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SEPTEMBER • 1999

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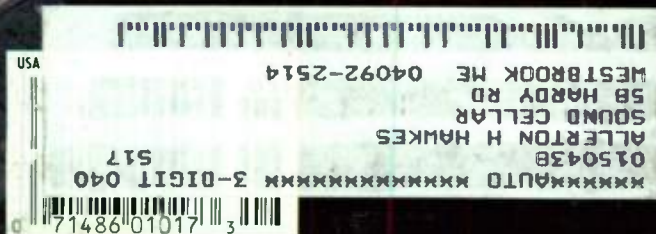
**Akai S6000
Sampler**

**Neumann
KM 184 Mic**

**MOTU 2408
System**

*Engineer Julie Perez and
Conan O'Brien work the...*

Late Shift



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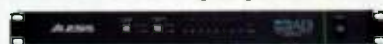
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VOLUME 3 • NUMBER 3 • AUGUST/SEPTEMBER 1999

Tony Maserati: Hip Hop's Master Mixer

With its street-savvy lyrics and aggressive beat, hip hop has fought its way to a place of prominence in the world of popular music. Like rap, some critics had hip hop pegged as a style that would burn out as quickly as it caught fire. And, as with the still-thriving rap music scene, those critics were dead wrong.

Tony Maserati is one of the busiest mixing and recording engineers in the world of hip hop, his most notable credits coming from his work alongside mega-producers Sean "Puffy" Combs, Trackmasters, Stevie J and Rodney Jerkins. Maserati has tracked and mixed songs for Jennifer Lopez, Faith Evans, R. Kelly, Kenny Lattimore, Mary J. Blige, Will Smith and 112. Pop and R&B artists, including Mariah Carey, New Edition, Babyface, Aretha Franklin, Janet Jackson, KD

Lang, David Bowie and Toni Braxton, rely on his mixing talents as well.

Maserati got his start doing live sound in Boston, learning the ropes from his friend, Chris Rival, doing sound for a local band. His interest in sound piqued, Maserati enrolled in Berklee's production and engineering program and was part of the program's first graduating class. Three and a half years assisting at Sigma Sound gave Maserati the opportunity to work alongside some great engineers and hone his skills.

Maserati's first success was tied to his grasp of a technology many engineers were quick to overlook – MIDI. "When I came from Boston to get involved in the electronic revolution," Maserati says, "the use of

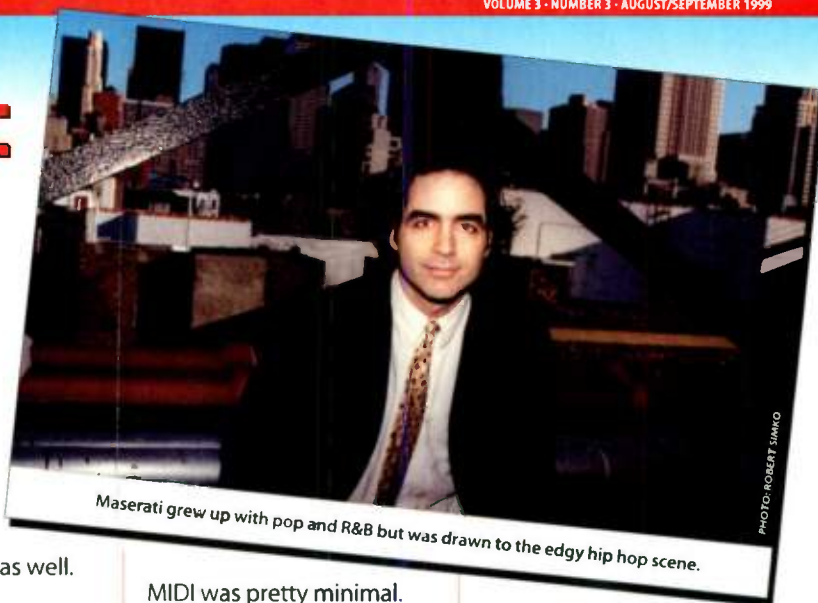
MIDI was pretty minimal. But I was fascinated by it and dived in wholeheartedly. That was probably the biggest reason for my early success, because none of the other engineers or assistant engineers really cared about it."

Maserati grew up listening to pop and R&B, but was quickly drawn to the edgy, down-to-earth hip hop scene. "Hip hop is probably closer to what rock and roll was back in the '60s and early '70s," he says. "It's rebellious and it's controversial."

Maserati is now mixing almost exclusively, citing his mixes for R. Kelly ("Holiday") and Mary J. Blige ("I Can Love You") as those most indicative of his mixing style. Maserati's mixes are known

for their powerful drums, full-sounding tracks and silky vocals. "Some of the more recent mixes I've done," he says, "like Kenny Lattimore and R. Kelly, are refinements to my style. I'm starting to venture into different territories, getting more raw and a little thicker. In my earlier mixes, I tried to make every instrument cleaner and more distinct. Now, I try to make the whole thing meld together into a more cohesive sonic arrangement."

Maserati's approach to building his fat, aggressive mixes is a familiar one. He begins with the drums. "If it's a straight-up hip hop track with a strong beat, I'll go right to the drums and make sure

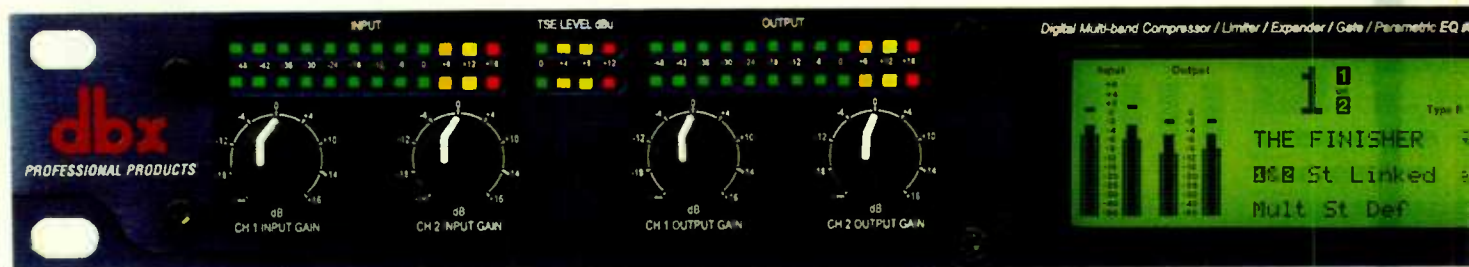


Maserati grew up with pop and R&B but was drawn to the edgy hip hop scene.

Continued on next page...

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EQ

PROJECT RECORDING
& SOUND TECHNIQUES
VOLUME 10, ISSUE 9
SEPTEMBER 1999



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ON THE COVER:

Conan O'Brien and Julie Perez in their NBC studio.
Photo by Wes Bender.

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IN AN EFFORT TO AVOID ANY MULTI-FUNCTION COMPARISON TO THAT OF A SWISS ARMY KNIFE, WE HAVE ELIMINATED THE TOOTHPICK.

SYSTEM: Type: Integrated, active near/mid-field monitor. Configuration: 2-way acoustic suspension. **Woofer:** 4.5" treated paper. **Tweeter:** 1" soft fabric dome. **Magnetic Shielding:** Full. **FEATURES/CONTROLS:** Connectors: Input: XLR, TRS, RCA. Controls: Input sensitivity: -10, +4, dB. Listening proximity: near/mid-field. Auto Power: On/Off.



SPECIFICATIONS: Amplifier power: 75W continuous rms/ch, 150W (100ms peak). Peak acoustic output: 111dB SPL (100 ms pink noise @ 1M). Residual hum/noise: <20 dB SPL (A-weighted @ 1M). THD @ 90 dB SPL: <1.0% (100Hz - 10kHz @ 1M). Response: ±2 dB (1/3 oct. swept noise): 98Hz - 20kHz @ 1M, 93Hz - 20kHz @ 2M. -6dB LF cutoff: 80Hz (in-room response). Monitor Dimensions/Wgt: 9" h x 5.7" w x 7.3" d, 14 lbs. Monitor Enclosure Materials: Cast aluminum/zinc alloy body, mica-filled polypropylene baffle.

M-00 The comparison would have been flattering, however, the M-00 is worthy of high praise on its own merit. Not only is the M-00 extremely versatile, articulate and accurate, it delivers tremendous output, along with surprising bass and clarity for a monitor of any size. And while the M-00 is built to the construction standards of a polar ice breaker, its compact nature makes simple duty out of schlepping it from one session to the next. And because the M-00 is magnetically shielded, it is ideal for use with PC based workstations. Further, it is sold separately so you can easily gang together 5.1 systems or daisy chain up to 10 M-00's per channel for fixed installations. As for the toothpick, all considered, we simply figured it was something you could learn to live without. www.nhtpro.com



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CIRCLE 67 ON FREE INFO CARD



Track 5 Track 6

VM-3100

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*Price point for VM-3100 indicated as MSRP. **Mic simulation and speaker modeling on VM-3100Pro only. Specifications and appearance are subject to change without notice. All trademarks are registered by their respective companies.

CIRCLE 41 ON FREE INFO CARD

The speaker impedance part is what throws most people (I know this since I get dozens of questions like this every month). If you have two speakers hooked up so they present a load of 8 ohms (which could be two 16-ohm speakers in parallel or two 4-ohm speakers in series), then the power "seen" by each speaker would be half of the total power delivered by the amplifier. Therefore, an amplifier putting out 200 watts into an 8-ohm load would deliver 100 watts to each of the two speakers. Furthermore, it doesn't matter if these are two 4-ohm speakers in series or two 16-ohm speakers in parallel.

If you have a pair of 8-ohm speakers in parallel, then their total load is 4 ohms. Moreover, if the amplifier will put out 400 watts into a 4-ohm load, then the power available to each speaker is 1/2 of the amplifier's total output power, which is 200 watts. These same speaker in series would present a 16-ohm load to the amp, for a total power output of 100 watts (which is 50 watts per speaker).

Four 8-ohm speakers wired in parallel will present a load of 2 ohms, which will draw 400 watts from this same amplifier, for a power of 100 watts per speakers. Now, to really make it confusing, four speakers wired in series/parallel will present a load of 8 ohms using 8-ohm speakers. In that instance, each speaker would see 1/4 of the total output of the amplifier (200 watts from the amp/4 = 50 watts per speaker).

Check out www.soundav.com/link13.html for one of my first columns on the subject.

Mike Sokol
Contributing Editor
EQ magazine
JMS Productions, Inc.
jmsokol@intrepid.net
www.soundav.com

The majority of the stuff I do is live gospel choir work with a full-band complement (drums, percussion, bass, keyboards, organ (B3 or C3), sometimes an electric guitar). How do I mic a choir properly (large choir — 40–60 voices)? I currently use a combination of SM58 and PZM mics and a Mackie 24-channel board.

Hallem Carter
via Internet

A For live work with choirs, I generally specify two or more AKG 414's. I put them on tall booms to get at least 10–12 feet of height, space them about ?? the width of the choir, and aim them down at about 45 degrees. This assumes that the band isn't directly behind the choir. Last week, I used four Audio-Technica AT4041's in the same position I just outlined, and they worked quite well. I think the key is to use a good condenser mic up high enough so that the whole choir blends. Then place one or two "spot" mics down front and get the singers to step up to the mic for their solo parts. A large-diaphragm condenser mic is probably the best choice for the spot mics, but be sure to use a windscreen since these mics can't stand significant breath blasts. If you don't have the budget for these mics (\$500 to \$1000 each), then the Shure Beta 57 is a good choice. I have used PZM's on Plexiglas panels above a choir, and while this should, in theory, work, I never liked the results. Lastly, do what you can to turn down the stage volume of the "electric" instruments, since they'll bleed into any open mic and muddy up the mix.

Mike Sokol
JMS Productions, Inc.
jmsokol@intrepid.net
www.soundav.com

IN-CHOIR-ING MINDS

Q Both Mike Sokol's Web site and the EQ site are great! I am from Ottawa, Canada, and have had about three years experience as the sound engineer for a Gospel Music conference called N.E.M.A.A.S. (Northern Exposure Music and Arts Seminar). I have found your articles on mics, mixing, and monitor levels very enlightening, especially as I have encountered almost every problem that you've identified.

ASK US

Send your questions to:
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EQ NEWS

SEPTEMBER • 1999

ARIS Welcomes SDMI Selection of its Watermarking Technology

The Secure Digital Music Initiative (SDMI) recently announced their adoption of the ARIS Technologies' digital audio watermarking system as part of their Phase I standard for portable devices for digital music. Welcoming the announcement, David Leibowitz, president of ARIS comments, "With the ARIS system as part of the SDMI requirements, the music and recording industries will have a simple and efficient means to notify consumers that Phase II technology is available so that they can upgrade their devices."

This recent SDMI announcement reaffirms the need for audio watermarking in the digital age. Having emerged as a core technology component for copyright pro-

tection architectures being developed for new digital media formats and distribution, audio watermarking technology can be used to authenticate work, deter or technically inhibit its unauthorized use, and control its functionality on compliant recording and playback devices such as DVD-Audio. The ARIS system is an active information technology solution, made up of data signals known as "embedded watermarks," that is embedded into the music and other audio and audiovisual content that provides the ability to verify and track both the performance and other commercial distribution of content distributed across various electronic and broadcast media.

Surround Professional Joins Miller Freeman PSN Inc.

Miller Freeman PSN Inc., publisher of EQ magazine, has acquired *Surround Professional* magazine and its parent company MP&A Editorial Inc. *Surround Professional* joins the ranks of *Pro Sound News*, *GLG*, *Videography*, *System Contractor News*, and, of course, EQ magazine, among many other titles.

Careful EQ masthead watchers may recognize MP&A Editorial, which has been the editorial/design consultant on this magazine since it was acquired by Miller Freeman PSN a decade ago. EQ Executive editor and MP&A president Martin Porter joins Miller Freeman PSN as senior vice president/publishing director.

In the transition, Miller Freeman PSN Inc. also acquired the assets of MP&A's subsidiary, Car Sound, LLC, which includes *Car Sound* and *Auto-Media* magazines.

ARIS recently announced its intention to merge with Solana Technology Development Corporation, and the ARIS/Solana audio watermark technology has also been adopted by the 4C Entity for its digital audio copy protection package, which includes DVD-Audio and related purposes. For additional information, visit ARIS's Web site at www.aristech.com.

On Stage Audio and Electro-Voice Produce FOX Event

Presented recently at Manhattan's Beacon Theater, FOX Broadcasting Company's "1999-2000 Primetime Upfront Presentation" was simulcast in real-time throughout the country to a host of venues in leading broadcast markets. For the event, FOX relied upon On Stage Audio (with offices in Chicago, Orlando, and Las Vegas) to design, supply, and engineer its presentation, an event FOX expects to attract most of the advertising revenue to fuel its upcoming television season. In response, On Stage Audio brought in Electro-Voice X-Array touring loudspeaker boxes and P3000 amplifiers with a host of support gear, including EV DML-1152 speakers, to help produce the event where FOX announced its new fall schedule and talent to possible advertisers.

Each of the two X-Array clusters at the Beacon consisted of three wide, three deep hang, left and right. The director for On Stage Audio/Orlando and audio designer/engineer for the FOX presentation, Paul Deuschle, explains, "FOX was going to use all three levels at the Beacon, so we required a system that could reach the en-

tire hall with extreme control, high SPL, and proper imaging. The X-Array systems and P3000 amps worked terrifically and sounded great."

Deuschle mixed the "1999-2000 Primetime Upfront Presentation" on a Yamaha PM4000 60-channel console. The amplifier system had to perform the difficult task of covering the Beacon's heights and depth dimensions. According to Deuschle, "With the X-Array boxes, they'll throw a long distance and are very directional, hitting the top balcony so we didn't have to use any delay speakers to compensate."

For more information on the Electro-Voice X-Array loudspeaker system, visit their Web site at www.electrovoice.com. Contact Paul Deuschle at pdeuschle@on-stageaudio.com.



FIRST LOOK

ROOM WITH A VU

Country Home

Country star Clint Black does it his way in his project studio

STUDIO NAME: Clint Black's Project Studio

MAIN MEN: Clint Black

CREDITS: In addition to many best-selling records, including *Put Yourself In My Shoes*, *The Hard Way*, *No Time To Kill*, *One Emotion*, *Looking For Christmas*, and *Nothin' But The Taillights*, Clint Black has also contributed songs to *Roy Rogers Tribute*, *The Prince Of Egypt* soundtrack, and *Common Thread*, a tribute to the music of The Eagles

CONSOLE: Yamaha 02R [2]

KEYBOARDS AND CONTROLLERS: Kurzweil

K2500XS; DrumKat percussion controller

MIDI GEAR: Alesis DM5; Yamaha G50 guitar-to-MIDI converter; Roland VG-8 guitar system, GR-1 guitar synth sound module, and

JV-1080; Opcode Studio 4 MIDI interface; Ensoniq ASR-10 sampler

MONITORS: Genelec 1030A powered speakers; Audio Composite Engineering #550-1521

COMPUTERS AND SOFTWARE: Apple Power Mac 9500/200 MHz, with 200 MB RAM and SCSI accelerator; Sony tape backup using Retospec software; Opcode Studio Vision 4.2.1 software

RECORDERS: Digidesign Pro Tools 4.3 for multitrack recording editing and mixing, with Digidesign 24-bit Mix Core Card, Farm Cards [2], and 888/24 interfaces [3]; HHB CDR 850 CD recorder/player

STORAGE MEDIA: Seagate Cheetah 9 GB hard drives [5]; 1.5 Syjet drive; 2 GB Jaz drive


DAT MACHINES: Panasonic SV3700 [2]

OUTBOARD GEAR: Sony R7 reverb; Ensoniq DP/4 effect processor; dbx 160XT compressor; Lexicon PCM80 and LXP15; Drawmer 1960 compressor; Tube Tech MP-1A mic preamp; Manley leveling amp

MICROPHONES: Neumann U47; various Audio-Technica mics including the AT4060; various Sennheiser microphones

POWER CONDITIONING AND BACKUP: Smart UPS APC UPS 1400

EQUIPMENT NOTES: Black states: I know just enough to be dangerous and not enough to not need everybody else around me. I'm enjoying the freedom and power that I get from something as user-friendly as the 02R's. They're sophisticated enough to do the job, but really easy to use. I don't use a lot of effects — with the 02R's, I use what's in the console. I go for the simplest route because I know I'm going to be able to do anything I need to do in mixing, as long as I'm not overloading the inputs and I try not to compress things very much.

PRODUCTION TIPS: Black continues: I don't see any difference if you have digital information going down on tape or going down on a hard drive. The only difference is that you have to stabilize the hard drives, which, to date, we have been successful at. I have found glitches even in the best studios with a noisy pot, a mic going bad, or any number of things that hold you up for a few minutes. I haven't been shut down yet. 



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- Change Velocity...
- Change Duration...
- Transpose... ☒ 1
- Select Notes... ☒ P
- Split Notes... ☒ V
- Input Quantize...
- Click ☒
- Click Options...
- MIDI Beat Clock...
- Input Filter...
- MIDI Thru ☒
- All Notes Off ☒

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CIRCLE 84 ON FREE INFO CARD

World Radio History

Fostex M77RP

Remembering the Regulated Phase transducer mic

MICROPHONE NAME: Fostex M77RP

FROM THE COLLECTION OF: Ken Avant, Avant & Associates (La Verne, CA)

YEAR OF MANUFACTURE: 1985

PRICE WHEN NEW: \$399 MSRP

TYPE OF MIC: Regulated Phase™ transducer (see notes)

POLAR PATTERN: Unidirectional

FREQUENCY RESPONSE: 40 Hz to 18,000 Hz

OPEN CIRCUIT VOLTAGE: -56 dB (0 dB = 1 volt/Pa)

OUTPUT IMPEDANCE: 250 ohms

OUTPUT LEVEL: -56.0 dBm (0 dBm = 1 milliwatt/Pa)

DIMENSIONS: 45 mm (diameter) x 172 mm (length)

OUTPUT CONNECTOR: XLR-3

MIC NOTES: Unlike most dynamic microphones, this Fostex M77RP does not fit neatly into either the “ribbon” or “moving coil” categories of dynamic microphones. Instead, the M77RP employs Fostex’s patented Regulated Phase transducer design. The Regulated Phase element — often referred to as a “printed ribbon” — is based on a flat, polyester film diaphragm upon which a fine aluminum coil is etched, using technology similar to that developed for the manufacture of integrated circuits. This diaphragm is suspended in a magnetic field, and driven with a piston-like motion for uniform phase response. The result is a lightweight and sturdy microphone element that combines the transient response of a ribbon with the durability of a moving coil mic.

USER TIPS: The M77RP features a three-position EQ switch built into a collar on the body of the mic, just below the capsule housing. When set to the position marked “0,” the mic will exhibit a slight midrange presence bump that is useful for capturing vocals. At the position marked “1,” this midrange bump remains, but a low-cut filter is added — reducing low-frequency response, and thus minimizing proximity effect. When set to the position marked “2,” both the midrange EQ and the low-cut are switched out-of-circuit, resulting in a flat response suitable for instrument recording. **EQ**



PHOTO BY EDWARD COLVER

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CIRCLE 80 ON READER CARD

Mackie D8B Console Part 2

More hints and tips on using the digital console more effectively

BY RANDY NEIMAN

Here are some of my favorite tips and tricks with the Mackie Digital 8•Bus console. These tips should, hopefully, allow the machine to help the engineer create, rather than to stymie and convolute the entire process.

LIGHT-SPEED MIXING

One thing that differentiates the D8B from most other digi consoles is the GUI, or Graphical User Interface. When a standard PC keyboard, PS/2 mouse, and SVGA monitor are attached to the Power Supply/CPU, the interface mirrors and duplicates every move made on the mixer's surface. Conversely, all moves in software display on the desk. This interface allows the user to work at a pace never before achievable: the distance between thought and reality is dramatically reduced.

Many mouse and keyboard shortcuts exist to make this process even faster and easier — here are some of the basics:

• **Clicking on the Right Mouse:** The right mouse button can perform many functions that might not be immediately apparent. A right-mouse click, hold, and swipe, for example, on the Select buttons can select multiple channels at once. In the fader section,

right-clicking on a fader and swiping in either direction will cause adjacent faders to snap to the selected fader's position. Holding Control on the console or keyboard while doing this will snap all faders to Unity; holding ALT instead snaps faders to Infinity (Off).

This also holds true for Aux Send positions in the GUI. Right-clicking on an Aux Send bar and swiping left or right will set adjacent Aux Send levels to the same level as the first clicked Aux. Pressing Control while right-clicking and swiping causes the selected Aux Sends to snap to Unity (0.00 dB) gain.

In the EQ window (both in the Overview and in the Fat Channel screens), using the left mouse button allows control over gain and frequency, while the right mouse button gives control over gain and Q settings. Quickly drawing an EQ curve with the mouse can help find problem frequencies in a flash! Remember: Find the pain, reduce the gain.

The EQ can be addressed in several different ways: from the Fat Channel area on the console (either in a 4-band mode, selecting gain/freq/Q on each band) or a single-band mode (with band and gain/freq/Q each having its own separate v-pot or

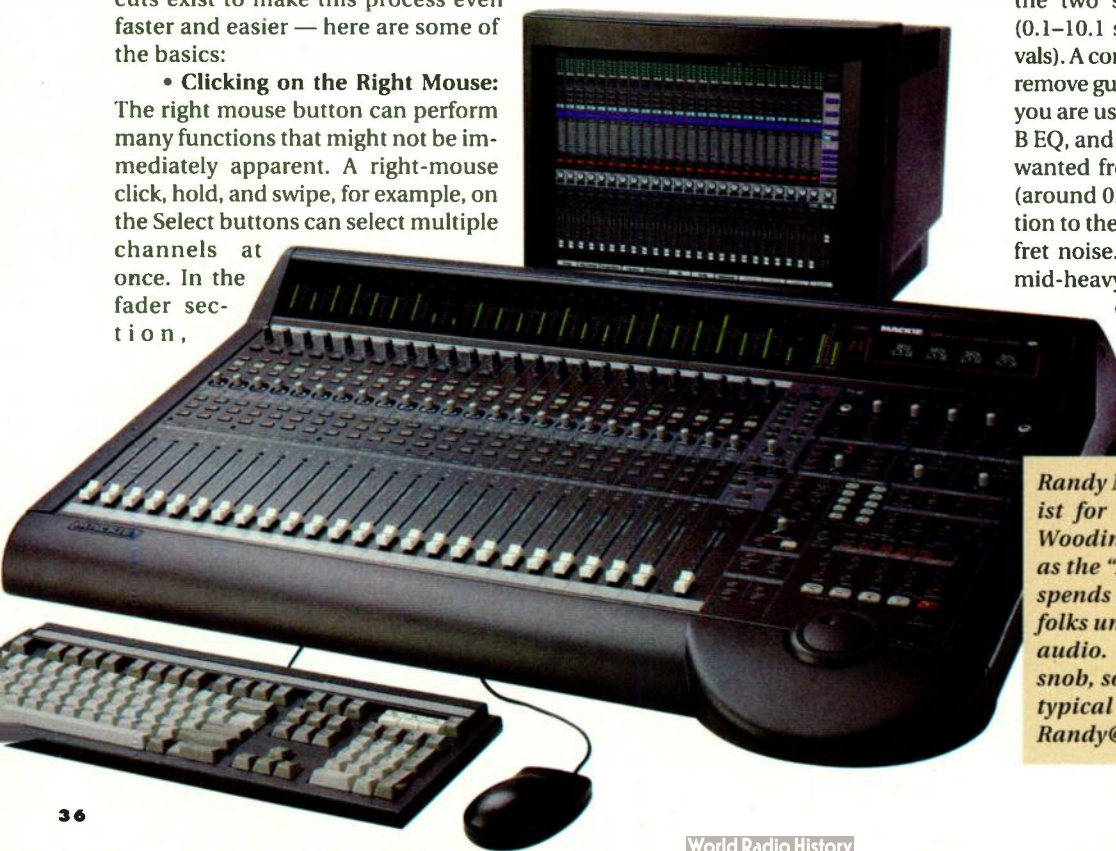
knob), in the Overview display on the optional SVGA monitor, by drawing in the channel's EQ window with the left and right mouse buttons, or by the same method in a selected channel's Fat Channel window. The mouse can also be used to turn the on-screen knobs, or change the numbers in the numerical displays on-screen, as well. Find the combination that works best for you.

• **Morphing Made Easy:** Each of the first 48 channels (your tracking and mixdown strips) has four types of EQ to choose from, selectable per channel:

1. British EQ — two parametric bands plus high and low shelving
2. British HP — a variable high-pass filter, high shelf plus two parametric bands
3. 4-band parametric — a 4-band fully parametric EQ with analog overlap points (Q from 0.2–16.0)
4. 20–20 k digital — four parametric bands with frequency ranges from 20 Hz to 20 kHz/±15.0 dB boost/cut/Q 0.2–16.0

Additionally, there are two EQ “memories” — A and B — allowing a rapid transition between EQ settings. While this change can be automated, a feature unique to the D8B allows a “crossfade” or “morph,” which interpolates between the two settings over a specific time (0.1–10.1 seconds in 1/10-second intervals). A common use for this function is to remove guitar fret noise by copying the EQ you are using, memory A, to the memory B EQ, and adding a notch filter at the unwanted frequency. A short morph time (around 0.2 sec) makes a smooth transition to the notch and back to remove the fret noise. Another trick is setting up a mid-heavy “AM radio” or “phone” effect on a voice, and using a longer (5–10 sec.) morph time during transitions. Play around and see what effects you can come up with!

Randy Neiman is a product specialist for Mackie Digital Systems in Woodinville, Washington. Known as the “Audio Guru to the Stars,” he spends a great deal of time helping folks understand the wiles of digital audio. He is also a complete beer snob, so don't offer him any of that typical bar swill. E-mail him at Randy@Mackie.com.





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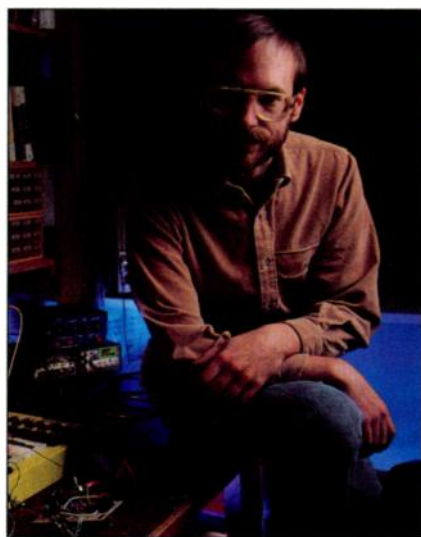
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CIRCLE 61 ON FREE INFO CARD

World Radio History

Digital Tape in a Hard-Disk World

Despite the number of hard-disk recorders out there, digital tape holds its ground



BY CRAIG ANDERTON

Ever since Alesis announced ADAT, people have been declaring that the death of digital tape was imminent. Then, however, TASCAM introduced the DA-88, and the ADAT XT, DA-38, DA-98, LX-20, XT-20 and, most recently, the Alesis M20 followed. There have even been "clone" ADAT-format machines from Fostex, Panasonic, and Studer, and a Sony clone of the DA-88 format. In addition, based on what I hear from many music stores, digital tape machines continue to sell, despite the onslaught of cost-effective, high-performance, highly editable, hard-disk-based recording systems. Why?

PLAYING GROWN-UP

Certainly, if digital tape hadn't changed with the times, it would indeed be dead. The original ADAT may have helped launch the project studio, but it's not easy being a pioneer — nor an early adopter. [EQ and its readers certainly know that! — HGL] In addition to reliability issues early on, unfamiliarity with the digital format

was also a problem (just ask those who applied analog recorder thinking to digital recorders, and ruined the heads by over-cleaning them). It also took a while to learn that the choice of tape was crucial to reliable operation. And while \$4000 seemed like a bargain for eight tracks of digital audio back in the early '90s, that's expensive by today's standards.

However, second-generation products like the XT and DA-38 reduced prices, without sacrificing performance, and, in some ways, improving on the original. Now you can buy an 8-track digital recorder for under one-third of what they used to cost, and with 20-bit instead of 16-bit resolution.

Meanwhile, during that same period, computer-based system prices nosedived, while sophistication and quality increased dramatically. Hard-disk recording systems offer many advantages compared to tape, such as exceptional editing capabilities, bit resolutions up to 24 bits, and sampling rates up to, and beyond, 96 kHz. By piggybacking on host computers, they enjoy the benefits of scale that affect all elements of the computer industry. So it would seem to be a slam-dunk for hard-disk-based systems, but there are several reasons why digital

tape just won't go away. One is that digital tape now has less in common with the analog tape it replaced, and more closely resembles the model of "removable media peripheral" for computers (fig. 1).

Format Commonality. There are a ton of ADATs out there, and a very respectable number of DA-88's. Digital tape recorders are easy to find and rent, and just about every studio has one or access to one. In a way, they've become the Zip™ drives of the audio industry: inexpensive, ubiquitous, removable media.

Just recently, I was remixing a tape in France, and the client wanted me to mix a second tune, but I didn't have enough time. Well, he has an ADAT, I have an ADAT, so he cloned me the tapes and I transferred them to my hard-disk system (coincidentally enough, PARIS) for editing. I could just as easily have transferred to a Pro Tools system, or to StudioVision, Cubase Audio, Logic Audio, Digital Performer, Samplitude, etc. — or any other program that can deal with an ADAT sound card interface.

When I record tracks elsewhere, I track on ADAT, bring the tapes home, and mix them in my studio. It seems that whenever I need to exchange multichannel audio, ADAT ends up being the "common denominator" format. A lot of companies



FIGURE 1: Emagic's ADAT Edit software, part of the Alesis ADAT Edit package, essentially treats ADAT as a removable storage medium. It transfers audio files to disk, which you can then edit, cut, mix, process, etc., and run in parallel with MIDI tracks.



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A-3340S**

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World Radio History

Mike Shipley



PHOTO BY ED FREEMAN

The versatile producer/engineer spans genres as easily as he does continents

BY MR. BONZAI

Mr. Bonzai: Why are you such a sought-after engineer?

Mike Shipley: Best to ask my clients, but I guess I have a reputation for being able to get the separation in a mix that people want but can't figure out how to get. It all started out working with Mutt Lange, whose whole concept was trying to make things larger than life — we tried to create a huge depth of field.

When did you first step into a studio?

I first walked into a recording studio in the '70s as a teenager, while living in London with my family. I was asked by my high school teacher to sing on a recording, and I was instantly bitten by the studio bug. I just knew I wanted to be an engineer.

How did you get your big break?

After returning to Australia and finishing high school, I jumped on a plane for London with a little bit of cash in my pocket. Being a big fan of Queen, I read on a record jacket that they recorded at Wessex Studios. I called the studio and asked for a job. As luck would have it, the manager liked my voice and hired me immediately, ahead of 200 other applicants. After nine months as an assistant engineer, I flew solo with a new group called The Damned, which had a number of English hits.

What was it like at Wessex when you started?

Incredible energy! Sex Pistols in one room, Queen mixing in another.

Which console did you use when you

Suspect: Mike Shipley

Ancestry: English

Occupation: Producer/engineer, with an emphasis on mixing

Birthplace: Australia

Residences: Los Angeles, Hawaii

Vehicle: Mini Humvee

Diet: Pescavorian

Mixing Credits: Shania Twain's 15-times-Platinum *Come On Over*; Semi-sonic, *For The Love Of The Game*; Dishwalla, "Find Your Way Back Home" for the *American Pie* soundtrack; Dixie Chicks' "Can't Hurry Love," Evan & Jaron's "From My Head To My Heart," and Shawn Colvin's "Never Saw Blue Like That" for the *Runaway Bride* soundtrack; Black Crowes, "Only A Fool"; Sponge, "Live Here Without You"; Blondie, "Maria"; Aerosmith, "I Don't Want To Miss A Thing"; Green Day, "Foot In Mouth"; The Cars, *Heartbeat City*; Joni Mitchell, "Dog Eat Dog"; Def Leppard, *Adrenalize*, *Hysteria*, and *Pyromania*; Tom Petty, Thomas Dolby, Fleetwood Mac, Chaka Khan, Devo, Yes, Foreigner, etc.

started out?

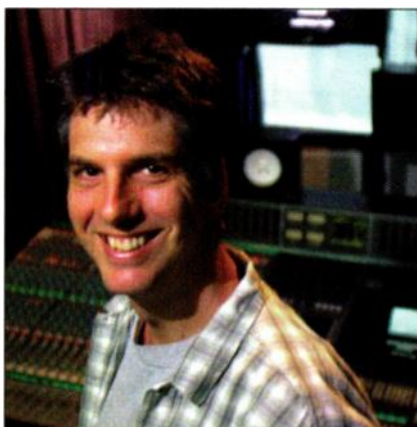
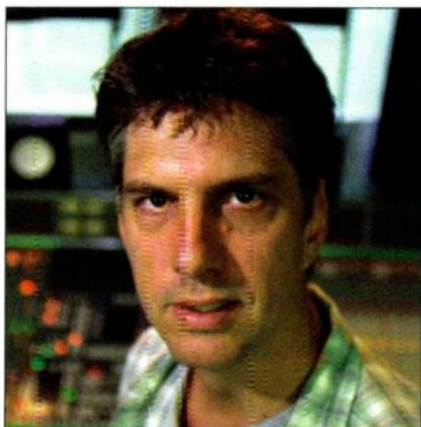
I was using a Cadac console at the time. A phenomenal-sounding board. Then I started working with producer Mutt Lange, and he asked me to help find a console for the new Battery Studios. Everyone suggested MCI because it was "cheap and cheerful," but I was intrigued by an ad I saw for the relatively unknown SSL desk. I rang up the company, and Colin Saunders himself came down to the studio with a module in a shopping bag. It had just what we wanted: parametric EQ, compressors and gates, small faders — [it was] mind-boggling what Colin had come up with. At first we couldn't get anything out of it but a scratchy radio-type sound, but we instinctively knew it was the way to go.

What was your first gig in America?

I came to New York and mixed *Heartbeat City* for The Cars, at Electric Lady. Then I came out to L.A., because many of the records I had worked on became so successful in America, even moreso than in England.

Do you have any personal favorite tools?

Yes, an SSL programmable equalizer that



MIKE SHIPLEY PHOTOS BY MR. BONZAI

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is no longer manufactured. On a lead vocal, I like to be able to memorize the EQ, take a bit of the boom out of one word, and add a bit of presence to another, making it so the vocal sits in the right place all the time. My new favorite is the Euphonix R1 hard-disk recorder.

You've recorded a number of records in project studios set up in houses. What do you need?

First, I just rent a house on the beach with a big live wooden recording space. I've found a number of great places in Hawaii,

and I usually take an 02R or a Mackie. In Hawaii, I have a lot of mic-pres — a rack of Neves, some gear made there by Gilleran, and some Demeter mic-pre/compressors that hold up well in the wet weather. I record to DA-88's or to Pro Tools and come back to L.A. and put it on tape. **In the mix phase, could you tell me the order of things?**

Before I take a job, I get a CD of the roughs and create a picture in my mind of how I am going to approach it. When I start out, I just put up a rough mix and

listen quickly to see how things fit together. After I've had all the faders up, I usually begin with the rhythm section, and, as I'm working on the drums, I'll put in basses and guitars. I just start at the beginning and work towards the end.

Where does the vocal fit in?

The vocal is always there, and I bring it in and out. It isn't left until the end, as some mixers do. I keep making sure that the space is right for the voice. I also spend a lot of time riding the vocal, and it takes as much time as anything in the mix. Rather than setting one com-



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pression level, I tend to compress the vocal less in some places — I have it multed to a bunch of channels so I can EQ and compress it in different ways in different spots. For example, certain places in the verse may need different compression than the chorus, where the singing may be harder.

Is there a point when you know the mix is finished?

Yeah — there's a point that just clicks in and you know when it works. Instinctively, there is that point.

What's your favorite board?

Well, I've always mixed on a variation of the SSL board, from the earliest B series. My favorites today are the J and the new MT.

Is it difficult mixing from so many sources?

Not really — my work these days is so varied and so much fun. I might get something solely recorded on Pro Tools, or something transferred from someone's home demo studio, or it could be recorded at Ocean Way by top-notch engineers. To me, it's all workable and has character. When it comes to mixing, you have so

much flexibility these days to enhance, or do additive sampling — it's all great to me.

What's wrong with the music industry?

It is what it is. I try to look at it in the most positive way I can — I can't get hung up on what's wrong. I just have a good time and do my work as best as I can.

What do you listen to while you're driving?

I have a 20-CD changer that has everything from Radiohead, Smash Mouth, and Flaming Lips to *Blue* by Joni Mitchell. I listen to music all the time, and it's always changing.

What did you learn from Mutt Lange?

Patience in the studio.

Do you have any business advice for engineers?

I'm the last person in the world to ask about business advice. Thank goodness, I have a good manager now. I've spent my life working my ass off in the studio, and, like many of us who concentrate on the music, we're ripe to be ripped off. Get a good retirement plan.

What makes a great producer?

Not letting ego get in the way of the process.

Any advice for getting a good start as an engineer in today's world?

Go for it. Don't overanalyze it. Dive in. And, if you possibly can, learn how to record things acoustically — that's fundamental to me. When I was an assistant, I was fortunate to have great teachers like Bill Price and Geoff Emerick. If I asked a question, they would take the time with me and not just tell me something — they would demonstrate different ways of miking. Geoff would say, "I can't explain it in words, I've got to show you."

How do you like your job?

I wake up every day feeling so lucky that I can have this much fun doing what I do. I look into the control room — fantastic! It just blows my mind how great this business is and how much fun it is, working with people and their music. I thank my lucky stars every day. **EQ**

One fish two fish red fish blue fish

In an ocean full of nearfield monitors, it is almost impossible to know whether or not you will make a good catch. That is, until now. Clearly, there are two distinctively different monitors on the scene. Tannoy Reveal and Reveal Active. Sure, they feature the latest in transducer technology, cabinet integrity and styling, but clearly what sets them apart is performance. Dual high speed mosfet amplifiers are driven by beefy toroidal transformers. The amplifiers are divided by precision active filter networks that combine to help you clearly navigate the murky depths of your next mix, no matter how many fathoms deep it is. But let's face it, they're all just fish stories until you listen for yourself. Go ahead, stick your toes in the water at your nearest dealer and find out why the New Tannoy Active Reveal is catching on!

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CIRCLE 65 ON FREE INFO CARD

The Human Touch

Engineer Bernie Kirsh shares his technical views, as well as tips for relating to the artists you work with

BY BOBBY OWSINSKI

Bernie Kirsh has made his mark as one of the top engineers in the world of jazz. From virtually all of Chick Corea's records to working on Quincy Jones's Back On The Block (which won a Grammy for best engineering), Bernie's recordings have consistently maintained a level of excellence that few can match. Although technical expertise is all-important for an engineer these days, Bernie tells us that there are other, more human requirements involved in recording as well, in another excerpt from my upcoming book Mixdown.

EQ: Can you hear the final mix before you start?

Bernie Kirsh: It depends on whether I've tracked it and I've been into it. If it's not something that I've tracked and overdubbed, then I'm discovering it as I'm mixing. But often, especially in the jazz world, it's much simpler because I start out with wanting each individual instrument to have a pleasing quality. There's a preconceived notion I have of what that is. If you're talking about straight-ahead jazz, there's a balance that's been accepted as part of the form. In that world, the cymbals are important, the position of the bass, piano, where the horns sit — all that kind of stuff we've listened to for decades. It's kind of a traditional form, so that's somewhat predefined. If you move away or want to make a variation of that, then you're on your own. If it's something more in the electric vein, and something that I've worked on, then I'll come up with a notion of where I want it to go.

How do you build a mix? That is, where do you start?

The first thing I look for is the melody. After that, I'll go for the bottom of the mix.

The bottom being the bass?

The bass usually. I don't necessarily go for the drums first. Before I hit the rhythm, I usually try to get the melody and some sort of harmonic setup first because I want that to be clear. Then, I'll often shape the rhythm to accommodate that. So that's the simplicity of it. If it's something that's harder hitting, I'll spend more time with the rhythm to get those guys pumping together.

Are there certain frequencies that you seem to come back to that need attention on certain instruments?

Let's say for piano, which I've dealt with a lot, what happens typically is that, in the analog domain, it loses definition and openness if it's mixed some time after it's been recorded.

Therefore, I'll usually boost in a couple of areas. First, up around 15k (sometimes that is lowered down to 10 or 12, depending on the instrument), and maybe a little midrange at 3k or 5k. It depends on the instrument and setting, but that's typical. I'll do the same thing usually with cymbals. I'll typically add between 12 and 15k on cymbals. Those are the EQ areas I find myself constantly using.

The frequencies that you adjust seem to be a little different from those in R&B or heavy metal...

With this kind of music, it's all about trying to go for more of a natural sound, for lack of a better phrase. So, if there's going to be any hype at all, it's going to be with the loudness button, where you get



PHOTOS BY EDWARD COLVER

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With the Yamaha 01V, you can create the exact same mix every time, right down to the EQ settings on input 12. That's because the 01V digital mixer lets you save every detail of its 32 parametric EQs, 22 limiter/compressor/gates, two 32-bit effects processors and 15 motorized faders. Then, when the time is right, you hit one button and recall the mix precisely and instantly. And, with an external sequencer, you can even let the 01V perform the entire mix. So last night's performance sounds exactly like tomorrow's.



The 01V comes with 24 inputs, 6 busses, 6 aux sends and 12 mic preamps. If that's not enough for you, link 01Vs together to create a much larger digital console without paying the price. In fact, the 01V comes in at a paltry \$1,999, far less than the cost of all the "external" digital gear it includes free.

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CIRCLE 72 ON FREE INFO CARD

World Radio History

the larger bottom and accentuate the top. Normally, if you're going to add anything else to a piano, for instance, you're in the 500 Hz range adding some warmth. However, I find sometimes that, when I finally get to mastering, the mastering engineer wants to take some of the warmth out for clarity purposes with just a little notch around 200 or 300.

Therefore, my tendency is to go for the warmth and then sometimes wind up taking some of that back out to achieve a little more definition or clarity later, if needed.

Do you have an approach to panning?

No, I normally keep things wide: drums in stereo; piano open. I personally like a wide piano. I like when it feels like you're sitting at the instrument.

You do it wide, left to right?

Yeah, wide left to right. I position everything as the player is seeing it rather than the audience. So the drums are from the drummer's perspective, piano's from the pianist's perspective, etc., unless there's a leakage situation where I have to worry about the phase. If, for instance, the piano and the drums are in the same room, I have to make sure that the cymbal is appearing in the right place and isn't smearing because of the leakage into the piano.

Of which projects are you the most proud?

What I'd like to do is delineate between the musical experience and the audio experience because they're two different things. There are albums that I did early on that, musically, I enjoy, and, I think, at the time were sonically enjoyable. One was an album called *The Leprechaun* by Chick Corea. That was 20 years ago. The reason it was a lot of fun was that we just did live recordings in those days. You had the horns, the strings — if there were strings — and the rhythm section playing all at once.

It was the most fun because you became part of the creative process. It's actually not a process at all; it's a different

kind of craft — a different type of musical creation. So I do enjoy that.

Although I didn't do the mixing, I did do some recording on Quincy Jones's *Back on the Block* record a few years ago. That was a great experience, and it won the Best Engineering Grammy Award. I learned a lot doing the record because it was so different than the jazz world, flying parts in and around, and using techniques that may not be used in straight-ahead jazz. **There was such a cross-pollination of different types of music on that album...** On that record, I was recording rap, R&B, straight synth parts.... It was a playground in there. It was so much fun. Working with

how they've been treated by other engineers? There are certain basic things that occur in that little microcosm called a studio that many engineers don't recognize. You're getting into some basic human sensibilities that may not be apparent as you look at it. For instance, you have artistic creation going on. You have a person who has come into the room, who has done something that's very, very close to whom he or she is. It's not PR. It's not show. It's something that they hold very, very dear to themselves. Now they are, for lack of better words, open and vulnerable, and they're not being social.

So now you've got an engineer in the room whose attention isn't on that. Often you get engineers who, through various different bits of behavior, will invalidate the artist, evaluate for the artist, and not respect the frame of mind that the artist is in when wanting to make his or her musical statements. In other words, not looking at what the artist is doing at the moment. I think you'll find that the best engineers, the ones who artists want to work with, have a notion that what the artist is doing is important and is something that needs to be treated with attention and respect. When I say that, I mean not to hold it up on a pedestal, but to understand that the action is something that's very close to the artist,



a person like Quincy was just a fantastic experience in itself because he is a genius. He's a superb musician, and he knows how to work with creative people. He understands it and he gets people to do what they do best. **Is there a certain psychology you use when recording?**

I wouldn't call it psychology, but it's in the realm of human interaction. I've had people approach me and say, "Why don't you tell people how you deal with others?" meaning that they felt good during this creative process, whereas in some instances they haven't.

So what's the difference between how I was treating them as opposed to

and not just a commodity.

For some reason, the creative process is different in the jazz world. Musicians are coming in, not necessarily to lay down just a rhythm track, but with the idea of making music. Therefore, I put a lot of attention on making the players happy with what they're hearing and make it comfortable for them. I don't work with a lot of engineers, so I don't see it, but, from the feedback I get, a lot of the younger guys don't recognize that element as really important. It seems like the job is really 10 percent technical. The rest of it's how you work with people and help them get what they want. **EQ**



INTONATOR

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Preserving integrity is a must when dealing with delicate human vocals. By dramatically reducing the amount of re-takes needed, you minimize the risk of fragmenting and potentially destroying the emotional integrity and consistency of the artist's expression.

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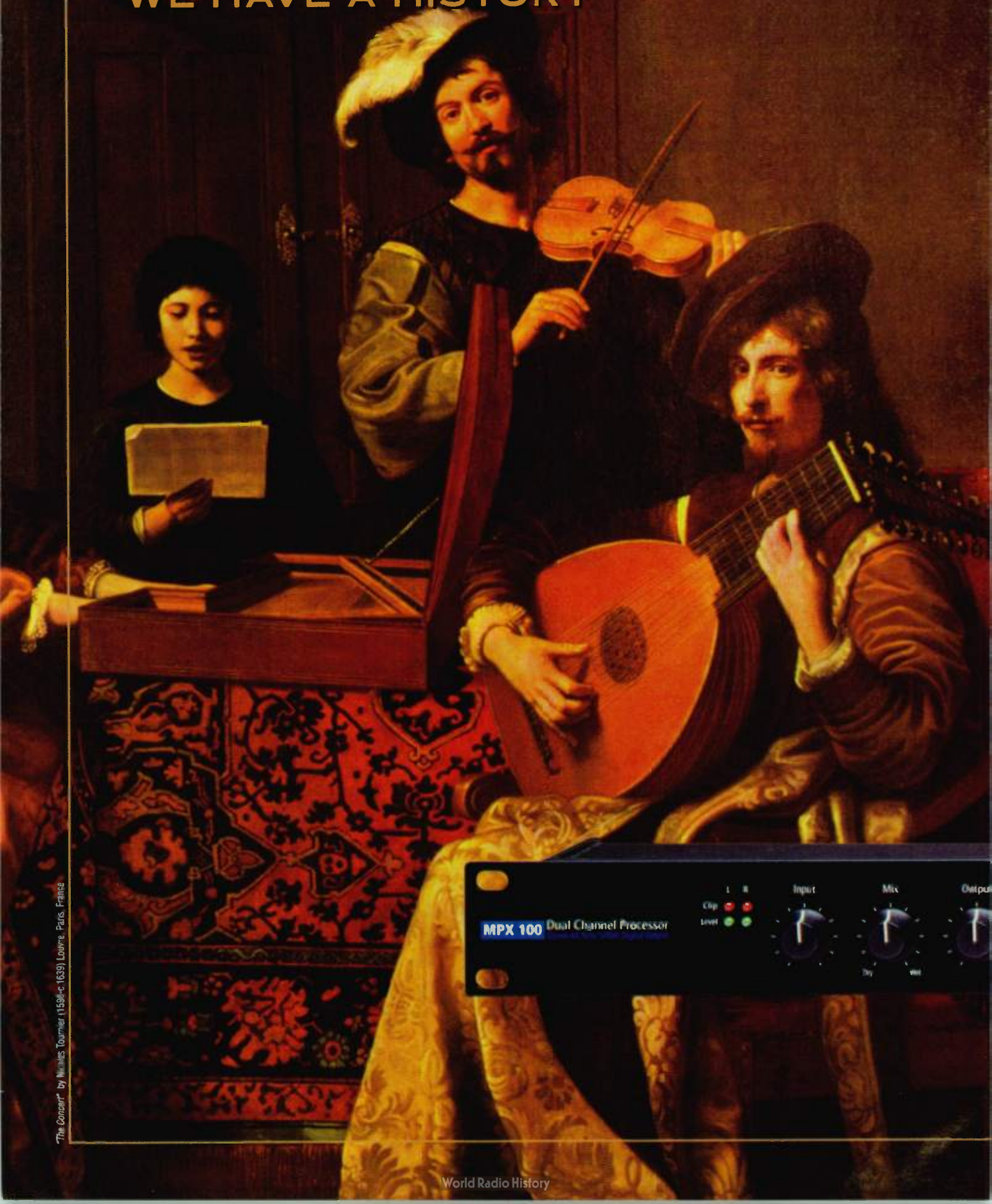
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\$899 List



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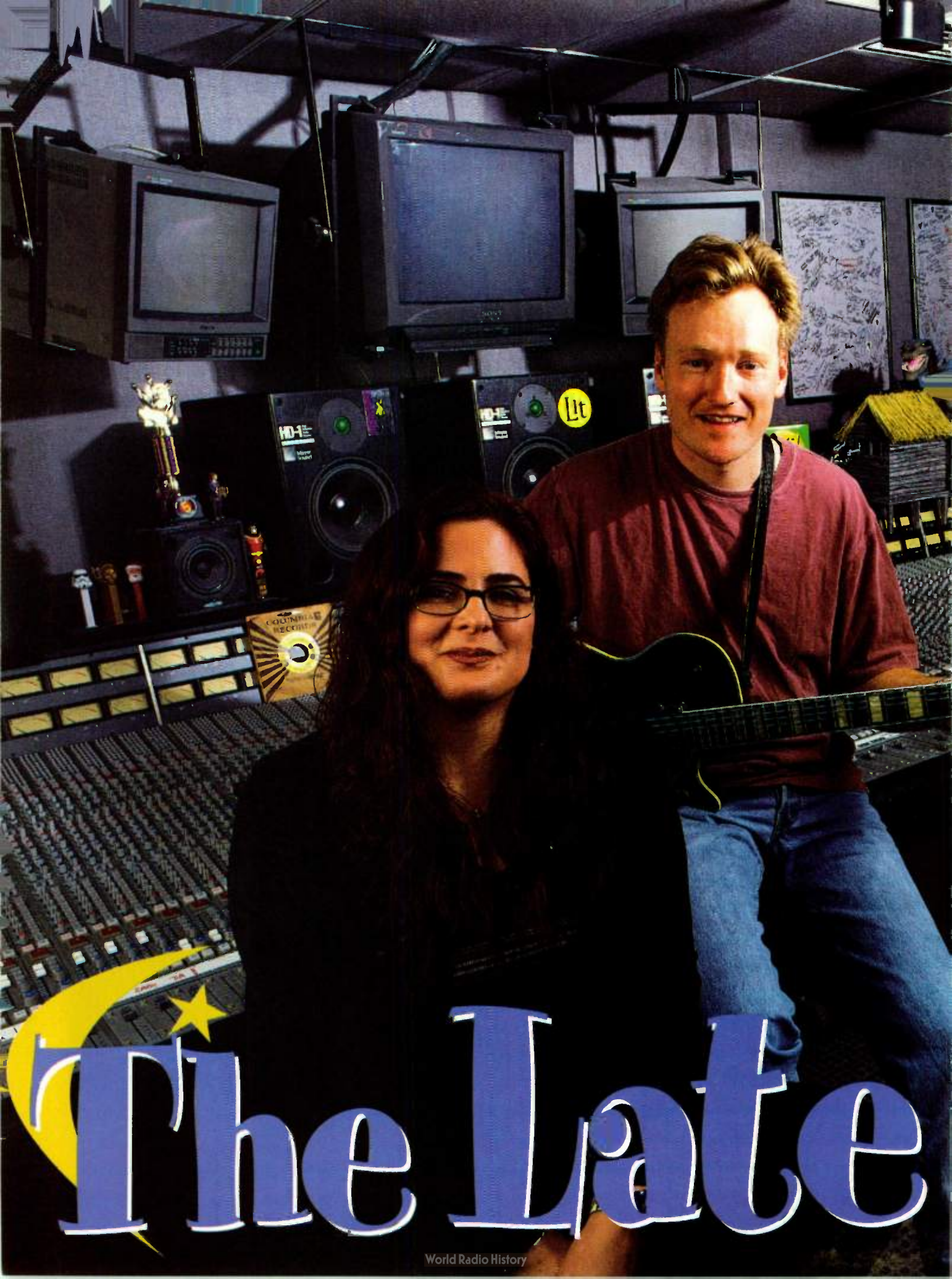
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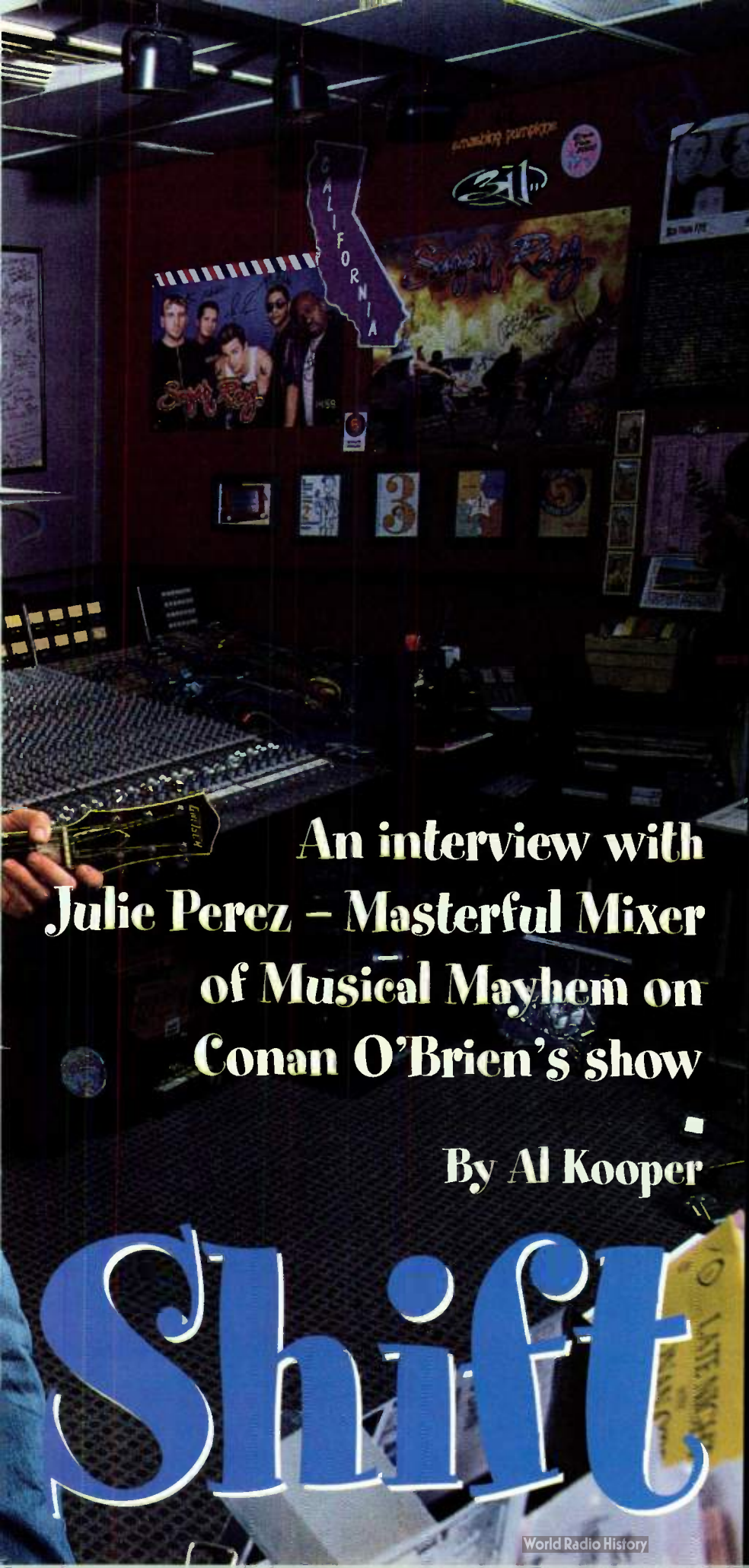
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CIRCLE 38 ON FREE INFO CARD
World Radio History



The Late



An interview with Julie Perez – Masterful Mixer of Musical Mayhem on Conan O'Brien's show

By Al Kooper

Shift

World Radio History

five years ago, I was a musical guest on *Late Night with Conan O'Brien*. At the time, two members of my current working band, plus many old friends, made up the house band, so I was pretty comfortable playing and singing with them. After an afternoon run-through of the song we were doing, my guitarist, Jimmy Vivino, motioned for me to follow him.

We walked through a labyrinth of hallways and wiring and came to the door of the recording booth. We walked in, and Jimmy introduced me to Julie Perez, who records and mixes the music for the show.

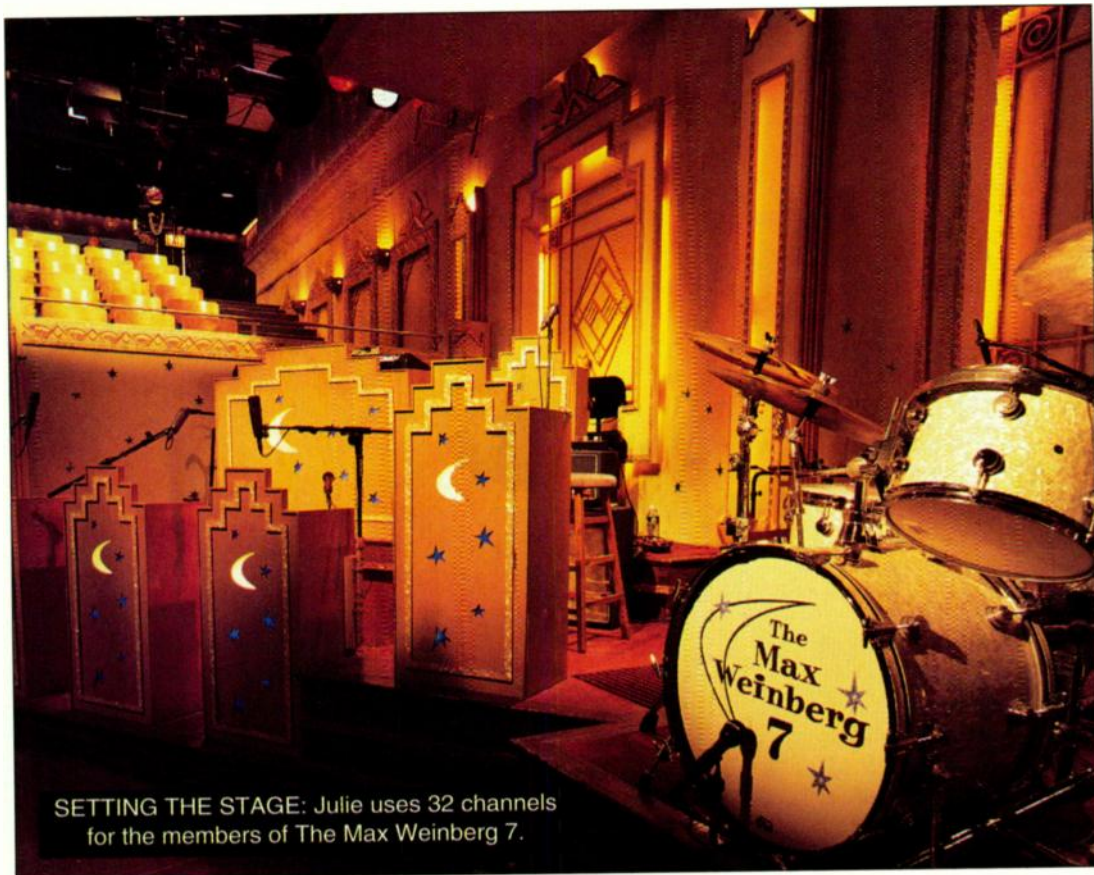
"Wanna hear how ya sound?" she inquired.

"Absolutely," I shot back, not quite sure what she meant.

She had recorded the run-through without my knowledge and, as it unspooled, I thought to myself: "Hey — this sounds better than the recorded version!" When it finished, she asked me if there were any mix problems, and I suggested she follow the dynamic range of the vocal a little bit more in the louder sections.

The Late Shift

PHOTOS BY WES BENDER



SETTING THE STAGE: Julie uses 32 channels for the members of The Max Weinberg 7.

"No problemo!" she laughed, and I told her that the mix of horns and rhythm section sounded better than our current record. She turned red and thanked me profusely. As Jimmy and I walked back to the dressing rooms, I told him I thought she was monstrous.

"She really is," Jimmy said. "And easy to get along with as well."

Now it's five years later, and I've been on the show twice more since then. I'm thinking to myself, people need to know about Julie — she's the best. So I talked my editors at *EQ* into a Julie feature, and it wasn't very difficult. They knew who she was! Turns out this gal I thought was barely out of college had really been around.

Probably none of her fellow students at the U of Miami had any idea how far music technology major, Julie Perez, was gonna soar. Her instructor, Bill Porter (former Elvis Presley engineer — in the studio and FOH on the road), knew that this bright, eager, ambitious student was going places,

*She had recorded
the run-through
without my knowl-
edge and, as it un-
spooled, I thought:
"Hey — this sounds
better than the
recorded version!"*

and he invested the best of his knowledge in Julie. With such a veteran of the consoles behind her, she was bound to succeed.

After school, she impulsively made the coastal crawl up to New York City to jump headfirst into television knob-twirling, her career of choice. Shortly thereafter, in dizzying succession, Julie was making music sound amazing on the Bob Costas interview show *Later*, *The Phil Donahue Show*, *Friday Night Videos*, *Letterman*, and then finally she settled into *Saturday Night Live*, working alongside mixer Jay Vicari. It was there that she came to the attention of producer

Lorne Michaels, who was just starting to put together the Conan O'Brien late-nighter.

Julie had charmed virtually all of her employers with her undeniable talent and enthusiasm, which were contagious the moment you entered her booth. The day I interviewed her, she had a Luscious Jackson song on the speakers blaring over and over. "Wassup with that?" I asked. "Well, they're on the show tonight doing this particular song, and I wanted to get as familiar with it as I could before they arrived," she answered. Good idea, I thought, but how many people would go through the trouble?

Stacey Foster, Lorne Michaels's technical consultant, knew who would, and hired Julie as the music mixing majorette domo for the upcoming *Late Night* series. He was familiar with her from *Saturday Night Live*, Lorne Michaels's other show, and thought it was time she had a little more responsibility. Foster allowed her to customize the control room just the way she wanted it. After all, she had worked here before on *Saturday Night*, *Letterman*, and *Costas*. She knew the room.

COOL FRONT. SERIOUS BACK.



HHB CDR850 CD RECORDER

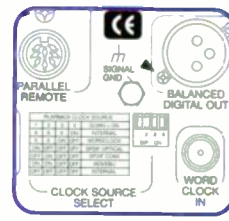
One look at the back panel and it's easy to see why the HHB CDR850 leaves other CD recorders where they belong: in the bedroom! XLR and RCA analogue inputs and outputs, an AES/EBU digital input, optical and coaxial SPDIF digital I/Os and parallel remote control, the CDR850's comprehensive connectivity perfectly complements its class leading sound quality and ease of use. And if you work entirely in

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CIRCLE 30 ON FREE INFO CARD

World Radio History

The Late Shift

With a massive SSL G series 80-input (!) console and a Sony 3324 multitrack (her children from SNL), she fashioned quite a room for herself. However, the multitrack never made it to air. Instead, she took a chance on the TASCAM DA-88 configuration that had just come out. She installed 40 tracks of digital heaven in a miniscule amount of space. The gods were with her, and she never had a lick of trouble with the 88's. In '97, she had new heads put on all the machines. Her fantasy, however, is to upgrade to a hard-disk multitrack recorder, which she feels would speed up the pre- and postproduction aspects of the show. For monitors, her faves are Meyer HD-1's. They've been with her virtually since she started in TV.

Recently, a CD of the best of the musical guests on *Late Night* was released. Entirely engineered by Julie, it contains six live mixes and six remixes, a tribute to her on-the-fly acumen and embracing of old-school engineering principles. How many engineers in today's pop alternative music world could stand behind a live mix they did as the whole band played together and release that commercially with no further mixing? How many

engineers today even use a microphone? But ahhh...I digress.

Surrounded by Japanese toys and discarded lewd cue-cards from the show, Julie's World has a lived-in look. You feel comfy the moment you sit down. Two imposing racks contain all the help an engineer could ever request (of course, Julie won't think so!), including UREI limiting and compression, Drawmer gates, Tube Tech EQs, and various Lexicon and Yamaha sound processing. (See sidebar.)

Julie's mic locker got me aroused in an audio kinda way: I admit I fantasized about borrowing these babies and toting 'em down to my project studio. Highlights include Beyer M88, AKG 451, AKG 426, CAD VSM-1, Neumann TLM 193 and KM 184, Electro-Voice RE20, Shure SM91, '98, '57, '87, and Sennheiser 855, 409, and 441.

Here's how the console is laid out for recording and mixing The Max Weinberg Seven (*Late Night*'s house band):

SSL 4000G 80-input console:

- 1 Kick — Beyer M88
- 2 Kick — SM91

- 3 SN top — SM57
- 4 SN bottom — AKG 451
- 5 Hat — AKG 451
- 6,7 Toms — SM98's
- 8,9 Overheads — AKG 426 stereo mic in XY configuration
- 10,11 Open for guests sitting in with band or comedy-skit music
- 12 Bass — Tube DI — Music Valve Electronics by Mat Priest

RACK STORY

Outboard Signal Processing

Left rack from top to bottom
 Drawmer DS201 Dual gates
 UREI LA-4 comp/lim
 dbx 902 De-essers
 Neve 33609/C Stereo comp/lim
 Tube Tech PE 1B EQs

Effects

Right rack from top to bottom
 Eventide H3000 SE
 AMS S-DMX delay, pitch bend, sampler
 AMS rmx16 reverb
 Yamaha REV 5
 Lexicon PCM70
 Yamaha SPX 90
 Roland SDE3000A
 Lexicon 224X and 480L

Also new: POD Line6 as fx device



13 Bass — Aquilar tube mic preamp
14 Gtr — CAD VSM-1 TUBE mic on Vivino's CD-100 Diaz Amp
15 Acous gtr — Line 6 POD DI
16 Tpt — Neumann TLM 193
17 Sax
18 Bone
19,20 Piano DI
21,22 Synth 1 DI
23,24 Synth 2 DI
25,26,27 Organ Hi L, Hi R, Lo (Leslie speaker under audience seats), SM57's, and RE20
28,29,30,31,32 Horn player and Vivino vocals — Sennheiser 835's and 855's

There are 32 channels for seven guys. In addition, there are 38 channels available for guest bands (the guest band stage is 20 x 18 if you're having your own little fantasy and wonder if you'll fit) and 10 channels of effects returns. They're certainly getting their money's worth out of that SSL over at NBC as the show celebrates its sixth anniversary in September of '99.

Despite run-ins with unnameable adversaries along the way, with the musical guests and production staff, gender has never been an issue in Julie's career. She's always been the best person for the job, and it doesn't matter in audio, believe me. There is precedence all over the recording world for women in high places; albeit not enough of them. Not unlike an audio engineering Rosa Parks, Julie should stand as a icon for any woman with the talent, ambition, and people skills to hold down her end of the console in the music business!

EQ



...AND JUST REMEMBER, IT'S NOT EASY BEING A WOMAN: Pictured above is a souvenir cue card of an unrelated Julie taken from a past show.

POD

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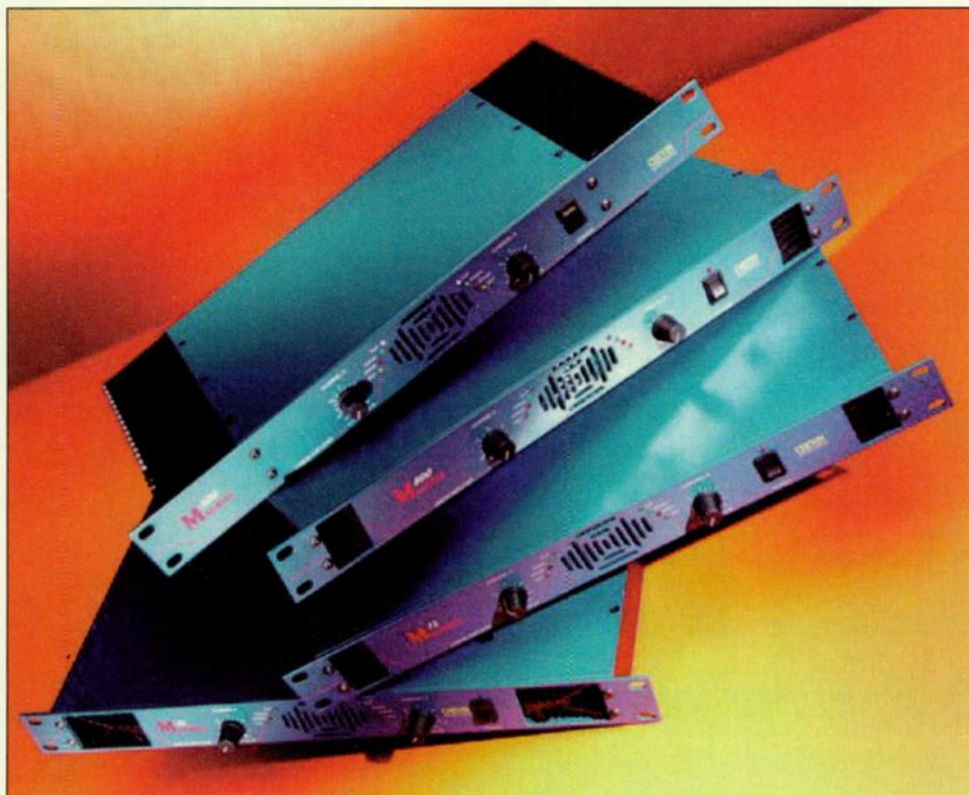
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World Radio History

CIRCLE 19 ON FREE INFO CARD

RECORDING PRODUCTS AT THE millennium

AS WE APPROACH THE FINAL AES CONVENTION OF THIS CENTURY, IT OCCURS TO US THAT THE PRODUCTS INTRODUCED WILL BE THE FIRST NEW PRODUCTS OF THE NEXT MILLENNIUM. THESE PRODUCTS SET THE TONE FOR HOW RECORDING WILL BE DONE IN THE YEAR 2000 AND BEYOND. CHECK OUT THIS SNEAK PEEK AT AES, AND TAKE NOTE OF WHAT THE FUTURE OF GEAR HOLDS.

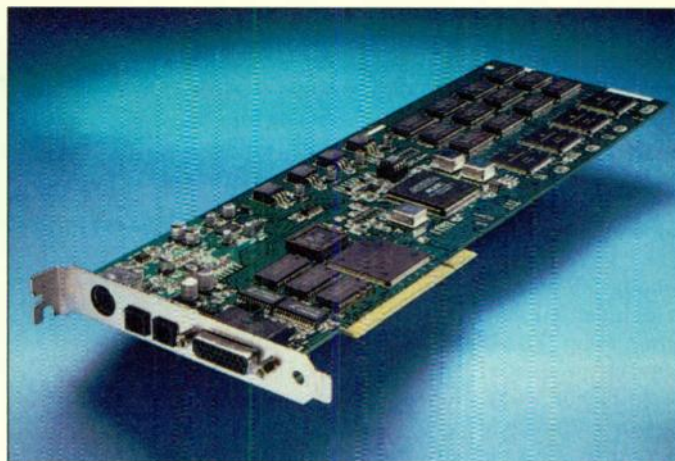


M IS FOR MORE POWER

Chevin Amplifiers is introducing the new M Series. Comprised of four PA standard stereo amplifiers, the M Series is capable of handling 300 to 550 watts at 4 ohms/channel. Lightweight (from 11 to 19 lbs.), the M Series delivers Chevin performance and sound quality in a one-rack space unit. Features include full front-panel indicators of signal and protection status, high slew rate, discrete driver stage, high-spec components, wide input voltage range, surface-mount technology, XLR input sockets, and Speakon output sockets. For more information, call Chevin Amplifiers at 860-434-9190 or fax them at 860-434-1759. Circle EQ free lit. #116.

AUDIO OASYS

Korg USA's OASYS PCI is a state-of-the-art computer card that integrates synthesis, effects processing, and computer audio input and output into a single audio card. The OASYS PCI includes over 100 effects algorithms. The majority of the effects from Korg's Trinity workstation are included — everything from standard reverbs, choruses, flangers, phasers, overdrives, and amp simulations, to unique effects like random filter, stepped phaser, doppler shift, and talking modulator. New effects include tempo delays and envelope and LFO-swept filters. The OASYS PCI features a total of 12 inputs and outputs. All I/O are 24-bit, and can be used simultaneously with compatible multitrack audio software. For more information, call Korg USA at 516-333-9100 or fax them at 516-333-9108. Circle EQ free lit. #117.



GUITAR STUDIO UPGRADE

Cakewalk has announced the release of Guitar Studio 2, a major upgrade for the industry's first and only multitrack recording software designed just for guitar players. New features include real-time tablature display and editing capabilities, improved fretboard editing, new Session Drummer MIDI plug-in, AmpSim Lite vintage amp simulation audio plug-in, up to 16 tracks of audio (doubling the original software's eight tracks), and up to 16 simultaneous real-time audio effects. Cakewalk Guitar Studio 2 has a manufacturer's suggested retail price of \$249 and is available immediately. Guitar Studio customers are able to upgrade for \$59 plus shipping and handling. For more information, call Cakewalk at 888-CAKEWALK or go to www.cakewalk.com. Circle EQ free lit. #118.

COMBO DEAL

Avalon Design is now shipping the VT-747SP, a combination stereo tube-discrete spectral opto-compressor with Class A 6-band program equalizer. The VT-747SP features a stereo Class A opto-compressor with built-in 2-band parametric sidechain for spectral control, stereo Class A 6-band discrete passive program EQ, Tube Signal Path (TSP) vacuum tube bypass, large gain reduction VU meter, twin 60 dB range LED output meters, internal regulated power supplies, extremely high headroom (+34 dB input before overload), and low noise (-92 dB unweighted). The suggested retail price is \$2495. For more information, call Avalon Design at 949-492-2000 or check out www.avalondesign.com. Circle EQ free lit. #119.

REACH THE SUMMIT

Summit Audio introduces the EQ-200 4-band equalizer designed by Rupert Neve. Featuring Class A analog circuits, the EQ-200 features switchable shelving or peaking filters for the low and high frequencies, sweepable low midrange and high midrange frequencies, and high- and low-pass filters offering a rolloff rate of 12 dB/octave. The filters can be stacked, offering a steep 24 dB/octave rolloff. As part of the *Element 78* line, the EQ-200 is fully controllable by a second EQ-200 or by the MPE-200 mic pre/EQ. For more information, call Summit Audio, Inc. at 831-464-2448, fax them at 831-464-7659, or visit www.summitaudio.com. Circle EQ free lit. #120.



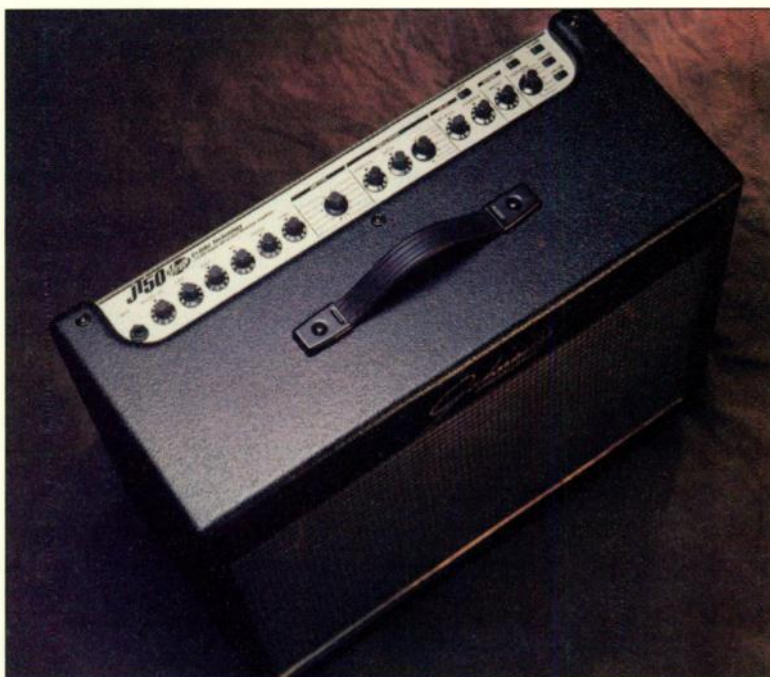
LEXICON'S LATEST

Lexicon's latest enhancement for its Studio System, the LDI-10T interface, is an I/O solution providing affordable analog inputs and outputs for hard-disk recording systems. The Lexicon Studio System's hardware components provide I/O options, DSP, signal routing, and synchronization for leading industry software packages based on PC or Mac computer audio production systems. The LDI-10T feature set includes ten simultaneous audio channels — eight analog (TRS balanced 1/4-inch) and two digital channels of S/PDIF (coaxial RCA) switchable input gain — 24-bit AD/DA conversion, and a 1/4-inch Timecode Input. In addition, Lexicon offers the LX3 multi-interface adapter, which allows as many as three LDI-10T's to be linked together, providing 24 channels of 24-bit analog, TRS balanced I/O, and three pairs of S/PDIF I/O. For more details, call Lexicon at 781-280-0300, fax them at 781-280-0490, or visit www.lexicon.com. Circle EQ free lit. #121.



MORE THAN A MIRAGE

The JT50 Mirage 50-watt 1 x 12 guitar amplifier combo is the most affordable modeling amp that Johnson Amplification has ever offered. The amp models a dozen of the world's most sought after modern and vintage amplifiers. Tone controls accurately emulate the authentic EQ points of each specific amp model, while Johnson's exclusive V•Tube digital technology delivers the dynamic response akin to a real tube amplifier. Once guitarists have dialed up their Amp Type and adjusted the Gain and Tone controls to suit their tastes, they can add up to three effects to complete their sound. There are also seven Modulation and Pitch Shifting effects, Delay (up to 2.5 seconds with Tap-It tempo), and two Reverb types (Programmable Hall and Spring Reverb). A stereo FX loop is also available for external effects processors and pedals. The JT50 Mirage is available for \$649. For more details, call Johnson Amplification at 801-566-8800 or fax them at 801-566-7005. Circle EQ free lit. #122.

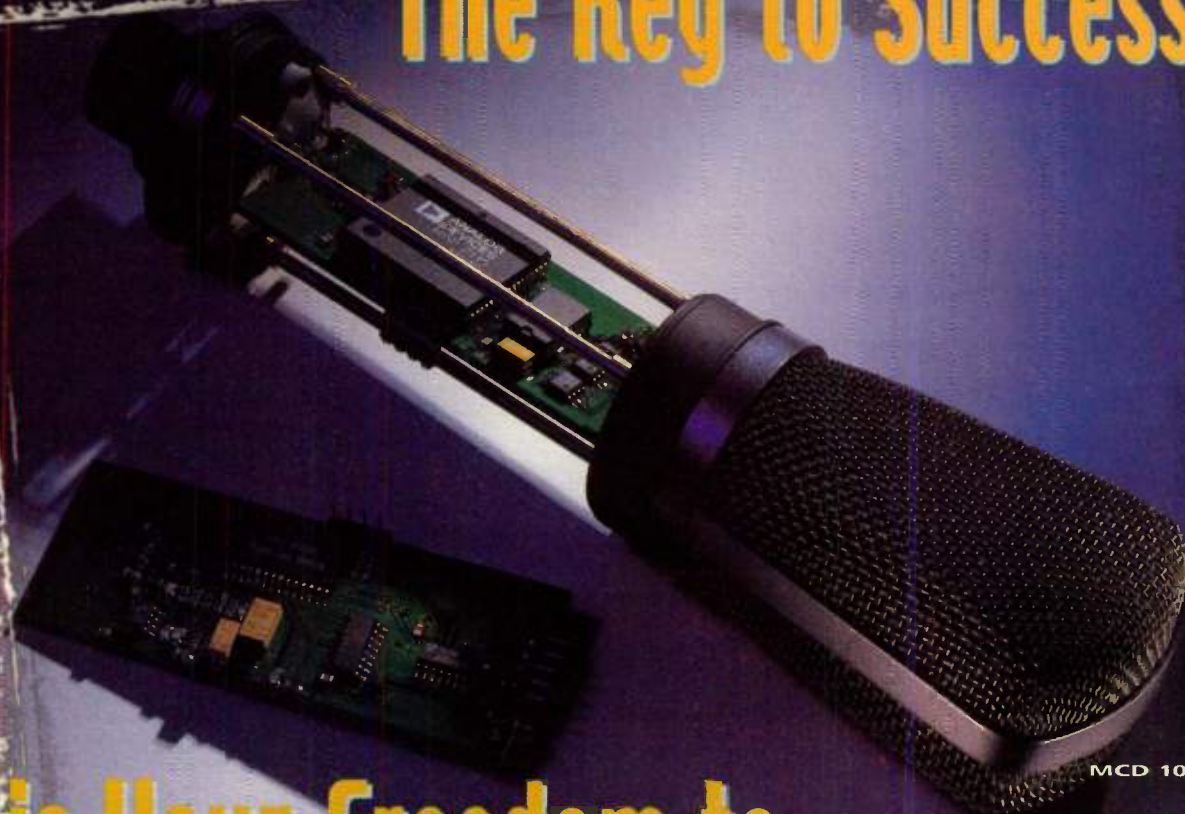


MAKE YOUR MARK

Mark of the Unicorn (MOTU) has announced the 308, a one-rack-space 24-channel audio interface for computers that will be sold as an expansion I/O for MOTU's 2408 and 1224 hard-disk recording systems for MacOS and Windows 95/98. The 308 adds eight channels of AES/EBU digital I/O, eight channels of RCA (coax) S/PDIF digital I/O, and eight channels of optical (TOSLink) S/PDIF digital I/O. The 308 can also be used as a standalone format converter. The 308 interface connects to one of the two extra "Audio Wire" jacks on the MOTU PCI-324 card in a core 2408 or 1224 system. All 24 of the 308's digital inputs and outputs immediately become available to all compatible host audio software. The 308 provides 24-bit digital I/O for all three formats at both 44.1 and 48 kHz. The 308's list price is \$695. For more information, call Mark of the Unicorn at 617-576-2760, fax them at 617-576-3609, or visit www.motu.com. Circle EQ free lit. #123.



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- Gold vapor, true condenser capsule
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MC 740:

- The best true condenser microphone available anywhere. Multi-pattern with equalization. Remote control available.

MCE 90:

- Ultra-low noise, large diaphragm condenser microphone ideal for the home and project studio. Shockmount is included.

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- Single pattern, large diaphragm true condenser microphone for recordings demanding absolute transparency in recording.

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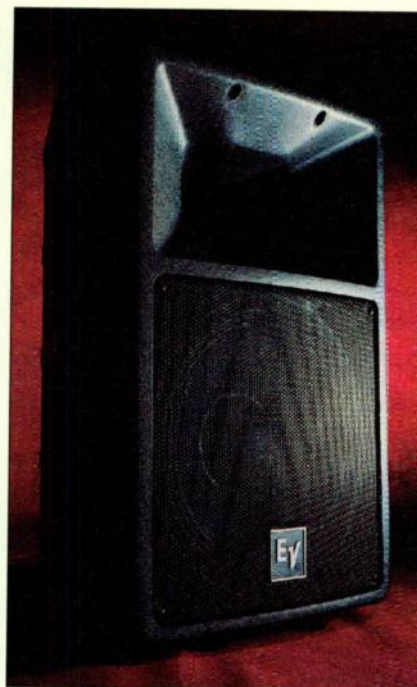
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PORT-A-SOUND

Electro-Voice introduces the Sx100+ 200 watt, 2-way, portable speaker system. The advanced design of the Sx100+ system combines speaker performance with a rugged, molded polypropylene structural foam cabinet, yielding a portable, easy-to-mount system. The Sx100+ is a lightweight speaker design incorporating a 12-inch woofer and one-inch exit compression driver with integral horn, yielding an axial frequency response of 80 to 25,000 Hz. Long-term power handling is rated at 200 watts with a maximum woofer acoustic output of 7.8 watts and a system sensitivity of 99.5 dB. For more information, call Electro-Voice, Inc. (EVI) at 616-695-6831, fax them at 616-695-1304, or visit www.electro-voice.com. Circle EQ free lit. #124.

MIXTREME UPGRADE

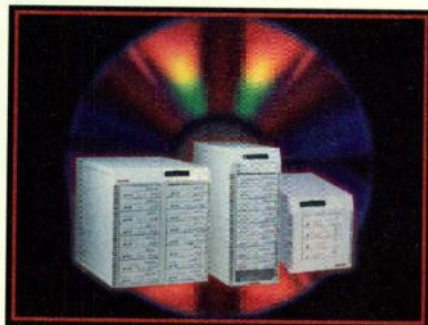
Soundscape has released V1.05 of its MIXTREME driver and mixer software. The new software adds surround mixing and panning elements to support the recently announced Dolby Surround Encoder/Decoder plug-in and multichannel support for the

Nemesys Gigasampler in their native GSIF format. As with the MME and ASIO drivers for MIXTREME, the GSIF driver is extremely low latency (under 10mS) and is multicient. For further information, call Soundscape Digital Technology at +44 (0)1222 450120, fax them at +44 (0)1222 450130, or go to www.soundscape-digital.com. Circle EQ free lit. #125.



BURNING FOUR YOU

MediaFORM presents the CD-5400 CD-R duplicator, capable of duplicating up to four CDs simultaneously without the need of a PC (host). The CD-5400 is a self-contained unit that can be configured to meet users' production requirements. With its simple one-button operation, users can easily copy directly from their master with no read-in required. In addition, multiple masters can be stored to the CD-5400's internal A/V rated hard drive. The unit is also DVD upgradeable. For more information, call MediaFORM at 610-458-9200, fax them at 610-458-9554, or visit www.mediaform.com. Circle EQ free lit. #126.



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CIRCLE 89 ON FREE INFO CARD



PERCUSSION SOLUTION

Audix has come up with a solution for drummers, percussionists, live sound engineers, and studio engineers — microphone packages designed specifically for percussion instruments. Based around the acclaimed D Series dynamic microphones and a new condenser mic (ADX-50), Audix has configured a variety of kits to fit the professional needs of just about any budget. The kits consist of four different packages, ranging from three microphones to six in each package. The full kit contains one D1 (snare), two D2's (toms), one D4 (kick drum), and two ADX-50's for overheads. The D-Series mics combine VLM (very low mass) capsule technology, hypercardioid pickup patterns, ultra-fast transient response, and the ability to withstand sound pressure levels in excess of 140 dB without distorting. The packages range in price from \$931 to \$1755. For more information, call Audix Corporation at 503-682-6933 or check out www.audixusa.com. Circle EQ free lit. #127.

MIDI MASTER

Building on Akai's MPC2000, the company's new MPC2000XL adds a host of hardware and software features. The MPC2000XL combines a sampling drum machine and a 64-track sequencer to create a unique musical instrument. The unit features 16-bit stereo sampling and 32-voice polyphony and comes equipped with 2 MB RAM — which is expandable to 32 MB with widely available standard SIMMs. Each voice features dynamic resonant filters, new time stretch capability, graphic cut-and-paste sample editing, and resampling capabilities. The MPC2000XL also includes built-in flash ROM for the operating system. The unit's 16 velocity and pressure-sensitive drum pads can be programmed to four separate banks, providing up to 64 sounds per program at the touch of a button. For more information, call Akai Musical Instrument Corp. at 817-831-9203, fax them at 817-222-1490, or visit www.akai.com/akaipro. Circle EQ free lit. #128.



CRITICAL LISTENING

The 2029A Digital Stereo Monitoring System from Genelec is a compact, two-piece, nearfield monitor system designed for sound professionals working in a wide range of critical listening environments. The 2029A is based on the 1029A two-way analog active monitor speaker. The monitor is designed to accept either S/PDIF digital audio or conventional analog audio inputs. The 2029A's digital interface is built into one of the speaker system's enclosures and, like all Genelec active monitors, the system includes built-in amplifiers. A built-in D/A converter has an interpolator that increases the internal sampling rate to 128X and yields a dynamic range of better than 101 dB. Low frequencies are reproduced by a 5-inch driver, which is magnetically shielded in a vented enclosure made of cast aluminum. The suggested price is \$1325. For more information, call Genelec, Inc. at 508-652-0900, fax them at 508-652-0909, or visit www.genelec.com. Circle EQ free lit. #129.



START DUPLICATING

Microboards Technologies introduces the StartREC CD duplicator. With support for up to four 8X recorders, StartREC provides the user with analog and digital inputs, and requires no host system operation. The unit offers a professionally designed user interface, and can be used in both rackmount or desktop configurations. Automatic CD format detection allows the user to begin duplication by pressing one button. The control panel features LCD input levels and time display. For more information, call Microboards Technology, Inc. at 800-646-8881, fax them at 612-556-1620, or visit www.microboards.com. Circle EQ free lit. #130.

MOUNT

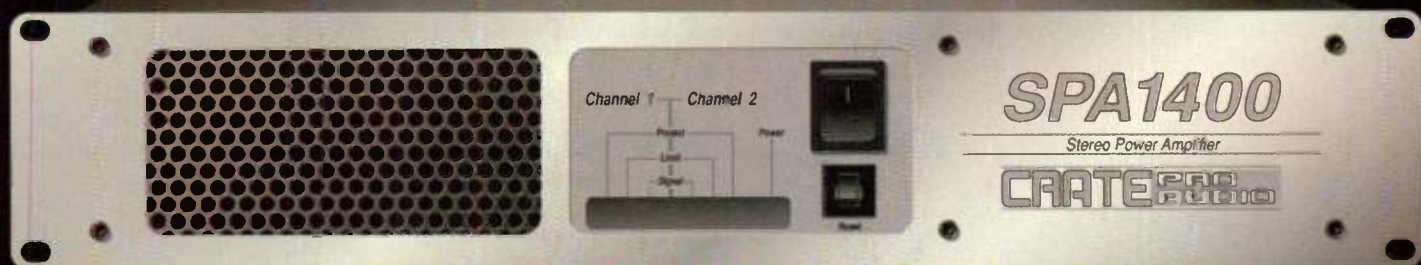
THIS



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SPA1400C

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The new SPA1400C will operate with up to 660 watts in stereo at 2 ohms or up to 1320 watts mono-bridged at 4 ohms. They feature two variable-speed fans and a massive amount of heat sink to keep cool in the most demanding situations.

The SPA1400C includes a built-in 24dB/octave, 2-way Linkwitz-Riley electronic crossover, giving you the flexibility to feed the upper range to Channel A, while the low range goes to Channel B, or vice-versa. This fully functional 2-way crossover is variable up to 2500Hz so you can use it for highs to mids as well as for sub-woofers. Balanced XLR thru jacks are switchable giving you the ability to pass the input signal out to other amps in your rack pre or post-crossover. In the "post" (or crossover out) mode, the XLR thru jacks will reflect the same crossover setting allowing you to send those signals to other amplifiers. So if you've set channel A for your high frequencies, then the channel A thru jack sends only those frequencies.



Additional Features of the SPA1400C

- Built in 24dB /octave 2-way Linkwitz-Riley electronic crossover. Variable from 40Hz to 2.5kHz
- Assign lows to channel "A" and highs to channel "B" or vice-versa
- 12dB /octave Variable low cut filters
1= per channel w/ defeat switches
- XLR Male "Thru" connectors selectable pre/or post crossover
- Outputs assignable below or above crossovers point.
- Parallel Mono Switch
(Signal paralleled after crossover out)

With your purchase of the SPA1400C, you have saved:

- Buying an external crossover
- Buying extra patch cables
- A rack space

Savings totaling more than \$200.00 all in one very convenient package!

CRATE PRO AUDIO

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START DUPLICATING PERFECT PRISM

Rimage Corporation has announced the release of the Perfect Image Prism Printer. This unique CD-R printer is the first thermal-transfer printer to offer full-color capabilities. Incorporating dry thermal processing, the Prism Printer enables the user to print customized, on-demand graphics and text directly on the surface of the CD without affecting data integrity. This process dries instantly and will not smear, fade, or wash off. Rimage's exclusive thermal technology delivers images directly onto standard media and keeps pace with high-volume production. For more information, call Rimage Corp. at 800-445-8288, fax them at 612-944-7808, or go to www.rimage.com. Circle EQ free lit. #131.

LET'S GET SMALL

The Lc5.75 is the latest addition to Westlake Audio's Lc Series Monitor Speaker System; it is also the company's smallest monitor yet. The Lc5.75 is a two-way mini monitor that offers precise imaging and solid low-frequency response from a compact size. The speaker employs a 5-inch woofer with a 3/4-inch tweeter in a single port enclosure and has a frequency response of 60 Hz–18 kHz. Ideal applications for the Lc5.75 include mobile recording environments, project studios, and quality control stations. For more details, call Westlake Audio at 805-499-3686, fax them at 805-498-2571, or check out www.westlakeaudio.com. Circle EQ free lit. #132.



FINALLY...A NEW MACKIE

The 1642 VLZ PRO is the first completely new high-end professional compact mixer offered by Mackie in over four years. Features of the mixer include 16 channels (8 mic/line, 2 mic/stereo line, and 2 stereo-line); Mackie's new XDR professional-grade mic preamps; 48-volt phantom power; eight TRS channel inserts; 60-mm long-wearing log-taper faders; 3-band active EQ with sweepable midrange on mono channels; and more. The suggested retail price is \$999. For more information, call Mackie Designs at 425-487-4333, fax them at 425-487-4337, or visit www.mackie.com. Circle EQ free lit. #133.



THEY'RE GR8

Allen & Heath expands its Contractor series of dedicated installation products with the launch of the GR8A, the first 8-channel amplifier on the market. Among the GR8A's features is a unique monitoring system that allows direct speaker line monitoring of each amplifier output from a front-panel headphone socket or rear-panel monitor socket. For more information, call Allen & Heath at 801-568-7660, fax them at 801-568-7662, or visit www.allen-heath.com. Circle EQ free lit. #134.



DOUBLE DUTY

TASCAM introduces the CD-A700 CD player and auto-reverse cassette deck.

The unit's flexible output architecture includes balanced XLR and unbalanced RCA analog I/O and coaxial (S/PDIF) digital output. The unit features a 12 percent pitch control (both CD and cassette) and D-sub 15-pin parallel control. The CD-A700's CD and cassette operations work individually of one another except when operating the CD-to-cassette dubbing feature. With the CD Sync feature, duplicating program material from CD to cassette is as easy as a single-button command. Other features include CD/cassette continuous play, individual counter (for both CD and cassette), Shuffle Play, Repeat Play, Intro Check, Program Play, Single Play, Fader Start/Stop, Event Start, Stop, Track Skip, and Play Tally. The retail price is \$649. For more information, call TASCAM at 323-726-0303, fax them at 323-727-7635, or check out www.tascam.com. Circle EQ free lit. #135.



RIGGING IT RIGHT

Polar Focus' ZBeam is the first-ever volume-manufactured rigging system designed specifically for professional sound reinforcement, audio, video, and lighting equipment installations and applications. The Polar Focus ZBeam rigging system can be used in almost any and all permanent, mobile, and modular system installations and applications. The ZBeam ZB-20-880 is designed to provide fast and effective rotational control around a vertical z axis for balanced suspended loads. For more details, call Polar Focus at 877-GO POLAR, fax them at 413-582-0095, or go to www.allenproducts.com. Circle EQ free lit. #136.

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x True Balanced I/O

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It All Adds Up... the Wave/824

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If you're thinking that buying a recording interface with professional 24-bit resolution, balanced I/O and Windows® NT or Mac support will cost an "arm and a leg," think again. We invite you to do the math – we think you'll find the Wave/824 is the winning equation!

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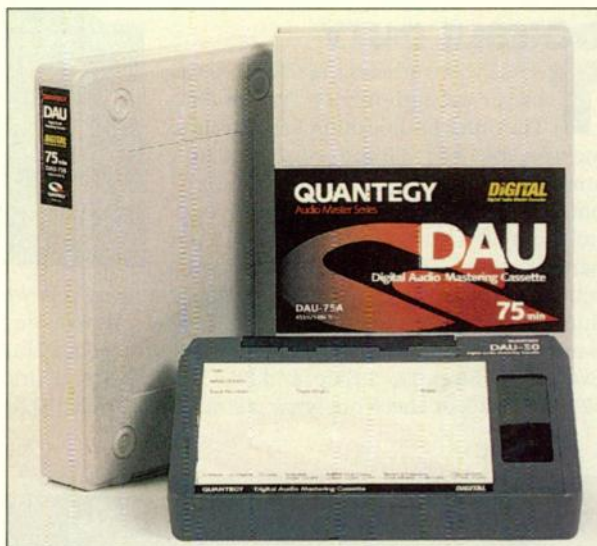
Pricing is suggested retail price for United States. Gadget Labs and Wave/824 are trademarks of Gadget Labs, Inc. Other names mentioned are trademarks or registered trademarks of their respective companies. Prices, specifications & availability subject to change without notice.

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MORE MICS FROM GT

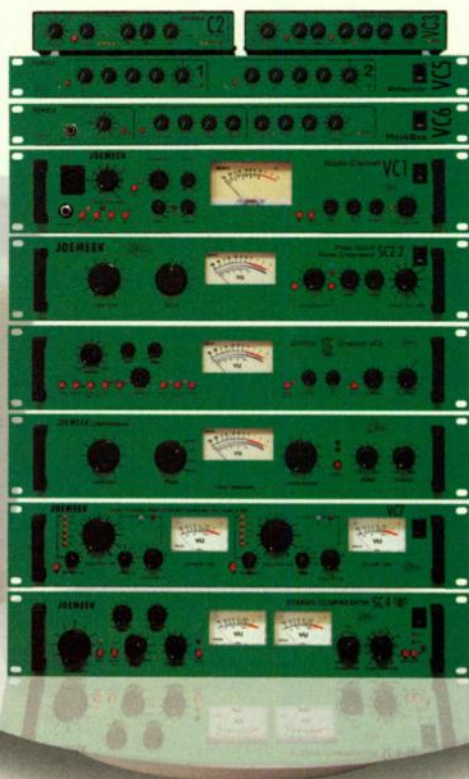
GT Electronics' introduces three new models to the AM Series of condenser microphones — the AM30, AM40, and AM11. The AM30 and AM40 are both slender front-addressed mics designed for close miking of all types of acoustical instruments and guitar amplifiers. The AM11 is a large-diaphragm condenser microphone designed for lead vocals and equally well suited to miking acoustic instruments. Like the other mics in the AM Series, these new offerings represent a collaborative effort between Alesis and long-time vacuum tube manufacturer and microphone and amplifier evangelist Aspen Pitman. The new AM Series mics are scheduled to ship to dealers this fall. List prices are \$399 for the AM11, \$499 for the AM 30, and \$799 for the AM40. For more information, call GT Electronics at 310-255-3495, fax them at 310-255-3481, or visit www.alesis.com. Circle EQ free lit. #137.



DAU JONES

Quantegy introduces the new DAU 3/4-inch digital mastering cassette. The cassettes are available in 30-, 60-, 75-, and 83-minute play lengths to accommodate short and standard recording times for audio cassettes and CD mastering times. The new formulation offers a longitudinally oriented, cobalt-modified, gamma ferric oxide designed to offer accuracy. For more information, call Quantegy at 334-745-7643 or visit www.quantegy.com. Circle EQ free lit. #138.

Got Meek?



No Matter How You Serve'em, Nothing Stacks Up Like A Meek!

There are hundreds of compressor limiters for sale in the world. Some offer extra knobs and facilities, yet all miss the fundamental point that a compressor was invented to produce a psychoacoustic effect of power and dynamics and not to perform any electronic protection.

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THE SOUND OF THE STARS

Electro-Harmonix has announced the reissue of the classic analog flange/chorus pedal that Kurt Cobain, Adrian Belew, and others relied on to create their signature sounds — only now, it's in stereo and it has an improved signal-to-noise ratio. The stereo chorus, chiming flange, slapback echo, and rotating speaker emulation are some of the unique effects possible with the Stereo Polychorus. The user-friendly layout gives the creative musician total control over the creation and manipulation of custom sounds, including the over-the-edge effects that made this pedal legendary. Four switch-selectable modes — Filter Matrix, Flange, Chorus, and Double Track — can be subtly shaped and manually swept by the Width, Rate, Tune/Delay, and Feedback controls. The suggested retail price is \$275. For more details, call Electro-Harmonix at 212-529-0486, fax them at 212-529-0486, or visit www.ehx.com. Circle EQ free lit. #139.

DO A LITTLE DESK

The Edit Center Desk Systems from Middle Atlantic Products incorporate an adaptive design that can be quickly configured to suit a diverse range of user preferences. Offered with a choice of two high-pressure laminate tops — cherry or graphite — Edit Center Desk Systems combine the aesthetics of custom furniture with the convenience of configured system ordering and quick shipping from stock. Features include a built-in cable management system, side bay racks, and height adjustment capability. Suggested retail prices begin at \$3000. For more information, call Middle Atlantic Products at 973-839-1011 or visit www.middleatlantic.com. Circle EQ free lit. #140.



C-NOTE

Hafler's new C-Series amplifiers are designed for the audio engineering market. The Series consists of live sound amps (SR), commercial contractor models for fixed install (CCA), and cinema models for fixed install (CCX). Hafler will release three models for each application. Availability of the 300- and 600-watt units is scheduled for November/December. The 1200-watt unit will follow next year, and will include Hafler's own twist of Class D technology. The live sound amps are basic, with crossovers available, as well as digital amplifier control circuitry. The contractor amps will have 70- and 100-volt line outs for restaurants, bars, retail stores, airports, etc. For more information, call Hafler at 888-HAFLER1 or fax them at 602-894-1528. Circle EQ free lit. #141.

CHANNEL YOUR CREATIVITY

The Pro Channel from ART features many new design enhancements, including the addition of a Variable Mu circuit to the compressor module. The Pro Channel allows users to select between ART's optical/ tube compressor or the Variable Mu circuit. The unit's 4-band parametric equalizer has selectable Q for the two sweepable mid-bands. These Q options were fine-tuned by some of the industry's top engineers. For more information, call ART at 716-436-2720, fax them at 716-436-3942, or check out www.artroch.com. Circle EQ free lit. #142.



PUTS MIXING IN A WHOLE NEW LIGHT



VM-200 With its completely digital operation, motorized 60mm faders, built-in ADAT Lightpipe™ interface, and much more, the new VM-200 is the first professional mixer that's as savvy as the rest of your digital studio. 44.1kHz CD-quality digital audio, 32-bit internal processing, dual onboard A.S.P. (Advanced Signal Processor) multieffects processors for instant access, easy programming, storage, and recall of settings—it's all in there. And despite its wealth of features, the VM-200 is exceptionally affordable and its operation couldn't be simpler. See for yourself: the VM-200 is the brightest way to mix.

the perfect combination

The perfect companion to the VM-200, the new, all-digital VR-800 offers eight channels of sparkling 44.1kHz digital recording on your choice of media.



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TC ELECTRONIC INTONATOR

BY MIKE SOKOL

*NOW YOU CAN FIX VOCAL AND OTHER
SINGLE-NOTE SOUNDS WITH THE FLICK OF A
SWITCH (AND THE TURN OF A KNOB)*



CHER SUPPOSEDLY NEEDS IT. TONY ORLANDO CERTAINLY COULD
 HAVE USED IT. AND, OCCASIONALLY, I REALLY WANT IT. SO CAN
 YOU GUESS WHAT CHER, TONY, AND I ALL HAVE IN COMMON? PITCH
 CORRECTION. YES, EVEN THE BEST (AND WORST) OF US SINGERS
 NEED A LITTLE HELP WITH PITCH. AND NOW IT COMES IN A BOX BY
 TC ELECTRONIC CALLED THE AUTOMATOR. FIRST, THOUGH, A FLASH-
 BACK. I REMEMBER A PARTY CONVERSATION I HAD WITH A WANNABE
 SOUND ENGINEER SOME YEARS AGO. HE SAID HE REALLY WANT-
 ED TO LEARN HOW TO RUN A BIG CONSOLE AND BE ABLE TO TURN
 A KNOB TO FIX A SINGER IF THEY WENT A LITTLE FLAT OR SHARP.
 OF COURSE, I GAVE HIM THE 30-SECOND LESSON THAT A TONE
 CONTROL OR EQUALIZER DOESN'T CORRECT PITCH. IT ONLY
 CHANGES THE GAIN WITHIN A CERTAIN FREQUENCY RANGE. BUT
 NOW, WITH THE DEVELOPMENTS IN DIGITAL AUDIO, ALL SORTS OF
 RECORDING AND EDITING TRICKS ARE COMMONPLACE THAT WERE
 IMPOSSIBLE A FEW DECADES AGO. ONE MORE BARRIER HAS BEEN
 HURDLED: YOU CAN FIX SOMEONE'S PITCH, AND YOU CAN EVEN DO
 IT LIVE IF YOU WANT TO BY SIMPLY TURNING A KNOB.



TC ELECTRONIC INTONATOR



One of the things we always worry about when recording tracks is getting the vocals in pitch. In addition, huge amounts of studio time (read money) are consumed in getting a track that not only has the right feel and emotion, but also is in key. Therefore, like many engineers before me, I've spent many hours "comping" together the perfect take from a bunch of related tracks. This is not only difficult on the engineer; it's exhausting to the singer as well. And with today's multitrack environment, even a studio of modest means has essentially unlimited tracks for retakes. Yes, you can cut 50 or 100 or even 1000 takes if you like (I think my record was 60 takes once), but not many performers and budgets will put up with that sort of abuse. What we need is a way to simply correct little pitch problems without dragging the singer back into the booth kicking and screaming (unless of course, that's the nature of the performance). Some digital editing systems, like Pro Tools, have plugins that will allow you to pitch correct a single note or track. But what if you're in a tape-based situation — is there a way to do this without breaking the bank?

Well, TC Electronic has come up with a product that does the job with quite serious authority. Called the Intonator, it's a 1 RU vocal coach in a box. Now, it's not going to turn a poor singer into the next Mariah Carey, but it will do a huge amount of tightening up of the vocal pitch and allow you to correct that one sour note that spoiled an otherwise perfect take.

Connections are included for balanced analog (XLR), S/PDIF in both optical and coax flavors, AES/EBU, and ADAT Optical. Note that, while this is a stereo unit, there's only a single channel of pitch processing, so you can't fix a duet in one pass. The second channel does allow you to split out the de-esser and low-cut processor to a separate independent channel, if desired. A large display keeps track of things like digital lock, what scale your performance is in, and the current note being sung. Moreover, LEDs above each key selection button display the note currently playing. I found this very informative to watch since I could quickly pick out a few notes from the pattern and tell what key the song was in. The coolest part of the front panel is a dual rubber-band-like display that shows how far off the singer is from the correct pitch, along with how much correction is taking place.

The pitch correction parameters include: the type of scale (major, minor, chromatic, or custom), an ad-

justable capture window up to ± 200 cents from correct pitch, variable attack time and correction amount. A large rotary knob labeled "Pitch" functions both as a manual control to "nudge" a note up and down and to adjust the internal pitch reference for those times when you weren't recording at perfect 440-A concert pitch. All of these functions are selectable and storable via the MIDI port to an external sequencer. Note that all controls except for the setup functions are available as dedicated pushbuttons and rotary knobs. This makes for a very quick interface where you can quickly try out what a setting will accomplish.

The auto-correct features worked surprisingly well. Of course, you need to tell it what notes to expect; hence the major/minor scale and key settings. If you don't happen to understand all this scales business, you can simply set it to Chromatic scale (which is all the white and black keys on a piano) and the processor will pull your track to the nearest half-step. The custom scale allows you to pick just a few notes to be corrected; maybe that high C that your singer just can't quite reach without going flat. And the MIDI Out port will output a data stream of pitch information, which you can store and later edit in a sequencer for tweaking just a few notes.

INTONATOR AT WORK

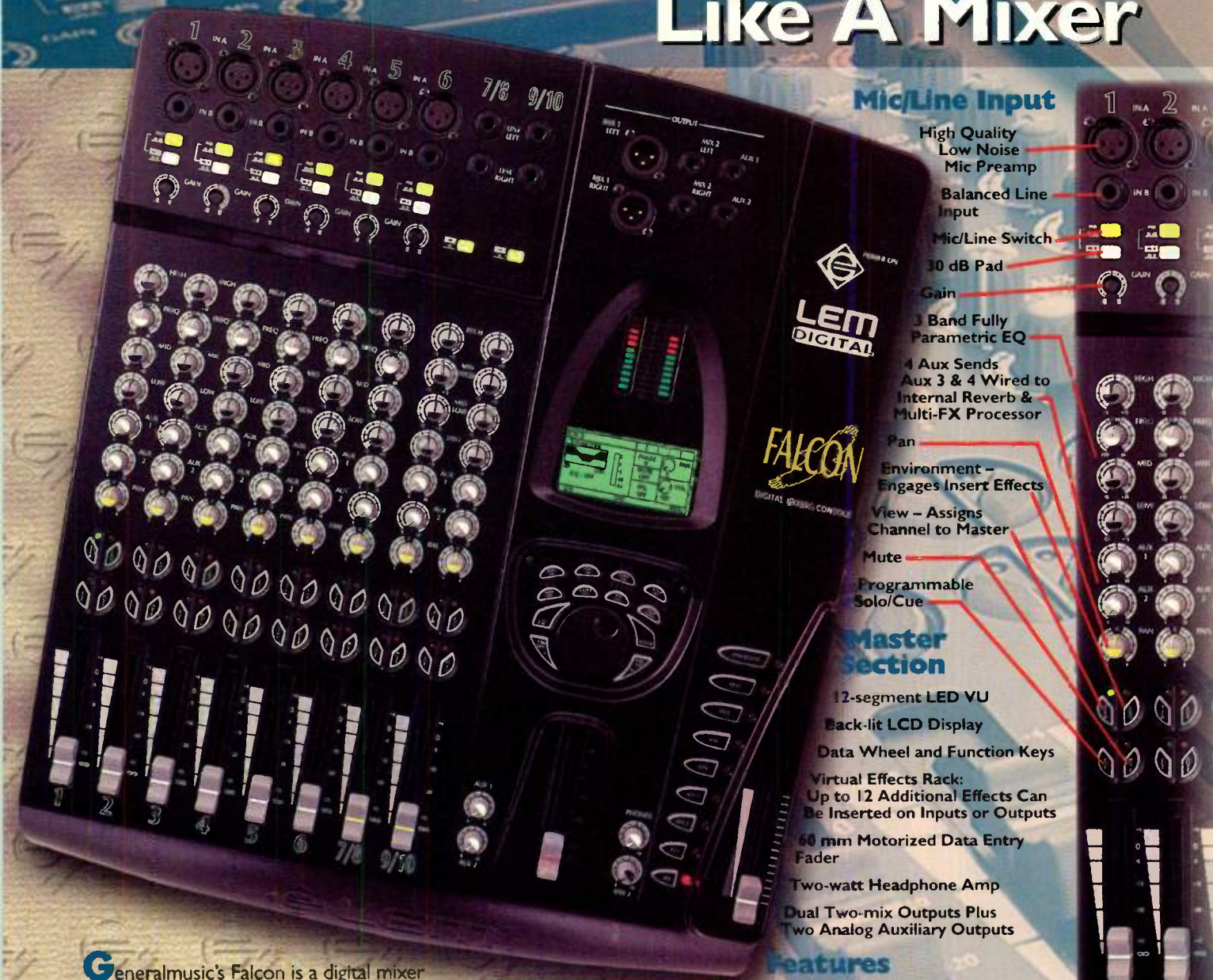
I patched the Intonator into the ADAT Optical port from one of my Alesis XT's and went to work. The interface allows you to isolate a track from the 8-track of the data stream and output it to a second track if desired. That way you could monitor both the original and processed version from a mixing console, or pass the corrected audio onto the next blank track on your ADAT.

The only thing the ADAT interface won't do is pass the rest of the tracks through unaffected via the Optical port while allowing you to monitor and correct a single track. You'll need to monitor from the analog outputs or use a digital patchbay to send your data stream to two places at once. (Sometimes digital stuff makes me nuts!) In addition, the box adds a consistent 15 milliseconds of latency, so you need to be careful to slip your track timing accordingly. This is an effect common to all digital devices, and needs to be addressed for any critical recording, since virtually every digital process takes a certain amount of clock ticks to happen.

I didn't think it was going to be a problem finding bad vocal tracks on tape to correct, and was I ever right. I found literally dozens of examples of singing tracks that



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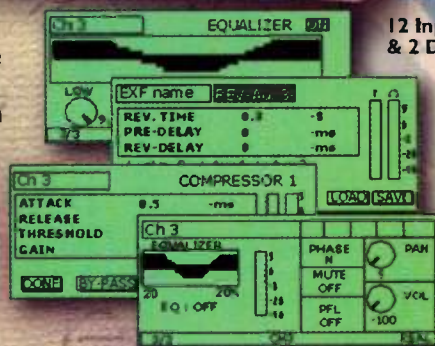
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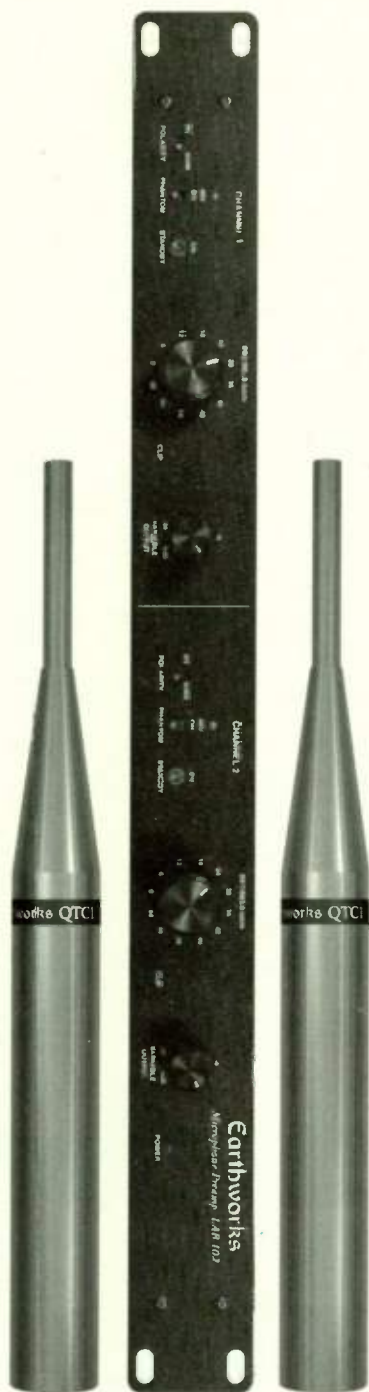
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CIRCLE 16 ON FREE INFO CARD

TCELECTRONIC INTONATOR

were *almost* right on pitch, but just enough out of tune to be bothersome. A few minutes of setting the controls pulled the vocals right to center, and really helped tighten up the tracks. Of course, you could make the settings too aggressive, which would make the track sound like an awful mess, so, as usual in audio, less is best.

Finding and applying the least amount of correction you need will result in the most natural sounding track. Slowing the attack time will cause a tiny slur as you add the pitch shift, which sounds more natural than robotic steps. The overall sound was completely devoid of any looping or alias artifacts. Once I did my job, the whole effect was very transparent. When listening in solo mode, there was only a very slight high-frequency boost to the processed signal, and only a tiny bit of digital smutz that I can hear on any pitch-shifting gear, no matter how expensive. It wasn't objectionable, and couldn't be heard at all once the processed track was mixed with any music.

I also tried the Intonator with fretted bass guitar, with very good results. I had one track where the bass really had bad intonation, and when the artist fretted up the neck, it really went sharp. A simple adjustment with the Intonator to those few notes was all it took.

Almost as a side note, the Intonator also has a very serviceable de-esser, as well as the coolest adaptive low-cut filter I've ever used. They can be set to operate on the same channel as the pitch correction or split out as a separate processor. Unlike a standard, sweepable filter in a channel strip, this one can sense the note being played and dynamically adjust the chosen frequency to slide up and down with each note. Thus, the filter frequency is always set just a tiny bit below the desired note, while the infrasonic garbage stays out of the signal. I was able to use it on bass guitar with absolutely no loss of bass response. On vocals, it made the LF room garbage just go away, while still leaving the male vocal fundamental tones in tact. Of course, any instrument with multiple notes is not a candidate for pitch correction. You can't retune just one note of a guitar chord or pick a single voice out of a choir, for instance. Nonetheless, I won't say it will never be possible. Give them a few years, and anything could happen.

Mike Sokol is an audio engineer/technical writer/communications integrator and sometimes musician, who could have used a pitch corrector on his own voice back in the good old days. Check out his Web site at www.soundav.com for past columns and current events.



LAB REPORT

MANUFACTURER: TC Electronic, 742-A Hampshire Rd, Westlake Village, CA 91361-9773. Tel: 805-373-1828. E-mail: tcus@tcelectronic.com. Web: www.tcelectronic.com.

APPLICATION: Pitch correction and sibilance processor for vocals, bass, guitar, and other single-note sounds.

SUMMARY: A single RU vocal coach in a box. Will auto-correct a voice or instrument to a predetermined pitch, or output MIDI information, which allows a sequencer to be used to edit the pitch of a track during mixdown. Analog, S/PDIF, AES/EBU, ADAT Optical, and MIDI I/O ports included.

STRENGTHS: Easy-to-use interface; can be used in auto-correct mode, manual (turn the knob) mode, or controlled by a MIDI keyboard or sequencer with pitch bend; also included are a de-esser and adaptive low-cut filter.

WEAKNESSES: Can't pick out a single ADAT track from the Lightpipe data stream while letting the other tracks pass through for monitoring.

PRICE: \$1500

EQ FREE LIT. #: 103

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When Steve Earle and the Del McCoury band take the stage, there's only one mic there to capture it all

PHOTOS BY DAVID K. BELL

NOW FOR SOMETHING COMPLETELY DIFFERENT...

BY STEVE
LA CERRA

Here's an interesting challenge: try doing live sound for a 5-piece band with a minimum of microphones. No big deal, you say? We're not talking about keeping the input list down to 10 or 15 channels. We're talking *three*. For the whole band, including vocals. And no effects either. Definitely not your typical live sound gig! Engineer Matt Svobodny explains how he pulls this off every night as engineer for Steve Earle and the Del McCoury band.

According to Matt Svobodny (pronounced "SWAB-o-knee"), the whole idea came from a recording

that Steve Earle did with the Del McCoury band. "The Del McCoury band have been touring for quite a long time using a one-mic approach as a throwback to the old Bill Monroe bluegrass days," Matt begins. "When they were getting ready to record *The Mountain* (released on E-Squared), Steve jammed with Del a few times and really dug the one-mic idea. So they recorded a lot of the record live using one mic and maybe a couple of spot mics. Steve decided he wanted to try a tour like that. It was pretty wild for me because I wasn't sure it could be done. We rehearsed and then did about six weeks in the U.S. with one mic for the entire band — a CAD VSM 1. Even-

tually we added a bass DI as well, because, for some of Steve's songs, we needed a little more low end than we could get out of just the one mic." (More on the DI later.)

SETTING UP

When Svobodny comes into a room for the first time, he usually plays a few CDs while walking around the venue, listening for reverberation and frequency response of the room. "I listen for low-frequency resonance on the stage so I can find the best place for the mic. Obviously, the band wants to stay centered, and I try to get them as close to the front of the stage as possible for the visual. But sometimes moving just six inches to one side or the other can avoid a major bass buildup. They want to be close to the audience, but I might kick them back a few feet to make it work PA-wise. After

I've found the spot, I have the house engineer go on stage and shout into the mic so I can establish gain.

"A lot of the house systems are set up for (Shure) '58's and a rock band, so they're hyped in the bottom and top. I usually ask the house engineer to turn the subs down a bit and sometimes the top end as well. When you use a studio tube condenser mic like the VSM 1, the PA goes nuts with feedback if you just put the mic up flat and try to get a level on it — this CAD mic is a lot brighter on vocals than, say, a '58 or a Beta 87. I'll tweak the house crossover and house EQ to where I think it'll work. Sometimes I have to turn the subs almost all the way off and depending on how reflective the room is, I might have to kick up the crossover frequency a bit and then lower the level of the high frequencies. Most of the time I try not to mess with the crossover too much, but if I get into a hole where I've been trying to ring the system and it's not happening, I'll try moving the crossover

point around to help me out.

"I also have a 31-band, 1/3-octave graphic EQ that I insert on the channel for the one main mic," explains Matt. "I'll try to notch out the frequencies that I think might feed back — and they can be completely different every night. Things like the room acoustics, the position of the mic, whether the PA is flown or stacked on the stage — all of that makes a huge difference, much more so than if you were multimiking. I really hate when I walk into a room and see the speakers stacked on stage. All of the low and low-mid crap from the boxes transmits through the stage, up the stand, and into the microphone, so I usually need to carve it out pretty heavily. For some reason 400 Hz is a typical place where it builds up when the PA is stacked on the stage. I can run the system a lot flatter if it's a flown system, say, 10 feet in front of the mic line."

CAN YOU TURN IT UP A BIT??

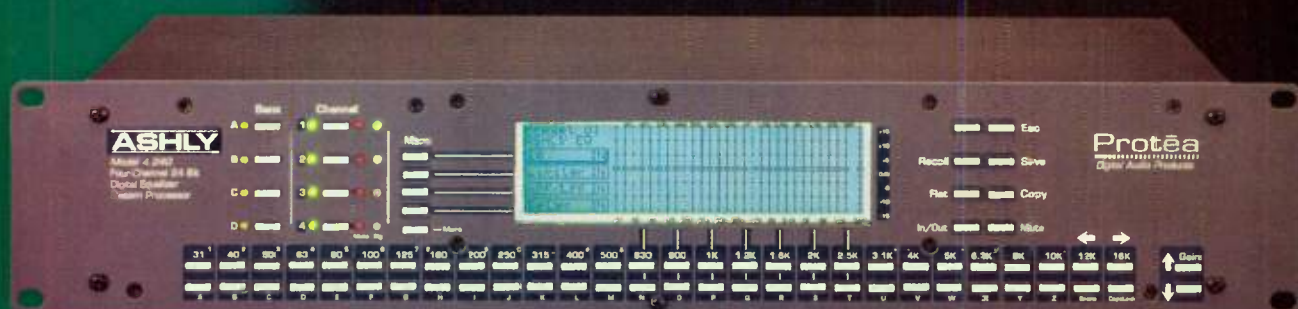
After employing this technique for about six weeks, Matt encountered a few difficult situations. "I ran into a couple of places where it seemed like, no matter what I did, I couldn't get a good-sounding mix loud enough. I think it was in Austin where we were trying to figure out how to get the mix a little louder. I took a tiny capsule from an AKG headset mic and taped it onto the stand, about halfway down. That really helped me bring out the instruments. The main mic is still the VSM 1, set about 5 feet high from the stage, mainly getting vocals. It picks up some instruments, too, but using the VSM 1 in combination with the AKG, I was able to get a more even balance, more consistently through the shows.

"When we came off that leg of the tour, I built a small stereo mic with two of those AKG's. I put the capsules into a housing that mounts on the stand. Now I have a stereo



FOUR MEN AND A MIC: Steve Earle and the Del McCoury band gather round the single CAD VSM 1 mic.

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HELLO EMMYLOU: The CAD VSM 1 had to handle guest performers, including Emmylou Harris, as well.

spread of the instruments. I can EQ that pair to fit around the holes I might have EQ'd out from the CAD mic. I'm able to get a little more volume off the stage and a more consistent sound. Getting it loud enough can be difficult, because we play to all sorts of different crowds. Steve's audience is pretty diverse and some nights everyone is sitting down, being attentive to the music — so 90 dB will work just fine. Other nights, we might be in a rock club where people are drunk and yelling. I'm sitting there trying to push it and every once in a while I get bit where something might squeal. I try to leave the two center bands on the channel's parametric free for the show in case the band gets up there, and all of a sudden it's obnoxious in the 1.2 or 1.6 kHz area."

Because of where Svobodny attaches the stereo pair to the stand, the distance between any of the mics and an instrument such as a mandolin or guitar is the almost identical, keeping phase problems to a minimum. How-

ever, Matt notes that, on occasion, he has run into a bit of phase cancellation by trying to mix the stereo pair too loud. "I still go through the first few songs of soundcheck with just the VSM 1 and tweak that to sound as good as possible. Then I add the stereo pair and the bass DI a bit, usually with a lot of the top end pulled off the bass."

SWEATING THE DETAILS

Matt has been using two of the CAD VSM 1's, rotating them every second night or so to protect them from overexposure to moisture or heat. He's observed that some of the players sweat while performing, "and a few times we've gotten moisture on the mic — which is a really nasty sound coming through the PA. We don't use a windscreen or pop filter on the mic, so we had CAD put a real thin layer of foam underneath the mic grille to help keep spit or sweat off the capsule. I

used the mics for quite a while without the pad (the VSM 1 has 8- and 16-dB pads built-in —Ed.), but I ran into a couple of situations where someone would get right in on the mic, belt something out, and the capsule would overload — which is heinous when you hear it through a PA. So I started using the pad. You can hear the tube overdrive just a hair on louder parts, which is real cool." Output of the VSM 1 is connected to an outboard power supply that sits on stage near the split. From the power supply output, audio is run into the house split and sent to the FOH console.

Although Matt doesn't use any reverb or delay effects ("Steve is allergic to reverb," he muses), he does use a careful amount of compression. "During indoor shows, I can get to the point where the system is pushing enough to fill the room, and I have a nice mix between the mic

and the natural reverb of the room. I don't compress the main mic individually, but I do compress the stereo mic pretty hard — a really slow attack with a quick release so that, on hard hits, it pulls 6 to 8 dB down. The stereo mic doesn't feed back much, and I'm not using it in the mix a whole lot. I also compress the mix just a bit to tame the peaks."

JOIN TOGETHER WITH THE BAND

When Earle performs with the Del McCoury band, the five musicians stand within an area of about 6 x 6 feet, in a semicircle around the mic. According to Matt, "Whoever is soloing or singing will take a step up to the mic, do their thing, and then back off for the next guy. When someone in the band is singing, they are anywhere from 6 inches to 2 feet away from the mic. It's really cool visually because the guys are trading spots and moving around this mic."

Just as interesting is the fact that the band doesn't use any monitors. "They play purely off the house system," observes Matt. "That's how the Del McCoury Band has been doing it, and Steve adapted his style to fit for this tour. It'd be really hard to get monitors to happen in that context. Steve does a solo set in the middle of the show where we bring out wedges for a more traditional setup, using a CAD 95 vocal mic and a couple of Fishman Blenders for his acoustic guitars. Then we switch back to the original setup for the end of the show." Talk about an easy changeover!

IT'S NOT ALL FUN AND GAMES...

With such a sparse miking arrangement, it's obvious that Svobodny's control is somewhat limited. "The band mixes themselves and they're great at working that one mic. But sometimes things happen that are out of my control. Early in the tour, we did a rock club in Louisville where the audience would not shut up. They were so loud, and it was before I was using the AKG mic — just the VSM 1. There was nothing I could do to get it loud enough. The crowd was eating it up and people were coming up to me saying, 'turn it up.' I kept creeping up the level, but then all of a sudden a frequency would go off and I'd have to back the PA down. I

could only get it to be so loud. Steve just said, 'Do what you can... this is our show. If people don't want to pay attention to it, that's their choice. We're going to give them our show, which is the one-mic thing. If they don't appreciate it that's their own problem.'"

Generally, Matt is able to maintain a SPL of about 90 dB at the mix position, though, on at least one occasion, he's had it as loud as 110. "That was at the end of a set in a big arena,"

he reveals, "and it was blowing me away. When the band did their big finish — 'Copperhead Road' — they peaked at 110 dB. The rig was flown way wide of the stage and way out front, which gave me everything I needed to work with to fill up the room without any problems."

Matt Svobodny may be reached via e-mail at: svobodny@bellatlantic.net.

left brain

Discrete solid-state class-A topology; Jensen input transformer into FET input circuit.
Noise: EIN < -129 dBv unweighted, 20 Hz to 22 KHz, 150 Ω termination resistor; Frequency response: 5 Hz to 50 KHz \pm 0.5 dB (mic input) 2 Hz to 80 KHz \pm 0.5 dB (Hi-Z input); Distortion: CCIR-DFD2 (1K) method = < -72 dBv @ 8V rms into 150 Ω load. (all measurements @ 40 dB gain).

right brain

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no brainer

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CIRCLE 28 ON FREE INFO CARD

ASHLY PROTEA 4.24G DSP-BASED PROCESSOR WITH 4.24RD REMOTE CONTROL

BY STEVE
LA CERRA

Ashly's Protéa 4.24G is a 4-channel DSP combining 28-band, 1/3-octave graphic EQ, limiting, high- and low-pass filtering, and signal delay functions for each channel. Designed as part of a modular system, you can use the 4.24G as a stand-alone or in a network acting as a master for up to three additional 4.24GS (4-channel) or 2.24GS (2-channel) slave units. Both of these units use the same DSP engine as the 4.24G, but lack the display and keyboard interface. Ashly's Protéa 4.24RD remote may be used as a master for the 4.24G, 4.24GS, or 2.24GS, providing control over a 16-channel system from one interface. Ashly also offers Protéa System software for running the system via PC. For this Road Test, *EQ* received a 4.24G and a 4.24RD, making a 4-channel, remote-controlled system.

On the front panel of the 4.24G resides a large, backlit LCD screen displaying six lines of text. The 4.24RD provides the same interface as the 4.24G, with pushbuttons for menu select, bank and channel select, and frequency boost/cut. In addition to LED indicators for bank, channel select, and channel mute status, both units have a set of pushbuttons for accessing help, escape, save, recall, flat, copy, mute, and in/out functions. The remote control connects to the 4.24G using any 3-conductor microphone cable, sourcing its power from the 4.24G.

Rear-

panel features of the 4.24G include balanced XLR and TRS I/Os, an IEC power receptacle, RS232 interface, XLR connectors for remote Data I/O, and MIDI In/Out/Thru ports. Protéa units may be networked either via MIDI or through the XLR connectors. On the 4.24G, there are two-color LEDs indicating signal present (green) and clipping (red) for each channel; these audio indicators are not included on the remote.

At first look, the Protéa 4.24 units appear intimidating, but they're very easy to navigate. We had them up and running without cracking the manual — a credit to Ashly's design department, considering these are complex devices. A 4-channel system utilizes "Bank A"; as additional DSP units are added,

access becomes available to Bank B (channels 5 through 8), Bank C (channels 9 through 12), and Bank D (channels 13 through 16). MIDI channel assignment of these channels is set in a user-preference menu. Calling up a DSP channel merely requires pressing the bank and channel buttons; you then use menu buttons to select EQ, limiting, filter, or delay parameter pages. Each menu button visually lines up with a page name, so there's no question about which button calls up a particular menu.

When you want to access the EQ, simply press the menu button

ROAD Test

MANUFACTURER: Ashly Audio Inc., 847 Holt Road, Webster, NY 14580-9103. Tel: 716-872-0010. Web: www.Ashly.com.

SUMMARY: Multifunction, 4-channel DSP providing 28-band EQ, high-pass and low-pass filtering, limiting, and delay functions.

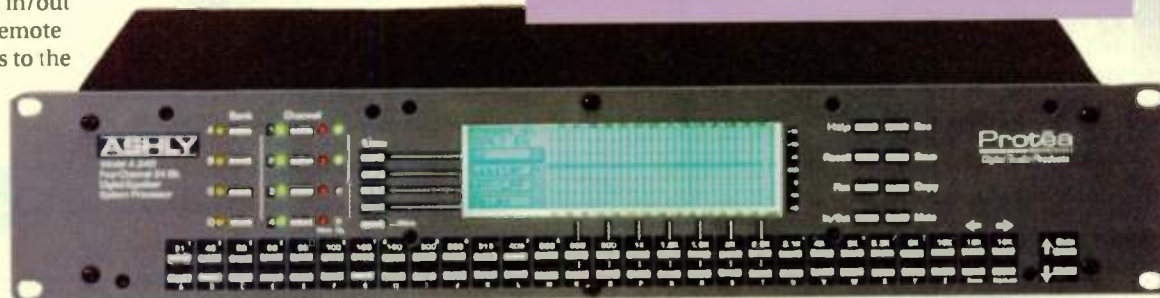
APPLICATIONS: Live sound touring and installed systems (monitor or FOH).

STRENGTHS: Easy control over complex functions; modular system; well-lit display is easy to see on dark stages; remote-controllable; stable operating system.

WEAKNESSES: Unit lacks a global bypass switch; remote does not show channel-linking status; delay time maxes out at 341 milliseconds.

PRICE: 4.24G, \$2000; 4.24RD, \$850

EQ FREE LIT. #: 104



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World Radio History

EQ Drive!

EQDRIVE!

BY PETE
LEONI

makers have been slow to make the needed changes.

Currently (although we'll see what AMD's upcoming K-7 "Athlon" processor has to offer), Intel remains the reigning FPU champion. All of Intel's high-speed CPU offerings (Celeron A, PII, and new PIII) combine excellent integer math and FPU performance. Surprisingly, Intel's so-called "budget" Celeron may, in fact, be the champion FPU performer, and could, in many applications, be the chip of choice for maximum software effects. Independent studies indicate that (new instruction sets aside) the Celeron A chips have somewhat better FPU performance than the PII. Consequently, unless the software has been written to take advantage of Intel's new SSE instructions, the Celeron surpasses even the PIII!

Also note that, although the Celeron includes less L2 memory cache (a type of fast access memory important to performance), it runs at a higher speed. This can be a superior arrangement for audio, as audio files contain many repetitive loops — ideal candidates for a small yet fast L2 cache. Although Intel's PII and top-of-the-line PIII are excellent choices for a DAW, the lower-cost Celeron chip is also a fine performer for audio.

HARD FACTS ABOUT HARD DRIVES

Not so long ago, only top-of-the-line SCSI drives were considered audio-friendly. Perhaps because manufacturers traditionally debut their fastest drives on the SCSI interface, a common misconception is that SCSI drives, and the SCSI interface itself, are inherently faster than IDE drives. Although some of the 10,000-RPM SCSI drives still have an edge, today's IDE drives using UDMA technology can rival all but the very best SCSI drives.

Business applications, when accessing the hard disk, often need to grab only a

The low-down on which CPUs and hard drives are really best for audio

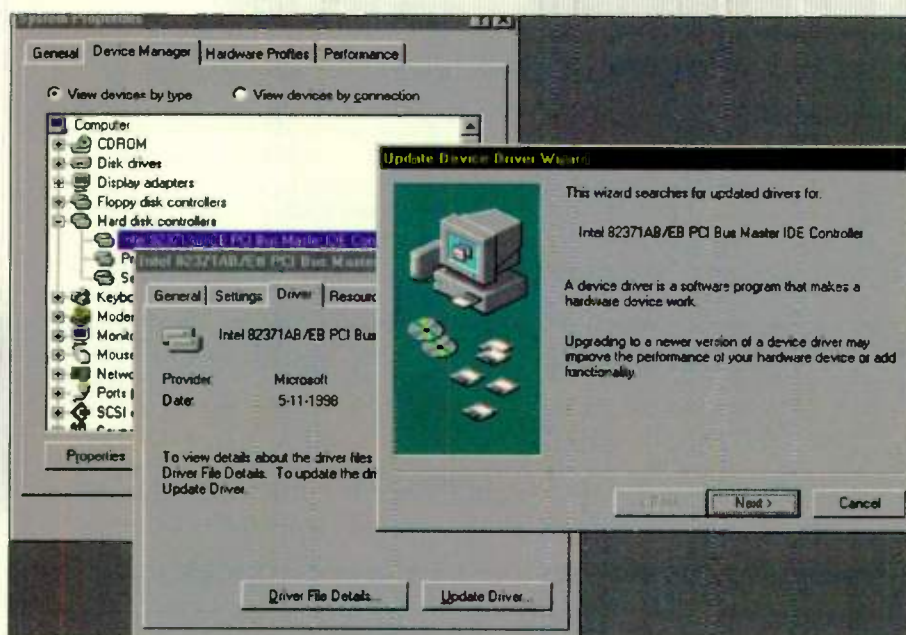


FIGURE 1: Device Manager shows that the primary hard drive is using a Bus Mastering driver. Double clicking on the drive icon reveals the driver being used; clicking on "Update Driver" brings up the "Update Device Driver Wizard."

PC HARDWARE SECRETS REVEALED

A digital audio workstation (DAW) and typical office computer have distinctly different hardware requirements. Those different requirements can lead to frustration when trying to run digital audio recording applications on off-the-shelf machines. Though high-speed computers may look and spec out the same, on the inside they can be quite different. Unfortunately, mass-produced computers often compromise the CPU and hard drive — the most critical components for audio performance. Here are some guidelines on choosing the right CPU and drive.

WHY INTEL IS STILL SWELL

Today's high-speed processors, coupled with efficient audio apps, have enough muscle to stream many tracks of audio and run multiple software effects simultaneously, without offboard DSP. If total

track count was our only concern, we could simply choose the fastest processor. However, streaming audio requires a completely different math process (called *integer math*) compared to running software effects (e.g., plug-ins), which uses a process called *floating point math* (FPU). Without top-notch FPU performance, your program — which may have no trouble at all streaming a couple dozen audio tracks — may stumble when you insert a reverb plug-in or two.

Traditionally, Intel's CPUs have had significantly, and inherently, better FPU performance than the competition. Although both AMD and Cyrix have attempted to close this "FPU gap" by including special instruction sets such as "3D Now," any software must be written to take advantage of these instructions, and most software

small chunk or many small chunks of data very quickly. Therefore, most disk manufacturers optimize for burst transfer rate and average access time. While fast access time is still very important for a DAW, the *sustained throughput* (also called sustained transfer rate) spec is vitally important when choosing a SCSI or UDMA drive. Why? Because digital audio files are huge compared to typical data files.

You may have to dig to find the sustained throughput spec. High-speed 7200 and 10,000-RPM SCSI drives have long been the choice for highest sustained throughput. However, with the advent of the wide-band UDMA Ultra 33 and Ultra 66 busses, today's IDE drives, if chosen carefully, are more than up to the task of delivering many simultaneous audio tracks — even at the disk-taxing 24-bit rate available on newer audio apps. (Note: A very fine and accurate program for testing sustained transfer rate was written by J. M. Catena, and is available free at www.ProRec.com.)

Increasing disk platter data density can also increase sustained throughput,

and recently there has been dramatic progress in this respect. As a result, 5400-RPM UDMA drives have substantially improved performance even when compared to fairly recent 7200 and 10,000-RPM units. Side benefits due to the progress in high-density, low-RPM drive technology include greatly reduced noise and heat, as well as truly high-performance 20 GB and larger drives at very reasonable prices. For EIDE, the Maxtor 4320 series (UDMA, 5400 RPM), Maxtor 5120, and Western Digital Expert series (UDMA, 7200 RPM) are highly recommended for audio. All of them are available in several (large) sizes, with superb audio performance.

A crucial factor in DAW performance for both CPUs and hard drives is the use of *bus mastering* disk drivers (fig. 1), which greatly reduce the CPU load during disk transfers. In fact, without proper bus mastering drivers, CPU load during disk access can be as high as 50 percent! This figure can go down to the single digits or less after installing and enabling bus mastering

drivers, thus freeing up CPU cycles to run our plug-ins instead of being wasted during disk transfers.

Before Windows 98, many off-the-shelf computers shipped without bus mastering drivers installed and enabled, sometimes to ensure compatibility with included software or hardware. In most applications, this didn't matter because typical users didn't need sustained disk transfers of large files. Fortunately, if your computer is a year old or less, it very likely is using, or can use, bus mastering disk drivers (see sidebar).

The dream of putting a powerful, smooth-running, ergonomic studio inside a computer has remained elusive; however, recent hardware advances may finally let the reality not only live up to the hype, but even exceed our expectations.

Pete Leoni operates a completely DAW-based recording studio, and is the founder, along with Morgan Pettinato, of Q Performance Systems. His e-mail is Demotech@datasync.com.

ARE YOUR IDE DRIVES BEING BUS MASTERED?

Go to Start > Settings > Control Panel > System > Device Manager > Hard Disk Controllers. Double-click on "Hard Disk Controllers." If bus mastering drivers are installed, you should see "Bus Mastering" or "Standard Bus Mastering" regardless of the chipset's manufacturer.

While still in Device Manager, close Hard Disk Controllers and double-click on "Disk Drives." Choose your hard drive(s) from the list. Double-click on "Settings" and look for a box labeled DMA. If this box is checked, and if you saw the term "Bus Mastering" while in Hard-Disk Controllers, you can be virtually assured that bus mastering is fully enabled on your system.

If you do not see bus mastering drivers listed, or do see the DMA box under Hard Drive Settings, you may still be able to install the proper bus mastering drivers for your system. *Caution!* If your system or hardware is not compatible with these drivers, you could very well corrupt Windows and take down your entire computer, so check everything out carefully before you perform this tweak!

Installing Bus Master Drivers

1. Determine the manufacturer and designation number of your motherboard's chipset (e.g., Intel VX, LX, BX, etc.). Intel and other manufacturers' Web sites have this type of information.
2. Determine the proper bus mastering driver for your chipset. Window's CAB files already contain bus master-

ing drivers for most hard-disk controllers, but it may be necessary to visit a manufacturer's Web site for an updated driver, especially for non-Intel hardware.

3. Go to Start > Settings > Control Panel > System > Device Manager > Hard Disk Controllers. Double-click on "Hard Disk Controllers."
4. Double click on the standard driver you want to change to a bus mastering driver.
5. Choose the "Driver" tab, and then click the "Update Driver" button. The "Update Driver Wizard" will appear.
6. In Windows 98, click "Next," then choose "Display a list of all drivers etc." and click "Next." In Windows 95, select "No, select driver from list," then click "Next."
7. Choose "Show All Hardware."
8. From the "Manufacturers" list, choose the chipset's maker as determined by your research.
9. From the "Models" list, choose the appropriate bus mastering driver for your hardware.
10. Push "Finish" and reboot your computer when prompted.
11. Go to Start > Settings > Control Panel > System > Device Manager > Disk drives.
12. Choose your drive(s) from the list and click on the "Settings" tab. Place a check in the DMA box if one is not there already.
13. Again, reboot your computer and perform the check for bus mastering outlined earlier.

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BITS & PIECES

Too often, significant products fall through the cracks because there aren't enough pages in a magazine to give full-length reviews to everything we'd like to cover. That's why, with this section, EQ introduces an additional, shorter review format to cover products such as software updates (many times it's not necessary to cover the basic program again, just what's different) and accessories such as interfaces and other products that lend themselves to an "executive summary"-type of approach. We hope Bits & Pieces can fill in some of the gaps.

KEYFAX PHAT-BOY

Summary: MIDI controller generator, with real knobs, for sound cards and software.

Basics: Human interfaces are hot, and Phat-Boy — which is essentially a "front panel" for computer-based musical instruments — is one of the least expensive. It has 13 front-panel knobs; a rotary switch to choose the MIDI output channel (1–16); and a button to send a snapshot of all control settings. Connectors include MIDI In, MIDI Out, and an AC adapter jack.

A three-position switch selects among three modes: controlling GS or XG tone modules; controlling the Creative Labs SoundBlaster AWE; or generating general-

purpose MIDI controller data (the knobs generate continuous controllers 1–13). However, an additional mode allows the three switch positions to select controllers 1–13, 14–27, and 28–41. **Pros & Cons:** Hands-on control is wonderful for real-time tweaking of sound cards, and puts a lot of the fun back into playing with synths (perhaps one reason why DJs are really getting into Phat-Boy). However, you

cannot change controller number assignments. Therefore, your target device needs to be able to remap MIDI controllers to individual parameters. For example, Steinberg's ReBirth (which begs for the real-time control Phat-Boy offers), with its "learn controllers" mode, is an ideal candidate; the Line 6 POD, which has hardwired controller assignments to parameters, is not. KeyFax is currently developing Mac and PC applications for remapping controller numbers.

Bottom Line: The price is reasonable. You get some freebie Standard MIDI Files from the acclaimed Twiddly Bits collection. There's an overlay and grease pencil for writing down control functions in the general-purpose mode. The knobs feel right and are spaced far enough apart for easy manipulation. More extensive control requires something like a Peavey PC1600, but for cheap, cheerful, fast, and fun, there's Phat-Boy.

Contact: KeyFax, Box 958, Aptos, CA 95001. Tel: 800-752-2780. Web: www.keyfax.com. Price: \$249. EQ free lit. #105.

OPCODE MIDI PORT 32

Summary: USB-compatible 32-channel MIDI interface for Mac or Windows.

Basics: Housed in a small, seemingly indestructible box, MIDI Port 32 hooks into your computer's USB port via the supplied 6-foot cable. With its two MIDI Ins and two MIDI Outs, MIDI Port 32 can receive or send up to 32 channels of MIDI data. If 32

channels aren't enough, you can stack multiple MIDI Port 32 units to a USB "hub" if you need more channels. Front-panel LEDs indicate activity on the four MIDI ports, as well as power on.

Pros & Cons: I tested the device with a Windows machine, and installation couldn't have been easier: plug it in, install the driver, and you're good to go. The box showed up in the Multimedia Control Panel, and, within about 2 minutes, I was recording and playing back MIDI data from within Emagic's Logic 4.0. Best of all, there were no IRQ issues, sound cards to install, or any of the other complications usually associated with adding sound and MIDI capabilities. Even the manual is well-written (despite some discrepancies in the description of the installation routine for Windows machines). If people actually read it, I suspect Opcode will receive very few customer support calls.

Incidentally, Opcode's MusicShop program (for both Mac and PC) ships with the interface.

Bottom Line: USB really can deliver on its promise, so it's great to see USB-compatible music-oriented products. Opcode has a long tradition of designing excellent MIDI interfaces; if the MIDI Port 32 is any indication of future directions, that tradition will remain intact.

Contact: Opcode Systems, 365 Middlefield Rd. Tel: 650-429-2400. Web: www.opcode.com. Price: \$149.95. EQ free lit. #106.

A quick look at some updated products and new accessories

BY CRAIG ANDERTON



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STEINBERG MASTERING EDITION

Summary: A bundle of six mastering-oriented plug-ins for Mac or Windows.

Basics: The Mastering Edition bundles six DirectX/WaveLab/VST compatible plug-ins for Mac and Windows. These include: ME Compressor (5-band dynamics processor with compress, expand, limit); Loudness Maximizer to get more level out of recordings; Spectralizer (harmonic enhancer that can add 2nd or 3rd harmonics); PhaseScope for checking phase and mono compatibility; SpectroGraph (basically a spectrum analyzer); and FreeFilter, a 1/3 octave equalizer that can also analyze the spectral characteristics of a reference file and apply those characteristics to a target file.

Pros & Cons: All the plug-ins are useful and sound great; there are also numerous cool features — such as the ease of use with which you can control the compressor bandwidths and curves. The VST versions allow for automation with a sequencer like Cubase VST. However, on the PC side, SpectroGraph, Spectralizer, and FreeFilter are DirectX-capable only, so they can be affected by DirectX's limitations, or how a host application implements it. For example, FreeFilter's "analyze and apply" feature doesn't work with my version of Sound Forge, which can't open up a second file while the plug-in is on-screen; this problem does not occur with Steinberg's own Wavelab editor or Cubase VST.

Bottom Line: As more studios get into "project mastering," it helps to have the tools used in typical mastering suites. Of course, nothing substitutes for good ears — but SpectroGraph and PhaseScope are excellent pieces of "test equipment," while the other processors add the functions most in demand for mastering applications. I use this useful and effective package constantly.

Contact: Steinberg, 21354 Nordhoff, #110, Chatsworth, CA 91311. Tel: 818-678-5100. Web: www.us.steinberg.net. E-mail: info@steinberg-na.com. Price: \$499 (upgrades available for owners of individual ME plug-ins). Circle EQ free lit. #107.



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SOUNDSCAPE MIXTREME PCI SOUND CARD

BY EDDIE
CILETTI

At last year's AES, I gave Soundscape's MIXTREME an *EQ Blue Ribbon Award*; not, though, because I expected it to be the ultimate sound card. I did it, instead, out of pure greed; I knew MIXTREME would provide additional processing power for my workstation — the Soundscape HDR-1 I purchased back in '94. (It's since been accelerated via Version 2.)

Soundscape's MIXTREME is a PCI sound card with enough on-board DSP power to mix 16 channels with its own software. MIXTREME can also be used with most of the popular software packages, including Cakewalk, Rebirth, and Steinberg VST. I tested it with Sonic Foundry's ACID and Syntrillium's Cool Edit Pro. With so many TASCAM DTRS recorders in use, it was time someone "invented" a card that needed no "translation." MIXTREME has two TDIF (TASCAM flavor) DB-25 connectors and an optional S/PDIF port. Soundscape also makes three I/O boxes, two of which speak ADAT Lightpipe.

WHY MIXTREME?

Aside from my own greedy need for MIXTREME, you may find that it provides a useful hardware interface to your

current multi-channel software package. The built-in Audio Toolbox can be used to optimize each incoming audio track, either before capturing to hard drive or when exporting to multitrack devices such as a dedicated hard-disk recorder or tape machine. If your current software — or production style — is overloading the host processor (via DirectX plug-ins), MIXTREME can take the load off by providing additional processing and I/O options. For example, you can audition and apply EQ, level, and dynamics processing (compression and expansion), plus add effects before recording, so that there will be more reserve system power for other DirectX plug-ins and processes "post" capture.

INSTALLATION

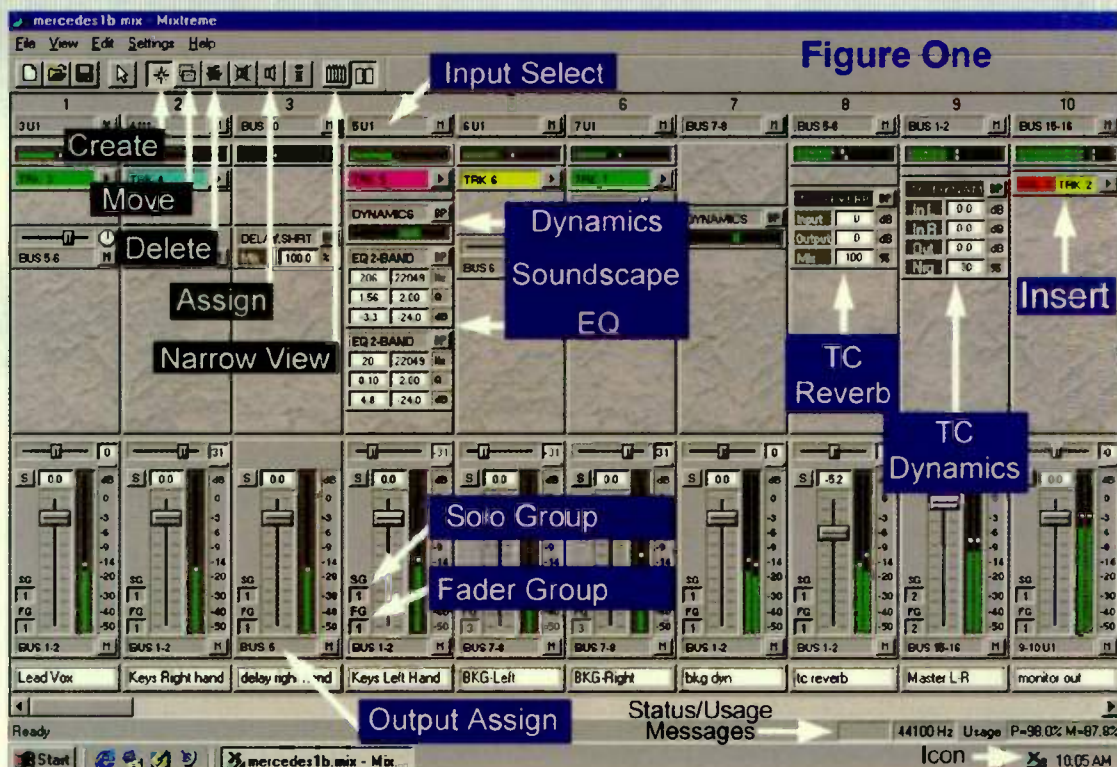
Getting MIXTREME into the computer was no problem. The software

loaded quickly and the system reported no conflicts. MIXTREME installs itself into the Start-Up folder so that it can be used as your default sound card. Like other programs that run in the background, MIXTREME became a small icon at the bottom right of the Task Bar. I didn't notice it there, at first.

To output "Windows" audio, you must configure MIXTREME and Windows to agree. Check out fig. 1 to see the mixer (with annotated features). In this instance, I chose Insert 9-10 as the virtual patch point to link Windows audio through MIXTREME. Fig. 2 shows the option windows for "Multimedia Devices" in the Windows 98 Control Panel.

FEATURE ONE: A TDIF PATCHBAY

Optical, AES, and S/PDIF ports operate in a single direction only, hence there are almost always two per device, one input and one output. Since TDIF has both inputs and outputs on the same DB-25 connector, it is not possible to connect more than two devices. With their other products in mind, I had long badgered Soundscape to provide at



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SEER SYSTEMS' SURREAL SOFTWARE SYNTHESIZER

SurReal is the result of Seer Systems condensing the technology from their excellent "Reality" software synth

into a general-purpose, stripped-down version for \$129. Although you don't get Reality's editability, SurReal has its own charms.

The program is simple to learn and use. The "1957 meets 2010"-style main screen (fig. 1) shows the 16 multitimbral channels, each of which plays back a particular sound. Controls for each channel are level, pan, reverb, chorus, vari (adds a program-dependent variation, such as brightness), solo, and mute. However, "chorus" actually encompasses 12 non-editable pro-

ferent reverb options. Sounds are organized as Programs (individual sounds), Banks (groups of 128 programs), and Banksets, which contain the individual programs used in the various Banks.

You can play sounds from the QWERTY keyboard (good for testing, and it's polyphonic), an external MIDI controller, or software sequencer using SurReal as an output device. In this last mode, SurReal makes it easy to import instrument lists into Cakewalk, Cubase, DOP, Logic Audio, Master Tracks Pro, and WinJammer. You can also load a Standard MIDI File for playback and do some (very) limited sequence editing via front-panel controls.

FROM THEORY TO PRACTICE

I tested SurReal with the Guillemot ISIS system, which includes DirectSound drivers for minimum latency. (Although generic Windows drivers are generally slower, some Windows

wave drivers do work well, such as Event's and those for the Soundscape MIXTREME. Seer's Web site contains info on sound card compatibili-

ty.) Using a Q Performance Systems Pentium II-class computer with 256 MB RAM, response was lightning-fast, with plenty of polyphony (max available voices: 64). Like all software synths, SurReal really benefits from newer CPUs and lots of RAM. Note that SurReal also includes a wave driver designed to mix its audio output with those of MIDI + digital audio sequencers.

As for creating or editing sounds beyond the limited front-panel controls, forget it: this is a playback-oriented program. There's global volume, transposition (± 12 semitones), detune (± 50 cents), and the chorus and reverb controls, but that's about it. However, many patches respond to mod wheel, sustain pedal, aftertouch,

TEST Drive

MANUFACTURER: Seer Systems, 108 Portola Rd., Ste. 133, Portola Valley, CA 94028. Tel: 888-232-7337. Web: www.seersystems.com.

APPLICATION: Produce synthesized sounds on Windows 95/98 machines using only the internal CPU for sound generation.

HARDWARE REQUIREMENTS: 133 MHz Pentium (Pentium II or III preferred), 32 MB RAM, sound card for playback, DirectSound driver for minimum latency, fast hard drive.

SUMMARY: While not a tweaker's dream, SurReal provides painless, inexpensive software synthesis and a great playback engine for sequencers.

STRENGTHS: Inexpensive; loads SoundFonts; useful included sounds and overall sound quality; minimal learning curve; great help system; plays back any sound created in Reality; includes lots of extras; excellent responsiveness with DirectSound and some Windows Wave drivers.

WEAKNESSES: No way to edit sounds or effects; can't save Banksets in SoundFont format; needs a fast processor and lots of RAM for optimum performance.

PRICE: \$129

EQ FREE LIT. #: 109



FIGURE 1

grams, including flange, delay, etc. Similarly, "reverb" includes eight dif-

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SurReal recognizes SoundFonts as well as Reality Banksets, so you have access to a huge library of sounds.

and whatever is programmed for the "vari" parameter (controller #80), as well as velocity. The good news is

that SurReal recognizes SoundFonts as well as Reality Banksets, so you have access to a huge library of sounds. Because SurReal uses host RAM, the Bank size limit depends solely on your computer's memory.

SurReal also makes it easy to recategorize programs into different Banks, and you can import programs from other Banksets to make custom Banksets. A sequence can also be saved as a

Bankset containing just the programs used in the sequence, along with the sequence in SMF format.

There are some limitations when

working with SoundFonts. Of course, if the SoundFont uses some ROM wave in a sound card, it ain't gonna happen in SurReal. Nor can you save a SurReal Bankset in SoundFont format, because the Reality engine underlying SurReal is much more complex than the SoundFont engine.

EXTRAS

SurReal also includes SeerMusic, an application that plays back music created with SurReal or Reality via the Internet (with a suitable plug-in). Other goodies include shareware versions of Awave (file converter), Cool Edit (audio editor), Wave Surgeon (ReCycle-type program), and WinJammer (MIDI sequencer), as well as a Techno Toys folder (MIDI patcher, arpeggiator, and 16-step "analog-type" sequencer). There are also several sets of SoundFonts and demos.

It's worth noting that SurReal's help system is one of the finest I've encountered. In particular, the section on advanced topics and PC

configuration is outstanding, with concise, musician-friendly explanations of swap files, caches, how video cards affect your system, which CPUs are best for digital audio, and so on.

If you already have some good software synths, or a SoundFont-compatible setup à la EMU APS, then SurReal probably won't rock your world. But if you'd like to get started making hardware-free sounds or want to play back sounds created in Reality (or just need some quality sounds for proofing sequences — yes, SurReal works just fine on laptops), SurReal delivers a lot for a little.

Craig Anderton is the author of Home Recording for Musicians and Multieffects for Musicians (published by AMSCO), both available from amazon.com. To check out some sound clips from a recent production project, surf to www.kac-cohen.com.

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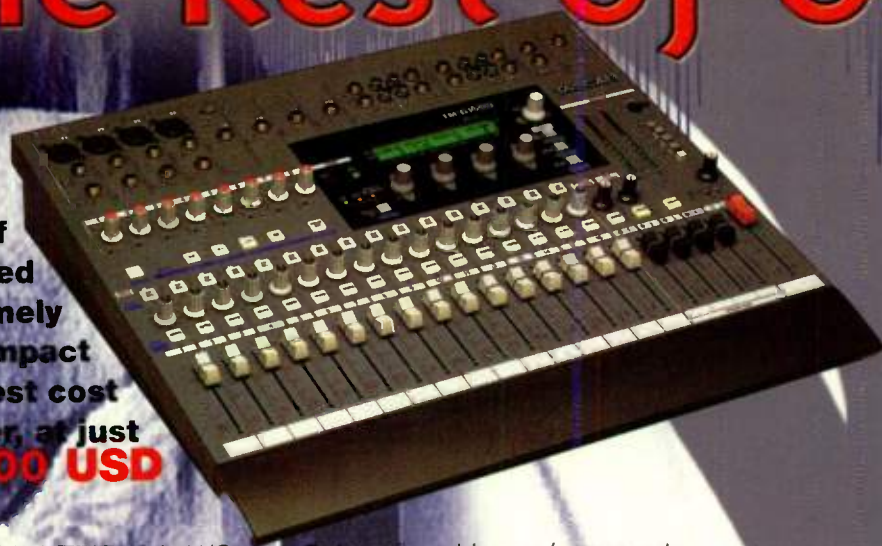
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EQ Groove

ROLL YOUR OWN "ANALOG" DRUMS

BY CRAIG
ANDERTON

Analog electronic drums are the percussion sound of choice for many types of groove music. Fortunately, if you can't find a vintage drum machine, there are plenty of sample disks and emulations of old-school sounds for your percussive pleasure. However, a digital audio editor such as Sonic Foundry's Sound Forge or Syntrillium's Cool Edit that can create waveforms lets you make your own analog drum sounds. These can be just like "the real thing," or you can use the software's editing functions to customize them to create drum sounds that go way beyond the norm.

ANALOG DRUM SOUND BASICS

To emulate analog drum sounds digitally, it helps to know how they're created. The basis of old analog drums is the Twin-Tee oscillator, a low-parts-count electronic circuit that creates a sine wave (the name comes from how the tuning components are arranged in two legs, each of which looks like a letter "T"). Lowering the circuit's internal feedback to just below the point of oscillation, then injecting a short voltage spike into the circuit, causes the Twin-Tee to oscillate for a fraction of a second. Often, a feedback trim-pot allows adjusting the

"ringing" or sustain" in response to the trigger.

The Twin-Tee produces a very pure sine wave with an exponential amplitude decay. The injected trigger adds a little "spike" at the beginning of the waveform, thus imparting a more drum-like attack. For snare drums, hi-hats, and cymbals, filtered white noise is the dominant sonic element, which is

subsequently processed by an envelope to add decay.

LET'S MAKE A DRUM

We'll assume your digital audio editor can create waveforms, impose amplitude envelopes, etc. Here's how to create a kick drum from scratch.

1. Create the initial tone. Cool Edit has a neat function where you can specify different characteristics for the beginning and end of a synthesized waveform, including harmonic content, frequency, and so on; the waveform morphs from the initial settings to the final

settings over the specified duration. Fig. 1 shows the settings needed to create a sine wave starting at 60 Hz (visible in the background), which transitions to 40 Hz over 0.5 seconds. Note that I added just a trace of 3rd harmonic content so that the signal would "cut" a little better than if it were just a simple sine wave.

2. Add an envelope. Now it's time to create a decay. In fig. 2, GoldWave's "Shape Volume Envelope" function has an exponential fadeout preset that makes it easy to add a mathematically accurate, exponential fadeout. You can also drag the little "handles" on the envelope line to change the shape as desired; for example, you might want the peak to sustain a little more at the beginning. Most audio editors give enough enveloping flexibility so that you can make virtually any type of amplitude curve.

3. Add an attack. There are many ways to simulate the effect of a Twin-Tee oscillator

How to use a digital audio editor and some drum samples to make sure that the beat goes on



FIGURE 1

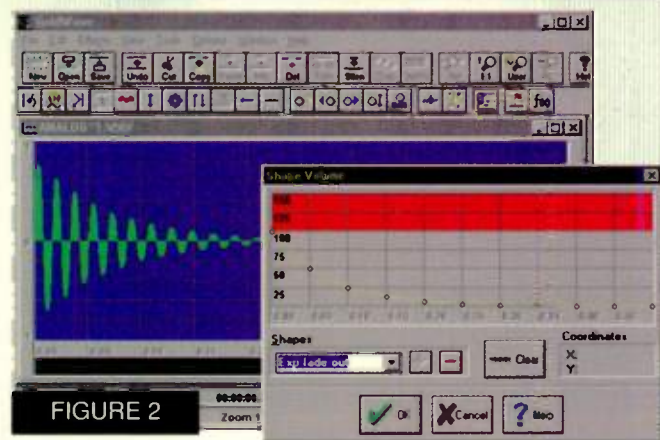


FIGURE 2

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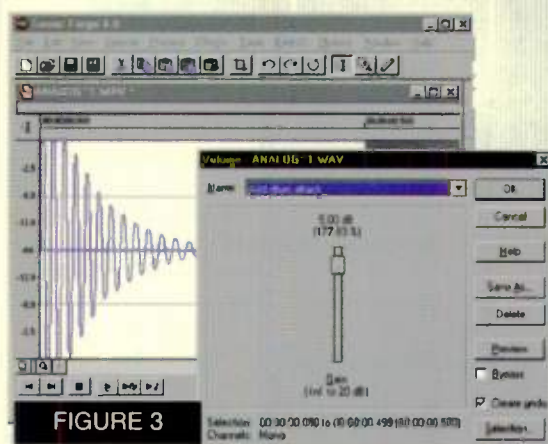


FIGURE 3

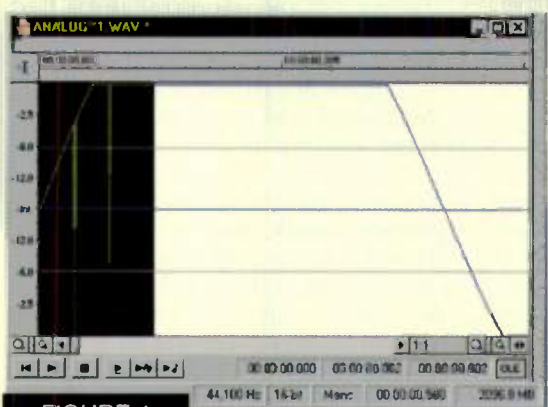


FIGURE 4

receiving an impulse. Fig. 3 shows the kick drum waveform in Sound Forge after having been normalized then boosted 5.00 dB. Boosting a normalized signal causes it to exceed the available headroom, so it clips for the first few cycles. This adds some high-frequency emphasis that provides an attack effect for (in this instance) the first 40 milliseconds or so.

MORE TIPS FOR ROLLING YOUR OWN DRUMS

You'll find your digital audio editor has a zillion options if you want to build on the basic sound. Here are a few of my favorite tips:

- If your program doesn't allow starting and ending frequencies, use the pitch bend function. Radical pitch bend effects (for example, a very quick, sharp drop from a high frequency to a low frequency, then a slow, exponential downward bend) can add character to both the attack and decay. Or for those disco-style "Syndrum" sounds, apply a pitch bend of about an octave over the duration of the file.

- For a more complex, layered sound, try layering a drum with a transposed (pitch-shifted) version. To do this, create your drum sound in stereo, then process one channel by shifting the pitch downward. (If you can't process just one channel of a stereo file, you will probably be able to copy the channel to a mono file, process it, then paste it back into the stereo file.) Transpositions of one semitone, a fifth, or an octave are good places to start; if you have the option to "preserve duration," do so. Finally, mix the stereo file together into a mono file to combine the two layered drum sounds into a composite drum sound.

- Speaking of layering, analog snare drums usually result from combining a sine wave with some white noise. You will probably want to filter the white noise somewhat to create

"pink" noise; experiment with your program's graphic or parametric EQ to shape the noise timbre as desired.

- Adding compression can "punch up" a drum's attack a bit and make it more prominent.

- For an attack that really grabs attention, break out your program's pencil tool and draw in some spikes during the first 3–4 ms or so. Fig. 4 shows two spikes added in Sound Forge, at about 0.6 and 1.2 ms. This creates a "click" at the beginning that can really cut through a track. In fact, it may be prominent enough that you'll want to add a little low-pass filtering to tame it somewhat.

You might be asking yourself, "Why go through all this instead of just using existing drum samples?" All I can say is, it doesn't really take very long and you can modify the sounds you create until they're exactly what you want. I've managed to create a useful little collection of kick-ass kick drums, some very cool toms, and a few mutant cymbals (the latter combine comb filtering with white noise). They're unique, they sound good and, oh yes, they were free!



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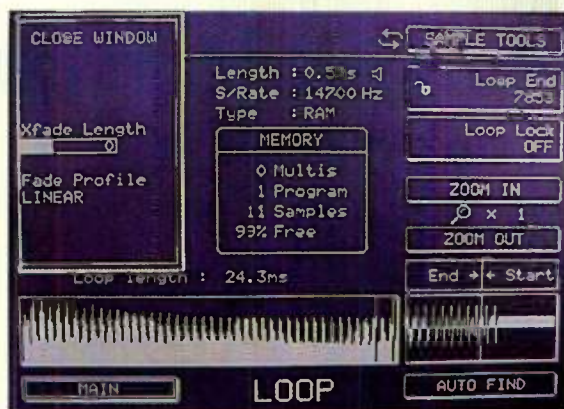


FIGURE 2: The loop editor window. In the upper left, a "pop-up" window lets you edit crossfade length and fade curve.

velope generators, and 26 different resonant filter types, with a matrix modulation system where the various controllers (pitch bend, mod wheel, velocity, channel or polyphonic aftertouch, etc.) can route to the various modulation inputs (filter, pitch, LFO rate and depth, level, or pan). In addition, some modulators have normalised connections, such as envelope attack time to velocity, with (of course) variable level.

Only one loop per sample is supported, with two modes: during the envelope release phase, you can select either loop playback or post-loop section playback. (There must be at least 15 samples between the loop end and sample end, so take this into account if you edit samples in a computer-based sample editor.)

Making loops is painless thanks to dual displays (sample only, and a small "loop tuner" to monitor out how the loop end butts up against the beginning). You can listen to a loop and slide

it back and forth in real time, unlike crossfade looping, which has to write changes to disk before you can audition them. A unique feature, "chop," drops out a designated portion of a sample. This is great for removing "dead spots" without having to use a noise gate.

SO IS IT REALLY THAT COOL?

This is a sophisticated product, and we can only touch on the highlights. Hey, we didn't even mention the beat-matching feature where you can specify

a loop's existing tempo and a new tempo, press a button, then audition the results to see if you want to keep the altered version...

The S5000/S6000 represent industrial-strength, expandable sampling that breaks with previous generations of Akai samplers. While it's an ambitious system — as evidenced by continuing software updates to add features and fix bugs — Akai is nailing down the loose ends. And then there's that gorgeous interface...

Granted, there's competition from software-based devices such as the Unity DS-1 and Nemesys Gigasampler. But, just as computer-based CD-Rs haven't killed off stand-alone models, there will always be a need for self-sufficient hardware devices. By marrying the best of computer thinking and technology with the musicality of sampling, Akai has managed to produce a hybrid product that celebrates, rather than hides, its computer-based soul. Welcome to the next generation.



CIRCLE 35 ON FREE INFO CARD

Neumann KM 184 Studio Microphone

After 30 years,
the venerable
KM 84 gets
an update

BY DAVID MILES HUBER

For decades, the Neumann KM 84 has been one of the most widely used small-diaphragm condenser mics in both the professional recording studio and on-location recording. They're still a mic of choice for drum overheads, string/ensemble pickup, and guitar. In fact, now that I think about it, the Neumann KM series mics have always been an all-around excellent choice for numerous applications. Now, more than 30 years later, Neumann has updated these well-known mics in the form of the 180 series, which includes the KM 183 (omni), KM 184 (cardioid), and KM 185 (hypercardioid).

Although the small size and shape have remained the same, Neumann has made several changes and improvements that have altered the basic character of the mic. These include: the addition of a gentle boost in the high-end (approximately 4 dB at 9 kHz); a 21-dB increase in overall dynamic range (due to a reduced self-noise of only 16 dB-A and an increased sound-pressure handling capability of up to 138 dB); a balanced, transformerless output circuit; and an increased output level.

The 184 is available in two flavors: as a single mic (includes a regular stand mount and a novel shock-mount adapter that attaches to the XLR connector instead of the mic body, allowing the mic to float freely); or as a stereo pair that comes in a handsome wood case.

IN THE STUDIO

We put the KM 184's to the studio test, and the versatile mics sounded great on almost any instrument that we threw at them (which is a bit more than I can remember saying about the KM 84's...). These mics were truly designed for the digital age, as the high-output and low-

noise characteristics created a pick-up that was noticeably quieter than most of the mics we tested. In addition, when put through a high-quality mic preamp, about half the gain was required to match the output levels of most of the other pickups in our comparison.

The descriptive word for the 184's sound is "warm." It's a real testament to small-diaphragm condenser technology that you can get such a rich-sounding presence from such a small mic. When testing the 184 against a Sanken CU31, Calrec 2050, and the AKG C60 (a vintage, small-diaphragm tube mic), the 184 sounded noticeably fuller, richer, and less noisy.

The 184 and an AKG C1000, to my surprise, compared quite favorably on voice, flute, guitar, mandolin, and upright bass, as did the AKG C3000, which also was right in the "warm and present" ballpark. (Since the C3000 is a large-condenser with a protective grille, it wasn't a fair comparison, but I had to see how the two stacked up.)

MY 2 CENTS

For those who sub-

scribe to the concept that "all you need are a few good mics that work well in a variety of applications," the KM 184 is definitely worth checking-out. The high-output and low-noise electronics — along with a "warm" and "present" sound — make this mic (or stereo pair) an excellent choice for recording in the digital age.

Note: Thanks to my buddy Phil Williams (voyager-records.com) for his never-ending help and support on articles like these. A toast to folks like him who are "addicted" to the art of microphone design and placement.

MANUFACTURER: Neumann USA, One Enterprise Drive, Old Lyme, CT 06371. Tel: 860-434-9190. Web: www.neumann-usa.com. **PRICE:** KM 184, \$ 729; SKM 184 (stereo pair), \$1458. EQ free lit. #111.

EQ Contributing Editor David Miles Huber is the author of several books on recording and sound, including the *Microphone Manual: Design and Application*, *Random Access Audio*, and *Modern Recording Techniques* (all available from Howard W. Sams & Co.).



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NHTPro M-00 Monitor

NHTPro packs
high-quality sound
into their new
“micro” monitor

BY BOBBY OWSINSKI

Powered monitors have become so prevalent these days that it's odd to find one that *isn't* powered. That doesn't mean, however, that monitors have lost their design edge. In fact, a new type of monitor is now coming to the fore — something I like to call the “micro” monitor. This is a monitor roughly half the size of a typical bookshelf that features a woofer of less than six inches. Although this type of small monitor has always been available in some form, the real trick has been to find one that holds

up against its bookshelf brethren in both level and quality. Excellent, studio-quality micros were hard to find. Now, though, NHT has introduced the NHTPro M-00's.

The NHTPro M-00 is a compact (9" H x 5.7" W x 7.3" D) two-way monitor featuring a 4-1/2-inch woofer and a 1-inch soft fabric dome tweeter. As is the appropriate trend these days, the unit's power comes from a more than ample, single, 75-watt amplifier, which, the manufacturer says, will provide up to 111 dB SPL at 1 meter. Vergence Technology (the makers of NHTPro) states that the monitor's frequency response is 98 Hz to 20 kHz (± 2 dB).

The enclosure is made from a cast aluminum/zinc alloy, with a mica-filled ABS baffle and weighs 14 lbs., which makes it deceptively heavy for its size. The rear of the shielded enclosure features XLR, TRS, and phono-input jacks, allowing for easy, adapter-less connection to any source, but does not include a master level control. There are

three, tiny toggle switches directly above the input jacks. One selects input sensitivity (+4 or -10 dB); a second selects either Nearfield or Midfield (NF/MF) response, which puts a gentle, high-frequency filter (down 3 dB at 20 kHz) into the circuit above 3k; and the third is an interesting Auto Power switch.

Auto Power is not to be confused with the master power switch, which is a large rocker switch located on the lower right of the rear panel. Auto Power enables the M-00 to go into a low-power mode if no signal is detected after about 10 minutes. In this case, the front-panel power LED glows red. As soon as a signal is sensed, the amp becomes active and the LED then glows green. If you're like me and prefer to keep your gear always powered up, but hate to pay the resulting electric bill, Auto Power is just the ticket.

The M-00 also offers 1/4-inch-20 threaded inserts on the rear panel designed to work with OmniMount's



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50/53 series bracket systems. The accompanying manual, while short and not too technical, is complete and covers the most important operational aspects of the monitor.

Since NHTPro sent five of these units (the companion subwoofer isn't ready yet), I used the M-00's in two different surround scenarios. The first was on a location recording in a church in Long Beach, CA that involved the percussion ensemble, Agape Beat. The ensemble consisted of five percussionists using a combination of a regular drum kit, congas, timbales, talking drum, djembe, cuica, bongos, and assorted percussion toys all set up in a semicircle and recorded in surround. Since the M-00's are very compact and powered, they're perfect for this kind of quick, run-and-gun situation (I used them without a subwoofer in this application). What I didn't count on was them sounding as good as they did. The M-00's pleased us all with their smooth, neutral playback, and they had just enough level to please even a percussionist fresh from being rocked by close-proximity transients.

In the studio, I was able to live with the M-00's at Front Page Recording's Studio A for a total of nine days. I was doing surround mixes for Shadowfax, Tangerine Dream, Tuck and Patti, Michael Hedges, Jim Brickman, Yanni, George Winston, and a few more artists for an upcoming Windham Hill DVD sampler. I've been looking for a small surround system specifically to use as an alternative to my main system (dare I say as an almost "surround NS-10" equivalent—in purpose, not quality), and the M-00's fit the bill exceedingly well. In fact, they sounded so good that we sometimes forgot which system we were listening to. Even in a fairly large (25' x 30' x 12') control room, the monitors always provided plenty of level. Although I must admit that I usually monitor at rather modest levels—from about 70 dB to about 94 dB SPL, but usually centered around 82 dB SPL. The M-00's were a good check of what was happening on the bottom end of a mix since we did not use a bass manager for low-frequency extension (you sometimes can get fooled when using a subwoofer). If the bottom worked on the

M-00's, then it would work in the real world as well.

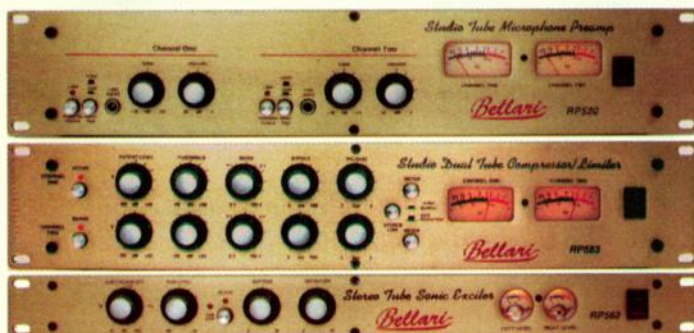
Although I used them only in a surround setup, I can envision a multitude of uses for these speakers. They're small enough to easily work besides DAW or synthesizer for programming, yet of a high enough quality to use as alternate speakers. While they may not be able to produce ear-splitting levels or have loads of low bass (what small monitor does?), the response is smooth and even at all levels—and what you'll hear will be accurate.

While there are now increasingly more "micro" powered monitors on the market, you'll have to look far and wide to find one that sounds as good as the NHTPro M-00's. At a very reasonable suggested retail price of \$375 each, you'll like what you hear.

MANUFACTURER: NHTPro, 3195 Park Road, Unit A, Benicia, CA 94510. Tel: US, 877-4NHTPro (877-464-8776); international, 011-1-707-751-0270. Web: www.nhtpro.com.
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SEPTEMBER 1999

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■ Now for the first time, you can realize the full potential of the world's finest condenser microphones with an affordable compact mixer: Room ambiance so detailed you can practically hear the carpet pattern...high frequency resolution that defines cymbals, triangles and bells down to the molecular level...midrange that's as gentle and fluid as a warm bath...and tight, authoritative bass with intoxicatingly rich harmonic texture. In short, you can now achieve an aural panorama that's breathtakingly realistic, excitingly vivid and truly 3-dimensional.

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0.0007% THD

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Lowest E.I.N. at real
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Impedance independent

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bandwidth

The best RFI rejection
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MS1402-VLZ™ PRO

6 XDR™ mic preamps
14x2 • 4 stereo line
inputs • 6 mono
mic/line inputs •
extra ALT 3-4 stereo bus



CR1604-VLZ™ PRO

16 XDR™ micpreamps
16x4x2 • 16 mono
mic line inputs
• 4 sub groups
• rotatable I/O pod



MS1202-VLZ™ PRO

4 XDR™ mic preamps
12x2 • 4 stereo line
inputs • 4 mono
mic/line inputs •
extra ALT 3-4 stereo bus



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MOTU 2408 Hard-Disk System

How to use the popular hard-disk recording system in different ways

BY CRAIG ANDERTON

Mark of the Unicorn's Performer and, later, Digital Performer have been synonymous with sequencing on the Mac since the mid '80s. Although there is yet to be "Performer for Windows," MOTU has nonetheless become a fixture in the Windows world via hardware interfaces, the latest being the 2408 family.

The 2408 is a product that doesn't really need reviewing: it was an immediate hit, and continues to do extremely well. It *does* need, though, an explanation of how it fits into the digital studio. (I'd bet that many people buy a 2408 for one specific application, and never really explore its other talents.) We'll also look at the 2408 from a Windows perspective, which hasn't received as much attention. First, however, let's cover the basics.

ABOUT THE 2408

The 2408 package consists of a cross-platform PCI sound card and external 1U rack that provides a lot of rear-panel interfacing:

- 24 channels of ADAT Lightpipe I/O
- 24 channels of TDIF I/O
- 8 individual analog ins and outs (unbalanced, -10, RCA connectors, with 20-bit oversampling converters)
- S/PDIF In and Out (with an additional S/PDIF Out that duplicates the master out)
- Word clock In and Out
- Balanced TRS phone jack master analog outs

The rack connects to the card via a firewire-type cable (although it doesn't use the firewire protocol), and you can connect up to three racks (or add another type of expander, the 1224; see sidebar) for up to 72 channels of digital and 24 channels of analog I/O. I/O is arranged as "banks" of eight channels. For example, you might configure your system with Bank 1 as ADAT I/O, Bank 2 as TDIF, and Bank 3 as analog. Unfortunately, S/PDIF works only with Bank 3, tying up the entire bank.

The front panel has a zillion LEDs to inform you of input and output status for the various ports, as well as input metering. There's also a headphone jack (and volume control) that parallels the main outs for instant monitoring.

The PCI card includes a port for connecting the MOTU Digital Timepiece's "Control Track" I/O (intended for sample-accurate DA88/ADAT sync). There's also a 9-pin ADAT sync-in connector, which allows for sample-accurate transfers between your host program and ADAT digital recorders. (Sample-accurate means that, when you transfer tracks from ADAT to something like a hard-disk recording program and back to ADAT again, the tracks end up precisely where they start-

ed, down to the individual sample. This is unlike sound cards that have no 9-pin sync, and rely on MTC to provide timing accuracy. Worst-case, MTC provides 1/4-frame accuracy—about 4 ms—but most software does a bit better than that.) Currently, only MOTU's Digital Performer and AudioDesk on the Mac can do sample-accurate transfers with the 2408, although more software will likely support this type of feature in the future. However, you'll still need a synchronizer such as the MOTU Digital Timepiece or MIDI Timepiece AV to resolve the entire system to SMPTE, or provide MMC control.

Overall, the entire package is a class act—it's a real relief after dealing with way too many sound cards that didn't install properly, screwed up my computer, or had documentation as cryptic as the U.S. tax codes. The jacks are gold-plated; the manual is well-written; the configuration wizard "interviews" you about your system and automatically sets up the hardware; the "firewire" cable is long enough that you should have no problems connecting your computer to the rack; and more. MOTU has made installing a sophisticated Windows sound card as easy as installing a card on the Mac, which says a lot.

Bundled software includes the Console (fig. 1), which routes inputs and outputs to the various banks, associates I/O with a particular bank, sets sample rate (44.1 or 48 kHz), chooses the buffer size to minimize latency, and the like. The 2408 "speaks" ASIO (the low-latency, multi-channel drivers used in Cubase, Logic, and many other programs), as well as standard Windows MME drivers (the Mac version is ASIO and Sound Manager-compatible).

The Cue Mix applet provides a simple on-screen cue mixer for slower systems, which may exhibit unacceptable delays due to latency when monitoring "live"

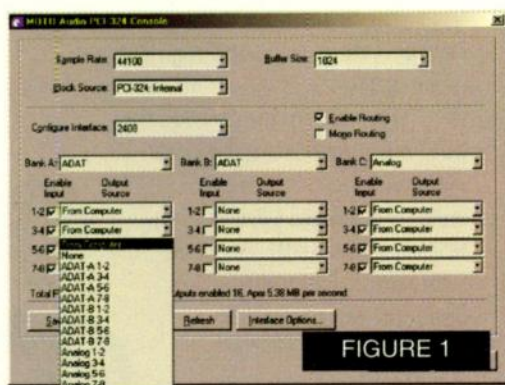


FIGURE 1



Ad Index *For fast and easy information use the reader response card in this issue*

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109	Conservatory of Recording Arts	82	800-562-6383	72	Musician's Friend	51	800-776-5173
97	Countryman Associates	12	650-364-9988	7	NHT Pro/Vergence Technology	52	707-751-0270
75	Crate Pro	31	314-727-4512	23	Opcode	53	650-429-2400
73	Crown International	89	800-342-6939	95, 105	Peavey	34, 39	601-483-5365
41	CTI Audio, Inc.	13	888-702-7075	27	QUSA, Inc.	54	608-251-2500
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122	Illo Entertainment	74	800-747-4546	49, 87	Yamaha Corporation of America	60, 72	714-522-9011

through a program. Cue Mix provides a low-level patch-through, which is conceptually similar to monitoring an analog tape recorder's source instead of monitoring off the playback head. Of course, with Cue Mix, you won't hear the results of any processing (such as plug-ins) in the host software.

Finally, AudioDesk software (the audio portion of Digital Performer, which also provides direct support for the 2408) is included for the Mac, but there is no Windows equivalent.

APPLICATIONS

Let's look at eight novel ways to use the 2408.

Expanding digital mixer analog inputs. Most digital consoles can accept TDIF or ADAT Lightpipe signals in addition to audio inputs. If you run out of analog I/O, you can use the 2408 in stand-alone mode (no computer required); patch your analog outs to the 2408 analog ins, route the analog ins internally to an ADAT or TDIF out, then patch that out to the digital mixer's corresponding digital input. Latency is essentially non-existent; in fact, the delay on the 2408's 20-bit converters was approximately 20 microseconds less than the delay on my digital mixer's 24-bit converters. "Networking" between Mac and Windows machines. On my Mac, I use the En-

soniq PARIS system, which has an ADAT card with 9-pin sync as well as "Lightpipe" connections, and is great for hard-disk recording. On Windows, I use ACID a lot, which is wonderful for looping but has limited hard-disk recording capabilities. With the 2408 hooked into the Windows machine, it's easy to assign premixed ACID outs to ADAT track pairs, blast audio into Mac, then overdub multiple hard-disk parts in PARIS.

Human interface. MIDI + digital audio programs are very cool, but it's a pain to mix with a mouse. Moreover, if you use too many plug-ins, computer performance slows to a crawl. The answer: use a digital mixer as a human interface and the software for tracking and editing. Assign the program's outs through an ADAT or TDIF connection to the mixer, and use the mixer's faders, automation, and

processors to complement the software. **Format conversion.** Converting between TDIF and ADAT is easy with the 2408 (you can even convert 24 channels simultaneously), but there are some less-obvious possibilities. For example, in addition to backing up DAT to CD-R, it's easy to back-up to digital tape by feeding the DAT output into S/PDIF, then assigning that to a tape track pair. Given that (for example) ADAT has

four track pairs that can play for up to an hour each, you can store about 2.5 GB of digital audio on a \$10 tape cartridge.

"In-place" digital tape editing. With programs that support sample-accurate transfers, any time you find a problem area on the tape, transfer it over to the host program, make any desired changes, then return it from whence it came. You don't have to re-record a track from the beginning, or transfer multiple tracks at a time.

Multitrack digital tape transfer into Pro Tools. Record the taped signals into AudioDesk or Digital Performer in one pass (up to 24 tracks with a core system, up to 72 with a fully expanded 2408 system and a fast computer), then use these programs' OMF export option to transfer the resulting project into Pro Tools.

Portable tracking. If you're on the road, according to MOTU, the 2408 works well with a G3 or Wallstreet PowerBook and Magma PCI expansion chassis.

So is the 2408 cool? It sure is. If you need to route, capture, or output digital or analog audio with a computer, you'd be hard-pressed to find a better solution. **EQ**



LAB REPORT

MANUFACTURER: Mark of the Unicorn, 1280 Massachusetts Ave., Cambridge, MA 02138. Tel: 617-576-2760. Web: www.motu.com.

APPLICATION: Provides rich audio I/O — analog, TDIF, ADAT, S/PDIF — for Mac or Windows platforms, or works as a stand-alone digital audio router/patchbay.

SUMMARY: Pretty close to a perfect product, from documentation to operation.

MINIMUM SYSTEM REQUIREMENTS: 32 MB RAM, PCI slot. Windows: 200 MHz Pentium, W95/98. Mac: 604-based PowerMac, OS 7.6.1.

STRENGTHS: Cost-effective; cross-platform operation; includes quality hard-disk recording software for Mac; well-constructed; excellent documentation; easy to configure and use; expandable for more I/O and/or 24-bit analog I/O.

WEAKNESSES: No on-board MIDI or temporal sync options means you'll need an external synchronizer in many applications; 20-bit converters and RCA phono jacks for analog I/O; no NT support.

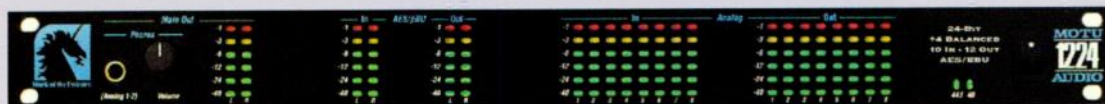
PRICE: \$995; 2408 rack expander, \$695.

EQ FREE LIT. #: 113

THE 1224 EXPANDER

Although the 2408 has a 24-bit internal data path, the converters are only 20-bit. That doesn't bother me much given that 20-bit converters yield a dynamic range that typically exceeds the CD delivery medium, but for those who want spiffier analog I/O, MOTU offers the 1224 system. This comes in two flavors: as a stand-alone "core" system similar to the 2408 with PCI card and rack (\$1295), or as an expander (\$995) for the 2408 or 1224 core system that plugs into one of the two extra "firewire" connectors.

The 1224 provides eight channels of balanced, +4 dB, TRS-style I/O with 24-bit conversion, and quotes an A-weighted dynamic range of 116 dB. It also sports AES/EBU digital I/O, balanced XLR main outs, word clock I/O, and a front-panel headphone jack with associated level control that monitors the main outs. The 1224 rack can stack with 2408's or other 1224's in any combination — for example, two 1224 expanders for 16 channels of high-quality analog I/O, along with a 2408 for 24 channels of ADAT/TDIF (or eight more channels of analog I/O).

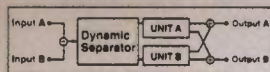


24-bit Reverb with Soul.

The Roland SRV-3030 24-bit Digital Reverb Processor represents a bold leap forward in professional reverb processing. Thanks to its breakthrough DSP chip, superb reverb algorithms, and unique dual-processor design, this digital wonder delivers lush, musical reverb that actually responds to your music during playback—a world's first.

Dynamic Separation Algorithm

The SRV-3030's "soul" comes from its proprietary Dynamic Separation Algorithm. Dynamic Separation splits signals of different dynamic levels, frequencies, or note densities and sends them through totally independent reverb processors. Thus, a kick drum can automatically trigger a tight room reverb while the snare triggers a hall setting; a horn solo can have less reverb on the quick phrases than on the slower phrases; and different instruments can trigger the type and amount of reverb which best suits them. All of which makes using the SRV-3030 a truly musical experience.



Easy to Use

The SRV-3030's streamlined graphic LCD and three edit modes give you exactly the reverb sounds you're looking for—fast. The quick, knob-based Direct Edit mode, the intuitive EZ Edit mode, and the full-featured Custom Edit mode let you edit as quickly, or as deep, as you want. The SRV-3030D model includes 24-bit coaxial digital inputs and outputs for quick, all-digital connection. You can even store short audio samples for instant auditioning of reverb sounds from the front panel, making the SRV-3030 one of the friendliest reverb processors you've ever met.

It's time to expect more from your digital reverb processor.
It's time to expect some soul.

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The SRV-3030D model pictured above includes 24-bit coaxial digital inputs and outputs.

Crane Song Ltd. **TRAKKER Comp-Lim**

The versatile processor
can handle from clean
to mean — and every-
where in between

BY EDDIE CILETTI

As a single-channel compressor/limiter with a wide range of "character settings," the Crane Song TRAKKER is in its own league. What sets TRAKKER apart from most of the competition is designer David Hill's commitment to build all of his products from the ground up, transistor by transistor. His is not the easy way.

Dynamics manipulation is not for purists, but you could say that Crane Song's TRAKKER is an audiophile product in the truest sense of that word. The design starts with clean, fast, transparent circuitry. On top of this foundation are 12 color options and four clean options, switched in or out by relays, and not with electronic switching circuits.

NO IMPLANTS

Gear with a super-chic exterior often makes me question what's on the inside. TRAKKER is not built to impress doctors or lawyers looking to impress their friends. Its clean, simple layout is soothing. Take one look inside and you will see why TRAKKER is worth

every penny of its \$1695 list price. The choice of high-quality parts, robust metal work, and circuitry (I was allowed to browse the schematics) shows that no shortcuts were taken. Give any of your techno-geek friends a peek, and they will tell you, "That's the way I would build it if I had the time."

The front-panel controls are clearly labeled; the metering is big and bright with generous resolution to let you know what's truly going on. Compared to the STC-8 (Crane Song's first dynamics processor), there is nothing ambiguous about TRAKKER's nomenclature. There is one "magic knob," labeled Character, which dials in (or out) the various "color" options described in the next section. You don't have to read the manual to figure out how to use TRAKKER, although its information is concise, useful, less technical than this review, and without ego.

SUMMARY

Here's the "color" commentary. The Character options for each quadrant are Soft Knee, Hard Knee, Optical, and Air-Optical. Within each quadrant there are Clean, Vintage, Clean-VCA, and Vintage-VCA options. Vintage-VCA is the most funky, especially with fast attack and release settings. (In VCA mode, transient harmonic distortion is added.) The Vintage setting puts a single-ended (Neve style) Class A amplifier in the audio path that has triode-like distortion (up to 6.5 percent) that is mostly second harmonic with some third (0.5 percent). The Optical settings have program dependent, nonlinear release times. Soft Knee does not have program-dependent release time. Air-Optical adds brightness as gain reduction increases beyond 12 dB (about 0.5 dB rise at 15 kHz) with a very wide bandwidth. This is noticeable in a good way!



LAB REPORT

MANUFACTURER: Crane Song Ltd., 2117 East 5th Street, Superior, WI 54880. Tel: 715-398-3627. Web: www.cranesong.com.

APPLICATION: Audio dynamics processor.

SUMMARY: High-voltage discrete Class A transistor circuitry with no ICs in the primary signal path. Single-channel compressor/limiter, up to eight Trakkers can be linked for surround or other multichannel purposes.

STRENGTHS: "Knee" feature adds impact to the Attack and Release controls; Character switch delivers 16 sonic "color" variations; excellent meters.

WEAKNESSES: None.

PRICE: \$1695

EQ FREE LIT. #: 114



FIRST TASTE

I first used TRAKKER on a Takamine acoustic guitar with a pickup. I had already recorded this guitar on another track with a Neumann TLM 193 and the TC Electronic Gold Channel. This time, I needed to effect the guitar to make it seem more like a bass instrument. Using an Alembic preamp to feed TRAKKER, I upped the Threshold until gain reduction kicked in, noticing, at first, that the guitarist's style was generating some major low-frequency thumps. I couldn't afford to rolloff any low frequencies, but by dialing in a faster Attack time, the thumps all but disappeared.

FINALE

My own preference for Slow Attack, Fast Release, and Gentle Knee made many of the options, except in the Air-Optical quadrant, fairly indistinguishable. Still, I was able to raise the level 4 dB to 6 dB without radically altering the sound. I know this is not the normal approach, so I went to the fastest Attack and Release settings, trying to make TRAKKER

sound bad — but that's a difficult thing to do when compared to many other compressor/limiters.

TRAKKER gets the most usable range out of each of its controls, letting you approach the "danger zone," but not get

sucked in. An LA-2A, 1176 or 160X can't be clean like TRAKKER, but I believe you'll find TRAKKER to be a versatile dynamics processor — from clean to mean — pleasing many different tastes and being the "master" of its trade. **EQ**

FET MESSAGE

Let's pretend that your ear is the detector of a compressor, your hand on the volume control represents the control voltage. In an optical limiter, sound is first converted into light, then coupled to a photosensitive resistor that is connected to another resistor, the two forming a voltage divider. A volume control is a variable resistor. A compressor, in its most basic form, is an "automatic volume control."

The beauty of two Classic optical limiters, the LA-2A and LA-3A, is that an audio amplifier and two transformers are what's between the input and output connectors. Substitute a Field Effect Transistor (FET) for the photo resistor — as is the case in the Classic 1176LN — and you must now make a circuit that creates attack and release curves, plus bias the FET to work in its optimum range. It gets complicated...

TRAKKER uses Pulse Width Modulation (PWM) to control the FET. This eliminates distortion typical of the older, more typical FET designs and, more important, makes performance more predictable. Stack eight TRAKKERS together, and they will track to within 0.1 dB — when linked — for the first 20 dB of gain reduction. You could not do this with two 1176's, especially at their age!

This is the foundation of clean signal processing.

"All The Sound You've Never Heard"



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4th Generation
Processing Engine

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SEPTEMBER 1999

Five Sites *to Place Your Song*

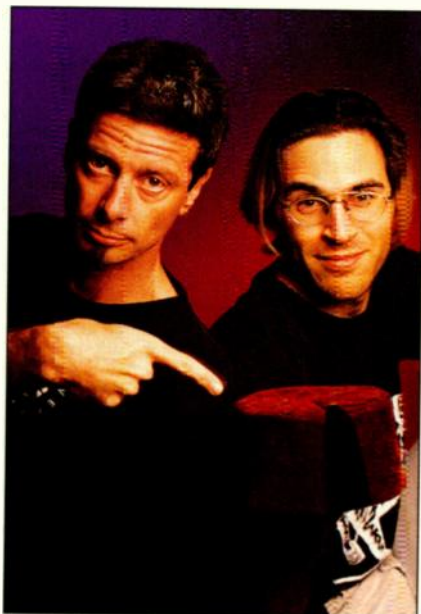


PHOTO BY STEVE JENNINGS

Now that you've got that killer song, where is the best place to put it?

BY JON LUINI AND ALLEN WHITMAN

This month we break all the rules, act like we don't know what we're doing, and try placing songs on a bunch of different Web sites. We pretend we're coming at Internet audio for the first time. Is it a kinder, gentler, and leveled playing field of a World Wide Web, or are things as complex and obtuse as the business of business typically make them?

We chose five mainstream sites: www.iuma.com, www.mp3.com, www.rollingstone.com, www.ubl.com, and www.riffage.com. We encoded a three-minute and thirty-three second song called "Diamond Mine" (band name: Doormouse, coproduced by one of us FezGuys) to an MP3 file using Xing's Audiocatalyst. With wide eyes and hearts full of hope, we fired up the modem...

WWW.IUMA.COM

Our first visit takes us to IUMA (the Internet Underground Music Archive). Creat-

ed in 1993 by some charming and unwashed geeks with too much access to computers at the University of California at Santa Cruz, it's the oldest and most venerable of the independent music databases. Upon arriving at the space-age/jazzbo site, we locate "Artist Uplink." Purporting to "offer you the ability to create, maintain, and customize your own Web site" this is IUMA's entry (now that they are owned by bigger fish E-Music) into free Web-site hosting. It's *deja vu* all over again, as this is what IUMA was about when it began.

This site requires a Javascript-enabled browser (Netscape 4.0 or MSIE 4.0). Clicking on the Artist Uplink area gets us to a sign-up sheet. It's clearly detailed, and the pop-up window help function is well-designed.

We fill out the rather long entry form. They want to know everything and we don't want to tell them everything, especially our phone number. It says we must, so we lie. We are assigned our own mini-domain name in the form of doormouse.iuma.com. This is better than a confusing URL you might get by hosting with a local ISP, though not as good as registering doormouse.com (which, sadly, is already taken). There are two identical contact info areas and, as we finish one and click through to the next, we find that the info must be completely filled out again. It would be easy to write a piece of script to copy this info for us.

Finally, we are uploading our image and song and, unfortunately, there's no status indicator in the uplink window. This would be a very useful function to have so we know how long we have to wait. Since there are always long pauses between mouse clicks, it is often hard to tell if anything is happening (i.e., did my click take?). IUMA automatically creates a RealAudio file from our MP3 file (which is nice), but the dialog info on the RealPlayer doesn't automatically make use of the author, title, and copyright fields. A simple fix at IUMA would configure their RealAudio conversion process for this.

Finally, we're alerted to successful uploads and offered a template from which to choose the design of our little area. The templates are relatively inoffensive and, as we have a password, we can go back anytime and change anything.

We are asked to wait "up to 24 hours"

to see the completed page, but receive an e-mail mere hours later from "Arti Shtuplink" (cute) announcing our area is ready. Everything works. We make a couple minor changes to the bio text, and we're done.

All in all, IUMA's site, directions, and presentation are very straightforward and reasonably simple. The finished product looks good. The audio is clean. This site is recommended: ease of use – easy design – groovy tech support – undetermined expected consumer experience – airport lounge, all planes running on time overall – recommended.

WWW.MP3.COM

This is a very busy but well-organized front page of links, resources, and data. We find the link to add our song well hidden at the bottom right under the name: "Artists Only." The font is tiny. We login and get a password. Again, lots of forms to fill out and a phone number or two to falsify.

After the contact sheets, we're snowed by the "terms of service" agreement, which, going well beyond mere legalese, pitches us on mp3.com as *the* site for Internet audio music downloads. We're already taking advantage of their services and don't need to be sold. Unlike IUMA, mp3.com puts our previously entered info directly into the next contact form, saving a few minutes.

When we first upload our little picture, we receive an error message stating our JPEG image was "not an image file." The site vaguely warned of problems like this, but offered no solution. We change the image from a "progressive" JPEG to a "standard" JPEG and the upload takes. The site (like IUMA) automatically sizes images, saving us that step.

We hit the song upload button and wait. It's not mp3.com's fault — 56k modems routinely provide for data transfer speeds of 40 kbps and down, depending on your connection. Again, it would be extremely useful if there were a way to know how long the upload is taking and how long there is to go. After about 25 minutes, we receive an alert. The song has been successfully uploaded.

As with IUMA, mp3.com automatically creates a RealAudio version from our uploaded mp3 file. There is a product recommendation to use the MusicMatch mp3 encoder on the site. It would be interesting to know if that recommendation was

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because of a technical preference or a business alignment. MusicMatch is not our encoder of choice, but it doesn't suck.

The Doormouse mp3.com site is up and running almost immediately after uploading the audio. Overall, our experience with mp3.com is positive, if time-consuming. Changes are easy to make, and the downloads tracking section is a big bonus. It's easy to see just how invisible you really are on the pop radar! The site is recommended: ease of use – good design – form follows content tech support – undetermined expected consumer experience – day trading in a bull market overall – recommended.

WWW.ROLLINGSTONE.COM

The Rolling Stone magazine site (www.rollingstone.com) takes forever to load. It's busy, confusing, and unclear on where to upload music. Unnecessary animations slow the process down. Whoever thinks they need 'em, well, you're wrong. We follow a link that squawks: "New Stars Wanted!" How lame is that? Every time we change a window on this site, it takes about a minute to load. This site is too slow.

First, we are told to register as members. They require our date of birth. That's weird. We lie about that, of course. After all, if we want to be "new stars," we don't want anybody to know how old we are. It's confusing to first sign up for a "member account" and then be required to sign up again as an "artist account." The contact info isn't repeated between member and artist forms. We fill it out all over again.

We upload our graphic image (sized to the required 200 by 200 pixels) and receive this puzzling alert:

"File doormouse%20200x200.jpg posted successfully. Reposting to URL 'http://real1.jamtv.com/scripts/repost-image.asp' failed."

Does that mean the image is there but, somehow, not there? We go back to the Doormouse area to look. It's not there.

We attempt to upload our song. We fill out track name, running time, creation date, and then press "Create Track." We are sent to a page that says: "Track created successfully." We haven't even uploaded the damn song yet! Where the hell do you actually upload the music? Scrolling down this window we find, buried in a list of fine print, the words: "Upload new song." Eureka! We follow directions and upload the song. Again, it would be swell to know how long the upload is taking. When we all have broadband access, this won't be an issue. Our three-plus minute song will upload in four seconds. But for now, it's about 40

minutes. We finally receive another puzzling alert:

"File DiamondMine.mp3 posted successfully. Reposting to URL 'http://real1.jamtv.com/scripts/repostrecording.asp' failed."

These conflicting messages without further explanation are maddening. Is it there or not? We go back to the Doormouse area to check. The audio file is not there. This is very confusing. In the so-called "Artist Area" (where we're supposed to make edits, changes, upload material, and preview), there are two locations to upload either graphic and music files. All four links give the same error message. Is anybody there? If the files were transferred successfully, as the dialog box states, why the failure message? And where are the files?

Perhaps the new music editors at *Rolling Stone* simplify their job by preventing people from uploading music in the first place. After several hours of trying different methods, we give up. This site is not recommended.

Just as we went to press we received this polite e-mail from an associate editor at rollingstone.com: "We thought we had that error fixed on Monday...feel free to e-mail me your image(s) and I'll be glad to upload them for you. Sorry about the frustration."

Overall: ease of use – frustrating design – Tina Brown takes over at *Seventeen* magazine tech support – helpful expected consumer experience – voice-mail hell overall – needs streamlining.

WWW.UBL.COM

Placing our song on the "Ultimate Band List" is long, involved, and very frustrating. We wonder who designs these interfaces and whether or not they actually use them. Again, the audio uploads are painfully slow and we're just hanging out on the line, not knowing how long it's going to leave us here.

We finally get the song file uploaded, but the site shuts the door in our face. After attempting to upload the bio and image file, we receive this helpful little prompt:

"An error occurred on the server when processing the URL. Please contact the system administrator."

Upon e-mailing a request for help, we receive this reply:

"Unfortunately, we are currently experiencing a problem with the Bio upload field and Bio Image upload field. Our programmers are working hard to fix this bug and we are making progress each and every day."

Each and every day. Hopefully by next year it might work. So there it sits. The songfile sounds fine, but without graphics or bio info, it's just another name on a list. Maybe it will sit there for all eternity, or as long as UBL's server infrastructure exists. And, almost immediately, the site spams us with a retail/vacation offer e-mail. The big question is: what business, exactly, is ubl.com in? You'll need to bring extra patience pillows to this site. There's a huge amount of information and ubl.com remains a popular Web destination. The FezGuys say: check it out, but don't waste too much time on it.

Overall: ease of use – confusing design – candy raver tech support – optimistic but ineffectual expected consumer experience – sitting in gridlock overall – ubl.com has a long way to go.

WWW.RIFFAGE.COM

The design of riffage.com is thoroughly messed up. It looks like it's optimized for a mutant Atari-based browser. To upload a song, we must click on "musicians only," feeling vaguely manipulated (as if it's supposed to make us feel special in some way).

Our attempts to upload "Diamond Mine" and our graphic image are continuously rebuffed. A dialog box says, "A song by that name already exists." When we search

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*All in all,
IUMA's site,
directions,
and presentation
are very
straightforward
and
reasonably
simple. The
finished product
looks
good.*



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Paul Sandweiss, Sound Design for Motown Live,
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Anthony Aquilato, Thom Cadley & Andy Manganello
- Sony Studios / Sessions at West 54th

Bob Whyley - The Tonight Show with Jay Leno

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World Radio History

ACROSS THE BOARD

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Back in L.A., it was time to finish any recording tasks and get all of the tunes ready to mix. I brought my Pro Tools for flying chorus vocals around. Nobody sings all of the choruses any more. It has been years. "Just sing one chorus and then we will fly it around." If a producer says that to you, make sure he doesn't forget about the key change at the end (rap artists can disregard this sentence).

After all of the ADAT tracks and 48-track stuff was massaged in Pro Tools, everything was dumped to a Sony 48-track master reel to turn in to the record company. What are they going to do with all of those ADAT tapes? Well, maybe I will erase all 100 of them and use them for my daughter's new band. Maybe I'll leave some of the percussion and drums, and loop part of the bass lines, and I think there was a couple of cool guitar licks and background "oos" ...naw, I better hit the red button before I get in trouble.

Oh, yeah. We are going to try to mix on the Otari Advanta digital console. I'll keep you posted on that one. ■

MAINTENANCE

continued from page 137

FREE STUFF

I would be remiss if I didn't mention all of the media I have been able to evaluate. In the past, Sony and BASF have been very generous in providing DAT, ADAT, DTRS, and CD blank media. Apogee recently sent a package that included not only their tape, but beautiful cables, including AES, S/PDIF — RCA and BNC — as well as TRS analog patch cables. I am currently working on a deal to give away a free tape or CD-R with every machine serviced. Who wants to be my supplier?

DVD ANYTHING

If you think surround sound is a waste of time, then you must be considering one, but not all, of its many potential applications. One example is to augment a video presentation in a theater-like session. Microsoft's PowerPoint currently is the popular presentation tool. As DVD authoring becomes affordable, its use as a presentation tool will increase. In addition to the picture quality and interactivity, multichannel sound will play a large role in its impact.

Seek out affordable alternatives to DVD authoring.

DADDY COMPRESSION

Last, but not least, is data compression, as it applies to Internet radio and record companies, portable MPEG players, and MiniDisc recorders. It may not be your idea of a good time to listen to data-compressed Internet radio all day long (some people had a "problem" with 16-bit CDs). However, there's now a whole new generation of kids who don't know from analog. As pioneers and providers of audio content, we must learn to do (with data compression) what our pre-stereo ancestors did with AM radio and jukeboxes: learn to make the most of limited bandwidth!

Drop by for a virtual visit at www.tangible-technology.com or e-mail edaudio@tangible-technology.com.

FEZGUYS

continued from page 142

riffage.com for "Diamond Mine," we come up empty-handed. It's odd that a site should limit an artist's right to use a song title. We notice yet another helpful little message stating that:

"Some people have reported trouble saving to the bio page."

The message goes on to recommend continued reposting until the site accepts your file. Again, very time-consuming. We keep trying. We're the FezGuys, after all. After fending us off again and again, we're ready to throw in the towel. Suddenly it appears that we may be well on our way, after all. Apparently, the "submit" page was patiently waiting for us to electronically sign a "terms of service agreement." We finally get a message promising "approval and posting in 72 hours."

After several days, we receive this e-mail: "It appears that ('Diamond Mine') did not upload correctly, so we have no file for it. Unfortunately, we had to reject your song. If you could please upload the song again, we could then approve it." We try again. Again we receive the 72-hour wait message. We're still waiting.

The FezGuys say: these lovelies need to go back to the drawing board: ease of use — not easy design — late '70s metal-head tech support — unemployment waiting room overall — needs more duct tape.

BOTTOM LINE

The FezGuys recommend you have a 200-by-200 pixel image prepared. Also, have your bio, lyric sheet, and credits

ready for cutting and pasting. You'll appreciate not having to type the same 200-word biography into each site. Allow roughly 10–15 minutes to fill out forms, and an additional 20 and 40 minutes per song upload (56k modem dialup), depending on traffic, weather, and the mood of the servers at your ISP. This entire exercise can be viewed as time-consuming, frustrating, and possibly pointless. Of course, if you have the time, there's nothing but time to lose and, who knows, you might get noticed. When you're done, go to www.listen.com, a portal site that reviews music online. Go to the "submit music" link.

It's likely that a musician's chances of getting noticed by popular culture using the World Wide Web are about as hopeful as getting "signed" by a major label. Not quitters though, your FezGuys, oh no. Where the good stuff exists, we'll find it and bring it to you.

The FezGuys never say "whatever." We care a lot! Visit their Web site at www.fezguys.com.

CURTIS MIC SYSTEM

continued from page 28

In terms of the type of recording application best suited for the Curtis AL-2, the system is noninstrument restrictive. On such instruments as drums, acoustic pianos, acoustic guitars, saxophones, and cellos, the performance of the microphone is, in the words of William Curtis, "world class." Curtis also noted that, "More importantly, the AL-2's are unprecedented in their ability to sort out and translate the super-complex harmonic interaction that occurs during events that are symphonic in nature."

The Curtis Technology AL-2 stereo microphone system ships with two microphones, the rack-mount power supply, Canare cables (reportedly the best the company has tested), shockmounts, and a case. With a suggested retail price of \$2995, this is hardly an impulse studio purchase. However, if you're in the market for a well-crafted set of microphones that have been built to exceptionally close tolerances, you simply cannot ignore a close look at the Curtis AL-2's.

Price: \$2995. For more information, contact Curtis Technology, 129 South Phelps Avenue, # 526, Rockford, IL 61108. Tel: 815-399-8453. Web: www.curtis-technology.com. Circle EQ free lit. #115.

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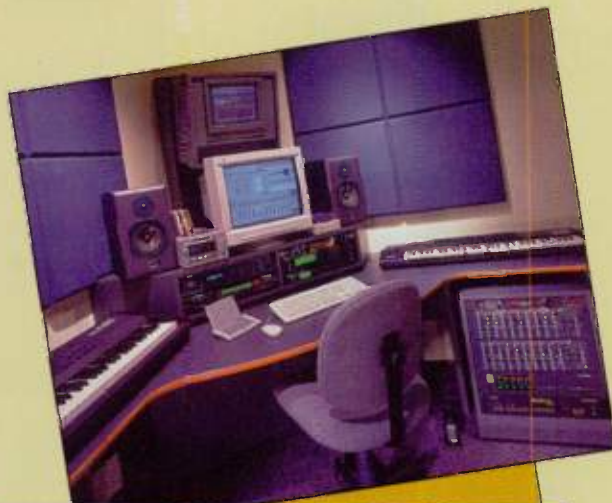
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- Truly the cutting edge of mixing technology.



Panasonic

WR-DA7 Digital Mixing Console

Stop dreaming about your digital future, it's here! The Panasonic WR-DA7 digital mixer features 32-bit internal processing combined with 24-bit A/D and D/A converters as well as moving faders, instant recall, surround sound capabilities, and much more. Best of all, it's from Panasonic.

FEATURES-

- 32 Inputs/6 AUX send/returns • 24-bit converters • Large backlit LCD screen displays EQ, bus and aux assignments, and dynamic/delay settings.
- 4-band parametric EQ • Choice of Gate/Compressor/Limiter or Expander on each channel • 5.1 channel surround sound in three modes on the bus outputs • Output MMC • Optional MIDI joystick



TASCAM

TMD1000 Digital Mixing Console

You want to see what all the digital mixing buzz is about? The TMD1000 from Tascam will have you smilin' & automatin' in no time. It features fully automated EQ, levels, muting, panning and more in an attractive digital board with an analog 'feel'. Your digital future never looked, or sounded, so clear.

FEATURES-

- 4 XLR mic inputs, 8 1/4" balanced TRS inputs.
- 20-bit A/D D/A conversion, 64x oversampling on input, 128x on output • Store all settings, fully MIDI compatible.
- Optional IF-TD1000 adds another 8 channels of TDIF and a 2-channel sample rate converter.
- Optional FX-1000 Fx board adds another 4 dynamic processors and another pair of stereo effects.



MASTERING

dbx QUANTUM Digital Mastering Processor



24-bit/96kHz mastering processor with a 48-bit digital signal path and the dbx TYPE IV Conversion System that retains the warmth and body of your signal while adding punch and depth. The intuitive user interface puts several high-end mastering tools at your fingertips including Tape Saturation Emulation (TSE), compression, EQ and more.

FEATURES-

- 96 kHz, 24 bit A/D/A, and Digital I/O on AES/EBU or S/PDIF • 48 bit internal signal path for increased headroom and low level resolution • Type IV A/D Conversion system with TSE • 4 band stereo compressor-gate-limiter • 5 band EQ Hi and Lo shelves, 3 band fully parametric • Normalizer • Stereo adjust controls stereo image • Sync I/O using dbx's own proprietary clock chips for extremely low jitter sync • Dither outputs to 16, 20, or 24 bits • Sample rate conversion • Software updatable via Internet and MIDI • 4 band crossover with variable slopes

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DIGITAL RECORDING

1224 Recording System



The 1224 is an expandable, cross-platform recording system using the latest 24-bit A to D and D to A converters. The system includes a 1224 single-rack space interface with 8 balanced 1/4" I/O's a pair of balanced XLR main outputs as well as AES/EBU and word clock I/O. The same PCI-324 audio card used in the 2408 hard disk recording system, ASIO drivers for Mac and PC, a multi-channel Wave driver (Windows 95/98), Sound Manager (Mac OS), and MOTU's AudioDesk workstation software for Mac OS. Connect any combination of up to three 1224 or 2408 interfaces with one PCI-324 card for a wide range of I/O configurations, customized to suit your specific needs.



FEATURES-

- 24-bit analog audio interface • Mac OS and Windows 95/98 compatible • State-of-the-art 24-bit A/D/A
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- Word clock in/out • 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 panel displays six-segment metering for all inputs and outputs

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- Headphone jack with volume knob
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Lexicon CORE 2 Recording System

High quality, true 24-bit computer based audio system at an affordable price (List \$599.00). Easy to use interface offers 4 analog inputs and 8 outs as well as coaxial S/PDIF and 8 channels of ADAT optical digital I/O. Dedicated hardware takes on the burden of CPU intensive tasks putting less strain on the computer's processor.

FEATURES-

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M3000 Professional Reverb



Incorporating TC Electronic's new VSS-3 technology, the M3000 is a great sounding, versatile reverb that is easy to use. Combining ultimate control of early reflections with a transparent reverb tail, the art of reverberation is brought to a new level. Whether it's a phone booth, cave or concert hall, the M3000 delivers high-quality ambience.

FEATURES-

- VSS-3, VSS-3 Gate, C.O.R.E. & REV-3 reverbs as well as Delay, Pitch, EQ, Chorus, Flanger, Tremolo, Phaser, Expander/Gate, Compressor and De-Esser
- 300 high-grade factory presets including Halls, Rooms, Plates, Ambience, Gated Reverbs, and more
- Up to 300 user presets in internal RAM and 300 more using an optional PCMCIA card
- Dual-engine configuration featuring 24-bit A/D/D/A's
- Connections include AES/EBU, Coaxial S/PDIF, Optical Tos-Link/ADAT & analog XLR I/O's, MIDI, IN/OUT, THRU, Clock Sync and External Control

Lexicon MPX1 Multi-Effects Processor



The MPX-1 is truly an outstanding multi-effects device. Using Lexicon's Lexchip, it offers outstanding reverb or ambience as well as a separate processor for effects for awesome power in the studio or on the road.

FEATURES-

- Intuitive user interface for easy editing, built-in help
- Balanced Analog I/O (1/4" & XLR)
- 56 effect algorithms
- Digital Inputs & Outputs (S/PDIF @ 44.1kHz)
- 18 Bit A/D; 20 Bit D/A Conversion, 32-bit processing
- >90dB of Dynamic Range
- Intelligent Sorting by Name, Number, Application, etc
- Parameter Morphing
- Dynamic MIDI patching & MIDI automation

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ANALOG TO DIGITAL CONVERTERS

Apogee

Rosetta 96k 24-bit Analog to Digital Converter

The high-end quality analog to digital solution for the project 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 Analog to Digital 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 MULTI-TRACK RECORDERS

TASCAM

DA-88 Modular Digital Multitrack

The standard digital multitrack for post-production and winner of the Emmy award for technical excellence, the DA-88 delivers the best of Tascam's Hi-8 digital format. Its Shuttle/Jog wheel and track delay function allow for precise cueing and synchronization and the modular design allows for easy servicing and performance enhancements with third-party options.

FEATURES-

- 1:48 minutes record time on a single 120 min tape
- Expandable up to 128 Tracks using 16 machines
- User-definable track delay & crossfade
- Shuttle & Jog capability
- Auto punch with rehearsal



• SMPTE, MIDI and Sony 9-Pin sync capability

• Options include RC-828/898 Remote Controllers, IF-AE8/IF-88SD digital interfaces, MU-Series meter bridge, MMC-88 MIDI machine control interface, SY-88 Sync Card

DA-38 Digital Multitrack for Musicians

Designed especially for musicians, the DA-38 is an 8 track digital recorder that puts performance at an affordable price. It features an extremely fast transport, Hi-8 compatibility, rugged construction, ergonomic design and sync compatibility with DA-88s.



ALESIS

ADAT M20 20-bit Digital Audio Recorder

The M20 represents Alesis commitment to meeting the high standards of world-class audio engineers, producers, studio owners and high-end video and film post production studios. A new professional digital multi-track, the M20 records 20-bit for outstanding source quality. Combined with a host of production features like SMPTE/EBU, the M20 is a powerful tool.

FEATURES-

- SVHS Recording format - up to 67 minutes recording.
- 18-XLR connections (9 in and 9 out) as well as a 56-pin ELCO connection • Digital I/O
- Includes LRC remote and a digital cable.



• 24-bit, 64x oversampling recording, 20-bit, 128x oversampling playback

ADAT XT20 Digital Audio Recorder

The New ADAT-XT20 provides a new standard in audio quality for affordable professional recorders while remaining completely compatible with over 100,000 ADATs in use worldwide. The XT20 uses the latest ultra-high fidelity 20-bit oversampling digital converters for sonic excellence, it could change the world.

FEATURES-

- 10-point autolocate system
- Dynamic Braking software lets the transport quickly wind to locate points while gently treating the tape.

ADAT OPTIONS-

- **BRC** for all Adat (except M20) w/ 460 locate pts, smpte/absolute time & bar and beat timing references, digital editing and transport control for up to 16 ADATs
- **AIS** 20-bit 8 channel analog - optical I/O interface



- Remote control
- Servo-balanced 56-pin ELCO connector
- Built-in electronic patchbay
- Copy/paste digital edits between machines.
- **CADI** remote control/autolocator for M20 w/ jog/shuttle & rj-45 ethernet connector for long distance cable runs
- **AdatEdit** integrated PCI digital audio card and software for recording and editing on Mac & Windows computers

CD RECORDERS

HHB

CDR-850 CD Recorder

The new HHB CDR850 is one of the most comprehensive CD - CD-RW recorders available today. It delivers the outstanding sound quality that HHB is known at a lower price than previous models. Equipped with a complete range of analog and digital I/O and easy to use one touch recording modes make the CDR850 suitable for any audio environment no matter how sophisticated or demanding.

- CD-R, CD-RW compatible
- All functions accessible from front panel menu
- 4 one touch recording modes: 2 manual, 2 automatic
- Sample rate converter accepts any digital signal from 32kHz to 48kHz including varispeed

- Copies all CD, DAT, MD, DVD and DCC track starts
- Complete user control over SCMS
- Balanced XLR analog I/O, Unbalanced (RCA) phono analog I/O, AES/EBU digital input, coaxial & optical S/PDIF digital I/O



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 CDRW 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

CopyWriter A2D CD Duplication System

The first CD to CD standalone duplicator with built-in Analog to Digital Conversion capability. Easy to use and powerful, the A2D has a 2.1GB internal hard drive and a SCSI port for direct connection to a Mac or PC. A perfect solution for audio, data and video applications.

Features-

- Interface includes Microphone in, Audio line in, Audio line out and external SCSI port
- Supported Formats: CD DA, CD ROM mode 1 & 2, XA, CD Bridge, Photo CD, CD Extra, Multi Session, Mixed Mode, Karaoke, (optional)
- Duplication Speed: 8X Read/ 4X Write

- Windows 95, NT, 3.1, Mac OS and Unix compatible
- Headphone output with level control



STUDIO DAT-RECORDERS

TASCAM

DA-45HR Master DAT Recorder

The new DA-45HR master DAT recorder provides true 24-bit resolution plus standard 16-bit recording capability for backward compatibility-making this the most versatile and great sounding DAT recorder available. With support for both major digital I/O protocols plus the ability to integrate the machine into virtually any analog environment, the DA-45HR is the ideal production tool for the audio professional.

FEATURES-

- Word Clock
- 24-bit A/D and 20-bit D/A with dither
- XLR balanced and RCA unbalanced analog I/O
- AES/EBU and S/PDIF digital I/O



- Word Sync In/Thru
- Alphanumeric data entry for naming programs
- Independent input level adjustment capability
- Output trim for XLR balanced analog output
- Optional RC-445 Remote Controller

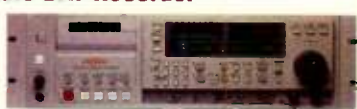
Fostex

D-15 Pro Studio DAT Recorder

The new Fostex D-15 features built in 8Mbit of RAM for instant start and scrubbing as well as a host of new features aimed at audio post production and recording studio environments. Optional expansion boards can be added to include SMPTE and RS-422 compatibility, allowing the D-15 to grow as you do.

FEATURES-

- Hold the peak reading on the digital bargraphs with a choice of 5 different settings
- Set cue levels and cue times
- Supports all frame rates including 30df
- Newly designed, 4-motor transport is faster and more efficient (120 minute tape shuttles in about 60 sec.)
- Parallel interface • Front panel trim pots in addition to the level inputs



D-15TC & D-15TCR

The D-15TC comes with the addition of optional chase and sync capability installed. It also includes timecode reading and output. The D-15TCR comes with the further addition of an optional RS-422 port installed, adding timecode and serial control (Sony protocol except varispeed)

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MICROPHONES



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 SolidTube 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 & omnidirectional 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



audio-technica AT4060

Combining premium 40 series engineering and vintage tube technology, the AT4060 delivers a versatile and competent studio microphone. Low-noise and high SPL capabilities make the AT4060 a premier vocal mic as well as strings, guitars and other demanding applications.

FEATURES-

- 20 - 20,000 Hz freq response
- Dual gold-vaporized large diaphragm elements
- Includes the AT8560 power supply, AT8447 shock mount, rack mount adapters and case.



SHURE KSM-32

The new KSM32 side-address microphone features an extended frequency response for open, natural sound reproduction. Suitable for critical studio recording and live sound production, Shure steps up to the plate with another classic.

FEATURES-

- Class A, transformerless preamplifier circuitry for improved linearity across the full frequency range.
- Exceptionally low self-noise and increased dynamic range necessary for highly critical studio recording.
- 15 dB attenuation switch for handling high SPLs.
- Switchable low-frequency filter to reduce vibration noise or to counteract proximity effect.
- Great for vocals, acoustic instruments, ensembles and overhead miking of drums and percussion.
- SL model also features an elastic shock mount which greatly reduces external vibrations.



BPM CR10

Hand-crafted in East Berlin, the BPM CR10 Studio Condenser Mic features a full frequency response for competition against the best of the best.

FEATURES-

- 1" Gold diaphragm
- Suitable for most guitar and vocal recording applications.
- Includes Custom Aluminum Road Case, XLR-cable, wind screen and elastic suspension.



SAMPLING

AKAI

S5000 & S6000 Studio Samplers

Akai is proud to announce its next generation of samplers with the introduction of the S6000 and the S5000. Building upon Akai's legendary strengths, both machines feature up-to 128-voice polyphony and up-to 255 MB of RAM. They use the DOS disk format and WAV files as the native sample format allowing standard PC .WAV files to be loaded directly for instant playback - even samples downloaded from the Internet into your PC may be used. And of course, both the S6000 and S5000 will read sounds from the S3000 library.

FEATURES-

- OS runs on easily upgradeable flash ROM.
- 2x MIDI In/Out/Thru ports for 32 MIDI channels
- Stereo digital I/O and up to 16 analog outputs.
- 2x SCSI ports standard
- Wordclock connection
- Optional ADAT interface provides 16 digital outputs
- .WAV files as native sample format

S6000 ONLY FEATURES-

- Removable front panel display
- User Keys
- Audio inputs on both the front and rear panel allow you to wire the S6000 directly into a patchbay from the back and override this connection simply by plugging into the front.



E-MU



E-mu Systems, Inc.

E4XT ULTRA Professional Sampler

The Emulator legacy continues with the new ULTRA series from E-mu. Based on the EIV samplers the new 32-bit RISC processing of the E4XT guarantees faster MIDI response, SCSI, DSP and sampling.

FEATURES-

- 128 voice polyphony
- 64mb RAM (exp. to 128)
- 3.2GB Hard Drive • Dual MIDI (32 channels)
- 24-bit effects processor • 8 bal. outs (exp to 16)

- Word Clock & AES/EBU I/O
- EOS 4.0 software
- 9 CD ROMS over 2GB snds



MIC PREAMPS



Classic 80 Pentode Tube Mic Pre

Fronted by a low noise EF86 pentode tube and 2 additional triode tubes per channel gives this pre amp detail, openness and presence. Input and output level controls allows precise control of harmonic contribution of the tubes.

FEATURES-

- 2 Channel Mic Pre • Balanced Mic Ins w/48V Phantom Power • Dedicated 1/4" Instrument Input
- High & Low pass filters w/ 3 cut off frequencies (HPF -

- 50kHz, 100Hz or 150Hz) (LPF - 5kHz, 10kHz or 15kHz)
- Phase reverse on channel 2
- Drive & Peak LED's • Large rotary output faders
- Illuminated VU meters • 250V HT voltage rail



dbx 586 Vacuum Tube Mic Pre

The DBX 586 Vacuum Tube Dual Mic Preamp uses hand selected and matched premium 12AU7 vacuum tubes ensuring ideal characteristics for a warm, distortion free signal path. Custom designed analog VU meters monitor tube level insert path or output levels well Line/Instrument and mic inputs make the 586 versatile enough to use with virtually any input source.

FEATURES-

- Mic or line/Instrument inputs on each channel.
- +/-10 operation.
- Drive control for a wide variety of great tube effects

- 3-Band EQ with sweepable frequency
- Optional TYPE IV Conversion System outputs
- Separate 1/4" Insert send/return on each channel



JOE MEEK VC1 Studio Channel

The Joe Meek Studio Channel offers three pieces of studio gear in one. It features a transformer coupled mic pre, compression and a professional enhancer together in a sleek 2U rackmount design!

FEATURES-

- 48V phantom power, Fully balanced operation
- Mic/Line input switch
- High pass filter for use with large diaphragm mics

- Extra XLR input on front makes for easy patching
- Compression In/Out & VU/Compression meter
- Enhancer In/Out switch and enhance indicator
- Internal power supply 115/230V AC



MONITORS



M6000/S Studio Monitors

The KRK M6000/S are designed for close-field monitoring. A smooth frequency response in a compact size make these units portable and efficient.

FEATURES-

- High power handling
- 62Hz - 20kHz, $\pm 3dB$.
- Compact and portable
- Low distortion
- Smooth frequency response
- Custom Gray finish.



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 or mastering. Supported by Hafler's legendary amplifier technology providing a more accurate sound field, in width, height and also depth.

FEATURES-

- 123 dB Peak
- Bi-amplified (50 W LF, 33 W HF) w/Crossover
- 45Hz - 21kHz Response
- Magnetically Shielded
- Electronically and Acoustically Matched



MACKIE

HR824

These new close-field monitors from Mackie have made a big stir. They sound great, they're affordable, they're internally bi-amped. "What's the catch?" Let us know if you find one.

FEATURES-

- 150W Bass amp, 100W Treble amp
- Full space, half space and quarter space placement compensation
- Frequency Response 39Hz to 22kHz, $\pm 1.5dB$



TANNOY Reveal

The latest playback monitor from Tannoy, the Reveal has an extremely detailed, dynamic sound with a wide, flat frequency response.

FEATURES-

- 1" soft dome high frequency unit
- Long throw 6.5" bass driver
- Magnetic shielding for close use to video monitors
- Hard-wired, low-loss crossover
- Wide, flat frequency response
- Gold plated 5-way binding post connectors



ACOUSTICAL PRODUCTS



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Famous people love LENRD because he's phenomenally effective at calming the room modes (low frequency spikes) that color their sound. Plus, LENRDs come in 12 colors of long-lasting Auralex Studiofoam™ and don't cost an arm & a leg.

Based on physics, all rooms have inaccurate low frequency response. In fact, some of the world's most famous control rooms have bass traps 6' thick(!), so it's a safe bet your room definitely needs low end help.

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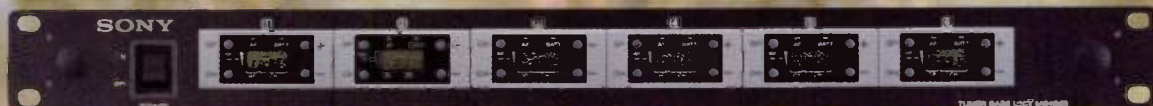


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SONY



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Audio-Technica took the heart of their smash hit 4050 large-diaphragm studio condenser mic and put it in a road-worthy, handheld body. The result? The AT4055 gives you stunning clarity and definition for live vocals and extraordinary flexibility for micing instruments on stage. Also available is the 4054 with an 80Hz Bass Roll-off to eliminate unwanted rumble. Still using those old dynamic vocal mics? The AT4055 is perhaps the single most effective upgrade you can make to your sound system.

The Best Value in UHF Wireless? Think A-T!

Meet the new 7000 series UHF wireless from Audio-Technica. This robust, 100 channel, frequency agile system is everything you've wanted for bulletproof performance including 1/2 rack, true-diversity receiver, full metering, balanced output and ground lift. Select from a wide variety of mic elements, instrument cables and accessories. Finally, a touring quality wireless for under a grand. Once again, A-T delivers top quality at an unbeatable price.

Variable Weight Round Base — A Breakthrough in Mic Stands!

Mic stands don't seem to make much news when it comes to new technology. But Quik Lok is making news with their new A-300 Series. It's round base starts off lightweight — just six pounds. Add sand or water to the exact weight you want. The convenient round base takes up less room than tripods but still gives you the option for maximum stability. The pro, flat black finish looks great. Cable clips are included to keep your stage setup tidy. Select standard or short heights with your choice of optional fixed length or telescopic booms. Our Quik Lok Four-Pack nets you tremendous savings on a set of four stands. Call now for yours!

Vintage Tube Sound Live? Must be your ART Channel Strip!

Sure, ART's Pro Channel and Tube Channel rackmount "channel strips" are two of the hottest studio devices. But don't overlook their tremendous advantages for live rigs. You get genuine tube based mic preamplification (and DI), opto-compressor and parametric EQ. Warm up your vocals? Pack some punch into your bass or kick? Tweak the heat on your guitars and keyboards? Make your sax sizzle? There are so many uses for these great tube processors, you'll want a rackfull! And thanks to their remarkably low price, you can have that vintage tone without the vintage price tag!

Six Top-shelf UHF Diversity Wireless Receivers in a Single Rackspace? Only with SONY's Unique MB 806A! Easily Expand from 1-6 Devices.

You'll love the astounding flexibility and convenience. And it's a fraction of the space and weight of yesterday's wireless at a lower price! 282 selectable frequencies across 6 UHF TV channels means no worries about getting shut out by DTV (Digital Television) or other potential interference. It can even assign channels automatically, skipping any that might give you trouble!

Ready for Extraordinary Accuracy? Pick a Pair of Earthworks Mics!

You invested a lot of time and money to get great sounding instruments and amps. So why not capture those great sounds as accurately as possible? The Earthworks SR77 is a positively delicious mic for all manner of instruments and vocals. Can you say flat frequency response? And no response peaks means less feedback as well. The available Matched Pair set of SR77s is your top choice for stereo location recording. If you haven't added a pair of Earthworks mics to your live rig, you just don't know what you're missing! Plus there's Earthworks' M30 measurement mic. Want to tweak your system to perfection? Read on!

Do You SpectraFoo? We Do! Your Complete Real-Time Metering System!

What do tours by the Dave Matthews band, Lenny Kravitz and Beauty & The Beast have in common? Their secret weapon: the award winning SpectraFoo audio metering & analysis software. RTA tools like 2 channel differential FFT help you quickly get the most from any PA. You get level meters, phase scopes, oscilloscopes, spectrum analyzers, a 24 bit signal generator and much, much more! SpectraFoo runs stand-alone on MacOS®, or as a TDM or MAS plug-in. Pop it on a PowerBook®, feed it from a pair of Earthworks M30 mics and you've got more metering power than a dozen traditional devices at a fraction of the investment!

Why not enjoy the extraordinary sound and exceptional convenience of these powerful performance tools at your very next gig? Call us today!

Sweetwater
music technology direct

(800) 222-4700

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Sweetwater MUSIC TECHNOLOGY REPORT:

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SHURE



EXCLUSIVE "ENSEMBLE SYSTEM!": You get 1 Transmitter and 4 Receiver/Earphone sets at a special discount — only from Sweetwater! Now your entire ensemble can enjoy the benefits of this advanced system!



TASCAM

TASCAM "PERFORMANCE BUNDLE": Another Sweetwater Exclusive! This offer upgrades your TM-D1000 Digital Mixer to deliver 12 Mic Preamps and double the DSP at an amazing Sweetwater "ProNet" discount! Call for details!



CHOOSE THE "XLT POWER TRIO" FOR SUPERB SOUND AND PORTABILITY: Thanks to the XLT41E's compact 12" and the XLT51E's powerful 15" driver, you get an incredibly convenient and easy-to-carry PA that really kicks! The XLT41E even works great as a floor monitor! Call for your special Sweetwater discount on this Power Trio!



MUSIC TECHNOLOGY DIRECT — and the Best Value, Guaranteed!

LIVE PERFORMANCE TOOLS

Why Upgrade to SHURE PSM® 700 Stereo Wireless In-Ear Monitors?

- You have the best possible **protection** for your **hearing**.
- Your monitors **sound great every night**, regardless of the venue.
- You have **tremendous freedom of movement** on stage - without losing your monitors.
- You save money as multi-user systems are actually **more economical** than traditional, multi-speaker monitor systems.
- You drastically **reduce the weight and size** of your monitor system.

Why does Shure Dominate the In-Ear Wireless Monitor Category?

- **Sound:** Shure's unique Low Mass/High Energy E5 dual-driver earphones deliver stunning audio quality.
- **Flexibility:** Each transmitter delivers your choice of one stereo mix or two user-selectable mono mixes.

Use any number of receivers with a single transmitter. Everyone on stage can enjoy a clear, safe mix — all for a lot less per band member than most floor monitor rigs! Add up to 16 base transmitters for a total of 16 stereo or 32 mono mixes.

Mark of the Unicorn — the Choice for Powerful Live MIDI & Audio

Live sequencing? It's not just for keyboards and drums anymore! Automate a mix, reset effects and EQs, run your lights, even play complete audio tracks with real-time plug-in DSP effects! **Digital Performer** sequencing software has proven reliability with hundreds of live touring acts and innumerable concert performances. The **MTP AV** patches your live MIDI rig with on-the-fly setup changes — indispensable for keyboards and FOH control of effects processors. The **2408** gives you tremendous audio playback and recording capabilities and the **1224** lets you record your performances in stellar, 24 bit resolution. This combo has quickly become the standard on pro tours, both for audio "sweetening" and live location recording.

Automated Digital Mixing for Live Gigs? The Tascam TM-D1000 Performance Bundle is Here — A Sweetwater Exclusive!

No soundman? No problem! Tascam's amazing TM-D1000 Digital Mixer is perfect for the small ensemble, keyboard player or electronic percussionist that wants great sound and extensive control, without a lot of complicated headaches. Easily create preset mixer "scenes" for each song. Set all mixing functions plus built-in digital effects with a single button push! Or enjoy real-time automation when you control the TM-D1000 from a MIDI sequencer such as Digital Performer.

Sweetwater's Performance Bundle adds Tascam's MA-AD8 8-channel mic preamp/A-to-D converter and FX1000 DSP expander. You get a total of 12 balanced, XLR inputs with 20-Bit D to A conversion, enough for full band. DSP horsepower is dynamically allocatable for up to 8 dynamics processors and 4 channels of digital effects. Save all settings with scenes or automate! Why settle for manual mixing? Call us here at Sweetwater Sound today for our special "ProNet" discount on this great bundle! We'll even **pay you top dollar for your old board when you upgrade** to a Tascam Performance Bundle.

Power and Grace! A Truly Compact PA that Smokes!

What if your club PA had more volume, cleaner sound and less weight? For solo artists and small ensembles, the Community XLT41E two-way cabinet is the perfect choice, balancing top sound quality, pro durability and remarkable portability. Add an XLT51E 15" subwoofer and you've got a full range rig that really kicks, without breaking your back! From the titanium, high-dispersion tweeters to the indestructible construction, Community has taken all of their knowledge and experience with arena and stadium systems and packed it into these little giants!

Enhance your live shows with these advanced tools. What's the best approach for your unique needs? Call us now to talk it over!

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Recording audio with your Mac or PC?



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116 dB dynamic range With our new 1224 analog interface

The 1224 gives you stunning audio specs that rival today's most expensive interfaces.

Balanced I/O With the 1224's eight analog inputs and ten outputs

All of the 1224's analog connectors are balanced +4 TRS or XLR for pro-grade I/O.

Tons of ADAT Optical I/O 24 channels of ADAT optical expandable to 72

The 2408 delivers all the ADAT optical you need for today's digital mixers, FX processors and other gear.

Loads of Tascam digital I/O 24 channels of Tascam TDIF expandable to 72

If you're in the Tascam world of digital I/O, no other system even comes close.

S/PDIF and AES/EBU I/O Together, the 2408 and 1224 interfaces give you both

Don't get stuck with the wrong digital audio format; the MOTU system gives you both.

Expansion With the flexible PCI-324 card — the core of the system

Connect up to three 1224 and 2408 interfaces for as many as 72 inputs/outputs.

Sample-accurate sync With digital transfers between your Mac and MDM's

Say goodbye to worrisome phase issues and other digital audio sync problems.



Broad compatibility With all major audio software for Mac and Windows

Use your favorite audio software with your favorite native plug-ins.

Audio format conversion Up to 24 channels at a time

Own the most flexible format converters out there — without paying extra!

Sample-accurate software with AudioDesk™, the workstation software for Mac OS

Make sample-accurate transfers with ADATs. Edit tracks with sample-accuracy.

Super-easy setup with our step-by-step Setup Wizard

You'll be up and running in no time.

Industry buzz Why is everyone is talking about the 2408?

Keyboard Magazine says it best: "Is the 2408 the audio interface system we've all been waiting for?...the answer is yes."

Price, price and price Did we say price?

A core 2408 system with 24 channels of input/output is only \$995. Add a 1224 24-bit analog and AES/EBU expander for only \$995. Or mix and match them any way you like. At these prices, you can own just the right combination.

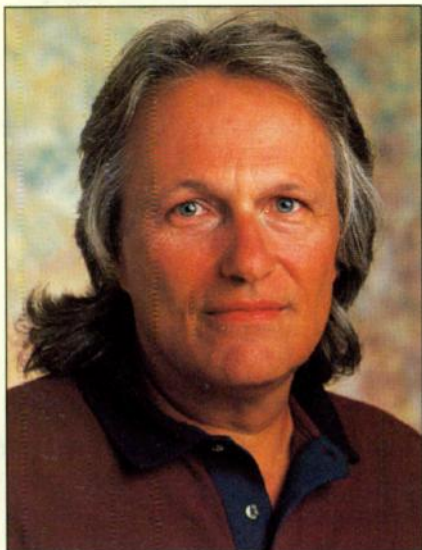


MOTU 2408 / 1224 hard disk recording

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World Radio History

Good-Fast-Cheap



Which two do you want
your project to be?

BY ROGER NICHOLS

Have you ever heard of the Good-Fast-Cheap triangle? Well, you should know about it.

Draw a triangle and write one of the words "Good," "Fast," and "Cheap" at each point. You can choose any two, but you can not have the third one. If you want your album to be Fast and Good, it won't be Cheap. If you desire Cheap and Good, it can't be done Fast. If the record company wants it Fast and Cheap, it can't be Good. The project I am currently working on requires a look at this triangle every day. Record, overdub, sweeten, mix, and master 36 songs by 20 different artists working in three different countries and get it done in six weeks with no days off. (Travel days to different countries counting as days off falls in the same category as declaring catsup a vegetable.)

LATIN WORLD ENTERTAINMENT

I guess I can talk about it now, because

it will be done by the time you read this. I am engineering a project that is being produced by Don Grusin and Frank Quintero. A mix of contemporary and ethnic Latin music recorded by artists from all over Latin America. The U.S. portion of the recording was done in Los Angeles at Cherokee Studios on a Sony 48-track digital machine. The tracking band consisted of Alex Acuna on drums and percussion, Abraham Laboriel on bass, Oscar Castro-Neves on acoustic guitar, Ramon Stagnaro on electric and acoustic guitar, and Don Grusin on keyboards, with various artists joining in for vocals, solos, and signature accompaniment by such notables as Sheila E.

After seven days of recording in L.A., we jumped on a plane (our day off) to Caracas, Venezuela. Our trusty tracking band came with us. We recorded at a studio called Ingenio Musical. There was no 48-track digital in Caracas, so we recorded on a flock of ADAT XT machines. Some of the songs we recorded in L.A. were digitally transferred to ADAT so we could do overdubs in Caracas. Most of the ADATs in Caracas had over 5000 hours on them. One of the XT's had pegged the hour meter at 9999 hours. Kind of like driving your car for six months after the "Check Engine" light comes on. The tapes played back perfectly after returning to L.A.

One of the best things I ever did was buy BASF preformatted blank ADAT tapes in L.A., instead of spending hours formatting tapes on unknown machines. (I did have to format some blank tapes after I ran out of BASF, but that is just between you and me.) The console in Caracas was a 48-input Amek Mozart. The 46- by 24-foot studio with 20-foot ceilings worked great, and we got a lot of recording done in six days.

Besides the L.A. All-Star Tracking Band, local musicians came in to record about half of the songs. A drummer named Andreas Briceno was great. Andreas brought his 10-year-old daughter to the studio one day. We heard her practicing trumpet in the lounge. She was so good, we got her to play trumpet on one of the songs. Ensemble Gurrufio was one of the most amazing collection of musicians I have ever seen. You'll have to hear this! They flew Bela Fleck in from Nashville to play with them for

the recordings. I told Bela that we were going to have to stop meeting like this.

It was time for a day off, so we flew to Havana, Cuba to do some more recording. The Cuba part of the trip was only four days, but the experience could fill a whole book. We recorded at Abdala Studios. Abdala took two years to build and has been operational for about one year. Abdala has two studios and a MIDI room. Both main rooms contain SSL 4000G+ consoles. One studio has a large recording room with five isolation rooms. Abdala had a Studer 48-track digital machine, a rack of ADAT XT's, and a rack of DA-88's to cover all possible situations. We recorded some new songs on the 48-track, and did some overdubbing on the ADATs we recorded in Caracas. Abdala is one of the best-sounding rooms I have ever recorded in. The control room sounded great, and everything worked like a brand-new studio. (Wait! It is a brand-new studio!)

In Havana, there is not enough electricity to go around. About four million people inhabit the city itself. There are rolling blackout periods where each section of town takes its turn doing without electricity for a few hours so that the hotels full of tourists won't have to do without. Because the power grid is on the ragged edge, thunderstorms easily cause numerous outages during any given day. Abdala has an extensive battery backup system that is augmented by a diesel generator the size of my Dodge van. The console, tape machines, outboard gear, and everything except the lights are always floating on the batteries. If there is a power blackout, the recording process doesn't even burp. The batteries and inverters hold the load while the generator kicks in automatically. The only way you know anything happened is by the switchover to emergency lighting. Cool.

If you love old cars, Havana is the place. I didn't see any American cars newer than 1959. There were thousands of '49 to '58 Chevys and Fords, some '50s Pontiacs, and tons of '57 Chevys. They can't get parts, so some ingenious guys are manufacturing new parts from scratch to keep these cars going. I haven't been in a '59 Ford taxi since...well, 1959!

continued on page 144

"The magic of the HD 600s
is their midrange—a purity of tone...
—Sam Tellig, *Stereophile*
February 1998



"WP, KR, and ST are unanimous
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headphones they've ever heard."
— *Stereophile Recommended Component*
April 1998

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The Sennheiser HD 600 is, quite simply, the finest dynamic headphone ever created. With its exceptionally smooth frequency response, remarkable clarity, and unparalleled comfort, it virtually speaks for itself. It's reassuring to know, of course, that everyone else seems to agree with what it has to say.

"...the Sennheiser HD 600s
are a must-audition product—
even, dare I suggest, a must-own."
—Wes Phillips, *Stereophile*
February 1998

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Introducing the 308.

The newest member of the MOTU family.

If you need digital I/O for your computer, MOTU's new 308 delivers more than any other audio interface.

The 308 gives you three banks — 8 channels each — of optical S/PDIF, RCA S/PDIF and AES/EBU digital input and output.

And in today's recording studio, digital I/O means the cleanest possible link between your computer and all of the latest, hottest outboard gear. If you just bought a new pair of monitors, there's a good chance even they have digital inputs.

Best of all, you can mix and match 308, 1224 and 2408 I/Os (up to three at once) to meet your exact I/O needs — up to 72 simultaneous input and outputs!

So check out MOTU audio interfaces for the latest in digital and analog connectivity for your Mac or PC.

- The 308 is a 24-channel expansion I/O for MOTU 2408 and 1224 hard disk recording systems.
- 8 channels of optical S/PDIF digital I/O (24-bit).
- 8 channels of RCA S/PDIF digital I/O (24-bit).
- 8 channels of AES/EBU digital I/O (24-bit).
- Word Clock In and Out.
- Adds 24 channels of digital I/O to a core 2408 or 1224 hard disk recording system.
- Expandable — connect up to three 308 rack I/Os to a PCI-324 audio card for 72 inputs & outputs.
- ASIO and Wave drivers — compatible with all major Macintosh and Windows audio software.
- Suggested US retail price: \$695.



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