Ameraycan Studios. I dropped in at that Lankershim Boulevard facility for a chat with the two new owners, longtime business partners Michael Kerns and Adam Beilenson.

The two, who hooked up 15 years ago, took the plunge with a second two-room studio when they found themselves so booked at their Hollywood location that they were turning clients away.

"We expect Ameraycan to serve as more of a lockout facility for us," explained Beilenson. "We're so heavily booked at Paramount, unless you're booking way in advance, if you want to get in for a month at a time, it's really hard for us to do. We plan to dedicate these rooms to daily, weekly and monthly lockouts—no hourly. It will serve a different kind of role for certain members of our clientele."

In the process of amassing seven rooms in 14 years, the duo have also acquired a lot of equipment. Ameraycan is outfitted with two SSL consoles, a 4056 in Studio A and a 4048 in B, both with G Series automation. Tape machines are Studer 800, 820 and 827 Series, and monitors in both rooms are Augspurger TADs. The outboard complement is none too shabby: Plenty of UREI, dbx, Lexicon, Eventide and API gear is available, along with a sprinkling of GML, Neve, TC and AMS. The facility also features private, secure parking, a kitchen and lounges, and Studio A is equipped with a Yamaha C7 grand piano.

On the day I stopped in, Studio B was undergoing refurbishing, and Studio A was busy with producer/engi-

neer/Renaissance man (and Macy Gray collaborator) Darryl Swann, who was sussing out a Macy track for remix ideas. "I'm really happy they got this place," enthused Swann, "because Paramount was just too busy. They've got such a niche over there that everybody and their mother is trying to get in all the time!"

In the past, Ameraycan has been a bit of an unknown entity except to those who were regular clients. "We weren't all that familiar with it," Kerns admitted. "It was low profile. They never advertised, and Ray used Studio B a lot for himself. But we found out a lot when we started asking around, and it was all good. When we first purchased Paramount, it was kind of a rude awakening, because we didn't realize it had a bad reputation. We took quite a hit from that, and it took us a long time to overcome it."

"So this time, we were careful," added Beilenson. "We asked many of the producers we know what they thought, and they were unanimous that Ameraycan was a good place. They all said it needed a little fixing up, but that it was basically an excellent studio. And there is a loyal clientele: For example, Cypress Hill has made four records here. Other recent clients include Tool, Everlast, Face to Face and Control Machete. We're also lucky in that we've got Brandon Abeln, who has managed the place for six years. He knows the existing clientele and how the place runs, and that's made it easier for us."

"Another thing: We've now got one of the best young techs in L.A., Tom Doty, who cut his teeth at Larrabee. Of course, now he has to run back and forth over the hill, but thank God it's freeway-close. The studios are only about 15 minutes away from each other."

Meanwhile, at Paramount, things keep on humming. Studio A has an SSL 6056, Studio B an SSL 4000, and Studio C a 64-in Focusrite with GML that previously made its home at Conway. Studio D, mostly used for pre-production, is set up with a Sound Workshop 34B, and Studio E is a mastering suite with both Sonic Solutions and Pro Tools. Beyond the album projects, Paramount also specializes in scoring, and Studio C can accommodate 25 players comfortably and affords video lock to picture.

In the 14 years that Beilenson and Kerns have owned Paramount, they've made plenty of changes, such as installing new consoles in every room. "It's pretty much always for SSL when

we get the call," commented Kerns. "That's another reason we went for the expansion. We've got four SSL rooms now. Then, if someone wants something different, we've got the Focusrite, with 64 inputs and moving fader automation, which is as good or better than a Neve. We had a Neve previously, and the Focusrite sounds better."

There are no real plans to change the focus at Paramount; it's still a place where new acts germinate. Recent acts in have included Black Eyed Peas, Montell Jordan and KRS-One.

"We work with all kinds of artists," Kerns said. "New, old, small budgets to large indie labels and majors. And even more than that, the production guys like Claudio Cueni, Rob Chiarelli, Mike Schlesenger, Jim Goodwin, Jamie Seyberth, Susan Herndon—a lot of them got there start here. We like to think we're nurturing, and we try to cut deals with people. A lot of them get their start here, and we're fortunate—a lot of them end up coming back."

"The industry may be shrinking," Beilenson stated, "but not in L.A. That's one of the reasons we decided to take the plunge. It's the hub here." ■

Fax L.A. news to 818/346-3062 or e-mail MsMDK@aol.com.

—FROM PAGE 210, NY METRO REPORT

MIXplus system and a Yamaha 02R console," Loeb replied. "I can comfortably track all of my guitar parts right here, as well as horns and drums, although we generally track drums at dedicated recording studios."

Many Pro Tools users have switched over to Digidesign's ProControl or the Mackie HUI, and Loeb said he's thought about going that way too but hasn't for several reasons. "For one thing, I do record drums here at times," he explained. "All of the other stuff I track is either mono or stereo, and I use a Tube-Tech MP-1A stereo mic pre for this work. When I record drums, I use the mic pre's on the 02R, which are fine. If I got rid of the board, I'd have to invest in a bunch of mic pre's, and that's an expense I'd rather not make. I'm really happy with the 02R—remember, it also has talkback, and inputs for DATs and CD players. My synths are also normaled to the board."

Loeb met his wife when he was in Spain touring with Stan Getz. "We celebrated our 20th wedding anniversary in May," said Loeb. "Our two kids were an

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important reason why we moved out of the city. I built my studio in the garage. It's not an acoustically perfect environment, but Phil has learned to deal with the limited bass response, for example, and take that into consideration when he mixes. We make sure to take our mixes into a number of different environments before sending anything out to be mastered."

Event 20-20bas speakers are Loeb's favorite monitors, but he also references mixes through pairs of Yamaha NS-10s and Tannoy 6.5s. Magnotti uses NHT Pros at his home. Add a car stereo system or two, and Loeb is confident that the product he delivers will stand up to sides recorded and mixed exclusively at large studios.

"I've been using a pair of Russian mics lately, the Oktava MC 012s," he said. "They only cost \$150, but they sound great, like the Neumann KM84 but with more gain and a beautiful high end. I track classical and steel-string guitars with them, as well as percussion." For vocals and sax, Loeb prefers a Neumann TLM193, a single-position cardioid mic, or his AKG 414. For low-end instruments like the trombone or bass drum, he usually uses an AKG D112. Percussion and drum overheads are often tracked with Shure SM81s.

Although he prefers working in Pro Tools, Loeb also has three ADATs, which he uses to add his guitar work to outside projects recorded to this medium. All three machines, an original black face and an early XT, are 16-bit recorders. "I definitely notice the difference between 16- and 24-bit recording, particularly in the depth of the image. But a lot of the European producers I work with use ADATs, and they seem happy with the product I give them on the 16-bit machines," he said.

While Loeb is busy working on his multiple projects at his home studio, Jeff Pevar has been juggling his own various gigs, on the road and back at the homestead, near Hartford, Conn.

"Can we speak at around noon on Monday?" reads the e-mail from Pevar. "I have to get to Madison Square Garden that night to see Crosby, Stills and Nash." A fan that night, Pevar has filled a distinctly different role in the fabled group, and its variations, at other times. Several years ago, Pevar—who sings, writes and burns on every conceivable guitar—was traveling as part of a duo with Marc Cohn. They found themselves opening for CSN. "From the first gig, David and Graham were in the practice room with us, figuring out har-

monies," he said. "They're both big fans of Marc. We immediately hit it off. Those guys are so open and generous."

David Crosby eventually asked Pevar to join him and Nash on some dates. "Singing three-part harmonies with them, what an experience! What better teachers could you have?" he recalled.

Pevar and Crosby, along with James Raymond, are now recording their second album together as the group CPR. James Raymond, who only met Crosby several years ago, is in fact his son. "What a great singer," said Pevar. "David says that James sings the way he wishes he could." Pevar is also touring with Grateful Dead bassist Phil Lesh.

When he's not on the road, Pevar lives with his wife, singer/songwriter Dana Pomfert, near Hartford, the area where the guitarist was born. In order to stay close to home and continue to interface with the outside musical world, Pevar joined the home-studio revolution six years ago, when he purchased an Allen & Heath GS3V console. "I'm not a tech head," he said, "but I liked the board's EQ a lot. It has an internal computer for VCA and mute automation, via MIDI or a sequencer, and that was important for me as well."

Pevar uses his home studio to track, but rarely mixes there. "I prefer to do what I do well and then go to a larger room to work with people who've spent as many years perfecting their craft as I have on mine," he said.

Tracking is done to both ADAT and DA-88s, he added. "I started out with a single black-face ADAT and bought the others over time, so I've now also got a 16-bit XT and a 20-bit XT. I bought the DA-88s because of the things I'd heard about the tape transport issue. Now I've got 24 tracks of both formats. My comparison? I think they're both great to work in. As far as the 16-bit issue goes, some of my favorite records were made on inferior technology. My whole interest is in capturing the spontaneous moment. That having been said, of course, I want the best sound I can deliver."

Of late, a Roland VS880 hard disk recorder has been a valuable road companion. "I use it to write on the road," said Pevar. "I took it over to David Crosby's house one time and had him sing a vocal line into it. Later, I moved that line all over the place as I worked on the song. The editing capabilities of the box are phenomenal. That reminds of an interesting way I used the VS880 on the Phil Lesh tour. The Grateful Dead song 'Unbroken Chain' has a solo section that's in 11/8. I blew the song into the

VS880 and copied that section over about 50 times. Fortunately, Jerry Garcia's solo was recorded to one side, and so I was able to pan him in and out of the mix. That helped me learn his ideas and then get some of my own."

Pomfert is signed to the Paris division of Warner Bros., which has released several of her CDs, and she has also worked in the home studio, where Pevar tracks her vocals. "I use a number of different mics to track Dana's vocals," he said. "I think the Audio-Technica AT4033 sounds great. The Audix CX111 is a large-diaphragm mic like the A-T, and it sounds a little rounder to me, while the A-T boosts the midrange a bit. I also like to track vocals with an AKG C-414."

Pevar has been using a small pair of Tannoy PBM-6.5 monitors for years, which, he said, "have a nice, small and natural sound in comparison to the NS-10s."

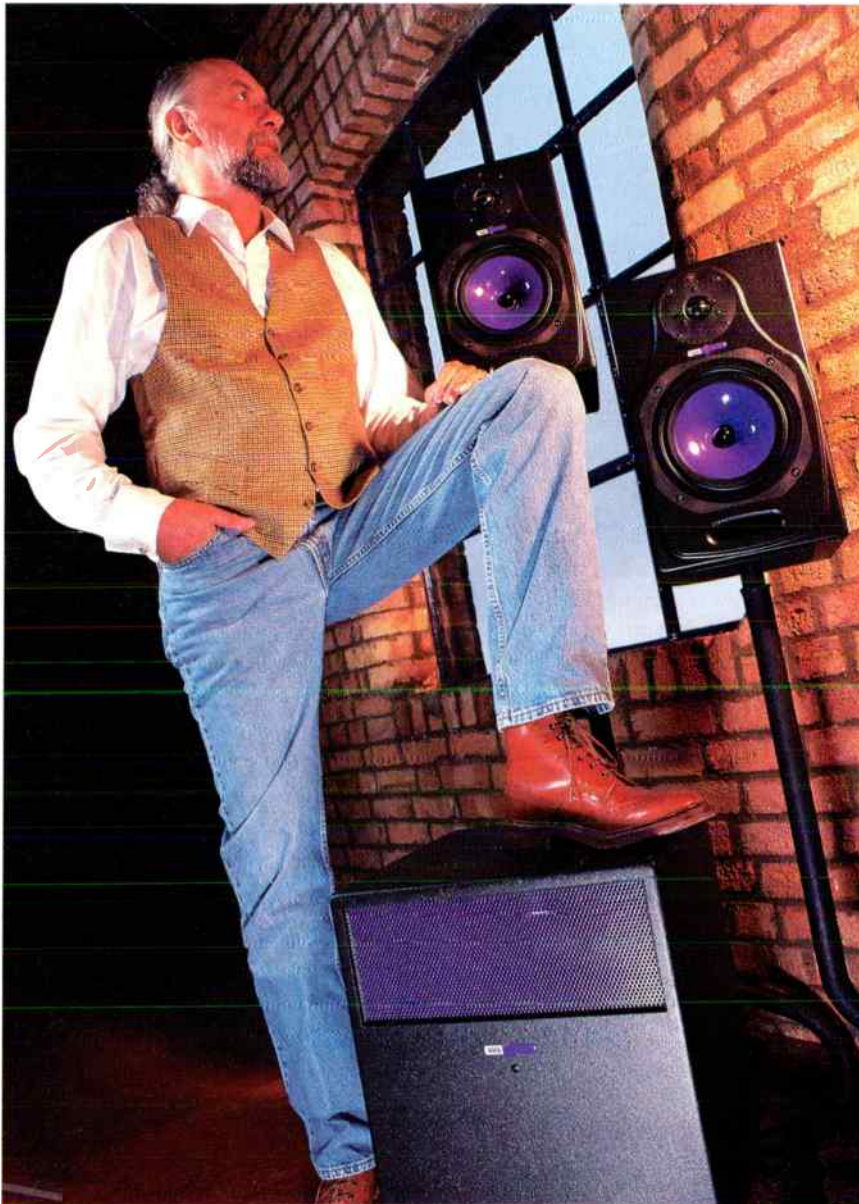
Finding different combinations of colors for his guitar tracking is critical. "I like to experiment with a variety of direct and miked sounds," explained Pevar. "Blending in different ways gives you colors to choose from. I might, for example, take a skanky, crunchy guitar sound recorded direct and layer it with a beautifully miked amplifier sound.

"I will tell you this—I've been waiting for the Pod my whole life. It's the ultimate guitar direct box, really amazing. There are numerous amp modelings in the Pod, from a small Tweed Fender to a huge Marshall, and the player has control over gain, EQ, reverb and effects. Don't get me wrong—I'm a big believer in putting a mic in front of an amp and moving air. That having been said, the fact that you can dial up an amazing sound immediately, while the moment is fresh, is fantastic."

Does he miss living in Manhattan? "You know, I toured with Ray Charles for three years," Pevar said. "When I left that band I based in New York for a while. I started out crashing on a friend's couch in the Bowery. But I also kept a rental apartment in Hartford: It's my home. I'm close enough to the city that I can shoot in whenever it's necessary or desirable to do so—like tonight, for instance. I don't know if they'll call me onstage to play or not, whatever. But I like coming back home to Connecticut." ■

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Above (left to right): HHB Circle 5 midfield monitor (active and passive versions available), HHB Circle 1 powered sub-woofer, HHB Circle 3 nearfield monitor (active and passive versions available).

Left: Mick Fleetwood with HHB Circle 5 active midfield monitors and Circle 1 powered sub-woofer.

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—FROM PAGE 211, NASHVILLE SKYLINE

needs a bus just to get everyone to its four locations these days), Soundstage, Sound Kitchen (proving that studio life does not begin and end on the Row), and County Q.

I ran into this enthusiastic group at Soundstage, where Ainlay was giving them surround mixing demonstrations on the SSL Axiom-MT he put into Backstage, the joint venture studio he opened there last year.

Ainlay's laid-back but candid style with the students was probably similar to what they encountered in other facilities and panels. He took pains to answer every technical question, but was also forthcoming with the fact that the demand for surround work was still nascent, at best, in Nashville and elsewhere. He also explained that all new avenues in audio come with another round of mundane issues. "The major record labels seem to be quietly stockpiling surround mixes, but even they're not sure what they're going to do with them," he told the group. "But what is happening is that people are beginning to expect that [engineers will] start providing them with the surround and stereo mixes for the same amount of money."

That observation drew a muted chuckle from the students who had crowded into Backstage's control room.

There was less of a response when Ainlay made an oblique allusion to the fact that another studio that was nestled within the Soundstage complex was actually owned by competing facility Emerald Recording. That comment underscored the changes that the Nashville studio community has been going through in the past two years, and served as the launch pad for some post-demo discussions with the students about how they perceived Nashville.

They were, for the most part, oblivious to the business upheaval in the city's entertainment sector. Instead, they focused on Nashville's well-deserved reputation for friendliness and the single-mindedness that gave rise to its "Music City" moniker.

But Michelle Kiely, a student from Norton, Mass., also knew that the tour presented the city's business in its very best light, and their own careers would probably require more involved maneuvers. "The panels gave us a lot of success stories, about how people had made it, but they skipped a lot of the steps in between," she added.

"The panelists painted a rosy picture," said student Mike Peters of Ar-

lington, Mass. But that realization dampened neither his amazement at the sheer number of recording studios in Nashville, nor the fact that they are so close to each other. "You get to meet a lot of people—engineers, producers, musicians—just walking down the street to lunch. I've been to L.A., but I can't imagine another city where you have this much interaction between everyone in the business."

And in light of the acquisitions and mergers of the past two years, Greg Price, a student from Rochester, Minn., didn't know how right he got it when he observed, "It seems like everyone has a connection to everyone else."

That comment also reflected the enormous strength that Nashville maintains at its core: Members of all the interacting disciplines of the Nashville music business interface constantly. It's no less common to find the songwriter at the session than the artist, the engineer, the producer or the musicians. In fact, several students expressed an amazement that there were so many musicians at sessions, a reflection of the fact that most records are being made in a human resources vacuum, with parts overlaid anonymously on other parts.

Perhaps the most interesting thing about the visit was watching the notion of alternative career paths unfold before the eyes of people who, like most budding engineers and producers, have been blinded by the science of gear. "Josh [Leo] told us that the musicians play better when there's a bunch of them playing together in the same room," said Peters. "The same seems to apply to songwriters. This trip has made me want to get into the songwriting thing as part of my career. And Nashville seems like the best place in the world for that."

Trust me, it is.

Milestones: It's with regret that we report the passing of one of Nashville's first resident recording engineers, Aaron Shelton, who died in April at the age of 89. Shelton was one of the triumvirate of former WSM radio engineers—the others were George Reynolds and Carl Jenkins—who created the Castle, the first dedicated recording facility in Nashville, in 1946.

Four years ago, I had the pleasure of interviewing Shelton, who engineered many sessions for Hank Williams, while researching my book *Nashville's Unwritten Rules*. He recalled tales of the Castle, which was located in the now-demolished Tulane Hotel in downtown

Nashville. Shelton told me that the former dining hall was divided into three sections: a recording room, a control room and a small area for the Scully acetate lathes which cut the music directly to lacquer disks. The Castle's home-made console was advanced for its day, with eight inputs for microphones—twice as many as most desks of the time. Shelton would divide the inputs up according to the configuration of the artist and bandmembers. If the sessions got too big, the Castle's engineers would book out the Ryman Auditorium three blocks away and rent time on telephone company lines to bring the signals back into the studio for mixing.

The Castle's sessions were mostly at night. With country music still a nascent commercial enterprise, many of the musicians and artists had day jobs. The studio charged \$90 for the three-hour sessions, and the cost included engineers, acetates and tape.

Shelton had some fun before the studio closed in 1954. Folk singer Burl Ives would start his recording dates with a pre-session dinner and drinks at the 216 Dinner Club downstairs, then pick up a bottle of Jack Daniels for the session. "Sometimes he made it through the session, sometimes he didn't," recalled Shelton. "He'd get high and start dancing around the studio and knocking over music stands and microphones, and we'd be picking them up behind him."

Another session was interrupted once when a hotel guest forgot to turn off his bathtub faucet in a room above the studio and the Castle's grand piano was turned into a freestanding pool.

They just don't make them like that anymore. ■

E-mail Nashville news to danurwriter@aol.com or fax 615/646-0102.

—FROM PAGE 211, SESSIONS & STUDIO NEWS
their first Interscope CD at Sound City (Van Nuys) with producer Chris Goss, engineer Trina Shoemaker and assistant Marek... Mix engineer Rob Chiarelli mixed "2 Glock 9's" for artist Beanie Sigal and producer C. Tram Tip for the La Face soundtrack for the *Shaft* remake... k.d. lang had her latest CD, *Invincible Summer*, mixed on the SSL SL 9000 J at O'Henry Sound Studios in Burbank. Damian Le Gassick produced... Bon Jovi slipped into the Record Plant (L.A.) and toiled on their upcoming PolyGram CD with engineer Mike Ship-

ley...At Skip Saylor Recording (L.A.), Suicidal Tendencies mixed their upcoming BHG Musick CD with engineer Paul Northfield and assistants Paul Smith and Regula Merz...Bill and Bonnie Hearne worked on an Americana album for Virgin/Backporch at Ocean Way in Hollywood. Former Flying Burrito Brother Chris Hillman contributed mandolin and vocals. Guitarist Randy Jacobs produced, and Sally Browder engineered...Less Than Jake raced through their latest Capitol CD at Grandmaster Recorders (Hollywood) with producer/engineer Steve Kravac...

NORTHWEST

At Studio Litho (Seattle), Jim Sangster recorded a Sub Pop disc for The Makers, and Jack Endino worked on a Sub Pop CD for Zen Guerrilla with help from Dave Fisher...Speaking of Endino, he also mixed some old "live" Gits tapes at Private Radio (Seattle), and recorded with Tad's new band Hog Molly...Green Day tracked a new disc at Studio 880 (Oakland, CA)...Xtreme/Music Works' (Bellevue, WA) truck recorded the music for *Battlefield Earth*, a sci-fi epic based on the book by the Scientology founder L. Ron Hubbard with John Travolta in the starring role. Contractor David Sabee assembled 92 musicians in the St. Thomas Chapel of Bastyr University in Seattle. John Whynot engineered with assistance from Steve Smith...At Gravelvoice (Seattle), Scott Colburn engineered sessions by John Fahey and Land of the Loops...At Rainstorm (Bellevue, WA), Aaron Lewis tracked a work about the Columbine shootings. Singer/songwriter Bridget St. John began production on an album. Paul Speer produced both projects, with engineering by Steve Carter...Jeff Saltzman engineered sessions with Mothball and Old Joe Clarks at Jackpot! (Portland)...Myles Boisen, *Electronic Musician* reviewer and engineer, tracked and mixed upcoming pop projects by Baby Snufkin and Mumble & Peg at his Guerrilla Recording (Oakland, CA). He also mastered Live Human's Matador CD...

SOUTHWEST

Al Jarreau got jazzed at Sunrise Sound Studios (Houston), doing a live interview and performance, which was recorded by Skip Burrows. Jarreau's bass player Chris Walker also returned; he recorded his upcoming solo album at Sunrise...Erykah Badu tracked her upcoming disc with engineer Chris Bell at Palmyra Studios, which recently

opened in Palmer, TX. Geff Grimes and Fred Neutz assisted...Feeling psyched at Sound Arts Recording in Houston: Dope



Production assistant Coyote, bassist Chris Walker and vocalist Al Jarreau at Sunrise Sound, Houston.

recorded a cover of "You Spin Me Round" for the *American Psycho* soundtrack...Arlyn Studios (Austin, TX) drummed up work with jazz legend Buddy Miles, who played with Stevie Ray Vaughan's old backing band, Double Trouble. Double Trouble also worked on their new album...Chaton Studios (Phoenix) recently opened and has already tracked Luis Gonzalas of the Arizona Diamondbacks for Capitol's *Big League Rocks*...

NORTH CENTRAL

Paragon of blues: Billy Branch and the Sons of the Blues recorded and mixed a new CD at Paragon Studios (Chicago) with engineer/producer Jack Letourneau. Uniform, Get Christy Love, Rev. Terry House and \$ee Money were also in...Vince Lawrence at Slang Musicgroup (Chicago) completed dance remixes of Donell Jones' "Where I Wanna Be" for LaFace Records...Composer/producer Jeffrey Fisher completed mastering Melomania, a two-CD music library, at his Inner Circle Studio near Chicago...

NORTHEAST

Prepare to rock when The Unband comes to town. The Northampton, MA, trio tracked their new TVT CD, *Retarder*, at Slaughterhouse Studios in Hadley, MA. "It's actually an old slaughterhouse, with cables hanging from old meat hooks. It's got a *vibe*," bassist/keyboardist Mike Ruffino recalls, adding that the eight-day recording session seems a little hazy now. Must be the lifestyle that goes along with writing songs like "Crack Soundtrack" and "Drink and Rock." "We write what we know," he says. "At 5 in the morning, we were in, shall we say, quite a state, and things like that tend to come out." Kevin Shirley ended up mixing it all down at Avatar in NYC...Also at Avatar,

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Dan Gellert recently mixed Joe Jackson's live rock trio album, *Summer in the City*, at the studio with assistant Charlie Post... Plenty of happening sounds were coming out of Sound On Sound (NYC): Whitney Houston tracked vocals with producer Joe Mardin and engineer Michael O'Reilly. Capone and Noreaga tracked and mixed with producer Nokia and engineer Tom Soars. Prodigy were tracking a self-produced Loud project with engineer Steve Sola. X-Ecutioners mixed with Sean C and Doug Wilson... Primus time at Indre Studios (Philadelphia): Michael Comstock engineered the 94 WYSP Rock Session with the art rockers, and Matthew Milner assisted... C'est chic at BearTracks in Suffern, NY: Nile Rodgers returned to the studio to produce Adam Cohen's upcoming Sony release. Gary Tole and Rich Hilton engineered with Michael Bates assisting. Jason Miles was also in, putting together a collection of music by Ivan Lins with engineers Doug Oberkircher and Bates... The Sounds of music-making from Art Garfunkel at Loho Studios in NYC: He was in producing and recording his latest with engineer Dan Geller and assistant Joe Hogan... Hip hop band Fathead tracked their latest album with producer David Ivory at Ivory Productions (located in Sigma Sound Studios in Philadelphia)... Life was a cabaret and more at Sear Sound (NYC): Liza Minnelli worked on a new project with producer/composer John Bucchino and engineer Tom Schick. Paul McCartney was also in, tracking a new Warner/Sire album that will pay tribute to Elvis Presley and Sun Records. Ahmet Ertegun produced, and Frank Filipetti engineered...

SOUTHEAST

"Smooth" moves down South: Matchbox Twenty cruised through their upcoming release, *Mad Season*, and finished tracking at Tree Sound (Norcross, GA) with producer Matt Serletic and engineers Noel Golden and Mark Dobson. Ginuwine was also in with producer Rapture to mix a medley for the Soul Train Music Awards. Robert Hannon and Matt Lohman engineered... Jam-

ming times at Southern Tracks (Atlanta): Pearl Jam returned to the studio they mixed *Vitology* and *No Code* to complete their latest, *Binaural*, with producer Tchad Blake and mix engineer Brendan O'Brien. Matt Bayles and Ryan Williams also engineered, with assistance by Karl Egsieker. O'Brien also produced and mixed Train's forthcoming *Aware/Columbia* disc. Nick DiDia and Ryan Williams engineered, and Egsieker assisted. O'Brien also mixed the Family Values Tour live recordings of Korn, Limp Bizkit, Primus, Crystal Method, Staind and Filter with help from Williams and Egsieker... The Dixie Chicks, Joan Osborne and John Fogerty dropped into Skaggs Place (Nashville) to track for *Big Mon*, an upcoming release on Skaggs Family Records. Ricky Skaggs produced, Brent King engineered, and Alex Anders assisted... No blues at House of Blues Studios in Memphis: Producer Malcolm Springer and engineer Charlie Brocco recorded and mixed *Mile* for Columbia/Aware. Rap A Lot artist Tela was in at Studio B with engineers Nil Jones and Jeff Willbanks... Guitar-slinger Junior Brown tracked self-produced songs at Seventeen Grand (Nashville) with engineer R. Nichols and assistant T. Johnson, then moved over to Woodland (Nashville) for mixing... Doves of ADR projects at Doppler Studios (Atlanta): Actor Jeremy Irons read a D.H. Lawrence poem via ISDN from

London for Turner Classic Movies. Producer Chris Merrifield and engineer Mike Hill worked on the project, and Hill also recorded Stacy Keach for Quokka.com... The Statler Brothers stood tall at The SoundShop recently: The group were in recording their 39th album in three decades with their longtime producer Jerry Kennedy...



Matchbox Twenty's Rob Thomas with producer Matt Serletic and engineers David Thoener and Noel Golden.

STUDIO NEWS

studio bau:ton recently finished a new state-of-the-art control room for LAUNCH Media's headquarters in Santa Monica, CA, which includes a Euphonix CS3000 console and a custom 5.1 surround sound monitoring system... Mastering facility Northeastern Digital Recording (Southborough, MA) celebrates its 15th year in June with live entertainment and other offerings... Dreamhire Professional Audio Rentals (NYC) launched two new programs: The "Virtual" rack program keeps a database of engineers' and producers' requirements so that they can be easily assembled and sent out to a session. The "Real" rack program provides cartage, storage and maintenance for engineers' and producers' own racks. ■

Mail Sessions & Studio News to Mix magazine, 6400 Hollis St., Suite 12, Emeryville, CA 94608, fax 510/653-5142 or e-mail Kim_Cbun@intertec.com.



L to R: The Statler Brothers' Jimmy Fortune and Don Reid, SoundShop owner/engineer Mike Bradley, producer Jerry Kennedy and the Statler's Harold Reid and Phil Balsley.

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 DRAWMER DS201; EAB 6x2 tube console; EAR 660 used;
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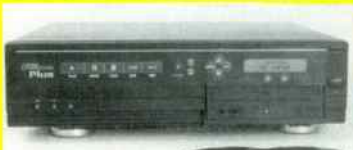
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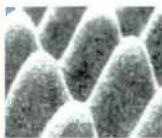
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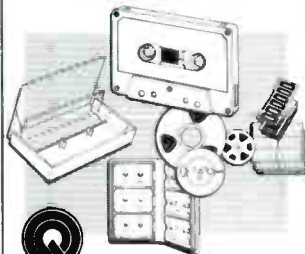
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—FROM PAGE 38, DON HENLEY

yourself, then you end up writing...
Crap?

Crap. Exactly. It's just like everything in life—the ideal situation is a balance between excess and deficiency. I think Aristotle talked about that a long time ago in something called the Doctrine of the Mean. That's what my whole life has been about—trying to achieve a balance between too much and too little of anything.

So are you less critical, less picky, than you were?

No. I'm still critical. At the same time, I'm more able to be positive and optimistic about the outcome. I know that if I'm having a bad day or a bad week, it will pass. I am usually confident that even though I may be stuck on a piece of material and I can't make any progress, if I put it aside for a while, and go on to something else, I can come back to it later and I know that it will be all right.

I also know that if it doesn't get finished that's all right, too. I have enough faith in myself and my colleagues that between all of us, we'll end up with the best possible work that we can do—and I don't mind taking a long time. We worked on this record for about three years, a lot of it just grueling, repetitive grunt work day after day after day. You get sick of coming into the studio; you get sick of seeing the same four walls, the same board, the same people. You get sick of listening to your own voice. You get sick of your own songs, your own point of view. Someone once asked me, "To what did you attribute your success?" and I said, "Well, the thing to which I can most attribute my success is the fact that I have a really high tolerance for repetition."

The technology now has given us so many choices in the studio that it's just endless. You could sit around all day just making one decision, considering all the options, but you have to be able to make decisions and stand by them. And it's okay to make mistakes—nothing ventured, nothing gained. You can always go back and try something else. Nothing is written in stone. Most of the time on this album, we tried to push things past what we thought was the edge of the envelope, and then if it was too far, we'd come back to something a little more reasonable.

Can you give an example of that?

Something as simple as a guitar sound—deciding how much distortion to put on

it, or how much of an effect to use on my voice. Singing into a bullet mic and putting that through a telephone device is another thing we did on the song "Inside Job." We were looking for a sound similar to the one on John Lennon's voice in some of The Beatles' records—that treble-y nasal quality that a megaphone produces. There are several different kinds of telephone-type mechanisms that you could sing through, several different choices of microphones that you could sing through. Several different kinds of echo and delay that you could add to that, different kinds of limiting that you could add on top of that. So you could sit there all day just trying to get this one sound on the voice.

In general, does it take you a long time to do your vocals?

Some days, it does; some days, it doesn't. That's another difficult thing about making an album—I'm usually not in very good vocal shape because my voice is better when I'm on the road, when I've been singing a lot. But now, both in the studio and on the road, I've found that if I work out, if I do about a 30-minute aerobic workout before I perform, I can sing much better. I'm talking about serious, hard-core aerobics, where you're soaking wet and your heart rate is up in the 140s somewhere for about 30 minutes.

Then you get oxygenated, your lungs expand and you can really—at least I can—get blood to your vocal chords and sing much better. In fact, I take an exercise bike on the road with me. I put it in the dressing room, and about an hour before I go on, I get on the bike and ride it for 30 to 40 minutes until I'm soaking wet, and then I get up and go onstage. It just gets everything moving. Much better than drugs or alcohol.

How did you know that the record was done?

Well, you just know. I mean, a record is never "done." You just have to let it go at some point. I'm sure if I sat around and listened to the record for another couple of months I could find something else to do to it. I replaced one song at the last minute, which I'm happy about; I think that was the right thing to do. But after a while you just say, "Okay, that's good enough. It's time to move on."

People have labeled me a perfectionist—I'm not a perfectionist, there's no such thing as perfection, especially in rock 'n' roll; rock 'n' roll is not supposed to be perfect. But I do strive for excellence, especially in the lyric department. I really try to give people

something other than the pabulum that they get on the radio, which I think insults their intelligence. I make no apologies for striving. I set very high standards for myself. I don't always meet them, but I come close, and I like to think that there's been growth on every successive album, including this one. I think I'm a better person and a wiser person than I was 11 years ago when I made that album. I think this album is more consistent than some of the previous albums with regard to material and I think it has some perspective to offer on the human condition. Especially to people of my generation—the Baby Boomer generation who are going through, or who have been through, similar things. This album may very well not appeal to teenagers and to people who are labeled "Generation X." Although I hate these labels—I don't like lumping people into categories, but a lot of this is pretty grown-up stuff.

There's still plenty of angry young man in me, though. I'm still rebellious to the point of immaturity sometimes. But now I stop and count to 10 or I sleep on it.

Well, we definitely don't want your anger to be entirely gone.

It hasn't diminished necessarily; it's been refocused. It's not free-floating anger anymore; it's highly focused anger. But it's also diffused. Like I said, I have balance in my life. I have my children, I have my garden, I have my animals, I have my spiritual life. And I have my exercise regimen, which really helps with stress management. You know, a person of my years has to work really hard at the chaotic dawning of the 21st century to maintain balance and a sense of well-being. Because the world is not a peaceful, benign place. There's still a great deal of beauty, but there's a lot of ugliness, too. And one has to come to terms with that and learn how to deal with it.

I'm getting better at that. And I channel my anger into these songs. It's kept me off the shrink's couch—I've never been on the shrink's couch. And I've never killed anybody, although I've wanted to.

The recording process, as I said, can be an agonizing, boring, monotonous, horrible process, but if you can keep your eye on the end result, and if you have faith and confidence that something good is going to come out in the end, you can keep going day after day. And then, eventually you begin to see the light at the end of the tunnel. ■

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MOTU DIGITAL PERFORMER

STILL PERFORMING MIRACLES AFTER ALL THESE YEARS

Performer, Mark of the Unicorn's flagship sequencer, has been around for a long time. Today, however, Performer is not just for MIDI sequencing but for digital audio, too. Digital Performer is packed with pro features sure to please even the most jaded music producer.

VOCAL EASE

Every so often, vocalists just can't cut their harmony parts. Maybe they're having an off day, or maybe—perish the thought—they just can't sing that well. If this happens to you, don't worry. Digital Performer can help cook up killer, natural-sounding harmony parts from a single lead line.

Grab the lines for which you need to generate harmony parts from the lead vocals and copy them to a new track. Highlight one of these sections and open up the Spectral Effects window from the Audio menu. Using Spectral Effects, you can not only change the pitch of the soundbite but its formant content and tempo as well. Adding a few cents to the pitch interval and varying the tempo by a few fractions of a percentage point changes the harmony part just enough to make it sound like a different take, not a clone of the lead.

Once you've built all the harmony parts and have a perfect blend between their volumes and pans, it's a simple matter to bounce all the tracks down to a stereo pair. This is important if, for example, you have a 12-part harmony and need to free up some voices. Highlight the regions of the tracks you want bounced and select Bounce to Disk from the Audio menu. Choose Split Stereo for Channels and Add to Sequence for Import. The soundbites produced in the bounce are automatically inserted on a new stereo track and should be perfectly aligned with the lead vocals (as-

suming you didn't move the source harmony tracks, which, incidentally, can now be turned off).

GETTING LOOPED

Looping samples is simple. However, trying to get a loop that's at one bpm to fit into a sequence that's at a different bpm can be a major pain. Too many programs lack an intuitive way of changing a sample's bpm using time compression/expansion. Digital Performer's soundbite tempo mapping features make this kind of operation a breeze, and its time compression/expansion algorithms sound rock-solid.

Begin by making sure your sample is trimmed to a perfect loop, or at the very least, that it ends on a beat. (Although you can tempo-map fractions of a beat, to the tick, whole beats are less hassle). Select the soundbite and choose Set Soundbite Tempo from the Audio menu. Here, you specify the number of beats in the sample and Digital Performer automatically calculates the soundbite's bpm.

The reverse also works: If you know the tempo, enter it, and the sample's number of beats magically appears. With the beats and tempo figured, the soundbite is easily matched to the sequence's bpm via the Adjust Soundbites to Sequence Tempo command, under the Audio menu.

WORKING SMART

Digital Performer Version 2.7—just released—now also supports Mackie's HUI hardware controller. This means no more mousing around (pardon the pun) trying to execute fades with your trackball. Simply select HUI as the controller in the Control Surface Setup window (under the Basics menu), and you get total remote control over every facet of the mixer. This includes everything from faders to pans, sends and



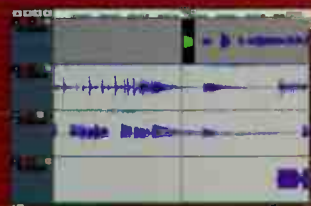
Digital Performer offers a variety of effects in addition to sequencing and editing features.

even plug-ins on the inserts for both MIDI and audio. ■

Erik Hawkins is a musician/producer working in Los Angeles County and the San Francisco Bay Area. Victor Owens is an independent producer and the owner of Digisonic, a fully equipped audio production facility in Berkeley, Calif.

BY ERIK HAWKINS
AND VICTOR OWENS

HDR24/96. MACKIE'S NEW 24 TRACK RECORDER. WORKS WITH ANY MIXER. NO EXTRA COMPUTER OR SOFTWARE NEEDED.



HDR24/96 editing features include:

8 takes per track with nondestructive comping, nondestructive cut/copy/paste of tracks, regions or super-regions, drag-and-drop fades & crossfades, 1x/2x/4x/8x/24x waveform views, bidirectional cursor scrub and unlimited locators and loops... with unlimited undos — but without requiring an external computer! Coming soon: DSP time compression/expansion, true waveform editing with pencil tool, invert, pitch shift, normalize and much, much more.



- Built-in 20-gig Ultra-DMA hard disk plus front panel bay for additional easily available pullout drives
- Intuitive analog tape deck interface and monitoring
- Syncs to SMPTE, MIDI, Black Burst, PAL & NTSC without extra cards
- Unlimited HDR24/96 linking! Sync 48, 72, 96, 128 or more tracks sample accurately
- 96kHz recording via software and new PDI • 96 I/O
- Digital 8 • Bus I/O cards — mix and match!
- 3.5-inch disk drive for software upgrades & tempo map importing
- Fast Ethernet port built-in
- Remotes available.

- 24 tracks...24-bits
- Built-in full-feature digital workstation editing
- Affordable pull-out media
- Built-in SVGA, mouse & keyboard ports
- Built-in 100BaseT Ethernet

New hard disk recorders are popping up all over the place.

Our new HDR24/96 is the only recorder with built-in nondestructive graphic waveform editing. Just plug in a mouse, keyboard and SVGA monitor to view all recorder parameters on screen in real time. Enjoy complete editing control with unlimited levels of undo, drag-and-drop crossfades with 9 preset combinations plus fade/crossfade editor. And look forward to DSP time compression/expansion, pitch shift and lots more!

The HDR24/96 was the only recorder that uses pull out Ultra-DMA hard drives, so affordable that you can keep one for each project—over 90 minutes of 24-track recording time costs less than a reel of 2-inch tape!

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William Wittman is a multi-platinum Producer/Engineer, former Staff Producer/A&R Vice President (RCA/BMG Records and Columbia/Sony Records), Musician and Songwriter. His career truly covers all the bases.

“I’ll tell you a secret; I’ve always had a love hate relationship with near-field monitors. But these LSR’s have changed all that. First, they’re just easy to listen to. They’ve got plenty of full, real bottom, great stereo imaging, and they go loud enough to feel right. Plus, they translate incredibly well to the rest of the world. They’re just *musical*. Wow; good sounding speakers I can trust! It’s love-love.”

LSR. Profiles

The world’s most noted recording professionals discuss the world’s most advanced monitoring systems.

The Three Best Performing THX® Monitoring Systems Are Also The World’s Most Applauded.

Since its introduction in 1997, the system-engineered JBL LSR Series has become a favorite choice of engineers, producers and performers, many of whom have also become its most loyal advocates. More important, this acceptance is found in every major geographic area of the recording industry; from Los Angeles and New York to Nashville and London.



Joel Jaffe is an award winning Engineer/Producer/Composer and co-owner of Studio Recording, Inc., home to a long list of platinum and Grammy Award winning albums and artist. Currently, Joel is working on DVD surround mixes for some of the industry’s top touring acts. LSR surround systems are his choice for stereo and 5.1 channel multimedia projects.

“The THX Approved 5.1 JBL LSR28P with the JBL LSR12P subwoofer provide an extreme linear response, great transients and full-frequency monitoring in a near-field set up. In addition, the LSR speakers allow us to be able to go between stereo mixing and multi-speaker formats, which is absolutely necessary today in a state-of-the-art studio.”



LSR 32

LSR 28P

LSR 12P

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ALL NEW LSR 25P



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