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THE MASTERING MYTH



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> IN-EAR MONITORING TIPS & TECHNIQUES

World Radio History

ISSUE TWO
A UNITED ENTERTAINMENT
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02 >

It doesn't take a million-dollar console to create a million-selling song.

Why our analog 8-Bus remains the industry standard.

Last year, four of the world's top-selling singles were tracked and mixed on Mackie analog 8•Bus consoles. So were at least two Platinum albums.

Bottom line: It takes a sonically impeccable console to make a hit. But that *doesn't* mean you need a million-dollar, block-long British console to get the job done.

If you have enough talent and creativity, you can build a chart-buster with a sonically-impeccable mixer that costs as little as \$3,399¹.

The industry standard 8-bus.

The analog 8•Bus comes in 24 and 32-channel flavors. Each channel strip has six aux sends, true parametric 4-band EQ and a Mix B in-line "channel strip within a channel strip" that's used for monitoring during tracking and as another input during mix-down (effectively doubling each console's input count).

The master section has six master aux sends, six master stereo aux returns with a wealth of assignment possibilities, separate Solo, Mix B Monitor, Studio/Control Room and Solo sub-sections as well as two

headphone source selection matrices.

Punctiliously-accurate faders.

One reason that top engineers take this console seriously is its logarithmic taper, 100mm faders. They behave like those on megabux consoles: You get accurate, linear sound control along the entire fader travel length – instead of an abrupt, unplanned fade-out about ³/₅ of the way down.

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First and foremost, it *sounds* warm and natural. Along with 12kHz HF and 80Hz LF shelving controls, we've added a sweepable low mid (45Hz to 3Kz) and a real parametric "high mid." Actually, it's sweepable over an incredible five- octave range, from

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Expandable to 80+ channels.

All of the engineers who created the hits listed at left have added one or more 24•E Expander Consoles. It plugs into the 24•8 or 32•8 via a cable to provide 24 more channels (sans master section). The 24•E's outputs are submixed internally to reduce line and thermal noise and maintain maximum sonic quality at the main console.

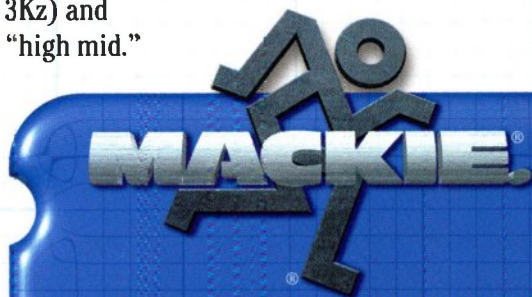
Just add creativity².

Don't use the lack of a gazillion-dollar console as an excuse for not getting into the Hot 100™. Call toll-free or log onto our web site for complete 8•Bus info...or better yet, visit a Mackie dealer and get your hands on the extremely affordable console that's put quality "analog grunge" into some of the world's biggest hits.

¹ Suggested U.S. retail for Mackie 24•8. Meter bridge is extra.

² Okay, we'll admit it: some really good microphones and out-board effects won't hurt either.

*Listing in this ad represents usage of our consoles as reported to Mackie by an independent producer or engineer and is in no way intended as a real or implied endorsement by the artist.



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TASCAM DM-24: The Affordable Luxury Console Is Here



Luxury usually comes with a hefty price tag. Not so with the new TASCAM DM-24 32-Channel 8-Bus Digital Mixing Console.

The DM-24's features are usually reserved for super high-end mixers. With 24-bit/up to 96kHz digital audio, the DM-24 blows away the standards in sonic quality for affordable consoles. With its internal automation, you'll get more power at your fingertips than you would from those huge consoles in commercial facilities. With some of the finest spatial and modeling processing from TC Works™ and Antares™, you can create fully polished productions without ever going to the rack. With incredibly flexible routing, fully parametric EQ, machine control capabilities, touch-sensitive motorized faders, and lots of audio interfaces, you can integrate the DM-24 into any studio environment.

Whether you're working with standalone hard disk recorders, DAW systems, MDMs or analog tape, the DM-24 is optimized to be the very best choice in consoles designed for 24-track recording. Ready to get everything you ever wanted (and more) in a digital console? Get the DM-24 today at your authorized TASCAM dealer.



Two DM-24s can link together with optional Cascade modules to create a seamlessly integrated 64-channel super console. For larger studios operating on a budget, it's a no-compromise affordable solution for high-end digital mixing.



The DM-24's rear panel includes AES/EBU digital I/O, SPDIF digital I/O, MIDI In, Out and Thru jacks, ADAT Optical input and output, external footswitch connector, time code input, GPI port, word sync in, out/thru, DTRS remote port, RS-422 9-pin control port, 24-channel TDIF I/O and more. Shown here with standard interfaces. Not luxurious enough? Customize your DM-24 with two expansion ports for extra analog, TDIF, ADAT or AES/EBU modules.

DM-24 DIGITAL MIXING CONSOLE

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VALERIE PIPPIN, *Publisher*
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Do Your Duty

I've been in dire straits lately — the situation, not the band. My natural instincts are finally in line with our government's directives: Spend, spend, spend to resurrect our flagging economy and to refill Wall Street's slightly less-bursting-than-before coffers. Being a gear geek, this isn't generally a problem for me. I've always got an audio-gear "wish list" that's longer than my arm — and that's using a microscopic font size. It's clear that it's my patriotic duty to get out there and load up with new toys.

Coincidentally, here it is, NAMM show time again. All that shiny new gear...the flashy new software versions...those lovely new microphones...outrageous new processors...even better digital mixers...over-the-top DAWs...improved this, upgraded that, cheaper everything — it's a gear junkie's dream.

But it's not just the audio/music industry that's conspiring to help me do my patriotic purchasing duty: Apple has jumped in with both feet with the new iMac. Gotta have one of those to hook up to my new iPod. And if I get a new iMac (the "digital hub," don'tcha know), then I also need a digital camera so that I can use it with the computer's bundled iPhoto software. Can't have the software on there without having a camera to use it with — that would be sacrilege. Since the computer also comes with iMovie and iDVD, guess I'll also need a digital video camera. (The fact that I have little interest in, or ability with, cinematography is beside the point.) One question: Where's the iMoney to help pay for all of it?

The problem is that I'm thinking about buying a house, and the bank thinks that spending money on anything other than that may be a mistake — at least until the deal closes. In the face of the above-mentioned duty, I'd say that was downright un-patriotic, if not truly subversive. I guess you could rationalize that buying a house is spending in support of our country, but let's not go there. The point here is to buy audio toys; if something trivial such as food, shelter, or clothing gets in the mix, it's a pure bonus — if not a mistake.

Ah, well, all a good American can do these days is grit his teeth and buy all those toys he's been wanting. Hey, it's all to make the studio and the music better!

Now, where'd I leave that Mastercard...?

—Mitch Gallagher
mgallagher@musicplayer.com



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Get de-bugged



Is your tuner *still* doing the Jitterbug?

LED & needle meter tuners are known for their inaccurate, jittery displays.

The new hand-held VS-1 Virtual Strobe Tuner* is the answer to this problem.

It's smooth, high definition display is accurate to 1/1000th of a semitone, and in "Bass Shift" it tracks signals down to below 10Hz, that's more than an octave below low B on a bass guitar!

And unlike those other tuners, you can use the VS-1* to set up your guitars & basses *correctly*.



Face it, the Jitterbug went out way back in the 1950s!

Since long before that, the Strobe Tuner has been the choice of true professionals, now you too can micro-tune and temper-tune with the break-through real time VS-1.

Ask your dealer today about the deadly accurate, portable *and* affordable new VS-1, you'll be glad you did.

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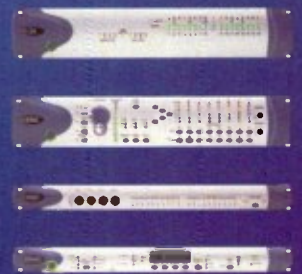
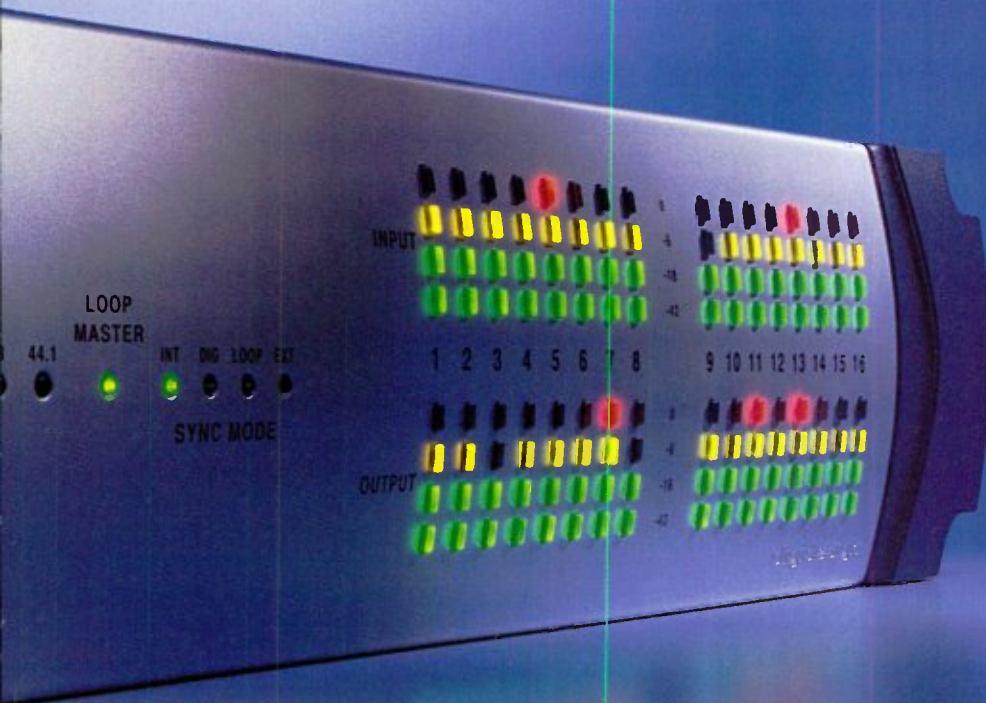


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BASS AND KICK IN THE MIX

I can't seem to find the right spots to fit the bass and kick in the mix — the bass kinda takes too much space and the kick doesn't seem to have enough...well...kick. Any suggestions?

—Marso, Montréal, Canada

Try this: kick EQ +2 dB at 80–100 Hz, –2 dB at 300–500 Hz, +1 dB at 3 kHz. Push the bass a little at the frequency you turned down on the kick. Now add a little compression (kick and bass under the same comp is fun), then sit back and wait for your Grammy.

—davedarling, Van Nuys, CA

Try some highpass filtering on everything else and clear away some of the mud. Start filtering out at 100 Hz, but don't be scared to take some things up to 250 or 300 Hz.

—linwood, Las Vegas, NV

Feed some kick in the sidechain of the bass' compressor. This way the bass will duck slightly whenever the kick hits, giving it space just in the moments when it actually needs it.

—gnoobu, Ingolstadt, Germany

If you can't separate them, blend them. Sometimes the song doesn't want to have kick and bass separation; sometimes the song wants to have the bass part accentuated on 1 and 3 rather than a full-on kick hit. The bitch of the whole thing is that the song knows what it wants, but won't tell you in words — it's your job to figure out what the song really wants and deliver.

—Fletcher, Foxboro, MA

STUDIO AIR CONDITIONING

I have only been in a very few studios that have had good air conditioning.

The control room is too hot and the studio is too cold. In putting together my new little room, I wanted to research all I could on HVAC to make sure I did a good job.

After a billion dollars worth of books and weeks of getting different stories from everyone I asked, I stumbled upon a PC program that will figure out everything you need to know about sizing the right AC unit for the studio. It will tell you duct sizing, calculates heat loss through windows, walls, ceilings, hot tempers, warm pizzas...check it out at www.hvaccomputer.com.

They have a demo and a cheap version for non-commercial use. It saved me thousands by keeping me from doing what I was going to do wrong.

—Roger Nichols, moderator

Another important factor is the addition of fresh air. A typical air-con guy will give about 10–15% added fresh air! I have found you need around 25%, as most air-con guys don't realize that there may be 6-8 people in the control room at one time.

—John Sayers, Australia

POWER TRIO GUITAR PANNING

My next project will be a punk rock trio — bass, drums, guitar, and screams. I've already experienced that, if you pan a distorted guitar in the center, it will likely clash with the voice. What would you do? Pan the guitar left or right and add a fast delay on the opposite channel?

—carne_de_res, Udine, Italy

If your guitar is clashing with the vocals when panned in the same position, you really need to reassess the EQ and mic placement of both. Try to minimize clashing at the same position first, then

webink
 Have a question you'd like answered?
 Visit Roger Nichols, George Massenburg,
 and David Frangioni online at
www.soundq.com

add any effects and panning.
 —GT3, Tampa, FL

If you can, overdub a second guitar track, then pan the two guitar tracks out just enough to leave room for the vocals.

—sactog, Sacramento, CA

You can make a pseudo-double track by either close and distant mic (dynamic mic up close, condenser at six feet or so away) or copy the track (or mult to two tracks) and delay the second one 5-15 ms, and pan to taste. If you really want to go old-fashioned, pan the bass slightly to one side and the guitar slightly to the other.

—pokeefe777, Riverside, CA

I like having a sense of the room in my recordings. For a three-piece, I use at least two mics for the guitar: one right on the amp and one further away to add depth and a sense of the room. If I record the guitar at the same time as the drums, I'll purposely let the guitar leak into the drum mics to add a little extra sense of the room. One has to keep experimenting with this, since you don't want too much leakage. When I do this, I don't feel like I am battling panning and EQing issues as much, and the vocals can ride really nicely in the mix.

—Ken/Eleven Shadows, Encino, CA

A lot of the classic punk records of the '70s had overdubbed/layered guitars, despite the "minimalist" façade. This can give a super-rich sound, so, if you drop the midrange a bit, there's still plenty of raunch.

—Craig Anderton, moderator

I have the guitar player play the same rhythm part, but using different chord inversions. This makes it sound a lot fuller on CD, yet live, you don't really miss the non-played part.

—Henchman, Vancouver, Canada

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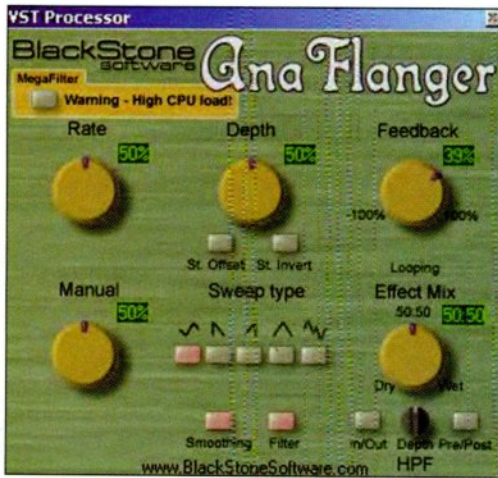
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Programs are not offered in all locations



SOFTWARE

BlackStone Software (formerly Obsidian Software, third-party DSP plug-in developers for Creamware platforms) has introduced the AnaFex plug-in bundle (\$75) for PC VST. The bundle includes AnaDelay (three-head tape delay unit emulation), AnaChorus, AnaFlanger, and AnaPhaser. The latter three have a multi-waveform LFO, and two different options for stereo image synthesis. All have defeatable filtering and smoothing for special effects. Also available: The YaleDelay (free download from site), which provides forward/reverse delay effects. For more information, visit www.blackstonesoftware.com.

Version 2.0 of the DelayDots Sound Designers plug-ins pack for VST PC/DirectX (reviewed 1/02) features DSP core and GUI optimizations, bug fixes, semitone pitch shift calibrations for the Pitch Shifter (DX only), and new factory presets. Price for the suite (Phat subharmonic low frequency synthesizer, PitchShift multiband formant pitch shifter, and daBomb distortion machine) remains \$55. For more information, visit www.delaydots.com.

MOTU now offers an OS X-compatible USB MIDI driver for all MOTU MIDI interfaces, including the 2x2 FastLane-USB, 4x6 micro express-USB, 8x8 MIDI Express XT-USB, and the 8x8 MIDI Timepiece AV-USB interface/universal synchronizer. The MOTU USB driver leverages the Mac OS's new "CoreMIDI" architecture, making all MOTU USB MIDI interfaces compatible with Mac software that supports standard Mac OS X MIDI drivers. For more information, visit www.motu.com.

Native Instruments' Spektral Delay PTE (\$449) is compatible with both RTAS and Digidesign's newly developed HTDM interface. This innovative signal processing plug-in supports total recall of settings, full automation (including ProControl and Control24 remote control support), and multiple instantiation. For more information, visit www.ni-protocols-edition.com. Also, Reaktor 3.0.5 updates for Mac and PC are now available. The updates offer enhanced ASIO and DXi support, improved stability, and the ability for Mac users to load all ensemble files written with the PC version of Reaktor. For more information, visit www.native-instruments.com.

Epinois Software's Digital Ear Real-Time v.4.0 is real-time, audio-to-MIDI conversion software for Windows. The latest version offers improved time resolution, more precise intonation, area correct tool for fixing glitches, and presets for common settings. A free demo is available. For more information, visit www.digital-ear.com.

Zoolab, a band and independent music technology site, offers the E-mu EOS Automatic Multisampling utility for E-mu EOS samplers. This utility helps

ACCURACY... NOW AVAILABLE IN SMALL, MEDIUM AND LARGE.



Yamaha's long-standing reputation for accurate, high quality studio monitors continues with the recently expanded MSP Monitor Series. The new 20-watt MSP3s are perfect for multimedia systems or keyboard rigs, while the bi-amped MSP5s (40 watts for mid/low, 27 watts for tweeter) and MSP10s (120 watts for mid/low, 60 watts for the tweeter) set the standard for small and large studios. These speakers also boast versatile EQ controls, tuned bass reflex designs and premium Yamaha components. Put your trust in Yamaha MSP monitors – they tell it like it is. Once again, Yamaha gives you more for less.



CREATING 'KANDO' TOGETHER

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automate the process of sampling synthesizer presets by using the Key sampling feature of E-mu EOS samplers (E IV, E-64, and the full Ultra-series), in conjunction with virtually any sequencer that handles sysex correctly, to automate the mapping process by taking two samples per octave (C and G) from any MIDI instrument's sound in the C1-G5 range. The result is an instantly playable, multisampled EOS preset. For more information, visit www.zoolabmusic.com.

Ableton announced a free OS X update for their innovative Live software at Macworld in San Francisco. Live (\$299.95) allows for the independent processing of time-stretching and pitchshifting for soundfiles. The new version takes advantage of the Mac OS X stability and low-latency audio streaming solutions to provide enhanced capabilities such as stretching and pitching audio while playing from disk, playing arbitrary samples in sync with song tempo, the ability to jam live, log the action and edit afterwards, and controlling every function with hotkeys and MIDI. For more information, visit www.ableton.com.

AudioEase has released version 3.0 of their VST Wrapper plug-in (\$49.95, upgrades \$20), which serves as a "shell" that allows MOTU's MAS-compatible applications such as Digital Performer and AudioDesk to run VST plug-ins. Version 3.0



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supports more instruments, improves MIDI timing, adds support for VST bank/preset saving, and supports multiple audio outputs from VST instruments. For more information, visit www.audioease.com.

Minnetonka Audio Systems has created A-plus (\$1,995) for Windows 98, 2000, and NT. An affordable and easy-to-use system for authoring DVD-Audio discs, A-plus supports dragging and dropping soundfiles to create playlists and to compile discs. There is support for stereo audio, as well as 5.1 surround audio as either six discrete files or as an MLP-encoded files. A-plus works with all sample rates and bit depths supported by the DVD-Audio spec, and allows display of a still image during playback of each track. For more information, visit www.minnetonkaaudio.com.

HARDWARE

EZQuest's Cobra+ 120 GB 7200-RPM FireWire hard drive has been tested by Digidesign for Pro Tools compatibility. Drives are stackable, and ship with Intech Hard Disk Speed Tools (RAID Level-0 striping software for Macs). Also new: the PC/Mac compatible Boa 32x10x40 FireWire CD-RW drive with "burn-proof" technology. For more information, visit www.ezq.com.



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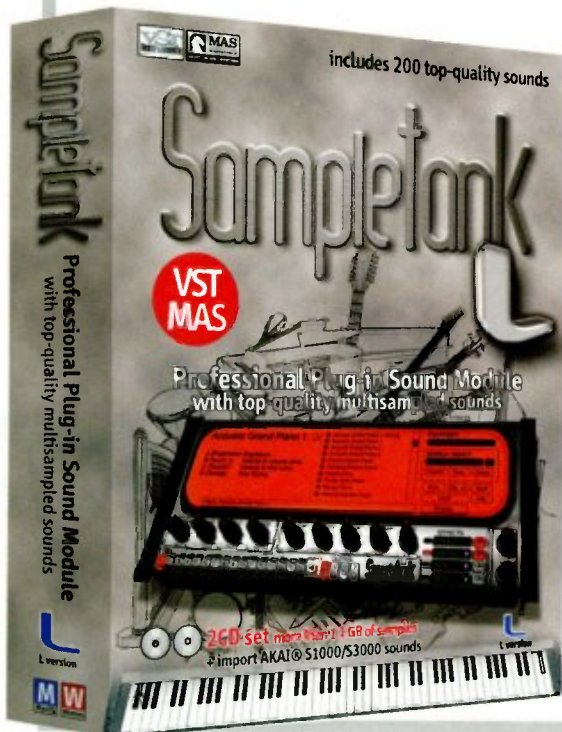
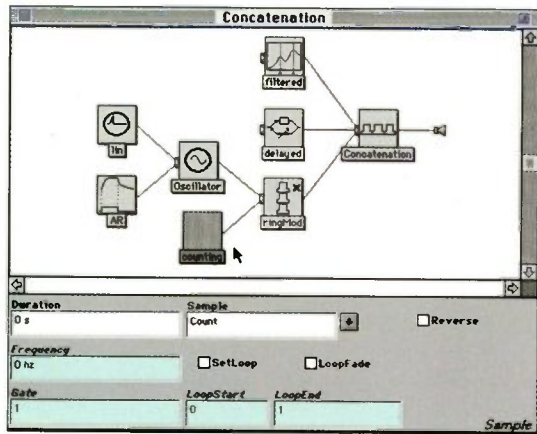
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Symbolic Sound Corporation announces a FireWire (IEEE 1394a-2000) interface (\$495, \$270 when ordered with a Kyma system) for their Kyma sound design workstation. The 400 Mbps interface provides a faster connection between the computer running the Kyma.5 software and Symbolic Sound's multi-processor Capybara 320 audio accelerator. This enables more disk tracks, a greater choice of host platforms (including Apple's iMacs, iBooks, G4s, and Powerbooks, as well as any FireWire-capable PC notebook or desktop machine), and longer cable runs. For more information, visit www.symbolicsound.com.

Mackie will market and distribute DSP-based software tools developed by Universal Audio; the first to become part of the Mackie family will be the UAD-1 Powered Plug-Ins [reviewed in the Jan. '02 issue], for Windows-based, VST compatible software (i.e., Cubase VST, Logic Audio, Nuendo, etc.). These will be available through dealers as Mackie Powered Plug-Ins' System (\$995). A Macintosh version that includes support for MOTU's Digital Performer will be available later in the year. For more information, visit www.mackie.com.

SOUNDS AND SAMPLES

Syntaur Productions' "Drumz Phatta Than Momma" CD-ROM (\$249.95) for the Akai MPC2000 and MPC2000XL samplers contains 1,080 kicks, 900 snares and rimshots, plus 900 hi-hats and percussion sounds, all in today's hip-hop style. Every pad in all four banks is programmed with a different drum sound, resulting in 64 different sounds per drum kit. Audio demos are available at www.mpcsounds.com. For more information, visit www.syntaur.com.

IK Multimedia offers 15 new sound modules (created in conjunction with MasterBits, SonicReality, and other sound developers) for their SampleTank VST/MAS sample playback plug-in. Sounds range from multi-sampled instruments to drum, dance, and percussive loops. All titles are available in native SampleTank format, and include SampleTank LE software (full version of SampleTank, but with four MIDI channels and one output). Audio demos are available at www.sampletank.com.

INDUSTRY NEWS

Shure and Sennheiser have joined together with China's Administration for Industry and Commerce (AIC) to take a stand against the production and sale of counterfeit microphones. In December, officials from the AIC's Jiangmen and Enping offices conducted raids that confiscated over 50,000 pieces of Shure and Sennheiser counterfeit items, making it one of

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The soft synth is here to stay, and making music will never be the same. The Oxygen 8 is the first in a series of new controllers from MIDIMAN designed for the *software-centric* musician.

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Roland Corporation now has a minority investment in Fender Musical Instruments Corporation. This builds on a relationship forged over the years with products such as "Roland-ready" Stratocasters, which contain the Roland 13-pin GK divided pickup capable of interfacing with Roland guitar processing and synthesis gear (e.g., VGA-7 V-Guitar Amp, VG-88 V-Guitar System, and GR-33 Guitar Synthesizer). For more information, visit www.rolandus.com or www.fender.com.



The soundtrack for the movie *The Fellowship of the Ring*, the first in the *Lord of the Rings* trilogy, was mixed on the Euphonix System 5-F all-digital film-mixing console. Audio postproduction was completed at The Film Unit Ltd. film-dubbing facility in New Zealand. In addition to the System 5-F console, the studio installed Euphonix FC727 digital format converters that allowed connecting their Digidesign Pro Tools systems directly into the console through MADI (Multichannel Audio Digital Interface), without using Digidesign 888/24 converters. Other music scores mixed on the System 5 include *K-PAX*, *Shrek*, and *Charlie's Angels*. For more information, visit www.euphonix.com.

MARCAN's duplication services division has recently added general purpose DVD copying to its roster of capabilities. MARCAN can now capture virtually any type of media format, including audio, video, and data, and duplicate it to the DVD-R format. For more information, visit www.marcan.com.

TC Group, the Danish parent company of TC Electronic, TC Works, and TC-Helicon, and TGI, parent company of Scottish speaker manufacturer Tannoy, English sound reinforcement speaker manufacturer Martin Audio, Swedish power supply and amplifier manufacturer Lab Gruppen, and auto-industry speaker manufacturer GLL, have agreed to merge. By combining digital technology from TC and the speakers from TGI, the merged groups intend to develop and market new products. For more information, visit www.tcelectronic.com or www.tannoy.com.

SONY

Sony Electronics has announced their "No Payment, 0% Financing" program, available for all new and existing customers. From now until March 29, 2002, customers can purchase a broad range of Sony BPC products through financing offered by Sony Financial Services LLC and make no payments until January 1, 2003. Once a customer is approved for the program by Sony Financial Services, the purchased product(s) will ship to the customer and the "No Payment/No Interest" period will begin. For more information, visit www.sony.com/professional.

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By Mitch Gallagher

Digidesign Pro Tools/HD

Digidesign's flagship industry-standard DAW system, Pro Tools, has undergone a complete rebirth. The new system, dubbed Pro ToolsHD, features completely new hardware as well as the new version 5.3 of the Pro Tools software. As with earlier incarnations, the system is built around a core card, the HD Core. Track count and DSP power is provided by the HD Core, and DSP power can be expanded with additional HD Process cards (analogous to DSP Farms and Mix Farms in previous systems). The new HD Core provides support for up to 128 tracks at 24-bit resolution with sample rates up to 192 kHz. Each card can support up to 32 channels of I/O, connected using proprietary DigiLink cables, which can be up to 100 feet in length. The number of useable I/O, whether digital or analog, is unaffected by sample rates (except with 176.4 or 192 kHz

AES/EBU). Up to seven cards (one HD Core, six HD Process) can be installed in a system with each HD Process card providing twice as much DSP power as a current Mix Farm card.

Two new audio interfaces are being released. The 192 I/O offers up to 50 possible inputs and outputs in various formats, including analog, AES/EBU, TDIF, ADAT optical, and S/PDIF; a card option bay allows the inter-

face to be expanded with a selection of formats. Up to 16 channels of I/O may be active simultaneously at up to 24-bit/192 kHz rates. Sample rate conversion is supported on the 192 Digital card, and Soft-Clip limiting allows for recording higher levels to hard disk. An expansion port allows direct connection of a second 192 I/O or a 96 I/O (see below), while a Legacy Peripheral Port supports connection of an existing 888I24 I/O, 882I20 I/O, 1622 I/O, or 24-bit ADAT Bridge I/O.

The 96 I/O offers up to 16 channels of I/O at resolutions up to 24-bit/96 kHz. Twenty connections are available, including eight channels of 1/4-inch TRS analog, eight channels of ADAT optical, two channels of AES/EBU, and two channels of S/PDIF. In addition, the ADAT optical connector can be switched to provide two channels of optical S/PDIF. As with the 192 I/O, Expansion, and Legacy Peripheral Ports are provided.

Rounding out the new system are three more peripherals: Sync I/O, MIDI I/O, and Pre. Sync I/O is a versatile synchronization device providing near-sample-accurate lock to time-code or biphas/tach signals and a 192 kHz low-jitter word clock.

MIDI I/O is a 10-port USB MIDI interface supporting up to 160 MIDI channels. Support is included for Digidesign's upcoming Time Stamping, which will improve MIDI timing accuracy to better than one millisecond.

Digidesign's Pre is the company's first foray into stand-alone microphone preamps. Pre is an eight-channel preamp offering complete remote-control capability from within Pro Tools. Built-in Soft Clip limiting prevents overloading downstream converters, and a built-in oscillator allows for easy calibration to other gear. ■

DIGIDESIGN PRO TOOLS/HD

WHAT IS IT? A high-definition version of the industry-standard DAW system.

WHO NEEDS IT? Any recordist working with high-resolution audio.

WHY IS IT A BIG DEAL? Pro ToolsHD increases the system's (both hardware and software) resolution to up to 24-bit/192 kHz, and provides increased DSP power and software capabilities.

SHIPPING: First quarter 2002

PRICE: Pro ToolsHD 1 (1 HD Core), \$7,995. Pro ToolsHD 2 (1 HD Core, 1 HD Process), \$9,995. Pro ToolsHD 3 (1 HD Core, 2 HD Process), \$11,995. HD Process, \$3,995. 192 I/O, \$3,995. 192 AD Expansion Card, \$1,295. 192 Digital I/O Expansion Card, \$995. 96 I/O, \$1,995. Sync I/O, \$2,095. MIDI I/O, \$595. Pre, \$2,495.

CONTACT: For more information, contact Digidesign at 800-333-2137 or visit www.digidesign.com.

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World Radio History



(L-R) Scott Storch, Timbaland, and Jimmy Douglass

By Lisa Roy

Timbaland Piano

How Jimmy Douglass gets his dream piano sound

SIGNAL PATH

There's more than one way to get the ultimate piano sound, as Jimmy Douglass points out. "I'd like to tell you the setup for my dream piano sound first," enthuses Douglass. "I start with two [Neumann] U 87's and go through the Neve preamps on the board. I put each mic through an [Urei] 1176 and a Pultec EQP1A. I run back and forth to move the microphones around the various holes in the piano to see what kind of sound's coming out of the top and bottom. I get the optimum sound near one of the holes. At that point, this is my roll 'n' roll sound that I really like. I use the 1176's and just do basic compression going in. For the EQ, I use something I picked up from the British guys a while ago: On the top microphone I add a lit-

tle bottom, at around 60 to 100 cycles. On the bottom mic, I cut the low end and add a little top end...about 7 to 10k. This gives me a psychoacoustic illusion because the low end is now bright and present, whereas the high microphone is now a little warmer and richer, not brittle, so it smoothes the high/low,

left/right thing. I play with the compression on both sides to see which one I need. And that's what I do if I have time to really play around with the piano and get that amazing sound. I would also set up two [Neumann] U 47's in the room, place them far away left and right room, and then super-compress those as well. When possible, I put them on separate tracks, and blend them later to taste at the mix.

"It seems more times than not, in hip-hop, no one really has to take time to do any of that stuff anymore. The music doesn't really require it. A lot of the music they're using, they've come to like these samples [loops] that are mixed products from somebody else's work that took all day...all the compression, the EQ, effects, blended, mixed, and it's the package that you can't possibly create in two minutes that they love. They want the idea of the sound rather than the amazing sound. The sound dynamics in hip-hop is not the same as in a lot of records in other formats, old and new. The part is sometimes more important, and they want to put the part down real quick. Sometimes it actually comes out cooler because it's not so perfect.

"For this record, because we were in a hurry — not to mention, it didn't take us long because Scott Storch is such a great player who is quick as well — the piano is a little different. I put up two U 87's. I used no compression on the line,

DATE: December 14, 2001

STUDIO: Westlake Studios — Beverly, Studio A

LOCATION: West Hollywood, CA

ARTIST: Timbaland

PROJECT: Timbaland Compilation, Beat Club Records/Interscope

TRACK: Scott Storch playing a 9-foot Yamaha piano on "Working Title"

PRODUCER: Timbaland

ENGINEER: Jimmy Douglass

ASSISTANT ENGINEER: Aaron Fessel

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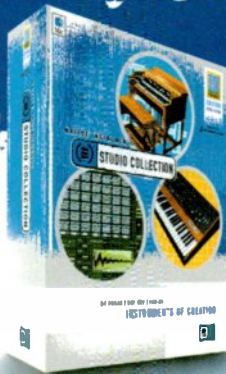
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TRK 1	TRK 2	TRK 3	TRK 4	TRK 5	TRK 6	TRK 7	TRK 8	
- 2TRK -		FRONT (DNU) TIM HOOK W/TASWAN	PIANO LO SCOTT	PIANO HI	X ATTITUDE 2ND V②	ATTITUDE LO 1ST V②	ATTI DOUGLASS	
TRK 9	TRK 10	TRK 11	TRK 12	TRK 13	TRK 14	TRK 15	TRK 16	
ATTI TRIPS	TIM HYPE	TIM HYPE DOUB	TIM HYPE TRIP	TIM HYPE QUAD		GUITAR PAUL RHYTHM	GUITAR PAUL CHINKS	
TRK 17	TRK 18	TRK 19	TRK 20	TRK 21	TRK 22	TRK 23	TRK 24	
							SMPT	

and I had no EQ either. I ran it through the Neve VR preamp and recorded to Studer A827 using Ampex Grand Master 499, as well as going to [Digidesign] Pro Tools. We do most of our recordings simultaneously lately because we love the warmth of the analog, but we love the quickness of the edit ability of Pro Tools. But when we don't need to edit, we use the material off the analog."

MIC POSITION

"I refer to this as string miking," confides Douglass. "In other words, I open the top of the piano wide and put a U 87 at the back where the thick big bass strings are, then I put the other U 87 in the front of the piano near the hammers on the high strings. I position them about five feet between the high and the low. This way I feel I'm getting the full range of the piano. I place the U 87's about six inches from the strings with the mics facing flat to the strings."

PROCESSING

"I mainly use the Neve VR preamps these days — I go through the board for everything," Douglass explains. "I don't use outboard preamps. I have them in my racks, but I find no need for them on this type of a session. I turn up the preamp gain until the signal's sufficient without overloading or not being where you get too much hum."

TRACK NOTES

Douglass concludes, "I've recorded Aretha's piano and Roberta Flack. I've also worked with a lot of great jazz players. These were sessions where the piano was the focus of the session. In the type of record we're making here, it happens to just be in the track, so it doesn't have exactly the same importance. Over the years, I've found that, if you have a basic instinct and a basic cool about how to record the piano, your instincts will probably take you there. When I go to mix this particular piano, I'll probably brighten it — I can't really tell until the mix stage. But I'm guessing that it's a little dull. The area I like to play with is between 5,000, 7,000, 10,000 cycles. I like to add a little hump at 60 [Hz]. Those are my magic frequencies I love to work with and, in general, I find they're pretty successful for me."

"Timbaland and I have been working together for about six years...Ginuwine, Bubba Sparxx, Nelly Furtado, Missy Elliot, Aaliyah, and Ludacris. We act as a team basically. We both picked Westlake's room to record because it's a nice quiet vibe. It's an older studio, and we like to work in an old joint because it's a lot funkier. I positioned the piano in Studio A in the back of the studio with the lid open. In a live situation it changes some of the things you have freedom to do because of leakage, you have to close the lid. So we try to do an overdub when possible."



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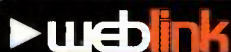
By Steve La Cerra

The Library

Make all the noise you want in this Library

STUDIO NAME: The Library
LOCATION: London, UK
KEY CREW: Julian Standen (owner/producer/engineer), William Spong (engineer/Pro Tools editor)
CREDITS: Lemonheads, Soup Dragons, Siouxsie & The Banshees, Twist, Cleaner, Grand Oral, Inimenter
CONSOLE: 16-fader Digidesign ProControl with Gallery Mission Control keyboard
MONITORS: Genelec: 1031A [2] and 1094 subwoofer; Sony blaster; Beyer DT150 headphones
RECORDERS: Panasonic SV3800, Aiwa cassette deck, Microboards StartRec 4-bay, 8x stand-alone CD-R
EFFECTS: AMS RMX 16 reverb, TC Electronic M3000, Eventide DSP 4000
OUTBOARD GEAR: SSL Compressor, dbx 16C VU [2], 902 de-esser [2]; Joe Meek SC3, Tube Tech LCA 2A compressor, PE 1C EQ [2]; Universal Audio 1176, ADR Vocai Stresser, Empirical Labs Distressor, Fatso; Manley De-esser, Trident CB9066 EQ
MICROPHONES: Neumann M 149 [2], Royer SF-12, R-121; Shure SM57 [3], Sennheiser MD421 [2], Audio-Technica AT25 Pro, AKG C451
MIC PREAMPS: Neve 1073 mic pre/EQ [2], Focusrite ISA215 mic pre/EQ [2], Helios mic pre/EQ [4], TL Audio 5051 (voice channel),

EQ1; API mic pre [4], NTI mic pre with "Air Band" EQ [2], Chiswick Research "Earlybird" mic pre [2]
KEYBOARDS/SAMPLERS/MIDI GEAR: Akai S3000XL sampler
COMPUTER: Apple G3/266 with XLR8 G4/500 upgrade, 224 MB RAM and Apple Studio Display [2]; Bit 3 7-slot PCI expansion chassis containing Digidesign Core [1], Mix Farm [3], Vintage Farm [2] and SampleCell card [1]; Rourke dual-bay "hot swap" with 9 and 18 GB drives; Sony DDS3 data DAT and CD-R back up, Retrospect
SOFTWARE: Digidesign Pro Tools V5.1
DAW EQUIPMENT: Apogee AD8000 Special Edition [2], Digidesign 888 [1], Cranesong Hedd, ZSystems Z16-16 Digital Detangler, Rosendahl Nanosync clock generator
POWER CONDITIONING: Radio Spares UPS (for DAW)
STUDIO NOTES: "I thought the gag vibe of a quiet library would make a funny contrast to the loud rock music I work on," muses "librarian" Julian Standen. "The books, wooden panels, and 'old masters' paintings give the place a nice atmosphere for concentration. We built a computer cupboard (with airflow) to cut down on hard drive noise in the control room, as well as the 'Gimp Hole' — a concrete bunker for a guitar speaker cabinet (named after a scene in the movie *Pulp Fiction*). There is a hidden door in the book wall; bands like it, and it still cracks me up!"



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► continued on page 114

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World Radio History



By Steve La Cerra

Jordan Rudess

The keys are the key to this project studio

STUDIO NAME: Jordan's Studio
LOCATION: Rockland County, NY
KEY CREW: Jordan Rudess, Bert Baldwin
CREDITS: Jordan Rudess: Dream Theater, Dixie Dregs, Liquid Tension Experiment. His newest solo CD is *Feeding The Wheel* (Magna Carta)

MIXING CONSOLE: Mackie 32•8 and CR1604

MONITORS: Mackie HR824, SRM 450; Tannoy PBM8, Beyerdynamic DT770 headphones

AMPLIFIERS: Denon DRA-35V receiver

RECORDERS: Alesis ADAT XT20 with BRC

OUTBOARD: Aphex Model 108 compressor

EFFECTS: Kurzweil KSP8, KDFX 4-stereo bus processors [4]; Line 6 Pod

MICROPHONES: Shure SM57 [2], Audio-Technica AT4050

MIC PREAMPS: Aphex Model 107

SAMPLERS/KEYBOARDS/MIDI MODULES: Kurzweil K2600XS [2], K2600RS [2], K2500RS ("all loaded!" according to Jordan), PC2R, K2000S, K2000VP; Korg Karma with MOSS board, Triton Rack; MiniMoog

COMPUTERS: Apple G3/266 with 192 MB RAM; Powerbook G3/400 with 192 MB RAM; Powerbook Titanium G4/400 with 256MB RAM; Iomega Jaz [2], Peerless, Predator; Yamaha 16x CD-RW, Que 12X burner; Microboards StartRec 400 4-bay CD-R system

DAW EQUIPMENT: MOTU 2408, 828

VIDEO: Ikegami 21-inch monitor, Sony DVMC-DA2 Digital Media Converter

SOFTWARE: MOTU Digital Performer 2.7, U&I Software Artmatic 2.0, MetaSynth; Bias Peak DV 2.54, Adaptec Toast Titanium 5, Bitheadz Unity DS-1, Retro AS-1, Black and Whites; SampleTank

STUDIO NOTES: "Every year the toys get better," muses Jordan. "As a keyboardist, my studio revolves around these tools.

Over the last few years I have primarily been using Kurzweil instruments because the technology behind them enables me to realize the sounds I hear in my head (which could be dangerous)! They are the ultimate combination of sampler and synthesizer, as well as mega-effects processors. The KDFX inside these units are capable of processing not only the internal sounds, but processing external sources as well (we used KDFX on the guitar for the new Dream Theater CD). My home studio is set up so I can easily route a sound through the Mackie 8-Bus mixer to any sampler in the room. So if I have a multi-layered texture that uses four synthesizers, I can sample it and then process it even further."

EQUIPMENT NOTES: "In addition to my Kurzweil's, I have been getting into the new Korg Karma lately. It is one of the most inspiring instruments I have ever played, and is featured quite a bit on the new

► **weblink**

Check out Jordan's Web site at www.jordanrudess.com.

► continued on page 114

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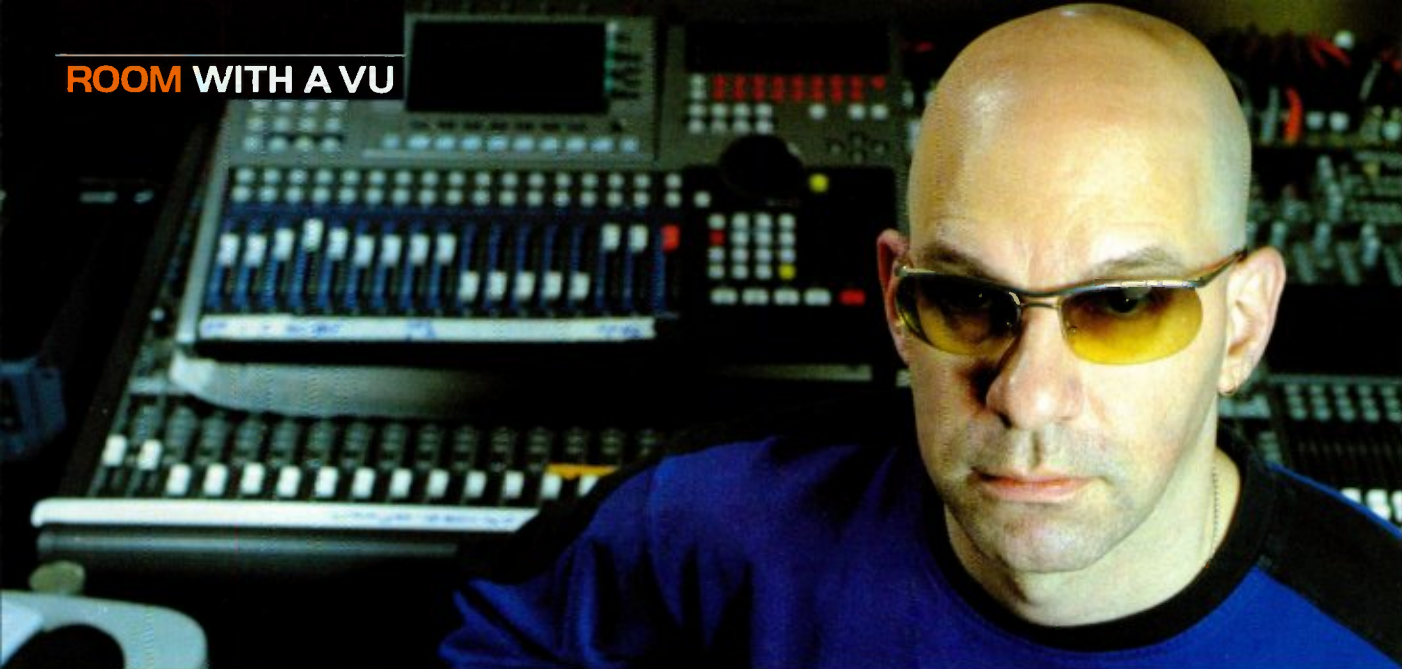
CLOCK SOURCE



REW

FFWD





By Steve La Cerra

Gold Club

Kenny
Greenberg
finds gold in
Tennessee

STUDIO NAME: Ken's Gold Club
LOCATION: Franklin, TN
KEY CREW: Kenny Greenberg
CREDITS: Producer/guitarist Kenny Greenberg has worked with Edwin McCain, Joan Baez, Ashley Cleveland, Llama, Jewel, Mandy Moore, Leann Womack, Brooks and Dunn, Tricia Yearwood, Indigo Girls, and Michael Bolton. Kenny's songwriting credits include "House Of Love" (Amy Grant) and "Little Goodbyes" (Shedaisey). Greenberg's music has aired on VH1 (*Behind The Music*), FOX Sports, *Beverly Hills 90210*, and *Baywatch*.
MIXING CONSOLE: Mackie 32-8
MONITORS: Event 20/20bas, PMC TB2, Bag End D10E-I ELF subwoofer
HEADPHONES: Fostex T-20 headphones, Furman HC-2 cue boxes
AMPLIFIERS: Bryston Powerpac 120, Stewart PA-1000 headphone amp
RECORDERS: Yamaha AW4416
OUTBOARD: Geoff Daking 52270 stereo mic pre/EQ, API 550 EQ [2] with Lunch Box, Empirical Labs Distressor, TubeTech CL1B, FMR Really Nice Compressor, dbx 166x
EFFECTS: Yamaha SPX900, SPX90, AG Stomp, DG Stomp; Ensoniq DP4, Tech 21 SansAmp, Line6 Pod, Delay, Distortion, Filter, Modulation Modelers; Maestro Tube Echoplex
MICROPHONES: Coles BBC 4038 [2], Royer SF-12, Audio-Technica AT4033 [2], AKG D12E, Shure SM57 [5], SM7

MIC PREAMPS: API 512 [2], dbx 386
SAMPLERS/KEYBOARDS/MIDI MODULES: Yamaha MOTIF workstation, RS7000, DJX, PSR9000; Kimball Baby Grand piano, MTron Virtual Mellotron, Korg MS2000, Roland SP808
SOFTWARE: Digidesign Pro Tools, Sonic Foundry Sound Forge v5.0, Acid; Propellerheads Reason, Recycle, Steinberg Cubase, VST plug-ins
COMPUTERS: Ovation PC Systems Pentium III/800 MHz, with 80 GB and 10 GB internal drives, Iomega/Glyph 20 GB external drive
DAW EQUIPMENT: MOTU 2408, MIDI TimePiece AV
STUDIO NOTES: Kenny explains that "the control room and main recording room are each roughly 18x13 feet. The recording room has a cement floor. I was going to put a hardwood floor over the cement, but we cut some drums tracks and they sounded great, so I didn't change it (the piano is in that room as well). On the other side of the control room is a small, dead room that can be used for tight-sounding drums or an intimate, dry vocal. Since this room is on the opposite side of the house from the bedrooms, I sometimes use it for recording guitar amps at night."
EQUIPMENT NOTES: "A lot of my sequences start in Cubase or Acid, and then I send them to the AW4416 or straight to Pro Tools, depending on the project. I just started using the Yamaha RS7000, locking it to Cubase and pulling grooves or sounds from it. The RS7000 has this really cool feature where you can sample a groove, and it will automatically break the beat into separate parts and allow

▶ continued on page 117



Kenny Greenberg may be reached online at
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World Radio History

How to increase productivity
with pen and paper

Using a Planner

by Jim Bordner

To quote master inventor and time-saver Ron Popeil, "How many times has this happened to you?" You started the day with a solid, do-able list of tasks in mind...call this guy, follow up with that guy, drop these things in the mail, edit this, dupe that, get a box of fish sticks for dinner, whatever. Eventide rolls around, and you realize that, while the list seemed reasonable in morning's light, only half of it got done. Where does the time go?

Up in smoke, unless you make a plan for using it. I know you have a calendar or DayRunner or a Palm or something. But even with making lists and keeping track of appointments, most of us let too many tasks go undone in the course of a day. The problem isn't lack of time. It's lack of training.

The purpose of a planner or a PDA is to make you more productive, but it doesn't work unless you understand how the system can help you. Try some of these planning techniques and see if your productivity doesn't increase.

DON'T LIST YOUR TASKS: SCHEDULE THEM. Most of us make lists of things to do. The problem with a list is that it doesn't tell you when to do it, or how important it is to get it done. So each evening (or morning, if you prefer) take just a few minutes to do the following:

- List what you want to get done.
- Prioritize the list. Use letters or numbers to group the tasks into high, medium, and low priority.
- Starting with the highest priority tasks, schedule them into your calendar.

By going through this exercise, you'll be forced to think about how much time each task will take, right

down to the five minutes it will take to call a supplier to place an order. Not only will you be able to create a more realistic picture of what you're going to do in a day, you'll also be creating a handy road map. Now you don't have to mentally sort through tasks two dozen times a day. Just do what it says on your calendar. 11:00 AM?

THE PROBLEM WITH A LIST [OF THINGS TO DO] IS THAT IT DOESN'T TELL YOU WHEN TO DO IT, OR HOW IMPORTANT IT IS TO GET IT DONE.

Says here it's time to call California and get that software authorization squared away.

Each day, take the stuff that didn't make the list or didn't get completed due to emergency or interruption and add it to the next day's list, prioritizing and scheduling as you go.

DON'T JUST LIST TASKS...SET GOALS. "I'm so busy I never get to work on my *own* music." "I'd love to do more self-promotion, but there's never

time." Common statements, and both completely true if you don't make activities that move you toward your goals a part of your daily schedule.

Once a week, during your planning, think about what you want to get done in addition to simply getting through the day. Start breaking those goals down into steps, and make the steps part of your scheduling.

GIVE YOURSELF A BREAK. The number one mistake people make when using this system is forgetting to schedule breathing room. A meeting runs over, you get stuck in traffic, you're just plain wiped out from a difficult session, and one or two or more things on the list don't get done. Your next conclusion is that the whole exercise is a waste of time, and you give up.

So you have to schedule time out, time to waste, time to woolgather. If you have a meeting scheduled for an hour, give yourself 15 minutes of "recovery time" afterward. Schedule lunch, schedule a break in the afternoon. Give your day some breathing room. And if you find a meeting runs short or you hit all the green lights across town, use the time you gain to knock off a couple of lower priority task from your list.

If you take this approach to your day planning, you'll be amazed at what will happen. You'll get more work done with less effort. You'll smile more. You'll reach large goals that you never seem to have time for. In short, you'll start to become one of those Highly Effective People you've heard about. And whether you're a Guest Room Warrior, a large studio owner or manager, or working for someone else, working better with less effort is good for you and everyone. ■

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Are you ready for High Resolution?

By David Frangioni

Although 16-bit, 44.1 kHz audio was hailed as a sonic revolution — and it was — we always knew we could do better. Well, that time has come. High-resolution (HR) audio features higher bit resolutions (greater than 16 bits), along with sample rates higher than the usual 44.1 and 48 kHz standards.

Granted, there aren't many commercial outlets yet for delivering high-resolution products to consumers, so there hasn't been that much incentive for engineers to upgrade their studios to the HR world. However, the situation is changing fast. DVD was *the* hot consumer item last holiday season, and audio manufacturers have recently brought sonically mature, well-implemented HR technology to the marketplace. The time is *now* to explore the world of better-sounding audio through higher-resolution recording; what could possibly be wrong with having more dynamic range, better frequency response, more "air," less drastic output filtering, and higher overall audio fidelity?

Answer: There's nothing *wrong* with it, just remember there's no free lunch. Getting involved with high-resolution recording involves more than simply changing a program's default sampling rate from 44.1 to 96 kHz...let's investigate.

CH-CH-CH-CHANGES

As with any type of new audio process, you don't have to invest in "all new everything." For example, if you record everything yourself (or only two tracks at a time), you could use a single two-channel, 96 kHz A/D converter in conjunction with a 96 kHz-capable recording system to record the tracks. After tracking the parts, listen back to the mix through the converter's D/A outputs.

Fortunately, there are many high-quality products now available at various price points. MOTU, Digidesign, Steinberg, and Apogee are just some

companies offering great HR products. Most modern, pro-level digital audio workstations and digital audio+MIDI sequencers offer at least 96 kHz recording/editing/playback, with up to 24-bit resolution. TASCAM's DA98HR can record and playback up to two channels at 192 kHz, and four channels at 96 kHz; it's a terrific option for archiving final HR mixes to tape.

GETTING INVOLVED WITH HIGH-RESOLUTION RECORDING INVOLVES MORE THAN SIMPLY CHANGING A PROGRAM'S DEFAULT SAMPLING RATE FROM 44.1 TO 96 KHZ.

And, as with previous evolutions in the improvement of sound quality, you may need to upgrade your mic preamps, room, and other gear — any flaws become magnified when recorded at high resolution.

WHO'S MINDING THE STORAGE?

Another major consideration is storage, because you have to capture (or retain) much more data at higher sample rates

and resolutions (most programs specify reduced track counts with higher-resolution recording). Whereas 16-bit, 44.1 kHz audio requires approximately 5 MB per minute of mono storage, 24-bit, 96 kHz requires more than three times that amount.

Not only does a lot of data have to be shoved through the computer's bus, but the hard drives used to record and playback audio also need to be very fast in order to read and write more data simultaneously. Multiple 10,000 RPM, mega-GB hard drives will be the standard for most high-resolution multitrack applications.

Backup systems will also need to be much bigger to allow archiving of high-resolution audio. Twenty-five GB used to be considered a large amount of offline storage, but not anymore: Ecir markets drives in the VXA-1 format that sell for under \$1,400 and allow 66 GB of storage (compressed) on one tape. The Viper 200 by Seagate is a tape drive based on the Ultrium format of Linear Tape-Open technology. It can hold 200 GB (compressed) on one tape, and retails for about \$6,000.

TRY IT, YOU'LL LIKE IT

HR audio has arrived, and you're going to start working with it sooner than you might think. HR sounds better, and its fidelity makes long-term audio archiving a reality — time to offload those DATs, analog masters, and LPs to 192 kHz digital!

So re-evaluate your system, both in terms of storage size and system stability. Even if you have to make do with a few less tracks or cut back on the plug-ins, pick a project and try recording and mixing at high resolution. You'll hear new levels of detail, and enjoy better-sounding audio than the usual "CD-quality" audio we've been listening to all these years.

Next month, we'll discuss the advantages of high-resolution systems when running standard-resolution audio, as well as high definition video. ■



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Arranging Drum Tracks with the Roland VS-2480

by Laura Tyson

Many people assume that drum machine- or playlist-style arranging, where you create a song by stringing together and rearranging patterns, is possible only with a drum machine or computer. But some stand-alone hard disk recorders (such as the Roland VS-2480) can treat parts more like "objects" than tracks, which allows for the same type of techniques.

For example, I use the Discrete Drums drum library in conjunction with the VS-2480 to create convincing drum parts without the expense of hiring a drummer or spending hours miking and remiking a drum kit.

The VS-2480 features that are essential to this task are WAV file import, per-channel processing, and a Region Arrange tool, all of which are key to assembling custom drum tracks from 24-bit WAV samples. Let's look at how each element contributes to the process.

REGION ARRANGE OVERVIEW

Suppose you record a song with the structure shown in illustration 1. The Region Arrange feature lets you change your song structure by copying, removing, or re-arranging the sections to play in

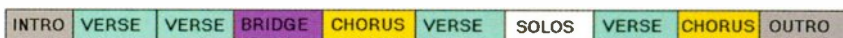


ILLUSTRATION 1

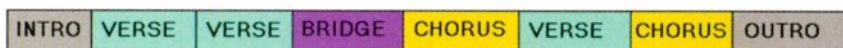


ILLUSTRATION 2

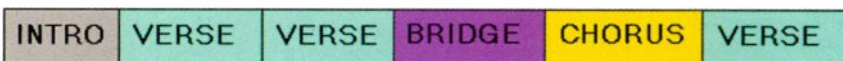


ILLUSTRATION 3

a different order. Because sections can have musical names, if you want to do something like eliminate the third verse and the solo that follows it, you can remove them as objects rather than have to do something more arcane (such as reference the time interval between time-code addresses). Removing the third verse and solos would give the song structure shown in illustration 2.

To get ready to do Region Arranging, you have to teach the VS-2480 where each section begins and ends. Do this by pressing the Tap button to place markers at the beginning of the intro, the first downbeat of each verse, bridge, and chorus, and, of course, the beginning and end of the outro. (You can hook up a standard ASCII keyboard to the 2480 to name the markers as "Intro," "Verse," "Bridge," etc.)

After defining these, call up the Region Arrange window, dial in the new Song Structure as desired, instruct the 2480 where on the timeline you'd like this new version of the song assembled, and then press OK.

If you aren't happy with the results, press Undo and try again. You don't have to worry about losing the original version anyway, because the 2480 places the new version at different position on the timeline, so your song's

original version remains intact.

REGION ARRANGE AND DISCRETE DRUMS

Let's get into a little more detail. This concept of creating and re-arranging drum parts is ideal for the Discrete Drums sample CDs, as they have multitracked drum parts (recorded over eight tracks) rather than mixed stereo tracks. The sample CDs provide the raw materials needed to create the various song sections, while the 2480 does the editing and arranging functions. Because each 2480 channel offers dynamics, equalization, and additional effects processing via aux busses, you can customize the drum sounds as needed. Also, the Discrete Drums Deluxe set's 24-bit resolution takes advantage of the 2480's 24-bit compatibility. Here's a step-by-step description of how to proceed.

1. Transfer the WAV files into the VS-2480 with its "WAV Import" function (fig. 1). Import all eight tracks of each section to the same position on the time line. The exact position the files are imported to doesn't matter as long as all eight parts from each section land at the same timeline position.

2. Before proceeding you might want to do some "housekeeping," such as labeling your tracks, setting up a tempo map, and linking channels on the mixer, but these



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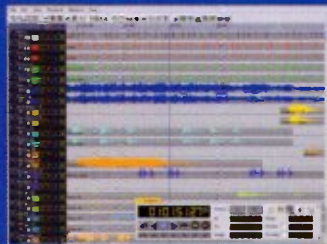


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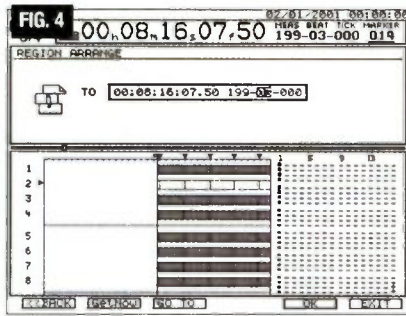
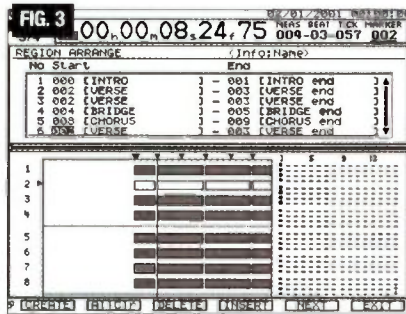
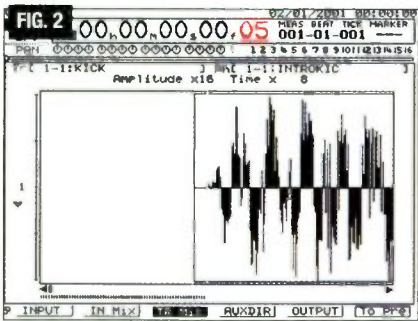
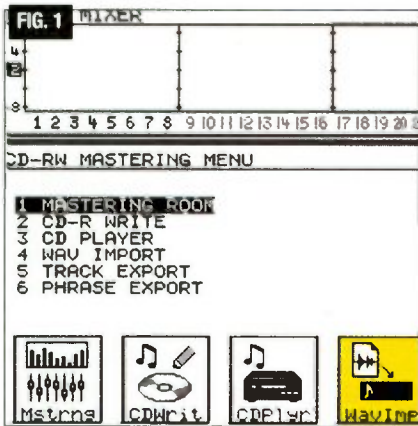


FIGURE 1: The CD-RW menu offers several functions, including WAV file import (highlighted here in yellow).

FIGURE 2: As the waveform window has subframe resolution (subframes are indicated here in red), you can zoom in to mark the waveform's exact start.

FIGURE 3: The Region Arrange window is the tool for testing out different song orders.

FIGURE 4: Assign the completed drum part to start at a certain place on the timeline.

aren't required to get your drums going.
3. Tell the VS-2480 the beginning and end of each section by placing a Tap Marker. Use the VS-2480's WAVE

display (fig. 2) to zero in on the precise "edge" of any downbeat. Make sure the markers land right on the beat, or else you might get some unwanted gaps.

4. For the Ending section, place a Marker at the beginning of the first downbeat, and the final Marker at the very end of the last cymbal fade.

5. Label the Markers once they're in place; this helps keep Verses and Choruses straight. Also, labeled Markers make the Region Arrange steps easier to get through.

6. All the sections are now sitting on the VS-2480, labeled and ready to be arranged in the right order using the Region Arrange window. Fig. 3 shows how the Region Arrange window would look if you arranged your drum tracks into the song structure shown in illustration 3.

You can, of course, modify this list, and make the tracks play as long as you like.

7. The final step is to tell the 2480 where on the timeline you want the drums to "land." For example, you could place the assembled drums at the One Hour (01:00:00:00) position on the time line. Or, you could have the drums start playing at a certain beat of a particular measure.

In this example, the intro of the "Tripped" drum kit is two beats. To make the downbeat of the first verse land right at the beginning of measure 200, set the "To" point in the Region Arrange screen to measure 199, beat 3 (fig. 4), then press OK. The 2480 assembles your multitrack drums into a full-length song...so press Play, and start mixing!

Laura Tyson is a hard disk recording product specialist for Roland. Not content with doing just that, she comes up with tricks like this in her spare time.

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THE MASTERING MYTHS

None disputes that mastering is a crucial part of the recording process, not only because it's the final stage — the last chance to enhance music into something better, and/or fix any remaining problems.

Back when mastering tools were prohibitively expensive, only a high priesthood of mastering engineers could afford them, and be trusted to use them. Mere mortals never had the chance to lay their hands on this type of gear, let alone practice with it.

But as with so many other aspects of recording, the personal computer has changed everything. With digital audio editors and mastering-oriented plug-ins, you can master in your project studio, at your home, or even on a laptop. Just because you can, though, doesn't mean you should... or does it?

For an analogy, think of cars. You can check the oil and air filter and probably change them, or rotate your tires. You can make sure the fluids are at the right level and replace them if necessary. But if you need to rebuild an engine, you're probably best off going to a licensed mechanic. This doesn't mean you can't learn to rebuild an engine, though. The question is whether that's really what you want to do with your time.

These days, mastering isn't just about producing commercial CDs. Voiceovers for commercials, soundtracks, sample CDs, music to be streamed over the Web — they all need mastering. While you might hire a pro with zillions of platinum records on the wall to master your breakthrough CD, you probably wouldn't hire someone to master the voiceover you did for a 30-second spot for your local car dealership, or a drum loop you just made. But if you learn how to do decent mastering, you can do those types of projects yourself.

It's a myth that only pro mastering engineers are worthy of mastering your music; after all, they weren't born as mastering engineers. They studied, learned, practiced, and listened to get where they are. If you have that kind of perseverance, you too can master your own

material. But it's also a myth that just because you have the tools, you can hit a few buttons and do as good a job as the pros. This is one endeavor where experience definitely does matter; when your career might be riding on the fate of a CD, do you really want to trust it to someone who just got a computer and some plug-ins?

I backed into mastering. I had always gone to professionals, where I watched and learned as much as I could. But then jobs started to come along that didn't have enough budget, or weren't crucial enough, to justify the time and expense of using pro mastering houses. My first attempts at mastering were audio-for-video projects. Back then, video folks were used to getting fairly low-quality audio, so when they got music and narration that actually sounded decent, all of a sudden I was a mastering engineer. Were my attempts at the Bob Ludwig level? No way. But my audio sounded great by comparison to the state-of-the-art at the time, and that's all it took to be asked back for more.

One thing led to another, I got better at my craft, better tools appeared, and, finally, a few bands started requesting my services because they liked the mastering jobs I did on my own tunes. That doesn't make me a world-class mastering engineer, but I know enough to make tracks sound vastly better than when they arrived in my studio, and that's what matters.

EQ magazine is here to, among other things, help you get started on the road to mastering. This issue has articles on mastering techniques for EQ and loudness maximizers, how to master for the Web (a very hot field right now, so jump in!), tips for the mastering-oriented Alesis MasterLink, an example of how to do basic mastering in a "studio in a box," and some general advice to help see you through your next mastering session.

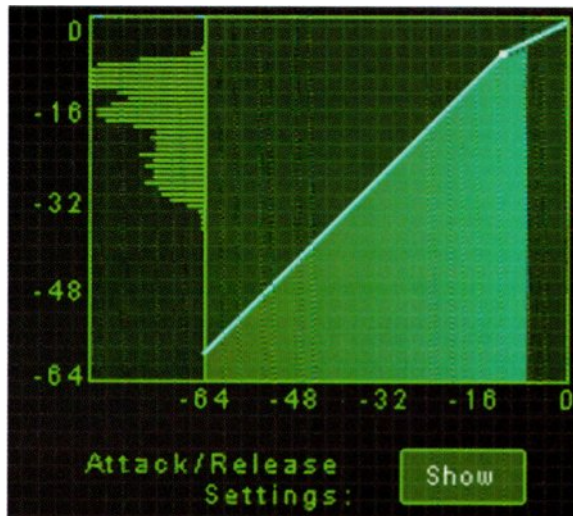
If you want your music to sound as good as possible, mastering is key. Whether you hire a pro or do it yourself, keep practicing, keep learning, and keep listening. You'll cut through the myths about mastering, and become a better engineer in the process.

BY CRAIG ANDERTON



FIGURE 1: Ozone's eight-stage parametric equalizer (left). The green, squiggly line shows the tune's spectral response, which can either be an average over time, or reflect real-time changes.

FIGURE 2: The histogram (below) in one band of Ozone's multiband dynamics module. To the right is a real-time compression curve that shows if the signal exceeds the threshold. You can think of a histogram as a level meter with a memory — as the level changes, it displays a history of where the level has been by showing wider lines. Here, for example, we can see that most of the tune's energy is in the -3 to -24 dB range.



MASTERING TIPS

What everyone needs to know before they master a project by iZotope

Note: I've been using a mastering program called Ozone, made by iZotope, for many applications. In a nutshell, it's a DirectX plug-in with parametric EQ, multiband compression, multiband exciter, multiband stereo imaging, loudness maximizer, reverb, and metering; see the review in the January 2002 issue for more details.

The company has an accompanying online manual/mastering guide that, while written with Ozone in mind, is full of mastering tips that apply to a wide variety of mastering tools. So, with iZotope's permission, we've adapted some of the more generic material from the guide for the benefit of EQ's readership. However, make sure you download the full version of the guide at www.izotope.com, as there's much more useful information than we can fit in the magazine. —Craig Anderton

EQ AND THE MASTERING PROCESS

Before you consider using compression or other mastering effects, start with EQ. A balanced frequency spectrum, achieved through optimal EQ, will work best with other processing; a poorly equalized track will still be poorly equalized, no matter what else you do. While most people understand how equalizers work (if you don't, check out the sidebar), it's not always easy to balance a mix with one.

The goal of EQ when mastering is to create the right "tonal balance." Any instrument-specific equalization has hopefully been done during arranging and mixdown, so we're just trying to shape the overall sound into something that sounds natural. Here are some general techniques you can use to get a decent tonal balance.

EQ the Midrange: Start with the midrange (vocals, guitar, midrange keyboard, etc.), as this usually represents the song's heart and soul. Listen

carefully and try to identify, then analyze, any problems that you hear. Compare the sound to another mix, perhaps a well-mastered commercial CD, and try to describe to yourself the difference between the two mixes in the midrange frequencies.

You can often fix a muddy sound by gentle cutting in the 100 to 300 Hz range, whereas an overly "nasal" effect requires similar cutting in the 250 to 1,000 Hz range. Harsh-sounding mixes are often due to excessive energy in the 1,000 to 3,000 Hz area — cut a few dB and see if that helps.

One common technique is to start by boosting a band to *emphasize* the area with the problem. In other words, sometimes it's easier to find where a mix is muddy by making it muddier, rather than trying to reduce the mud. Once you've found the problem area, then you know the right place to cut. You'll get the most natural sound using wide bands (Q less than 1.0); you will also not need to use as much gain or cut with wider bands.

Hopefully, using a band or two of EQ in these regions will improve the midrange sound. Remember that some equalizers can provide a way to isolate individual bands so you can concentrate on what's happening in specific ranges. If you find yourself using a relatively narrow notch filter, or lots of gain, you may be

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MASTERING MYTH

trying to repair something that EQ on a stereo mix can't fix. Go back to the individual tracks, isolate the problem at the source, then do another mix.

Note that your ears quickly get used to EQ changes. You may find yourself boosting or cutting more than necessary to hear the difference; sometimes it's a good idea to halve the EQ setting. For example, if boosting by +3 dB at a certain frequency seems to be the ticket, boost by +1.5 dB and live with the sound for awhile to see if that might be enough. If your program has a "history" window that lets you audition settings prior to making changes, comparing the difference before and after a series of subtle EQ changes can help prevent you from over-doing boosts or cuts. Multiple undos can also provide a similar function, although you're generally limited to going back through consecutive steps.

EQ THE BASS: If you now compare your mix to a commercial mix, you may be tempted to boost the bass using an equalizer. Resist the temptation;

multiband compression is usually a better tool for giving low-end punch.

A reasonable use of EQ in the low end is to shelf filter below 30–40 Hz. Purists might find this alarming, as, yes, we can hear down to 20 Hz and some musical information can be lost. However, what most people consider "bass" is in the

50–100 Hz region, and audio in the 20–40 Hz range can usually be rolled off because it won't even be reproduced on most consumer-grade speakers. The benefit of shelving is that it removes some low-frequency rumble and noise that could otherwise reduce the overall headroom.

PARAMETRIC EQ BASICS

There are many different types of equalizers, but they are all meant to boost or cut specific frequencies or ranges of frequencies. Parametric equalizers, which provide the greatest level of control for each band, are often used for mastering.

Parametric EQs typically consist of several bands (commonly, up to eight). A *band* of EQ is a single filter. You can use each band to boost or cut frequencies within the range of the band. By combining bands, you can create a practically infinite number of equalization shapes.

Fig. 1 shows Ozone's equalizer screen, but the principles are the same for most parametric EQs. The eight sets of arrows represent eight bands of equalization; one band is selected, and has been dragged down to cut the frequencies in the range of 3,753 Hz by -3.5 dB.

The bright red curve shows the composite or overall effect of all the bands combined, while the darker red curve shows the effect of the single band that's selected.

The sloped yellow line on the spectrum serves as a guide for equalizing the high frequencies; see the section of text that describes the high-frequency "signature" of typical popular music.

True blue.



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Keep in mind that for bass, or any EQ change for that matter, every action has an opposite reaction. If you increase one frequency, this can mask another frequency. The flip side of this is that cutting one frequency can be perceived as a boost to another frequency. Each change that you make, no matter how seemingly small, will likely affect the perception of the *entire* piece's overall tonal balance.

Bass guitars and kick drums can span a wide frequency range. Where the "oomph" of the kick drum is usually centered around 100 Hz, the attack lies much higher — often in the 1,000–3,000 Hz region. Sometimes you can get a sharper sounding "bass" sound by focusing on the higher frequency attack, as opposed to emphasizing the 100 Hz region, which can cause "mud." On the other hand, to add that hip-hop style "ring" to the bass, try a peak at 50–60 Hz.

EQ THE HIGHS: Finally, listen to your mix's high frequencies.

- Don't be surprised if, when comparing your mix to commercial CDs, yours

sounds a little dull or muffled. You can compensate for this with some high-frequency EQ, using a low Q (wide bandwidth) band around 12–15 kHz. Alternatively, you could skip the EQ and add some sparkle using a multiband harmonic exciter.

- Be careful boosting around 6,000–8,000 Hz. You can add some "presence" in this area, but may also bring out an annoying sibilance or "ssss" sound in the vocals.

- Noise reduction is a huge topic in itself, but you can sometimes reduce tape hiss or other noise by cutting high frequencies around 6,000–10,000 Hz. As this will affect a tune's "sparkle," though, you're almost always better off using dedicated noise-reduction tools (often available in plug-in form).

A high-frequency spectrum that rolls off gradually creates a generally pleasing tonal balance. Many commercial recordings exhibit the "signature" high-frequency spectrum shown in fig. 1; the overlaid yellow line is an optional reference overlay that shows this gradual rolloff. If you have

a program that can analyze a signal source's average spectrum, you'll probably be amazed at how many follow the same slope.

GENERAL LOUDNESS MAXIMIZER TIPS

Loudness maximizers give tunes an overall volume boost, but are based on special algorithms that are designed to sound as transparent as possible. Maximizers are used a lot with pop and dance records to give the "hottest" possible sound, and you certainly don't want your music to sound "weak" compared to others. However, when overused, loudness maximizers can suck all the life out of a song and lead to aural fatigue. The following are a few tips to help you get the most out of these processors.

- Do not set the margin (the maximum level attainable) higher than -0.3 dB. Technically, you can set the margin to 0 dB so that the loudness maximizer's output is maximized to the point of near clipping, but any subsequent editing of your mix (even just crossfading) could push it over the edge. Leave yourself a little

Different shades of blue.



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room. Furthermore, some CD pressing plants will reject CDs if they consistently hit 0 dB for extended periods, as it's assumed that indicates clipping.

- If your digital audio editor has multiple slots into which you can place effects, insert the loudness maximizer last. It doesn't make any real sense to put it elsewhere.
- More aggressive loudness maximizing (e.g., lowering the threshold at which maximization starts to set in) will generally require longer release times.

Well-engineered loudness maximizers can do extreme loudness maximization without distortion or other artifacts. Just consider whether that's what you really want. *Dark Side of the Moon* is one of the best-selling CDs of all time, yet it used very little compression or limiting. More loudness means less dynamics (highs and lows), which is one of the important qualities that helps make music satisfying. There's always a tradeoff.

MASTERING AND METERING

Some people think that you shouldn't use your eyes to mix a tune, but your ears. Of course, if you could only use one sense, the ears would obviously get the gig. Expert mastering engineers don't need meters; they only need to listen. They can hear a sound and know its frequency, or hear a level and know when it's compressing.

However, for those who are still new to mastering, there's a lot to be learned from visual feedback through appropriate meters. When equalizing, you can see a spectrum. When compressing, you can see a histogram of levels (fig. 2). When trying to widen the stereo field, you can see phase meters.

There's no substitute for using your ears, but think of it like driving a car: when you first start driving, you spend a lot of time looking at the speedometer. Over time, you develop an instinct and need the meters less. But from time to time, we've all looked down and thought, "Hmmm, I had no idea I was driving that fast." Whether you're just starting with mastering or have been doing it for years, you can benefit from the second opinion that a good set of visual displays can provide. ■

SEVEN MASTERING SUGGESTIONS

Before you jump into a marathon mastering session, here are seven points worth remembering.

- Have someone else master your mixes for you. Granted, in most project studios, the same person is often the performer, producer, mixer, and mastering engineer. But at least get someone else to listen with you. Or find someone who will master your mixes if you master theirs. You're too close to your own music; you'll hear things other listeners won't hear, and miss things that everyone else does hear.
- Take breaks and listen to other CDs in between. Refresh your ears in terms of what other music sounds like. Okay, the pros just instinctively know what sound they're working toward, but for students of mastering, being reminded from time to time during the process isn't such a bad idea.
- Move your listening position. Studio reference monitors are very focused and directional, so their sound can change significantly depending on your listening position. Shift around a bit. Stand across the room for a moment.
- Listen on other speakers and systems. Burn a CD with a few different variations and play it on your home stereo system, or drive around and listen to it in your car. Don't obsess over the specific differences, but just remind yourself what other systems sound like.
- Check how it sounds in mono, and with the polarity inverted on one speaker. People will listen to it this way (although maybe not intentionally), and, while your master probably won't sound great under those circumstances, hopefully it won't completely fall apart either. Mastering for MP3 is an entirely different subject — see "The Strange Art of Mastering for the Web" elsewhere in this issue.
- Monitor at normal volumes, but periodically check it at a higher volume. When you listen at low to medium volumes, you tend to hear more midrange (where the ear is most sensitive) and less of the lows and highs. This is related to the Fletcher-Munson effect, which involves how different frequencies are heard differently depending on the playback volume. So check from time to time how it sounds at different volume levels, and master so that the sound works at all possible levels.
- When you think you're done, save any presets, or whatever it takes to be able to get back to precisely where you were. Take the rest of the night off, then, next morning, listen again with fresh ears. If you need to make a couple of tweaks, recall the presets, and make the necessary changes.



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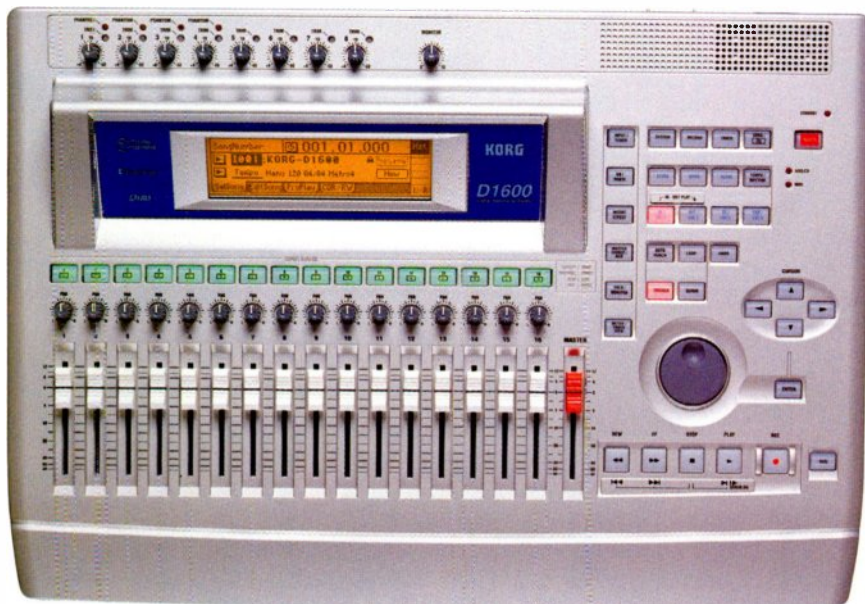
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MASTERING WITH ALL-IN-ONE STUDIOS

*Taking your project all the way with a “studio in a box”
by Craig Anderton*

Back in the Analog Age, a “studio in a box” simply had a mixer and multi-track recorder. But in the digital age, you’re likely to find effects, automation (snapshot and, on more expensive boxes, even moving faders), connections for external storage, and, now, even CD-R or CD-RW drives so you can take a project from plugging in your first instrument to burning a CD for the band members.

As equipment has gotten better, though, so have the technical standards by which music is judged — when you burn a CD, it had better stack up to commercially available ones. Unless you have mixing chops of the gods, the only way to get that kind of pro veneer is to master your final mix.

As a result, some all-in-one studio products — especially those with recordable CD drives — now include effects algorithms designed specifically for mastering. As one example, let’s look at Korg’s D1600, which includes several tools to help you create the best possible sounding final product. In addition to traditional insert effects, the D1600 also includes a Final Effect slot where you can insert effects that shape the overall mix.

THE TWO CRUCIAL MASTERING EFFECTS

For starters, the D1600 includes the two most-needed mastering effects: multiband parametric equalization to correct for frequency response problems (e.g., increasing articulation through a slight upper midrange boost, or reducing “muddiness” by trimming back the bass), and dynamics control. Dynamics is the key to obtaining today’s controversial “hot” sound, which places great importance on creating as loud a mix as possible.

Using EQ on your entire mix may be unnecessary if you properly equalize individual tracks first. In addition to the channel EQ, which is good for general tone-shaping, Insert Effect #1027 (four-band parametric EQ) can provide very sophisticated EQ control for individual channels. To process

the overall tonal balance, you can insert #F010 (parametric EQ) as the Final Effect. However, as the D1600’s mastering-oriented dynamics processors also include basic EQ options, you’ll probably want to use the Final Effect slot for dynamics processing so you can control both dynamics and EQ simultaneously.

DYNAMICS CONTROL

Any mix’s maximum level depends on the available headroom — peaks that exceed it create distortion. Dynamics control reduces peaks, thus opening up more headroom. You can then increase the overall level until, once again, the peaks hit the maximum possible level.

The D1600 offers several dynamics effect presets (#F001-#F008) for the Final Effect slot. The first four are based on stereo compression (Effect DY1). Compression causes a change in input level to create a smaller change in output level. With stereo mixes, compression gives a punchy, “pop music” sound.

The other four presets are based on stereo limiting (Effect DY2). A limiter controls peaks, but doesn’t affect the dynamics of lower-level signals. Subtle settings give a more “natural” sound than compression, so limiting is a favorite for acoustic music (jazz, classical, etc.). Limiting also acts a “safety valve” to make sure signals don’t exceed the maximum available headroom.

Extreme amounts of limiting or compression produce a very “hot,” loud master. This is popular with dance music, because DJs want to minimize track-to-track level variations as they segue from one tune to another. However, you have to be careful. Dynamics processors can’t repeal the laws of physics; push them too hard, and you’ll end up with distortion.

SALVAGE JOBS

Sometimes, mastering engineers are called upon to do more of a salvage job than a simple enhancement. Live recordings, for example, may need sophisticated EQ and dynamics, which is more than you can fit into the Final Effect slot.

The solution is to use the D1600 more as a signal processor than a recording device. For example, run your two-track master into two inputs of the D1600, and

► continued on page 117



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FIGURE 1: The Windows Media Player is part of the Windows operating system, and can play back MP3 files. Apple's OS comes with a QuickTime player, which is functionally very similar.

THE STRANGE ART OF MASTERING FOR THE WEB

After you've finished your perfect master, it's time to make a Web-friendly version by Craig Anderton

The dot-com bubble may have burst (and I hope you didn't get too wet when it did), but using the Web as a showcase for your music remains viable. Companies such as Broadjam.com continue to spotlight new artists, while bands post tunes on their Web sites for the benefit of fans and A&R people alike. And MP3s are a great way to exchange musical ideas without using up a lot of bandwidth.

However, in terms of mastering, what works for a CD will likely not work for the Web — the two media are too dissimilar for a "one size fits all" approach. This is both bad news and good news, because while mastering for the Web adds yet another step to the mastering process (just like in the days when you had to produce separate masters for cassette and vinyl), it also means a potential new income stream for studios and engineers who can make music sound great in Webworld.

We'll address how mastering can compensate for the online music experience, but first we need to understand how audio works on the Web.

THERE'S TOO MUCH DAMN DATA!

The biggest obstacle is that quality audio generates a lot of data — over 10 MB per minute for CD-quality (stereo, 44.1 kHz, 16-bit) sound. Yet

traditional copper phone lines choke on that kind of data stream. A typical, dial-up, 28.8 kbps (kilobits per second) connection can transfer about 2.5 kilobytes of data per second *if* net congestion isn't too bad. Under those conditions, sending or receiving a four-minute, CD-quality pop tune would take over four hours.

By now, of course, we were supposed to have broadband connections flowing into every home...yeah, right. DSL requires being a certain distance from a phone company switching station, cable modem performance deteriorates as more people sign up for the same service, and satellite modems are fast for downloading, but, with few exceptions, are slow (dial-up connection speeds) for uploads.

As a result, much of the world is still stuck with 56k dial-up modems. And even these aren't always an improvement over 28.8 kbps, because, in some areas (particularly rural localities), phone lines aren't clean enough to deliver anything faster than 28.8 kbps

anyway. Besides, kbps specs are mostly fictitious. You're lucky if your 28.8 kbps connection can reliably hit 20 kbps. And if net traffic is really heavy, it might be more like 16 kbps.

Because it takes so long to download a long music file (let alone have it "stream" in real time, like a radio broadcast), you must make compromises to present music on the Web. Someday we'll all have fiber-optic cable coming to our doorstep with all the data we would ever want, but until then, let's deal with the real world.

THE SCIENCE OF DATA COMPRESSION

To get around bandwidth limitations, software engineers have devised *data compression* algorithms that drastically reduce the amount of data needed to convey music. (Note that this has nothing to do with dynamic range compression, as used in audio.) For example, if there's a lot of high-level sound going on, the algorithm might assume you can't hear lower-level material, and decide that for those sections you need only 24 dB of dynamic range. This requires four bits of resolution — 25% the amount of data required for 16-bit resolution.

Unfortunately, though, it's difficult to retain quality when music is data-compressed (video and images are much more easily compressed, with less loss of quality). Musicians generally belittle devices with data compression (MiniDisc, some hard disk recorders, etc.) but, like it or not, this is something you have to live with for the Web.

There are many methods of data compression. The most popular are:

MP3. This allows several levels of encoding, so you can generate just about any size audio file you want, with a corresponding loss of fidelity as the files get smaller. MP3's highest quality mode produces sound quality nearly equal to a CD; its lowest sounds worse than AM radio on a bad day. But MP3 is by far the most common audio file protocol for the Web. There are many free or shareware MP3 players and encoders, although it often pays to purchase a program

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THE MASTERING MYTH

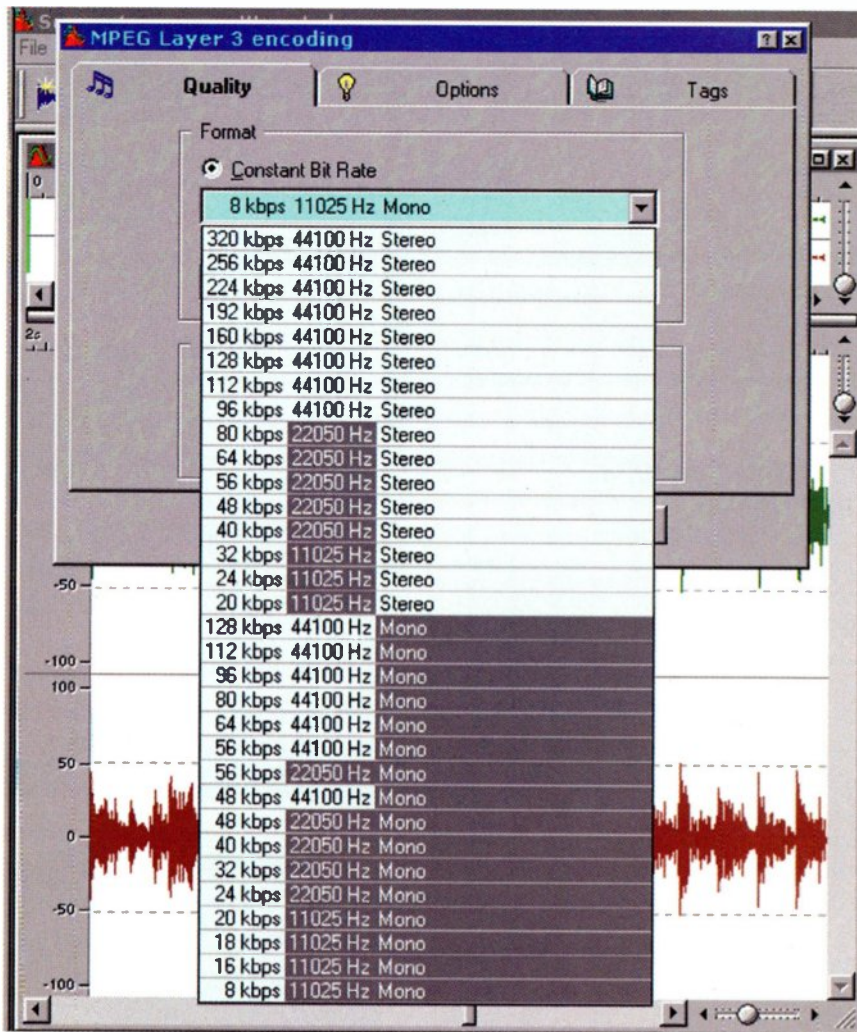


FIGURE 2: Wavelab is just one of many programs that lets you save files in MP3 format.

with pro-level encoding (the Fraunhofer algorithm is somewhat of a standard, but there are different ways to encode, and future updates will undoubtedly improve sound quality for a given file size). Most digital audio editors now include a "Save as MP3" command, or accommodate an MP3 encoding plug-in.

RealNetworks. This is, for now, the most popular format for streaming video on the Web, and produces acceptable quality even on dial-up connections. The audio isn't too terrible, and some prefer to release music in the Real format for streaming (for downloading — a non-real-time process — most musicians remain committed to MP3). Players for both Windows and Mac are available for free at www.real.com; they can play

MP3 files and formats other than just Real-based files.

Apple QuickTime. QuickTime is the father of streaming video, and remains more popular for video delivery than audio. Its player is free (at www.apple.com), available for Mac or Windows, and can play files in other formats, including MP3.

Windows Streaming Media. This has the power of the Microsoft Empire behind it, and is coming on very strong — to the point where it's giving RealNetworks the jitters. For a given file size, many rate the sound quality as equal to, or better than, MP3. Despite being Windows-centric (Windows Media Player — see fig. 1 — is part of the Windows operating system), Mac players are available. Either type reads a variety of file formats, including QuickTime and MP3.

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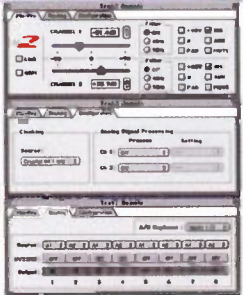
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MASTERING MYTH

If you're releasing audio-only content, there's little value in saving to a format other than MP3. All the players read it, there's a ton of supporting software and player add-ons (e.g., EQ modules), and people can load the files into portable MP3 players. However, if video enters the equation, then you'll need to look into other formats.

FORGET THE DETAILS

Data compression is not about subtlety. You'll get the best encoding if you start with a signal that has a really high average level, and spends most of its time in the very top (loud) end of the dynamic range. Professional mastering engineers hate to think in those terms; it goes against everything we've learned about preserving dynamic range and quality. But we're dealing with a highly imperfect medium, and some of the standard rules have to go by the wayside. This doesn't mean you can't encode songs with wide dynamic ranges, but the difference in quality between what goes in and what comes out will likely be greater than if your song has really "hot" levels.

Before doing any major processing, remove any DC offset, then normalize your file to get as hot a raw signal as possible. Next, apply one of the many tools for creating super-hot levels; I use the Waves' L1 plug-in a lot, but also like Steinberg's Loudness Maximizer (part of their Mastering Edition set of plug-ins), and the loudness optimizing module in iZotope's Ozone. Any of these increases the perceived loudness, and, as long as you don't go too nuts, the overall sound remains relatively natural.

One caution: Please don't master your CDs this way. The extra volume kick may sound spectacular at first, but then listener fatigue sets in. When putting audio on the Web to convince people to buy your CD, anything goes. But whoever actually buys your CD should be treated to high-quality music. This is another reason why I emphasize that mastering for the Web and mastering for CD are very different processes.

A PRACTICAL EXAMPLE

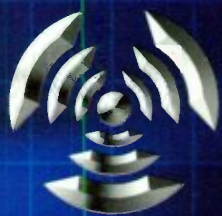
Let's look at the options Steinberg's Wavelab offers when you save to MP3 format (fig. 2). You can choose from 32 constant bit rates, from 320 kbps (excellent quality, but largest resulting file size) all the way down to 8 kbps (good enough for voice, and that's about it — but it doesn't take up much space). For example, compressing a 78 MB WAV stereo audio file using 320 kbps data compression results in a 17.7 MB file; compressing to 8 kbps yields a 0.45 MB file — a data reduction ratio of 33:1.

You can also choose between stereo and mono encoding. We'll get into why this is important shortly.

THE ART OF DATA COMPRESSION: A CHECKLIST

Of course, you can just choose a compression rate, save as MP3, and figure your job is done. But there's an art to all this because of the balancing act that involves a lot of variables: whether your program can save at a variety of kbps settings, how the music reacts to the data compression algorithm, the file's ultimate size, and the file's intended purpose and means of distribution. Here are some things you'll need to consider when encoding to a data-compressed format.

Analyze your target audience's needs. For lowest-common-denominator streaming to the widest possible audience, you pretty much have to choose 20 kbps to stream with a 28.8 k connection, or 32 kbps if you expect to serve a 56 kbps hook-up. You can bump these up a notch to 24 kbps and 40 kbps, but if the net's congested, the audio could break up or pause for varying amounts of time — not exactly a seamless listening experience, especially if it happens just before The Big Chorus. On the other hand, if you're pitching a soundtrack to a video production house or ad agency, it's likely they'll have broadband, so you can get away with 96 kbps or 128 kbps files. To my ears, 128 kbps is the crossover point between quality and file size — higher rates yield progressively smaller improvements, while lower rates



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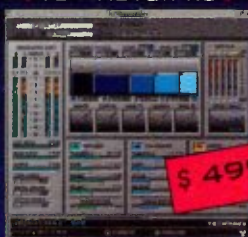


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impact the fidelity to a relatively significant degree.

Use the highest quality source material. It's a fallacy to think that because the file will end up compressed, it doesn't matter if you start off with lower-quality audio. You want to give the encoder the highest possible quality so it can make the best decisions about how to compress the material.

Will the file be downloaded, streamed, or both? Unlike streaming, which is a real-time phenomenon and therefore critically tied to phone line speeds, downloading occurs in the background, so speed is less of an issue. Here the tradeoff is download time versus fidelity; if the download takes too long, you'll wear out your potential listener's patience. But if you choose too small a file size, the sound probably won't be that great. Many sites offer two versions of a file — a lo-fi streaming preview and a higher fidelity version for downloading. That way, the listener can decide whether to download based on more than just a song title or description.

Are you sure you want to provide the best possible fidelity? If you're trying to sell a band's music and the downloaded version sounds great, then people may not have as much incentive to buy a CD. But if it doesn't sound that great, then people may not want to buy the CD anyway. Decisions, decisions. One possible solution is to do mono files. That way, even if they sound good, people will likely want the stereo version. And speaking of mono....

When fidelity is paramount, save in mono. Mono and stereo files are the same size, but a mono version's fidelity will be better because the bandwidth is devoted to a single channel, rather than split between two channels.

Variable or fixed rate compression? In addition to converting to fixed rates, some MP3 converters include variable bit rate options that optimize the bit stream according to the material being encoded. This is not as universally compatible as fixed bit rates; for general distribution, I'd

advise sticking with fixed bit rates. However, if files are being exchanged among a select group of people — for example, all the musicians working on a project — and they all have players that can handle variable bit rate streams, go for it.

Save in multiple formats and compare. Save a file using a variety of bit rates and sampling frequencies, in mono and stereo, and see which combines best sound with smallest file size. Taking the example of the 78 MB file mentioned earlier, using 96 kbps stereo compression brings it down to a reasonable 5.3 MB, while using 48 kbps stereo gives a download-friendly 2.6 MB. Actually, with material that doesn't have a huge dynamic range, 48 kbps isn't that horrible. The high frequencies won't be very good and the sound will lack definition, but it will be good enough to give an idea of what a tune is about — and remember, most listeners judge music more by the content and its accessibility than the sound quality. (Otherwise, DVD-Audio would be all the rage, and MP3s would be a footnote in audio history.)

Encode files using every encoder you have, and check out which sounds best. Even files with the same sample and data rates can sound very different, depending on the algorithm used to create the MP3 file. What's more, a file might sound better at 96k with encoder A than encoder B, but B might sound better at 64k. (I'm not talking subtle, "golden ears"-type differences, but fairly obvious ones.) The only way to squeeze out the last ounce of encoding performance is to keep trying and comparing until you find the version that sounds best.

INDEED, MORE THAN MEETS THE EAR

Mastering has always been a complex process that requires capable tools and sophisticated ears. But these days, after you've done your perfect master, take the time to create another version specifically for the Web. If the music ever needs to be released to the global village, you'll be ready. ■

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TEN ESSENTIAL MASTERING TIPS

by Craig Anderton

- When mastering with a digital audio editor, save the setup you use (plug-ins, levels, etc.) as a preset, if possible. For example, Steinberg's Wavelab has a Master Section Presets option. If the vibe of the CD changes over the course of mastering, you can go back to earlier tunes, recall the preset, and make a few tweaks rather than start over from scratch.
- Duplicators will often reject CDs if the level hits zero for several samples in a row. Yet these very short overloads may not be objectionable to the listener. To get around this problem, after assembling the entire CD, normalize it to -0.1 dB. This leaves just enough headroom that the CD won't be rejected for "overs."
- Make very small changes when EQing, because an increase or decrease in one frequency range has repercussions elsewhere. For example, if you boost the treble, the bass becomes less prominent. It's amazing how even a 1/2 dB change can make a noticeable difference. Adjust EQ to what sounds right, then halve the amount of boost or cut you added. This gives your ear a chance to get acclimated to the change in sound. You can decide later whether you want something more drastic.
- Always back up your original unmastered, two-track mix before you start mastering, and work on a copy.
- Don't add song fade-ins or -outs when mixing. Tunes may need a longer or shorter fade than anticipated. If the fade is built into the mix, you can only make it shorter.
- Avoid excessive processing, especially with 16-bit systems. These operations sometimes round off numbers; if these errors accumulate, there can be an audible "fuzziness."
- Test your order first. Many digital audio editing programs can assemble a "playlist" of tunes. Record it to cassette, CD, MiniDisc, etc. and live with it for a few days so you're sure everything flows smoothly.
- Use normalization sparingly. Normalization sounds like a great idea: click a button to amplify your signal so that the peaks just reach the maximum available dynamic range. But music doesn't work like that. A heavily compressed tune may seem much louder than a less compressed tune whose peaks are actually higher.
- Think 24 bits. Save your final mastered versions in 24-bit resolution, even if the target playback medium is a standard 16-bit CD. Then apply dithering to the 24-bit file to create the best-sounding 16-bit file.
- If you mix to DAT or transfer tunes to DAT prior to sending them to a duplicating house, record a minute or two of "digital black" (silence) at the tape's beginning. This gets past the part of the tape that is most likely to have questionable surface characteristics. You can then transfer the DAT digitally to your computer for editing. Also, eject any digital tape in a space between songs. Should any tape damage occur while threading or unthreading, your song will be spared.

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ALESIS MASTERLINK TIPS

*How to get the most out of Alesis's stand-alone CD burner
by Dan Tinen and Craig Anderton*

The Alesis MasterLink was one of the first stand-alone CD burners designed specifically for mastering; it incorporates a host of mastering-oriented DSP, and can record/play back CD-Rs in 24-bit as well as 16-bit resolution. These 10 tips will show you to get even more out of this versatile device.

THE MULTIPLE-DISC, MULTIPLE-PLAYLIST MIX

Because standard CD-Rs can hold a maximum of 650 MB (or 72 minutes of 16-bit/44.1 kHz audio), if you want to prepare an hour-long DVD that uses 24-bit resolution, you'll need to split the "album" into at least two CD-24-format CDs worth of material (24-bit data storage uses up 50% more capacity than 16-bit material). Also prepare a single, 16 bit/44.1 kHz Red Book CD to show the DVD mastering lab how you want the final project assembled. You'll end up with three or more CDs to send:

- CD24 (high resolution) with the DVD's first half

- CD24 (high resolution) with the DVD's second half
- Red Book CD with all songs at CD-resolution, in order, with spacing and fades

Check with your DVD mastering engineer to find out requirements for received material; note that CD24 disks do not require a MasterLink for playback, as they store AIFF files that can be opened by most digital audio editors.

Incidentally, mastering engineers may request that the DVD tracks be submitted to them "raw," with no DSP or fades, so they can do that work on their (very expensive) workstations. If you add the types of DSP and fades you want to the Red Book CD, it can help get across what type of sound you'd like to hear on the final DVD.

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options. Each one is useful with different types of material.

- Lg1 (concave logarithmic) is best for most music. The logarithmic curve fades abruptly at first, then decays slowly.

- Lg2 (convex logarithmic) keeps the volume up as long as possible, then does a quick fade. For example, suppose you want to fade out a 30-second commercial, but the narrator goes almost to the end. Add a short (500 ms) fade with the Lg2 curve.

- Lin (linear) can seem abrupt compared to a logarithmic fade. However, if a song already contains a fade made during the original mix, the Lin curve can

shorten the fade but preserve the existing fade's curve.

AUDIO/METERING MISMATCHES

Because of the MasterLink's "look ahead" feature (*i.e.*, it analyzes the signal before applying compression to catch any transients), when auditioning DSP it takes about 500 msec to hear any changes made to the EQ or compression settings. Therefore, the display will change before you hear the sound that corresponds to that change.

USING THE COMPRESSOR'S KEY FUNCTION

The Key option can compare either

the right, left, or both signals to a specified threshold when determining whether to apply compression. L & R is the most common choice, as linking the left and right channels together allows changes in one channel to affect the other, which preserves stereo imaging.

However, suppose the channels are out of balance because the left channel has higher peaks than the right. Set the threshold just above the right channel's highest peaks, and key to left channel only. When the left channel signal exceeds the threshold, compression kicks in on the left channel. As the right channel signal does



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not exceed the threshold, it will not be compressed.

THE IMPORTANCE OF LIMITER RELEASE

With short release times, the limiter tracks every little change in level, producing a potentially uneven or "choppy" effect. However, overly long release times can result in dynamics that sound unfocused and mushy. If the dynamics are crisp and well-defined, and the transitions as the MasterLink goes in and out of limiting sound smooth, then you've found the optimum release time.

Note that the rate at which the compressor's gain reduction meter decays provides useful information about the compressor's release time setting. If the gain reduction meter darts rapidly among segments, the release time is relatively fast. If the meter transitions more slowly between segments, the release time is slower.

DON'T ADD FADE INS AND OUTS WHILE MIXING

Fades are best left for the MasterLink's mastering process, because, with digital fades, the change in level is not continuous, but goes through a series of very tiny steps. Inexpensive digital gear often has coarser steps than the MasterLink, which uses a high-resolution fade algorithm to minimize the gap between steps. This produces smoother, "sweeter" fades.

WHAT'S WITH THE MULTIPLE LEVELS?

There are three principal ways to change levels:

- The overall level that's set for the entire track
- Gain applied in the compressor
- Gain applied by normalization

Choosing the correct place to change level is like gain-staging in a mixer, with the three MasterLink controls listed above corresponding respectively to a mixer's input gain, channel volume, and master volume.

The track level shown on the top line of Playlist Edit mode is the first in the chain. Changing this affects what the compressor "sees," which lowers or raises the threshold where the compressor

starts to work. The normalize setting is the last in the chain, and makes up for any gains or losses in the compressor, EQ, and limiter before it.

WANT A HOT SOUND? TRY THE LEAST OBTRUSIVE DSP FIRST

Let's assume a CD doesn't sound "loud" enough, and you want to make it louder with dynamics processing. Try the DSP effects in the following order:

NORMALIZE. This doesn't affect dynamics at all, it just raises the overall

level to use up the maximum available headroom. If this delivers the results you want, there's no need to go further.

LIMITER. This affects only the peaks of the signal, leaving the rest pretty much intact. Light amounts of limiting (e.g., a threshold between -6.00 and 0.00) can increase the overall loudness without perceptibly altering the song.

COMPRESSION. Compression affects the signal the most. Use this if you want a really "hot" CD (e.g., dance music), or if the dynamics need to be



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restricted more drastically than what you can obtain with limiting.

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If you mix from your multitrack directly into the MasterLink hard disk, until you burn a CD, there's no backup for that mix. If the hard drive fails, a power surge takes out your gear, or an errant pet knocks the MasterLink onto a concrete floor, you may lose that mix forever. To be safe, mix to the MasterLink and back up to CD as soon as the mix is complete.

CHOOSING SAMPLE RATE AND WORD LENGTH WHEN MIXING

Many engineers use MasterLink as a "drop-in" replacement for DAT, and mix directly to it from a mixing console. As MasterLink can record at different resolutions and sampling rates, here are some guidelines on how to set the MasterLink's parameters, depending on the type of source material that feeds it.

If your mixing console is analog:

USE A 20-BIT WORD LENGTH. The noise floor that results from the console itself, microphones, preamps, and all the components connected to it is much higher than the 20-bit encoding of a digital recorder. You can, of course, use 24-bit, but you're just wasting disc space to store random numbers well below audio thresholds.

USE A SAMPLING RATE OF 88.2 KHZ. Recording at 88.2 kHz will give you and future DVD listeners the chance to hear any high frequencies in the 20–40 kHz range that may have been recorded by analog equipment (although very few microphones actually produce frequencies up there, and even fewer speakers can reproduce them). Professional mastering engineers like to receive 88.2 material, because it allows them to use EQ in the top audible octave (10–20 kHz) without distorting the anti-aliasing filter required for 44.1 kHz operation. An additional advantage is compatibility with today's CDs, as sample rate conversion from 88.2 to 44.1 causes no sonic artifacts. This is because conversion simply involves taking every other sample, as if the source material was originally recorded at the lower rate. However, if saving

space is important, then you can always go with 44.1 kHz.

If your mixing console is digital:

USE A 24-BIT WORD LENGTH. While the noise level of analog input signals to the digital console is (at best) at the 18- to 19-bit level, the digital signal processing used by the console itself will generate usable information down to the

MANY ENGINEERS USE MASTERLINK AS A "DROP-IN" REPLACEMENT FOR DAT, AND MIX DIRECTLY TO IT FROM A MIXING CONSOLE.

21- to 22-bit level. (When you lower a fader of a digital mixer below unity gain, it is mathematically dividing the numbers and creating significant bits of resolution: a 19-bit signal running through a digital fader set to -12 dB becomes a 21-bit signal.)

USE A SAMPLING RATE OF 44.1 KHZ. If your digital console has 88.2 kHz capability, you'll of course use that. But for the 99% of digital consoles that are limited to 44.1 or 48 kHz, you may as well use the CD-compatible 44.1 kHz rate to avoid the sample rate conversion process to go from 48 to 44.1 kHz. Although modern sample rate conversion algorithms don't degrade the sound like earlier algorithms did, it's always good practice not to add unneeded processing.

Dan Tinen is a producer, musician, and consultant to the music industry.

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BY LISA ROY • PHOTOS BY MR. BONZAI



From a Victorian Mansion in New Orleans to a house in Mexico, on to a warehouse in San Francisco, then to an old movie theater in Oxnard, producer/engineer Mark Howard has successfully created recording environments in some of the most unconventional places...without any major acoustical treatment or construction. Speaking with this audio wunderkind, who looks more like a rock star than a technician, you get a sense that this is second nature for him. Just invite him over and he'll have your living room or garage turned into a recording space with a great vibe and killer acoustics without lifting a hammer. "It's the art of placement...the art of feel and getting the mood right," he says matter-of-factly. "I guess I just have a certain knack for doing that."

LOCATION, LOCATION, RELOCATION

"It started about fifteen years ago when I was in Canada working as an assistant engineer," Howard explains with a slight French accent that is oh-so chic. "I was recording bands using a technique where I would mix them live, but take splits off the console and go through preamps direct to tape, then take it back to the studio to mix. That's where I met Daniel Lanois."

Lanois immediately honed in on Howard's unique technical skills and asked him to go to New Orleans and build a studio for him because he was going to produce the Neville Brothers' *Yellow Moon* record there. "That first studio was called



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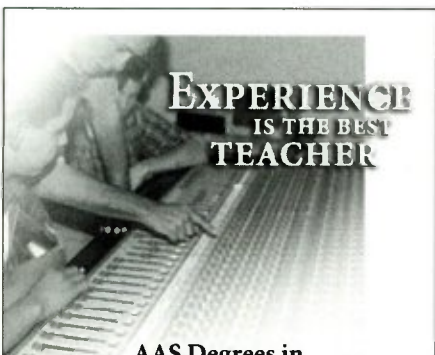
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- Neve BCM 10
- Westlake BSM monitors
- Neumann U 47, M 147, and M 149 microphones

“Studio on the Move,” he recalls. “Dan said, ‘You have to find a location to do it in, rent a big place, get all the gear and set it up.’ So I ended up renting a five-story apartment building on St. Charles Avenue in the Garden District. We had the studio on one floor and everybody else lived on all the other floors. I got an Amek Matchless, all the effects, a Studer A80, and a rack of Dolby A. Once I got the studio wired up, I vibed it out, bought couches, rugs, and other things. That’s where it began...the installation, people all living in the same kind of environment and making a record.”

It wasn’t long after they started the recording process that Howard realized he had to make a few adjustments. “We had streetcar noise that was leaking

into the studio,” remembers Howard. “I did a bit of investigating and found out that if I lined the windows with lead, it would soundproof them. Dan didn’t like power tools, so I did the work myself by hand, screwing in these big planks of wood.” That is where they ended up not only recording the Neville Brothers album, but also Daniel Lanois’s first solo record *Acadie*.

Soon after, the Howard/Lanois team moved on to a Victorian mansion in the same neighborhood for their next project, Bob Dylan’s *Oh Mercy*, before landing semi-permanently at a “haunted house.” “It was the largest single-dwelling home in the French Quarter,” shares Howard. “The ceiling was caved in and it was a wreck. I supervised the renovations and in one month we were making a record in the ballroom. We bought the Record Plant-NY’s API, installed it, and that became Kingsway Studios.” Of course, by then Howard and Lanois had hit the road again and headed out west to Mexico where Howard found a house built in the side of a mountain. The walls were all natural



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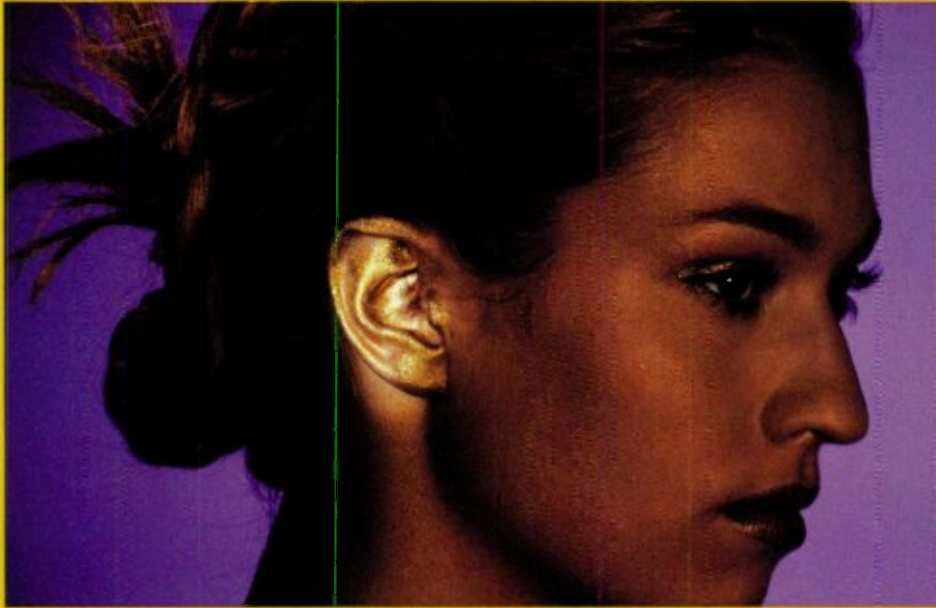
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STUDIO SETUP TIPS

According to Mark Howard, "I have a standard setup for my studio equipment. I set it up in a horseshoe shape — that way I can access all the gear easily. You are always plugging in something, and this setup makes it more practical to work in. I cover most of the floor with large Indian rugs. The couches and lamps are always moving, depending on the project. Lighting is the most important thing...getting the mood without losing your work light. It can be as easy as draping a beautiful fabric over a lamp, so you get enough light from below but a great effect of color from above. Surround the studio with inspiration like keyboards, guitars, any percussion instruments...[which are also] great for last minute ideas."

rock with big glass windows that overlooked the Sea of Cortez. Howard explains, "There was a grass roof and the studio was open to the environment. It was real tropical...birds would fly in. We called that studio 'The Bird House.'"

After leaving Mexico, the sonic duo headed for San Francisco where they took over an old warehouse in the eclectic South Of Market district. "I rented a three-story warehouse with huge skylights, we had the studio in the top floor, had an elevator, and the second floor was all apartments where the guests would stay. We did a couple of records there — some with Emmy Lou Harris for *Wrecking Ball* and worked on Dan's next solo record. Then after about a year and a half there, I was getting a lot of complaints because I had residential people on one side."

Next stop was Oxnard, CA, where they moved into an old 1940s cinema that became known as Teatro Studios. It was within these walls that Lanois and Howard were able to do some of their best work, including Willie Nelson's album of the same name and Bob Dylan's *Time Out of Mind*. "We ripped out all the seats and put a big platform in the middle and that became the studio right there, Howard states. "We had a stage, a movie screen, and a full blown quadraphonic sound system."

DOWN HOME DEN

The next stop on this opulent project studio tour brings us to the current venture located in the Silver Lake area of Los Angeles. After fifteen years of being globetrotting troubadours, Lanois and Howard decided to set up their own

recording environments separately. Lanois decided on an Italian Villa in Silver Lake where he set up a studio in the basement. Howard discovered Paramour Estates, which he turned into Real Music Studios. The history of Paramour adds an extra sense of romance to the project. Howard explains, "The house was originally owned by a silent screen star, and, when he married this actress, her parents, who were big oil tycoons, built this place as a wedding present for them. The architect that designed this place also designed the Pentagon. The main ballroom room was designed for making music. In the library is where the old pipe organ was, and in the '20s they had opera singers come in and give their guests private recitals."

No opera stars have graced this room since Howard took it over in April, but he certainly has had his fair share of greats cross its inconspicuous threshold. Recent sessions include Eddie

Vedder, whom he produced, and Hootie and the Blowfish 5.1 mixes by Howard with producer Don Gehman, as well as Leonard Cohen's son Adam and a band called Deadmen, which Howard produced and engineered.

As he settles into Real Music Studios at Paramour Estates, which is also available to the public, he says he is continually discovering its many assets as a recording environment. "This place is the best of all of them," he admits. "It has everything that they all had, but it's on a much higher level. Here you have the freedom to walk around the gardens and also to be in the city and have the convenience to be at the record company in five minutes or any restaurant you want to go to."

Equally great is Howard's gear. Westlake monitors are the listening medium of choice at Real Music/Paramour, which also houses a Studer A80, an Otari RADAR, and a Steinberg Nuendo system. Howard made the choice to install the Rupert Neve-designed Amek Media 5.1 surround console, and has been thrilled with his choice. "I've been using Amek consoles for the last 20 years. I really like the way the preamps sound, and they have really great equalizers," he says.

Howard emphasizes, however, that regardless of the equipment and even the picturesque locale of any studio, the most important thing you can remember as a studio designer (or studio interior designer, as he likes to refer to himself), engineer, producer, or artist is that the vibe of the place is often what makes or breaks a successful recording session.

TRY THIS AT HOME

"This is no different than recording in your own house," confides Howard. "It's the same kind of idea. I create a performance room, but I also have isolation. I've got the guitar amps in the library and the bass amp in another room. I do the drums acoustically in the main room. Everybody wears headphones or I can record with the speakers on. There is very little leakage into the microphones."

So how did Howard turn this mansion into a great sounding studio? "This is kind of my circus that I roll around with, all my carpets, couches, and stuff like that," he says pointing to his interior treatments. "When I first came in, I

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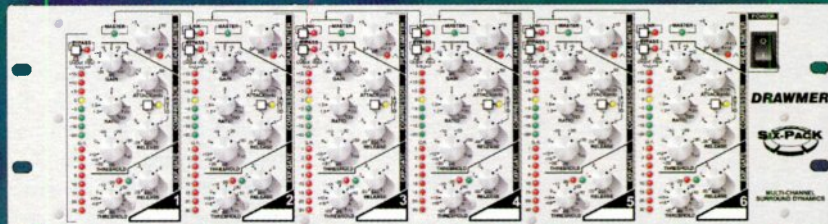
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BEHIND THE BOARD

As much as he enjoys being a “studio interior designer,” Mark Howard says he digs being behind a recording desk producing even more. “As a producer/engineer, I have a vision for music and I want to get it out there and express it the way I feel it,” admits Howard. “I’m kind of a visionary in this new world.”

After Howard gave *EQ* a tour of Real Music Studios, we settled into the ballroom/control room to discuss his long and winding road of hits in the project studios he designed.

HOWARD'S FIRST

“I went from setting up ‘Studio On The Move’ to assisting Dan’s [Lanois] engineer Malcolm Burns for the Neville Brothers, to actually becoming the engineer. At first I was nervous being thrown in the hot seat, but I was like a sponge soaking it all up. I got my education through working with Dan then. So much of the recording was done on the fly where he’d be playing and he would nod at me and I’d punch him in. It was that kind of scene.”

WILLIE'S TEATRO

“Willie [Nelson] was only supposed to come to Teatro Studios to record two songs with Dan and me. Dan put together a band for him with two drummers. I put the two kick drums side by side and they shared a floor tom...and an ashtray because they both smoked. I recorded the first song, it sounded great, and I’d print the mix and move onto the next song. We did twelve songs in one day and then another thirteen the next. At the end of the night, I made a CD of all the songs and we listened on Willie’s bus. He was dancing around. He was amazed by it — so that was the record. I never put the tape up again. I never mixed — that was it. I just printed direct to DAT. It was one of those great moments in time that I captured.”

U2 AND HOWARD

“It was a two-year process. Bono came to Teatro with Edge to work on songs for the film, *Million Dollar Hotel*. When I was recording vocals with Bono on the single ‘Ground Beneath Her Feet,’ I had my back to him. The vocal sounded really big and full, and I thought — wow. I turned around and he was holding the microphone down by his chest; his projection was incredible. We used a handheld [Shure] Beta58.

“When I recorded Edge, we were working in headphones. I asked Edge to try it without the headphones. I pumped it through the rear speakers in the theater so it was constant level. He played the part, and he just opened up because he was getting the sound pressure...it was incredible. You really don’t worry about leakage because you’re more interested in the performance, and that usually outweighs leakage or any technical problems anytime.”

thought the room might be too crazy, but then I did a test and the sounds were as good as you can get just by miking the drum kit with two mics. Doing vocals in here is like magic."

One of the main issues of any studio commercial or home is electrical grounding. Howard shares his home-made problem-solving technique. "In a couple of locations I had grounding problems, and I solved it using an isolated ground. I take copper rods and stick them in the ground ten feet apart and I join four of them together and I use that as my ground." He continues, "The main thing is to start with good, clean, solid power. One of the techniques I use when I'm looking at a new place is I go in with a little Peavey Solo amp with a Lawrence pickup. I'll check the magnetic field of the room, and some rooms are bad. That's when you just go *agh!* You'll plug the pickup into a self-powered amp and run it along the floor and find hot spots where there's power under the floor. It's my own testing kit that I take to find which room is good and where is the best spot for the guitar amplifiers. This is one of my homemade tools."

Recording in a room as large and majestic as the ballroom that serves as the cornerstone of Real Music Studios offers artists more than just the creature comforts of the estate. The massive space alone provides projects with the freedom to experiment with the "built-in acoustics" of the house and, Howard says, the room affords the opportunity to have "happy accidents" that result in creative records. He explains, "A lot of times it's happy accidents that happen, like say you record a mic that's not supposed to be there or something happens, and it's just one of those things where you'll end up with a sound that's a main part of the mix that's exciting. Working like this you can discover new things all the time, and discovery is one of the exciting things of recording. It keeps it fresh all the time. Without discovery, you're working in a normal studio all the time. You fall into the same techniques and you might not discover those interesting things. Making records should be about new sounds and interesting ideas and those things that bring something to the music that you might not get somewhere else." ■

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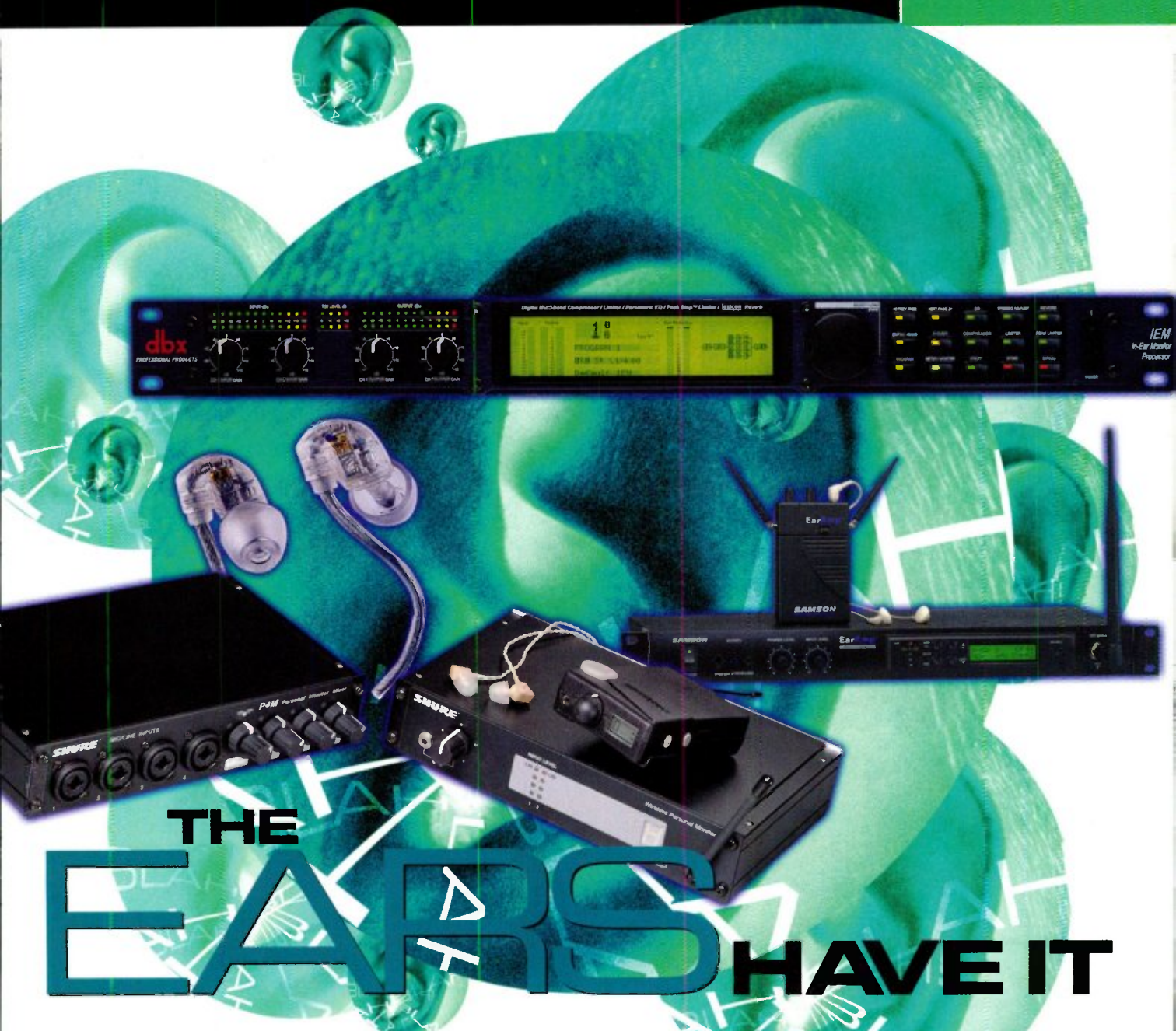
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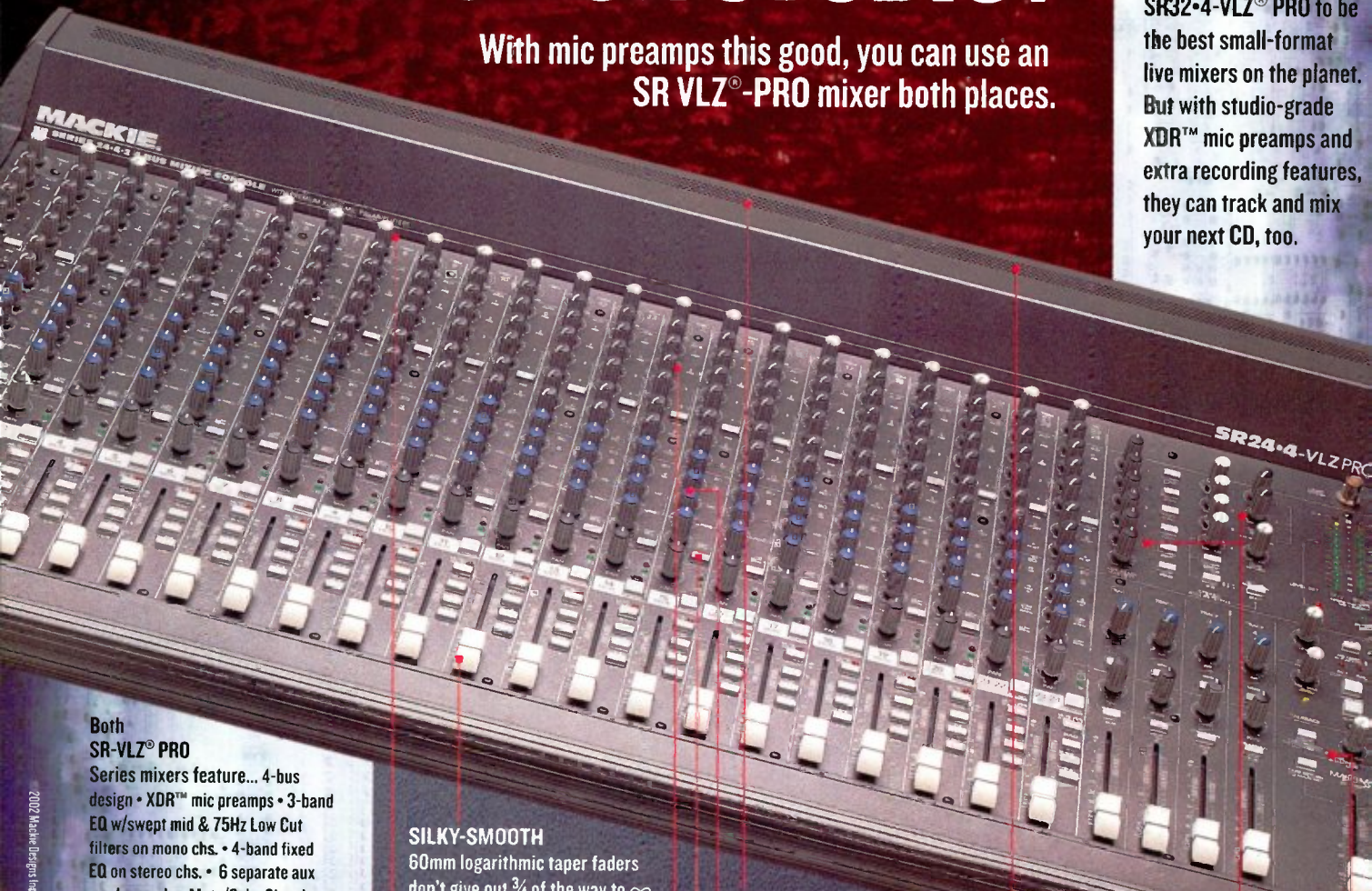
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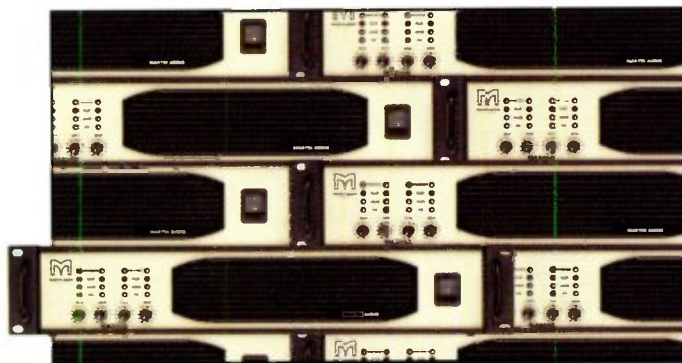
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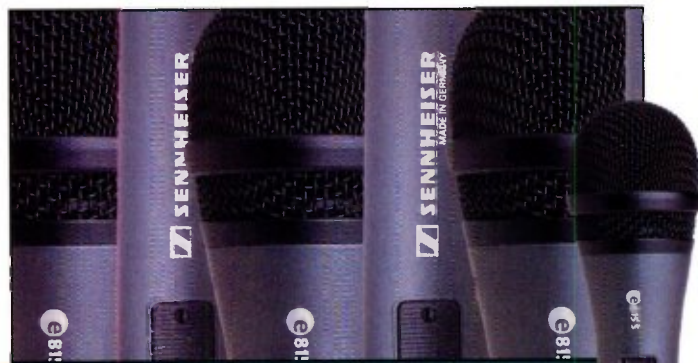


MARTIN AUDIO MA SERIES

THE BASICS: Power amplifiers

THE DETAILS: Martin Audio has increased their range of MA-series power amplifiers with the addition of three new models. The MA200Q provides four channels with 200 watts into four ohms, while the MA900Q provides two channels with 450 watts each into four ohms, and the MA1400 offers two channels with 700 watts into four ohms. The new amplifiers use conventional power supplies with toroidal transformers and proprietary copper cooling to provide excellent sonic performance in a 2-U package.

CONTACT: Martin Audio at www.martin-audio.com



SENNHEISER E815-SP

THE BASICS: Microphone bundle

THE DETAILS: Sennheiser is now bundling a stand clip and carrying pouch with their e815-S in a new package that will be dubbed the e815-SP. The general-purpose e 815-SP boasts a frequency response of 80 Hz to 15 kHz in a lightweight, 11.6 oz package. Its cardioid polar pattern rejects sounds that originate at the rear of the microphone.

CONTACT: Sennheiser at www.sennheiserusa.com



TANNOY T8

THE BASICS: Compact speaker/stage monitor

THE DETAILS: Tannoy's new T8 speaker is intended for high-quality music and speech sound reinforcement as well as mini-stage monitor applications. It uses a high-power eight-inch dual-concentric drive unit that features the company's unique point-source technology, which ensures a consistent and wide conical coverage pattern. The T8 features a multi-ply hardwood cabinet, recessed carrying handle, and integral stand mount. Flying and bracket mounts are also supplied on the rear of the cabinet.

CONTACT: Tannoy at www.tannoy.com



EARTHWORKS FLEX SERIES

THE BASICS: Cardioid microphones

THE DETAILS: The Flex Series from Earthworks comprises three new microphones intended for applications as diverse as hanging choir mics, podium mounting, and drum miking. The series is designed with minimum handling noise and unobtrusive size. The FM720 is an extra-long model for desktop use or hanging, the FM500 is the right length for most podium applications, and the FM360 excels where a low profile is need for tight miking situations.

CONTACT: Earthworks at www.earthwks.com

JAY PHEBUS

A royal rack setup for King's X

NAME: Jay Phebus

RANK: Tour manager/front-of-house engineer

CURRENT ASSIGNMENT: King's X (fall 2001)

PRIOR ASSIGNMENTS: Eric Gales (spring, summer, fall 2001)

TRANSPORT: Custom-built, 20-space floating shock rack and 14-space road rack

HARDWARE: Custom-built Power 8L light module, ART 2408 mixer, DXR Elite delay [2], Multiverb Alpha SE, HD-31 EQ [3], HD-15 EQ, MDM-8L, MDC2001 [2], ProGate [2]; Yamaha SPX900, REV500

CABLING: Assorted looms by Carver Pro Cable

COMMENTS: "The ART DXR Elite is a really nice delay unit because it is a true stereo processor," explains Jay. "One of the DXR Elites is dedicated for (King's X guitarist) Ty Tabor's and (drummer) Jerry Gaskill's background vocals. I have the DXR Elite set for 42 milliseconds of delay, and I return it hard left and hard right into the ART 2408 mixer along with my other effects. The other DXR Elite is used only for (lead vocalist/bassist) Doug Pinnick's vocal. I have varying programs for Doug in this unit, which I use for different songs. I have short delay settings for a doubling effect, plus longer settings for a slapback delay and a one-second-plus delay, which provides a cool, eerie soft reply to Doug's vocal lines."

"Each of the vocals is patched through one of the ART HD-31 (31-band, 1/3-octave graphic) EQs, where I can sculpt the tone much more precisely than with the

console EQ. If there's some harshness that's being produced only by a vocal in the PA, I can meticulously smooth it out using the HD-31 — improving vocal intelligibility, while maintaining maximum dynamics for the instrumentation in the mix. Of course, everyone's voice has differing dominant frequencies and characteristics. I try to shape each vocal in a way that sounds natural and doesn't fight the instrumentation in the mix. Also, the sound of Doug's voice can be different depending upon the song, so I actually make EQ adjustments for each sound according to how aggressively or softly he sings the song. Doug and Ty each have an MDM-8L patched on their vocal mics for limiting. On Jerry's vocal, I use an MDC2001 and take advantage of the de-esser and the expander. When it comes to EQ'ing vocals, drummers are the most difficult. Depending upon the aggressiveness of their drumming (and lack of aggressiveness on vocals), it can be an almost impossible task. With Jerry, I try to EQ out the overbearing snare and cymbal frequencies while trying to maintain some kind of vocal distinction. I plan on experimenting extensively with sidechaining the EQ through the MDC2001 on the next leg of the tour, in my never-ending quest to improve the sound of live vocals!

"Jerry's kick drum is processed using the HD-15 EQ (two-channel, 15-band graphic) and the MDC2001 dynamics processor. The snare is processed using the other channel of the HD-15 EQ. For the kick insert, the send is patched into the EQ first and then the output of the EQ is patched into the MDC2001. The output of the MDC2001 comes back to the insert return. Some people prefer to patch dynamics before EQ, but I prefer to 'sculpt' and then limit. In addition to functioning as a gate, the MDC2001 has a de-esser, an expander, and an exciter. The exciter section can come in handy because sometimes gating the kick drum can cut off some of the attack. The exciter section of the MDC2001 helps restore that aspect of the kick sound."



Jay Phebus is a freelance tour manager and sound engineer, and is available for international touring. He can be reached online at Jaypphebus@yahoo.com.

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SHURE AUXPANDER MIXER AUXILIARY BUS EXPANDER

BY STEVE LA CERRA

The AuxPander from Shure is an audio router/mixer used to expand the aux send capabilities of any mixing console. The AuxPander patches into a mixing console through its insert points, providing additional signal routing possibilities without diminishing any features of the console.

The front panel of the AuxPander features eight channels, each with rotary pan and level knobs for four stereo output busses, which appear on rear-panel balanced, 1/4-inch TRS jacks. The rear panel also provides jacks for linking the AuxPander to your console simply by patching a TRS cable from any insert on the console to an In/Out jack on the AuxPander. You can "AuxPand" any channel, group, or mix bus that has an insert. Each In/Out jack has a

two-position switch labeled Tip Assign that toggles the tip of the In/Out jack between output and input — so you can use any off-the-shelf TRS cable without worrying about whether the mixing console's inserts are tip=send or tip=return. Very clever.

Directly above each In/Out jack is a 1/4-inch TRS insert that replaces the insert you lost when you patched the AuxPander into your console. The configuration of this jack automatically matches the Tip Assign switch, so once you've set the Tip Assign switches to work correctly with your console, the AuxPander's insert configuration becomes transparent. This is a very important feature in cases where the AuxPander is added to a system with a patchbay, because the patchbay will function the same as it did before the AuxPander was in use.

Each insert jack has an Insert Assign switch that provides three routing options. When set to Global, the insert is assigned to the signal within the AuxPander and the signal returning to the console. If you set the switch to Local, the signal inside the AuxPander is processed, but the signal returning to the console isn't. If you set the switch to Remote, then the signal returning to the console is processed, but the signal inside the AuxPander isn't processed. Got all that?

► continued on page 118

SHURE AUXPANDER

REVIEW

MANUFACTURER: Shure Incorporated, 222 Hartrey Avenue, Evanston, IL 60202. Tel: 847-866-2200. Web: www.shure.com.

SUMMARY: Auxiliary expander device for use with any mixing console. Use it for in-ear and wedge monitor mixes, aux send expansion, zone mixing, or for studio headphone cue mixes.

STRENGTHS: Near-infinite routing possibilities. Tip Assign switch facilitates. Use with any console.

WEAKNESSES: No master bus level controls.

PRICE: \$990

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THE EARS HAVE IT

GET YOUR MONITOR SYSTEM OFF THE FLOOR AND INTO YOUR EARS WHERE IT BELONGS **by Steve LaCerra**

As with any recent technology, prices of in-ear or “personal” monitor systems have fallen, quality has improved, and the number of manufacturers has risen. As a result, regional and local acts can enjoy the benefits of these monitors as much as national acts with big budgets. A band and their sound engineer can experience significant changes in stage life after switching to in-ear monitors, many of which are for the better. Here’s what to expect.

We’ve all experienced the problems associated with traditional wedge monitoring: inability of performers to hear themselves clearly, feedback, inconsistent monitor performance from room to room, and a general wash of noise coming off the stage, mucking up the front-of-house mix. There’s also the issue of ear fatigue and the well-known danger of hearing damage due to high onstage SPLs.

Sound on any stage can roughly be categorized as either signal or noise. Under traditional circumstances, the two are difficult to keep separated due to lack of isolation between the band members’ instruments and their monitors. A sound that is “signal” for one performer could be considered as “noise” by another performer in the same band (all right, no wisecracks here!). But if you can allow a performer to hear only the sounds they desire (the signal),

they won’t have to battle the noise. Short of (ahem) turning off the lead guitar player’s amplifier, the best way to achieve that kind of isolation is by using personal monitors.

A properly designed earpiece isolates a performer’s ear canal from outside noise. I’m not talking about an “earbud” style headphone-thingy you pay five bucks for at a K-Mart. First and foremost, the earpiece must prevent outside noise from entering the ear canal, ensuring the performer a high “signal-to-noise” ratio from the get-go. Obviously, custom-molded earpieces are going to be the most effective, but there are earpieces from Etymotic Research (the ER4S), and FutureSonic’s (Ears) that are available off-the-shelf, will fit just about any ear, and will seal off the outside world to a high degree.

Earpieces that don’t seal off the ear are an invitation to trouble. Take, for example, someone listening to a Walkman on a train or airplane using open-air headphones. The volume level has to be cranked up high enough to overcome the ambient level of the vehicle before the music can be clearly heard, resulting in an SPL at the ear that’s often unsafe. Subjectively, the listener might not think that the headphones are that loud because they’re just overcoming the ambient noise — but the SPL from the ‘phones might be harmful anyway.

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Mix, April 2001

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HomeRecording, June 2001

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mixes (along with their onstage instrument amps) and use earpieces instead — greatly increasing the onstage signal-to-noise ratio. At the very least, you want each band member using *either* a wedge or earpieces. A performer who uses one of each is really defeating the whole point of in-ear monitors in the first place because their wedge is still contributing to the onstage din. The golden rule here is: The higher the isolation from the PA and backline, the lower (and safer) the performer's monitor level can be set.

WHAT YOU NEED

The practical application of personal monitors doesn't have to be a complicated, expensive affair. One of the local bands I work with (Driving Blind) uses a very basic setup with a Mackie CR1604 for their monitor mixes. Aux 1 from the Mackie feeds a Symetrix compressor/limiter, the output of which goes to a Samson headphone amp situated next to the drummer. He plugs a pair of Etymotic ER4's directly into one of the front-panel outputs of the headphone

If noise from the vehicle is blocked from the ear, a much lower sound level is required for music to be heard clearly by the listener. The result is safer SPLs and reduced ear fatigue. Proper fit is also crucial to good bass response. Much like an acoustic suspension

loudspeaker, low-frequency reproduction will be at its best when the earpiece fits snugly in the performer's ear.

Contributing to the "signal-to-noise" ratio will be the presence or absence of wedges on the stage. In an ideal world, the band would lose all of their wedge



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amp, giving him control over the volume of the ear mix during the show. Due to the fact that he's not mobile, there's no need for a wireless ear system; so the whole cost is about the same as a decent pair of wedges, and the clarity is way higher than with a pair of regular monitors. Wireless ear mix systems can be connected using a similar patch, but instead of the headphone amp, output from the limiter is connected to the input of the wireless transmitter.

One of the more innovative approaches to in-ear mixing has been developed by Shure in their PSM systems. In addition to providing stereo or mono ear mixes, PSM systems feature MixMode operation. MixMode turns the performer's wireless receiver pack into a two-channel mixer. The idea is that you send a discrete signal to each channel of the transmitter (such as a band mix to one channel of the transmitter and the performer's own voice or instrument to the other channel of the transmitter). The two signals are broadcast to the receiver, which has a balance control, allowing the performer to adjust the mix between the two signals. The combined mix is sent to both the left and the right earpieces. Other possibilities for the use of MixMode would be lead instruments on one channel and the rhythm section on the other, or the band mix on one channel and room ambience on the other (more about ambience in a minute).

OVER THE LEGAL LIMIT?

An important component of any ear mix system is the limiter. The one thing that absolutely must not happen with an ear mix is for an uncontrolled, loud noise to reach the performer. This could result in hearing damage, and will certainly result in the performer being extremely pissed off at you. A peak limiter with "brick wall" characteristics can act as a safety net to catch a loud peak or spike coming down the line. To set the threshold, you can patch a CD player into the system while wearing a set of earpieces. Slowly turn up the level of the CD player in the cans, until it's loud enough (see note below). Set the threshold of the limiter so that the "limit" light barely blinks at this level. *Keep in mind that a peak limiter doesn't stop a performer from cranking up the volume control on his/her beltpack.*

Note: Unfortunately you can't use an off-the-shelf SPL meter to measure levels inside the ear canal. The only way to truly determine this is by getting a qualified audiologist to attend a rehearsal and let him or her measure the SPL inside the ear under "battle conditions." A miniature microphone can be placed inside the ear while an earpiece is in use, providing an accurate measurement of SPL inside the ear. Once the SPL is determined, the audiologist can make recommendations as to the length of exposure at the SPL

deemed "loud enough" by a performer. (In case you're thinking of trying to do this measurement yourself, a Shure SM57 won't fit inside most ears. I've tried).

WHERE'D EVERYBODY GO?

The most common reaction performers have when switching to in-ear monitors (aside from realizing how poor their pitch was) is that they can't hear the audience — a critical factor for any band who cares about the way their fans react to a show. Fortunately, the problem is easily

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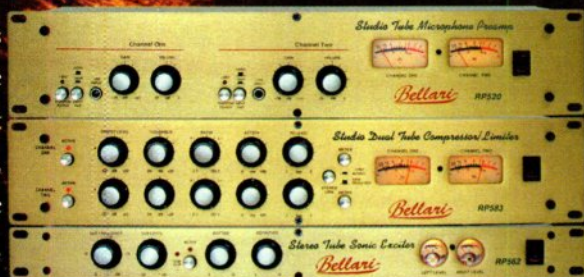
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THE EARS HAVE IT



remedied through use of one or two room mics fed into the ear mixes. As a starting point, try placing microphones at the downstage-left and downstage-right edges, focused toward the center of the audience. It's probably best to start with directional mics so that the house PA system isn't picked up too strongly in these mics, but try to avoid mics with a very narrow pickup pattern. You want to capture a blend of fan noise (not the fan in the amp rack!), and not favor a single person or just a few people. You can also achieve good results from a stereo XY pair situated at the downstage edge, dead center. In

addition to capturing audience reaction, this will also give the ear mix a sense of space and open up the closed-in feeling that an in-ear system can sometimes engender.

SHEIK YERBOUTI

Drummers, in particular, may notice that, when using personal monitors, they're quite literally not getting the kick in the ass they experienced when using drum fill boxes — especially since drum fills tend to be much larger than wedges. Alas, even the best earpieces aren't going to shake your pant leg like a double-18 sub box — but there's

hope! A number of manufacturers produce "bass shakers" or "butt thumpers." Often used in home theater applications, a "butt thumper" is a mechanical transducer that creates vibrations based on low-frequency audio fed to its input. Such a device can be bolted directly to a drummer's seat, putting the kick back where it's supposed to be without spilling bass all over the stage.

Of course, switching to in-ear monitor mixes also provides a huge bonus to the front-of-house engineer, who will no longer have to fight bleed from the stage reaching the audience. If you're skeptical about just how much the monitors contribute beyond the front of the stage, soundcheck the band with the entire monitor and front of house cranked up, and, while they are playing, turn off the entire monitor system. You might be shocked.

The editors of EQ magazine strongly recommend that anyone considering use of personal monitors consult with a qualified audiologist. ■

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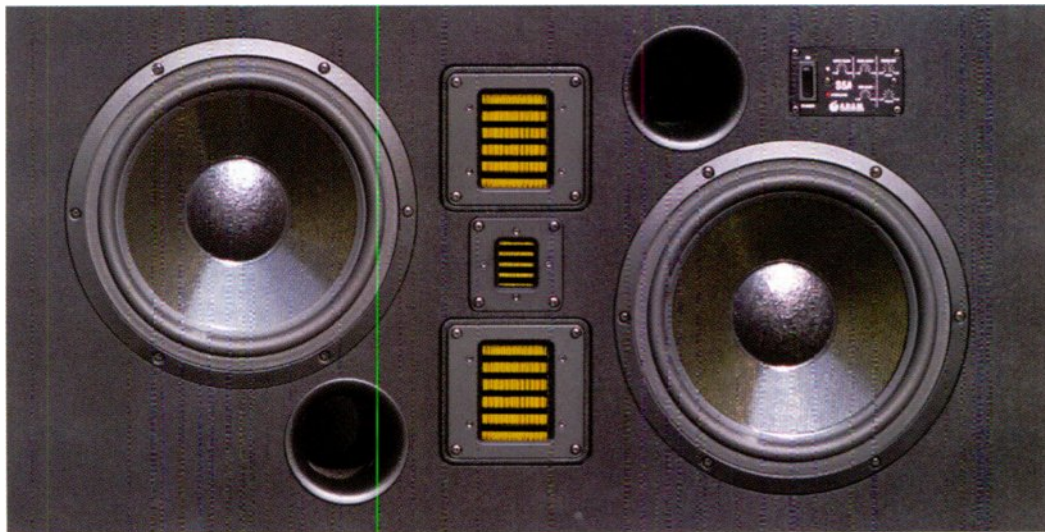


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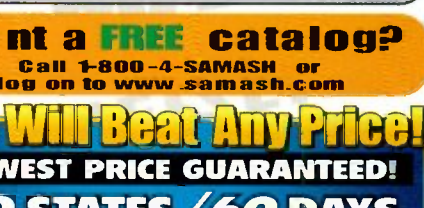
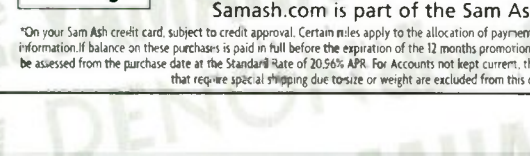
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A.D.A.M. Professional Audio S3A Powered Monitor System

Will these speakers turn your studio into the Garden of Eden?

A.D.A.M. (Advanced Dynamic Audio Monitors) Professional Audio of Berlin, Germany has been quietly manufacturing high-quality monitoring systems for a few years. But, until recently, it's been impossible to get them without crossing the Atlantic. U.S.-based distributor McCave International is now importing and offering the line to studio owners on this side of the pond.

The powered S3A's on test here fall roughly into the middle of the line, which also includes passive models, as well as a couple of powered subwoofers. All of the A.D.A.M.'s offer uniquely shaped cabinets, generally squared off, but with angled front-panel corners. The low-frequency cones have an interesting honeycomb appearance, and their dustcaps are "crinkly" (technical term) as opposed to smooth.

But there's more to the A.D.A.M.'s than meets the eye. Although the S3A's appear to be a familiar dual-woofer two-way design, with two identical-sized low-frequency drivers, these monitors are actually a sort of three-way design. One driver functions as a subwoofer (operating below 150 Hz) and the other as a low to low-mid driver (operating from 32 to 1,800 Hz). Each driver is individually powered by a 100-watt amplifier. The combination of the two woofers overlapping on the lowest frequency range with a deep cabinet and dual ports allows the S3A's to provide a surprising amount of low



▶ A.D.A.M. PROFESSIONAL AUDIO S3A

MANUFACTURER: A.D.A.M., dist. by McCave International Inc., 924 Colina Ct., Lafayette, CA 94549. Tel: 800-218-6305. Web: www.mccave.com.

SUMMARY: Mid-sized powered three-way monitors provide outstanding performance. The S3A's offer a unique tonality, very different from other monitors, but one that you'll find yourself respecting. No way to audition these babies: You gotta buy 'em to try 'em. You'll have to go direct to the distributor to get a pair, but they do offer a 14-day money-back guarantee.

STRENGTHS: Smooth high-end. Tight, deep bass. Excellent detail and depth. Controls easily accessible on front panel. Plenty of power for medium-sized and smaller control rooms.

WEAKNESSES: Interactive High Gain and Room EQ controls make tonal shaping less than intuitive. No center-detente on tone controls.

PRICE: \$3,990 per pair

end, and to solidly get down into the very low-bottom realm without strain.

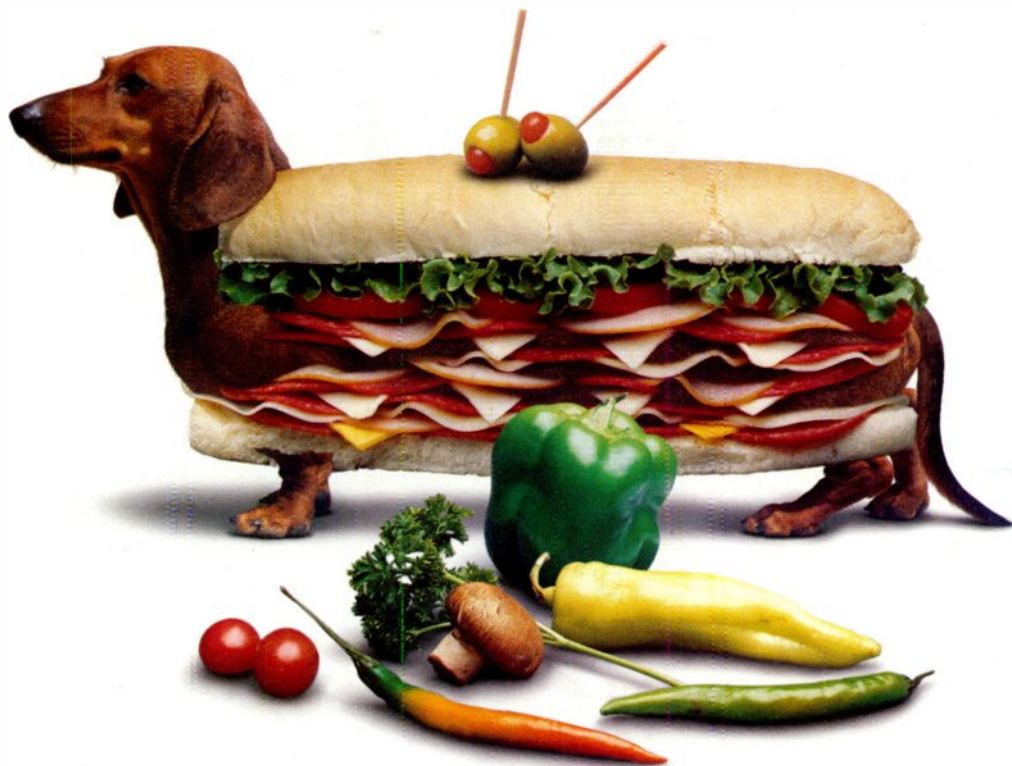
TIE A YELLOW RIBBON

The S3A's (along with all of the other A.D.A.M. speaker models) use Accelerated Ribbon Transducers as high-end drivers. (Larger models also use them as mid drivers.) These differ from traditional ribbon transducers in that they are said to "force air in and out with a squeezing motion" where other drivers (ribbon or otherwise) use a piston approach. A.D.A.M. claims that this results in a better load (impedance) match between the driver and the air, greatly improving driver efficiency and reducing high-frequency breakup. Because of the large, folded design of the diaphragm, the driver is also capable of higher output levels and increased



Extra Toppings

(or how to get real bass management)



(Canine SubWooferus)

The Gourmet Sub

Our new PS350B subwoofer with Real Bass Management uses just the right ingredients to get your juices going. Much more than the flavor of the month, the PS350B adds



unprecedented power, accuracy and functionality to the studio environment.

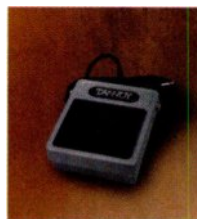
You know how difficult and frustrating it is to reference a two channel mix to a modern surround format. Using the PS350B's Bass Management Bypass cable, you have both full 5.1, or full bandwidth stereo monitoring available at the flick of a switch. Plus, the one-sub/two-sub selection switch allows



two PS350B's to be used together without adversely affecting your system's overall balance. Couple these features with 350Watts of patented ProBASH™ amplification for a truly remarkable product that

is sure to be welcome in your workspace.

We could (and should) go on about the other extra's in our new gourmet offering, but the proof of the pudding is in the eating, and the PS350B is most definitely-Hmmm...Yum.



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A.D.A.M. S3A SPECS

FREQUENCY RESPONSE	32 Hz to 35 kHz \pm 3 dB
DRIVERS	Subwoofer: 7.3-inch Kevlar cone driver; Woofer: 7.3-inch Kevlar cone driver; Tweeter: 3.75-inch Accelerated Ribbon Transducer
POWER AMPS	Subwoofer: 100 watts; Woofer: 100 watts; Tweeter: 100 watts
CROSSOVER	Subwoofer: 150 Hz; Woofer/Tweeter: 1,800 Hz
MAX SPL (1 M)	>112 dB
CONTROLS	Input sensitivity, High Gain, Room EQ >6 kHz, Room EQ <160 Hz
DIMENSIONS	19.69 w x 9.45 h x 12.6 d (inches)
WEIGHT	35.2 lbs. (each)

sensitivity with less dynamic compression. Like the subwoofer and woofer, the high-frequency driver is powered by its own 100-watt amplifier. Whatever the technology behind them, the tweeters are smooth and detailed; a real pleasure to listen to.

CONTROLS

The S3A's On/Standby switch, level and tonal shaping controls, and power indicator and overload LEDs are conveniently located on the cabinet's front panel. No more reaching blindly behind your monitors turning them on or attempting to adjust them. Nice. The rotary level and tone controls are all recessed pots requiring a screwdriver for adjustment — no danger of inadvertently moving a control while turning the speakers on or off.

The Input Gain control is straightforward, offering \pm 10 dB of level setting. The tonal adjustment of the monitors is a bit more complex. There's a High Gain control providing \pm 4 dB of level control over the high-frequency amplifier. In addition, there are two shelving Room EQ controls, one covering frequencies below 150 Hz, the other handling those above 6 kHz. Since the high-frequency amp is crossed over at 1.8 kHz, this means that using the High Gain and 6k Room EQ interactively lets you balance the mids and highs. Doing so isn't especially intuitive. To boost the mids without boosting highs, for example, you turn up the High Gain, while turning down the 6k Room EQ. Fortunately, if you do find yourself needing to adjust the speaker EQ, you'll probably only have to do it once — set it and forget it. Unfortunately, the controls aren't center-detented, so you'll have to get back to "flat" by eyeballing the controls.

In my case, I didn't feel that changing

the controls from flat was necessary. I prefer to learn the sound of the monitors at flat settings and work with what they provide naturally than to attempt to EQ them into submission. But it's nice to have the ability there if you need it, and if you've got a particularly difficult frequency response problem, you'll appreciate it.

THE SOUND

I set the S3A's up in my studio alongside my Genelec 1030A's and carefully calibrated them to within 1 dB of each other level-wise. Comparing three-way A.D.A.M.'s to the much smaller Genelecs is hardly apples to apples, but the 1030A's offer a handy, well-known reference "sound." But even before doing any comparison listening, my first impression of the S3A's was that they sounded great. I was immediately taken with their smooth clarity and depth, and with the high-frequency detail they provided.

I settled in for critical listening, both to familiar CDs and to my own mixes. It quickly became clear that the A.D.A.M.'s sounded radically different from the Genelecs — we're not talking a subtle difference here, folks. EQ contributor Jon Chappell dropped by my studio during the review process, and he described the S3A's versus the Genelecs using visual terms: Jon felt that, relatively, the response of the Genelecs could be described as barrel-shaped, while the A.D.A.M.'s were hourglass-shaped. As always, Jon is right on the mark — this describes the contrast between the two monitors exactly. But it shouldn't be taken to mean that one sounded worse than the other. Both the 1030A's and the S3A's offered great depth and detail, smooth sound, solid lows, and plenty of dynamics. But tonally, each offered very different results.

Both Jon and I loved the A.D.A.M.'s

on acoustic instruments, particularly classical guitar. A recording such as the L.A. Guitar Quartet's *Air & Ground* revealed tremendous detail, eliciting an almost-visual perception of flesh and fingernails on strings. On distorted guitar-laden tracks such as those from Rob Zombie, Sevendust, Tool, and Rage Against The Machine, the S3A's favor high-mids (around 2 or 3k), where the Genelecs seem more focused around 1k. But the S3A's project solid low-end guitar/bass thump with ease.

My favorite cut for auditioning low-end response these days is "I Love You" from Sarah McLachlan's *Surfacing*, which contains a very low synth bass part not easily audible on many systems without a subwoofer. Using only the S3A's, this subbass part was nearly as apparent as it was when I was using a 15-inch subwoofer — truly impressive from a cabinet this size.

Imaging is excellent with the S3A's; it's very easy to place tracks exactly where you want them in the stereo field when mixing. The detail these speakers offer also makes it easy to balance effects such as reverb. I liked the S3A's for tracking and mixing vocals, although I found myself slightly over-EQ'ing high-bass and low-mids into certain male vocal tracks when mixing; I had a similar experience when mixing rhythm guitars and some keyboard parts. As with all monitors, once you learn their "sound," you'll quickly adjust to these minor anomalies.

A.D.A.M. LEAVES THE GARDEN

I'll be truly saddened to have to box up the S3A's and send them back — I've grown extremely fond of them during my time with these monitors. Their unique design provides numerous benefits; in particular, their low-end response is outstanding. I found myself less enamored of their tone controls, but I ended up not using them much, so this was a minor complaint.

If you can afford to pony up the dough, the S3A's are a true delight. McCave will give you a 14-day return period to try them out after you buy them, but you won't need it. In a word, these are amazing speakers. And why trust your audio to anything less than amazing? ■

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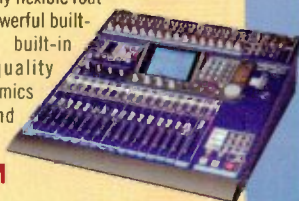
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TASCAM



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MENTION
CODE ME02

BLUE Baby Bottle Cardioid Large-Diaphragm Condenser Microphone

Milk this baby bottle for all it's worth

The latest addition to BLUE (Baltic Latvian Universal Electronics) is the Baby Bottle, a lower-priced sibling to the company's high-end Bottle switchable-capsule mic. The Baby Bottle is a large-diaphragm condenser, utilizing discrete Class A electronics throughout, with transformerless output. Finished in black powdercoat, the mic looks sharp; it comes in a heavy velvet bag inside a very nice wooden case — a bonus at this price point. A swivel mount is included, but unfortunately BLUE's "Baby Shock" shockmount is an optional accessory. For this review, BLUE also supplied one of their Blueberry high-definition mic cables.

As its name implies, the Baby Bottle is substantially smaller than its big brother, coming in at less than nine inches long and two inches wide. With its smaller size and unique shape, the Baby Bottle is easy to position into tighter spaces than many large-diaphragm mics, but it's not so small that you don't feel like your standing in front of a "cool" studio mic when you step up to do a vocal.

I used the Baby Bottle in a number of situations, running it through an Oram MWS as well as the Focusrite preamps in a Digidesign Controll24. In addition, I used the Baby Bottle extensively with the Apogee Trak2, which is reviewed elsewhere in this issue. Comparison mics included a Shure KSM44 and an Audio-Technica AT4050cm5.

I found the Baby Bottle to be an excellent all-around mic. It performs very well on vocals, offering a round sound with plenty of low end. Its proximity effect is strong, as you'd expect from a fixed cardioid capsule. Off-axis rejection is good, with smooth response across the front of the polar pattern.

In fact, "smooth" is a good word to describe the sound of the Baby Bottle.



► BLUE BABY BOTTLE

MANUFACTURER: BLUE Microphones, 766 Lakefield Road, Suite D, Westlake Village, CA 91361. Tel: 805-370-1599. Web: www.bluemic.com.

SUMMARY: For those whose needs are focused around large-diaphragm condenser applications, the Baby Bottle offers a cost-effective, great-sounding solution. As with all BLUE mics I've seen, construction, appearance, and packaging are impeccable. A worthy addition to your mic collection.

STRENGTHS: Nice tonal quality. Quiet. Strong proximity effect. Un-hyped response. More compact than similar priced and spec'd mics.

WEAKNESSES: Does not include shockmount.

PRICE: \$649.99

Its response is un-hyped; especially in the upper-mids and highs. Because of this, I found it ideal for taming harsh electric guitars while preserving a fat, round tone. Because of the nice proximity effect, you can really dig in and capture the thump and punch of a 4x12 cabinet.

But just because the highs are smooth don't infer that there isn't plenty of detail on the top end — there is. However, the smoother highs can make it sound a bit darker in some situations. I didn't find this a problem, in fact, just the opposite; I felt that the Baby Bottle's high-end came across as very natural and well-suited to drop right into a mix.

The Baby Bottle is a worthy addition to BLUE's mic line, and a solid choice for expanding a mic locker. If you've been looking for a large-diaphragm cardioid condenser, this one deserves your attention. Solid, quiet performance, and round, smooth, natural sound quality combined with excellent manufacture add up to a mic that's easily worth its asking price. ■

MANUFACTURER SPECS

CAPSULE TYPE	Edge-terminated single-membrane large-diaphragm
DIAPHRAGM	6-micron mylar, gold/aluminum sputtered
POLAR PATTERN	Fixed cardioid
SENSITIVITY	33.5 mV/Pa
IMPEDANCE	50 ohms
SIGNAL-TO-NOISE RATIO	76 dB (CCIR468-3); 87 dB-A (DIN/IEC651)
SELF NOISE	5.5 dB-A
MAXIMUM SPL	133 dB
DIMENSIONS	8-3/4 x 1-3/4 (inches)

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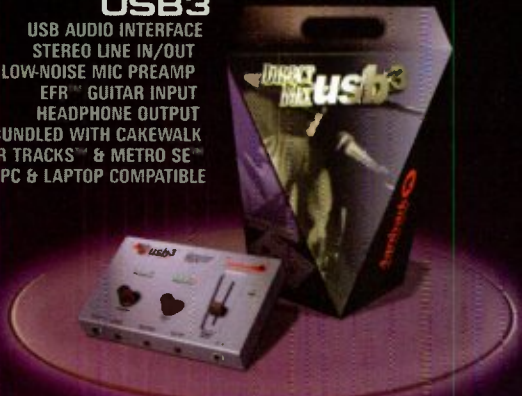
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World Radio History

Peterson VS-1 Virtual Strobe Tuner

Have the “cents” to be perfectly in tune

Getting in tune is the bane of many a musician's existence — and a serious trial to the patience of many an engineer and producer. The first electronic tuner — the Stroboconn (1936) — and its many progeny have made tuning a much easier task, but there's always room for improvement.

Mechanical strobe tuners have long been the Holy Grail of tuning, but the cost and size of such machines was problematic. Now Peterson Electro-Musical Products, long-time champion of strobe tuners, has created the VS-1; a virtual recreation of a mechanical strobe tuner in a compact, handheld, digital package. Instead of spinning backlit mechanical wheels that appear to stop moving when a sound is in tune, the VS-1 has a backlit LCD with moving blocks that come to a stop as the correct pitch is achieved. You can either plug an instrument in via a 1/4-inch jack or use the built-in front-panel microphone for inputting audio. If you prefer to use those primitive devices on the sides of your head, the VS-1 can also output line level tuning tones.

The VS-1 offers numerous cool features in addition to straight-ahead auto and manual tuning. You can calibrate Concert A from 433 to 447 Hz in 0.5 Hz increments, and pitches can be tuned over a range of ± 50 cents in 0.1-cent increments. The VS-1 features nine preprogrammed temperaments: Equal, Pythagorean, Just Major, 1/4 Meantone, Kirnberger, Werkmeister, Young, Kellner, and Peterson's proprietary “Guitar 5ths,”

which is said to sweeten fourths and fifths. For those into such things, it would be nice to have user-programmable slots for storing your own temperaments.

If you're a guitarist who use capos, check this out: The VS-1 has a Fret Transposition System; a special mode that allows you to view capoed “open” strings with their normal open-string note names. So with the capo at the third fret, when you play an “open” note on the first string, the tuner reads out an “E.” A similar mode allows non-concert pitch instruments such as a saxophone to tune using transposed note



PETERSON VS-1

MANUFACTURER: Peterson Electro-Musical Products, 11601 S. Mayfield Ave., Alsip, IL 60803. Tel: 708-388-3311. Web: www.peterson tuners.com.

SUMMARY: Highly accurate portable tuner with numerous convenience features. Especially cool for guitar players, the VS-1 should find a welcome home in every gig bag, studio, and sound design suite.

STRENGTHS: Accurate to ± 0.1 cent. Bass Shift. Fret Transposition System. Nine temperaments. Tone generator. Parameter memory.

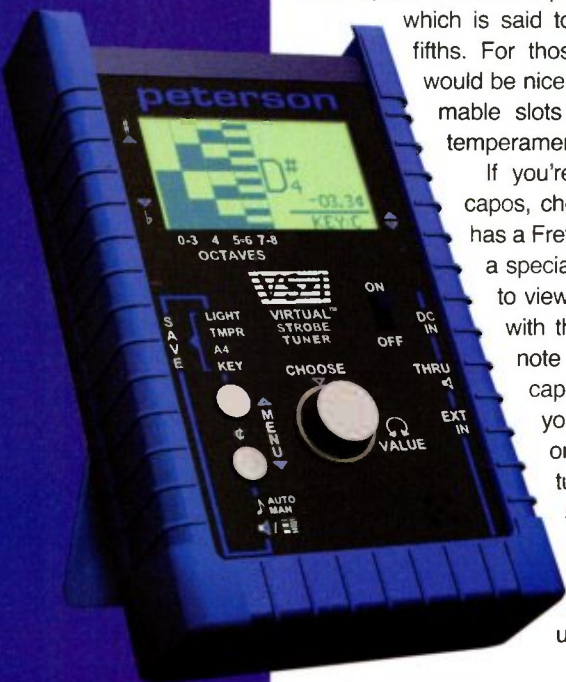
WEAKNESSES: Larger and more expensive than most handheld tuners. No user-programmable temperaments.

PRICE: \$329. Optional suction cup tuning pickup, \$13.95. Clip-on tuning pickup, \$16.95. Carrying case, \$36.

names. Nice. And for bass instruments, there's a Bass Shift that optimizes the VS-1's response to frequencies as low as 10 Hz. Transposition, calibration, and temperament choice can be saved so that when the unit is powered off/on, it returns to the same state it was previously in.

Those features are great, but they'd be useless if the VS-1 didn't excel as a tuner — and it does. It's easy to use, and it's amazingly accurate. Peterson recommends the “Over Easy” test: Tune a guitar while holding it in regular playing position. Now lay the guitar on its back and check the tuning. With other manufacturers' tuners, the guitar still appears in tune. With the VS-1, the strings will show slightly sharp due to the effect of gravity on the instrument. I tried the test, and got exactly those results — impressive. In fact, Peterson claims the VS-1 is accurate to ± 0.1 cent compared to ± 2 cents with other tuners. I found the improved accuracy to be a real benefit when intonating guitars and basses.

If you're after the most accurate tuning at the lowest price and in the smallest package, the VS-1 is a prime contender. The VS-1 will solve your tuning woes. ■



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Apogee Trak2 Mic Preamp and A/D/A Converter

Get your digital conversions on the right track

With digital recording, it's all about the quality of your analog-to-digital conversion — if you don't start out with a great digital representation of your analog signals, there's no way you can make them cleaner or add resolution to them. For this reason, many of us are looking to improve on the "front ends" of our studios — specifically their analog-to-digital converters. Apogee has been a leader in the field of converter technology since back when the first ones and zeros started cascading down cables. Among their latest products is the Trak2, a two-channel analog-to-digital converter paired with two microphone preamps and supplied with numerous extras and capabilities, as well as several options for expanding the system. All of this adds up to an extremely flexible and deep system front end; let's take a closer look.

The Trak2 supports sample rates up to 96 kHz with resolutions up to 24 bits. Three forms of signal processing are included in the unit. Two are analog: Soft Limit, which allows for maximizing input levels without clipping the A/D converters, and Soft Saturate, which processes input signals to simulate the effects of analog tape compression. The third type of processing is Apogee's proprietary UV22HR, a high-resolution version of Apogee's bit-reduction processing.

THE GRAND TOUR

The front panel of the single-rackspace Trak2 is loaded with controls and displays. Starting from the left is a power switch. Next to this are four cursor buttons that are used for navigating around the Trak2's menu display and for selecting parameters to edit. The LCD screen follows. As you'd expect, it's on the small side, and a lot of data gets crammed on there at times. A data wheel is next, then two rows of LEDs that indicate the status of channel clip, phantom power, polarity reverse, inserts, and aux inputs (more on the inserts and auxes later). Below these LEDs are two Quick Keys, which can be used to jump straight to a user-assignable parameter/page in the LCD screen.



▶ APOGEE TRAK2

MANUFACTURER: Apogee Electronics, 3145 Donald Douglas Loop South, Santa Monica, CA 90405. Tel: 310-915-1000. Web: www.apogeedigital.com.

SUMMARY: If your gear quest includes a front end for your DAW or digital recorder, the Apogee Trak2 can cover you in spades. You'll drop serious coin on it, but isn't your audio worth it?

STRENGTHS: Extremely flexible routing. Great sounding mic preamps. Stellar A/D/A conversion. Headphone output. Optional 2- or 8-channel D/A. Two balanced sends. Two balanced line ins that also function as returns. Two AMBus slots. Soft Limit. Soft Saturate. UV22HR. Flexible metering. Flexible clocking. MIDI control. 24/96 operation.

WEAKNESSES: Must enter menus to get at pre-amp and headphone level control. Unless you use it as "set-it-and-forget-it," be prepared to do a lot of button pushing, although "Quick Keys" help. Slight cooling fan noise may be a problem in hypercritical situations.

PRICE: \$3,995. Trak2/2DA, \$499. Trak2/8DA, \$1,195. Digi8+ AMBus, \$595. AES8 AMBus, \$795. ADAT8 AMBus, \$495. TDIF8 AMBus, \$495.

Stereo LED meters follow; these can be set up to display various combinations of peak, average, and peak hold metering. You can select the number of consecutive clipped samples required to light the Over indicator. As a cool extra, pressing and holding the Clear Peak Hold buttons below the meters causes them to function as phase meters; the bottom meter displays the relative phase between the channels, the top meter shows the summed level of the two channels.

Next up is the 1/4-inch headphone jack. Unfortunately, there's no front-panel volume



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LATE-BREAKING NEWS — FIRE ON THE HORIZON

By the time you read this, Apogee will have announced new FireWire AMBus cards for both the Trak2 and the AD8000 eight-channel converter at the Winter NAMM show in Anaheim, CA. The new cards will support ASIO drivers, so any compatible native digital audio program will be able to directly access the Trak2 or AD8000. This is especially great news for those who are looking for portable rigs: A FireWire-capable laptop and a Trak2 or AD8000 are all that you'll need for a world-class, highly portable rig.

control provided. You'll have to dive into the Trak2's menus to find the parameter to set the 'phone's level. This isn't bad for set-it-and-forget-it situations, but it's tough to quickly pull down the 'phone's level if you get a burst of feedback or noise.

On the far right of the front panel are two Neutrik combi XLR/TRS 1/4-inch Aux Input connectors. These can operate at mic, -10 dBv line level, or guitar/bass instrument level. Note that, in order to activate the front-panel XLR connectors, you'll have to go into the menus and switch them on, which deactivates the back-panel mic-level inputs. The 1/4-inch jacks are always active.

AROUND BACK

The Trak2's back panel is loaded with connectors and expansion slots; every bit of space is used. On the left are two mic-level XLR inputs, which feed into the onboard preamps. Next to these are two XLR line-level send jacks, which can be used either as the send part of an analog channel insert or as direct outputs from the mic preamps.

Alongside the sends are two XLR line-level inputs, which can serve as the return points for analog channel inserts or as direct line inputs to the internal A/D converter, bypassing the mic pre-amp stage. Three option slots follow (see below). Next to these is an XLR output connector that can carry either AES/EBU or S/PDIF format signals (for S/PDIF, you'll need an XLR-to-RCA adapter cable). Word clock in/out follow, on BNC connectors. Below these is a COM port, which can be used (with a breakout cable) to provide MIDI in/out/thru and a serial connection for remote control over the Trak2 and for loading software updates. A standard IEC AC-power connector rounds out the back panel's features.

OPTIONS, OPTIONS, OPTIONS

The Trak2 can be expanded with several options. There's a D/A (digital-to-analog) Converter Option slot on the back panel that can be fitted with either a two- or eight-channel converter card. (Note that the AD8000 DAC2 and DAC8 won't work in this slot; these are proprietary Trak2 expansion cards.)

Also on the back panel are two AMBus (Apogee Multimedia Bus) slots, which can accept a variety of digital interface cards, such as the ADAT8 (eight-channel ADAT optical), TDIF8 (eight-channel TDIF), AES8 (eight-channel AES/EBU), and so on. For Digidesign Pro Tools users, there's the Digi8+ card, which allows you to connect the Trak2 directly to a Pro Tools system as if it were a Digidesign audio interface.

There's also an optional Video Sync card available, which allows the Trak2 to sync its internal clock to external video sync signals. The review Trak2 was supplied with Trak2/8DA, ADAT8, and Digi8+ cards installed. These worked without a hitch.

WHAT THE HECK CAN IT DO?

With all those connections and options, the Trak2 can do a lot. In fact, it's flexible enough to serve as a comprehensive front end to just about any system — as long as you only need two inputs. Given the right set of option cards, it can serve as a stand-alone, remote-controllable stereo mic preamp (with or without balanced line-level analog insert points), as a stereo mic preamp (with or without inserts) feeding A/D converters outputting virtually any digital format, as a line-level A/D converter, as a two- or eight-channel D/A converter, as an eight-channel digital format converter, as a two-channel mastering



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processing with Soft Limit and UV22HR, as a stand-alone interface for Pro Tools, and probably 10 or 20 more applications I haven't thought of.

In addition, the Trak2 is loaded with little niceties, from a built-in oscillator for calibration, to a Mic Protect system that automatically

turns off phantom power when a mic is unplugged; the list of features is extremely long. But this brings us to one of the Trak2's few weaknesses: You're going to be pressing those little cursor buttons a *lot*, and the LCD screen, while informative, isn't exactly spacious. If you're using the Trak2

for only a few applications, and they tend to be the same things over and over, you may not mind. But if you're pushing the unit and taking advantage of all it can do, be prepared. On the plus side, you can save/load Trak2 system settings. However, I've rarely found preset mic preamp settings to be of much use.

THE SOUND

While this is the most important feature of the Trak2, it's the one that there's the least to say about — this thing simply sounds *great*. The mic preamps are pristine, detailed, round, and dynamic, or, if you want, you can grunge them up with Soft Saturate. (You could debate whether it truly emulates analog tape or not, but, regardless, it does a nice job of adding grit and tape compression-like effects to the signal.) Soft Limit works transparently with reasonable signal levels, and does a good job of staying out of the way even when signals get out of hand.

Likewise, the converters simply sound awesome — premium Apogee quality. Having these converters (both A/D and D/A) in my rig, as well as the Trak2's clock to use as a master sync source, definitely cleaned up my audio.

THE LAST WORD

If you're looking for a top-quality front end for your system, the Trak2 delivers. As an interface for Pro Tools it excels — just plug it in and go. And when I used it via ADAT optical with a MOTU 828 FireWire interface with my PowerBook, I was equally pleased with the results. Plus, the whole rig fit in a laptop case and a two-space rack — a nice bonus. The mic preamps are more than an add-on or throw-away extra; they're an integral part of the unit, and are definitely on par with high-end stand-alone models. It's not the easiest box to use, and you may end up with button "pushitis," but, if you're like me, you'll find the user interface weakness an easy trade-off for such a compact, powerful, flexible, and sonically stellar unit. ■



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Marantz PMD690 Portable PC Card Recorder

Field recording
in a flash

The PMD690 from Marantz takes portable audio to the next logical step, offering a sturdy black box that records in stereo to PCM-CIA-compatible Flash media. While the PMD690 does what it does well, it's not for everybody; no doubt some will still prefer a portable DAT.

Marantz calls the PMD690 a "field acquisition tool," and has designed the unit accordingly. Assuming 99% of field recording involves microphones, the PMD690 has only two inputs — mic/line switchable XLR jacks with phantom power. I did several spoken word and SFX sessions using condenser and dynamic mics, and all sounded good. There's also an internal mic that's adequate for capturing notes and interviews.

Record levels can be set manually, manually with a limiter, or using an auto function that works quite well. You can pad the mics by 15 or 30 dB, and there's an Ambient Noise Cancel switch with band-pass or low-cut filters at 150 Hz.

Of course, the coolest part of the PMD690 is what it records to — Flash cards (Type II and CompactFlash) and IBM MicroDrives that are small enough to stick in your wallet. While this media isn't cheap — prices are around \$1-\$1.50 per megabyte for Flash memory while a 1-GB Microdrive lists at \$380 — it's extremely convenient to take a card out of the PMD690 and pop it into your laptop's PCM-CIA slot or an USB Flash memory reader connected to your desktop. I tried it with both an IBM ThinkPad and an Apple PowerBook, and the card immediately read as an external hard drive. You can buy cards in sizes up to 1.2 GB.

The PMD690 records at 48 kHz and can be set to make WAV, MPEG-2, or BWF (Broadcast Wave



MARANTZ PMD690

MANUFACTURER: Marantz Professional, 2640 White Oak Circle, Ste. A, Aurora, IL 60504. Tel: 630-820-4800. Web: www.marantzpro.com.

SUMMARY: Portable stereo recorder that writes to Flash media.

STRENGTHS: Nice form factor. Records WAV, MP2, or BWF. Easy, fast drag-and-drop file transfer to computer. Time/date stamp.

WEAKNESSES: Flash cards still relatively expensive.

PRICE: \$1,499. PMD680 mono version, \$1,249.

Format) files at a variety of bitrates. Audio is monitored via RCA stereo outs, a coax S/PDIF digital out, the internal speaker, or headphones.

How much can a card hold? That depends on the file type and bitrate, but the PMD690's manual says 67 MB are required for an hour of mono 128 kbps MP2 recording. To record a PCM-quality (16-bit) mono WAV, file you'd need 400 MB per hour.

The PMD690 is easy to use once you get past a bit of option anxiety. Recording is simple, and there's a two-second "pre-record" buffer to capture that once-in-a-lifetime quote if you're late on the trigger. A top-panel switch selects among high-quality stereo, long-play stereo, or mono modes, each with their own preset bitrate.

The Silent Skip function starts and stops recording based on a user-adjustable threshold, and Auto Mark will add what Marantz terms EDL markers. (The PMD690 currently won't do an EDL export; Marantz is working on adding this capability.) EDLs can also be added manually, and each marker's status can be changed to skip or to create an A/B repeat. The unit can run on the included AC adapter or for 1.5–2 hours on batteries (there's an optional rechargeable Ni-Cad).

At \$1,499, the PMD690 isn't cheap, nor is the media it uses, but, if you need good field recording and quick drag-and-drop file transfer to computers, it's worth considering. ■



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HHB BurnIt CDR-830 Stand-Alone CD Recorder

We don't
need no
stinkin' DATs

To be honest, it's hard to imagine why someone would buy a DAT recorder when the HHB BurnIt series and similar units are available. The recently introduced CDR-830 may be light in the analog I/O department, but otherwise brings a very capable standalone CD recorder to studios at a price that's hard to argue with.

The CDR-830's back panel is as straightforward as they come, offering coaxial and optical digital I/O and 24-bit analog I/O on RCA connections. If you need balanced XLR analog and AES/EBU digital connections, you'll want to look at the CDR-850 for \$995. That said, the CDR-830 sports some bells and whistles that unit doesn't have, such as CD-text, control over digital input volume (which can come in mighty handy), and a L/R balance parameter.

In use, the CDR-830 is as easy as any other two-track recorder. Simply pop in a CD-R or CD-RW, select the input (analog, optical, coaxial), press Record and set the level if need be, and start 'er up. I recorded discs using media from HHB, Imation, Maxell, Fujifilm, and even Office Depot, and all worked like a charm. The CD-Rs played in several stereos, including my car, and the CD-RWs read fine in computers (and played back on the CDR-830, of course).

If you're not the manual-recording type, the CDR-830 offers three auto-record modes: Sync-1 (records one track and stops), Sync-All (records all tracks from the source and stops), and Sync-Final (records all tracks from the source then finalizes the disc). When set to Sync, the CDR-830 starts after the audio passes a user-adjustable threshold for analog, or once it sees the proper subcode info via the digital ins.

Unfortunately, all digital signals aren't created equal, and the CDR-830 gets finicky when trying to auto-record from some digital sources or read DAT start IDs. In addition, the Sync-All and Sync-Final modes tended to read certain silences as the end of the source

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MANUFACTURER: HHB Communications, 1410 Centinela Ave., Los Angeles, CA 90025. Tel: 310-319-1111. Web: www.hhb.com.

SUMMARY: Real-time CD recorder in a 2U rack.

STRENGTHS: Supports CD-R/RWs. Coax and optical digital I/O. Adjustable digital input. CD text labeling. Full-featured remote.

WEAKNESSES: No balanced analog I/O. Auto record modes are fussy.

PRICE: \$569

material without restarting (as the manual says they should) when a subsequent track began. I had the most success using Manual record and letting the threshold-based auto track numbering — which works extremely well — do its thing.

A Monitor button is kindly provided for listening to the source or setting levels when not in Record, and the built-in sample rate converter parlays signals from 32–48 kHz into CD-ready 44.1 kHz. I recorded a disc from a 24-bit/48 kHz Pro Tools session via S/PDIF coax, and everything worked fine.

Among many other conveniences, you can record fade ins/outs from 1–12 seconds with the press of a button on the remote. The CDR-830 also lets you easily enter CD-text for disc, artist, and track info; in addition to the fact that a growing number of CD players support CD-text, this can be a valuable tool for cataloging discs and alternate takes.

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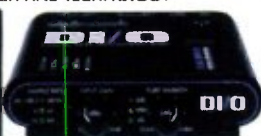


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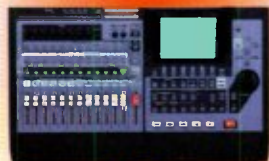
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traditional analog console, with most of the functions having the same names that you're familiar with. Along with the usual features is a Phase button, which, while standard on hardware consoles, is usually left off DAW mixers. Bravo, Merging, for adding it here, since it's an essential element used a lot more than some manufacturers think. Also available

outs, thereby negating the need for a small external console (usually an integral, but what should be unneeded, part of DAW situations). For the life of me, I can't figure out why other manufacturers refuse to incorporate this feature, but Merging got it right. As a result of having the monitor fader section, it's also possible to include other logical monitor fea-

on each channel strip is a Pre-Fader Level switch that, when engaged, displays the level before the fader.

One of the best features is that the mixer has a separate level control (called "Monitor") for the control room monitor

tures in that section such as In-Place Solo and Dim. Global controls to remove all active solos and reset the peak/hold meters are also welcome.

One interesting thing is how Pyramix works with solos. There's a monitor solo that sends the result just to the monitor mix, but each time you add an effect or mixer section, it also contains its own solo. It's nice to have a solo at each point in the signal path, since it's often difficult to track down the source of a problem in most DAWs. Once again, Pyramix mirrors its hardware predecessors.

An excellent dither and noise shaping section, along with a function generator (why isn't this on every DAW?) and high-resolution metering, round out the mixer section.

DSP

Pyramix offers quite a lot in terms of signal processing. There's a four-band fully parametric EQ, 10-band graphic EQ, and three-band tone control available. The interesting part here is that there's not only a huge amount of control (± 40

Make Music Now!

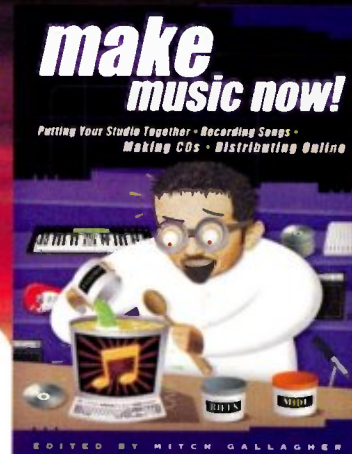
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Edited by Mitch Gallagher, Editor in Chief of EQ

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dB) in the parametric EQ, but also something called Automatic Gain Compensation. Automatic Gain Compensation is a feature that automatically adjusts the master output gain of the parametric EQ in order to maintain a constant acoustic power output level as the gain of each individual band is adjusted. The effect is most noticeable when boosting or cutting bass frequencies, since this is where the greatest acoustic power is available.

Also included is a digital delay

processor that can be configured for delay, echo, and comb filter derivatives such as phasing and flanging. The dynamics processor includes a noise gate, a downward expander, two compressors, a limiter, and a de-esser with an EQ on the sidechain.

CD-R MASTERING

Pyramix has a full CD mastering section that not only allows CD-R recording (which conforms to the Red Book CD-audio standard), but full PQ editing and

even DDP (Disc Description Protocol) tape masters. DDP is the preferred master format of many replicators, record companies, and mastering houses because of the inherently low error rate of the format.

The functions of the digital mixer and the system's real-time digital effects processing with the CD-R creation process are also integrated. This means that the system's mix automation functions, EQ, dynamics, delay, and other digital audio effects, as well as multitrack editing features can be seamlessly integrated with the CD-R writing feature. Pyramix supports both Disc-at-Once mode, as well as Track-at-Once mode for most CD-R devices.

OTHER FEATURES

While all the features of Pyramix are too numerous to mention in this article, there's a couple more worth referring to. If you're doing post work, Pyramix's Autoconform enables you to read a CMX-compatible EDL from a file and automatically digitize all the edits in the EDL from one or several media sources (e.g., DAT or video tapes). Also, a nice varispeed function allows you to vary the speed of audio playback within a range of $\pm 12.5\%$.

SYSTEM REQUIREMENTS

As with most DAWs, the more muscle your computer has, the better it will work. Even though Merging states that Pyramix will work on a Pentium 266 MHz, at least a 500 MHz or faster PIII is recommended for high track count projects. Also needed is a half-length PCI slot for the Mykerinos card and 128 MB RAM. In these days of relatively inexpensive processor power and RAM, neither of these should be a problem.

CONCLUSIONS

Pyramix is about as full-featured as a workstation gets and, as a result, is aimed at the professional power user. On the surface, it's easy to drive but gets increasingly difficult as you dive underneath the hood, which is the same as any sophisticated application. But Pyramix does have all the major DAW functions well in hand, as well as a lot of the little things that will make us hardware-centric guys happy. ■

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World Radio History

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EQUIPMENT NOTES: "The four-channel Helios mic pre/EQ is my favorite piece. It came from the Ronnie Lane Mobile truck used to record two Led Zeppelin albums, two Bad Company albums at Headley Grange Castle, and *The Who Live at Leeds*. I use it mostly on guitars and toms. The Pultec mixer is the only 'real' mixer in the studio, and it's mono! I mainly use it to sum multi-mic guitar signals and kick drum mics. Most overdubs go to Pro Tools via the Fatso then the Hedd. I mix exclusively in Pro Tools without patching out to an analog console. For EQ inside the computer, the Sony Oxford R3-EQ TDM plug-in with the GML 8200 option is amazing, and has really taken my Pro Tools mixing to another level."

PRODUCTION NOTES: "I started my publishing company, Library Music, to develop unsigned acts. By using a DAW, I don't have to make a big investment in analog tape — just my

time. During a spec project, it's a breeze swapping over to commercial work (a man's gotta eat!) and back to spec again, as the absolute and total recall of the DAW allows me to pick up right where I left off. The 16-fader ProControl makes artists feel more involved and not shut out of the production because they can take part, grab the faders, mute, pan, press 'Play,' etc., and show me what they have in mind."

JORDAN RUDESS

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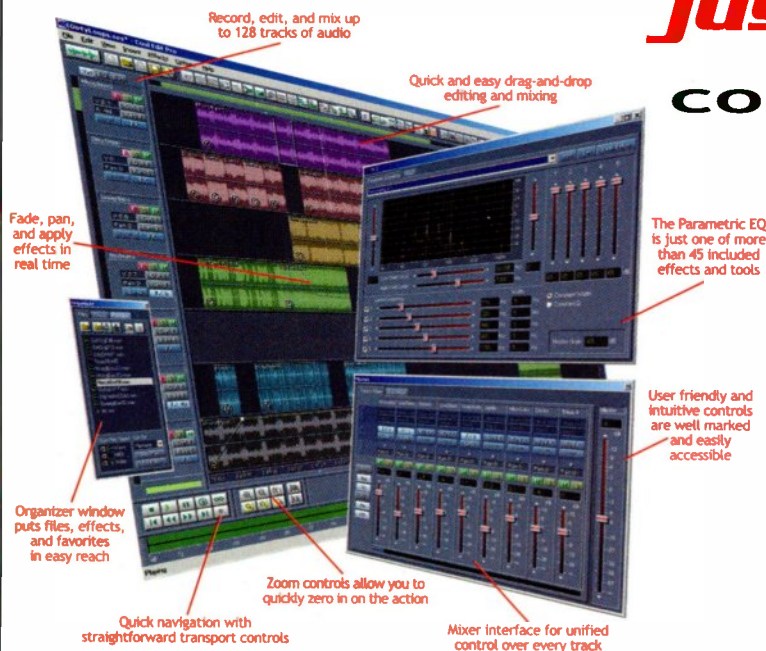
Dream Theater CD.

"Physical logistics play an important role in my studio. Equipment needs to be placed in a position that makes it easily accessible. I put a lot of time into figuring exactly which QuikLok hardware would make my studio work. I have come to appreciate not only cool, cutting-edge instruments, but also the equipment that supports all this technology and keeps it where I can get my hands on it."

PRODUCTION NOTES: "My world these days is very computer-based. I have been a MOTU Performer user since the beginning of time, and I always record my keyboards into that software. For the latest Dream Theater album, we used my Titanium Mac with the MOTU 828 Firewire interface and MidiTimepiece AV to move audio from 48-track analog tape into my Digital Performer world. This system worked like a charm. It's incredible that relatively tiny components can do the important job of moving audio between formats and record it with such ease. Once captured, I would escape into my own headspace and continue my keyboard orchestrations. Of course, backups must be made constantly, and it gets to be quite complex equipment-wise. The Kurzweil's are backed up to my Jaz Drives via SCSI. Then the files are transferred into the computer and moved to CD via my SCSI drives and burner. There are many drives in my studio, but all are there for a reason!"

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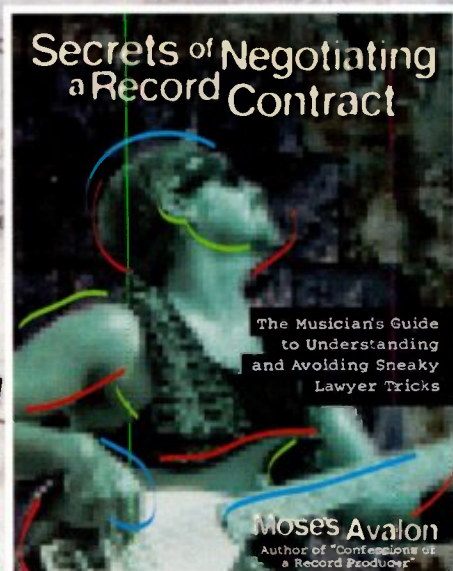
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Though CD-R tracks are set in stone (or plastic) once recorded, you have several options for erasing CD-RW tracks or the entire disc. When you're ready to permanently "fix" a CD-R and make it playable on other stereos, you use the Finalize function, which takes two minutes or so except when using the Sync-Finalize mode, where for no apparent reason it takes about four minutes.

With all of the great recording features, it's easy to forget the CDR-830 also gives you a high-end CD player that supports CD-text, track playlists and shuffle, skip IDs, and even index marks. Since most of our work ends up on CD anyway, the CDR-830 removes a step from the normal DAT-to-computer-and-burn or bounce-to-disk-and-burn cycle. It doesn't replace a good software/burner combo for making a final master, but it definitely makes life easier for mixes, session backups, and quick one-offs. Well worth a couple of rack spaces in any studio. ■

KENNY GREENBERG

▶ continued from page 30

you to edit the parts just like MIDI data. You can change the tempo without affecting pitch or even replace, say, the snare drum sound from the groove with one of the RS7000's onboard sounds." **PRODUCTION NOTES:** "Since my computer setup isn't mobile, I use the AW4416 as a satellite to my studio — it's like having a portable 02R with a built-in hard disk recorder. If I'm tracking at a different studio I'll record a sequence from Cubase to the AW4416 and dump it to the studio's recorder. Then the band can play their parts against the sequence or loops. Or I might record a mix from a Pro Tools session onto the AW4416, take it back to my studio for overdubs, and then dump it back to the master for mixing. I also lock the RS7000 or Cubase to the AW4416 via MTC, dump audio to the '4416, and then proceed with overdubs on it. It's a fast way to do overdubs, yet I can still change the submix in Cubase and re-record it because everything is locked together." ■

MASTERING

▶ continued from page 48

use parametric EQ for the insert effect slot. Multiband limiting (DY3) might also be appropriate as an insert effect if the dynamics vary too much.

Next, for the Final Effect, insert dynamics processing to produce a smooth, hot-sounding master...then burn your CD.

Be aware, though, that mastering is a subtle process. A few dB of EQ or dynamics control is usually all you need. Higher amounts will unbalance the overall sound — if you boost the bass a lot, for example, then the treble will sound thin by comparison. This is why mastering is considered such an art: it's all about subtle changes that add up to a major improvement in the sound.

There's no guarantee that using mastering tools is going to produce a great master recording, any more than buying a guitar is going to make you a great guitarist. In either case, practice makes perfect. But in the case of all-in-one studios, it's at least nice to know that the tools are there for you to use. ■

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SHURE AUXPANDER

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My first use of the AuxPander was simply adding stereo sends to a small-format console. I patched all the vocal channels from the console to the AuxPander, and then fed three of the AuxPander's stereo outs to three stereo effect units — certainly enough vocal processing to get anyone in trouble! (The whole patch took about five minutes.) It's important to note that, in this application, I had to tweak the AuxPander sends each time I moved a vocal fader on the main console, due to the fact that the insert on the console was pre-fader. So if I made a vocal channel louder, the level to the AuxPander was unchanged, and the effect remained constant (throwing it out of balance with the dry vocal). If the insert on the console is post-fader, this won't be an issue.

The real strength of the AuxPander becomes apparent when using it in monitorland, particularly for in-ear mixes. I inserted the

AuxPander's first two channels on the stereo mix bus of a monitor console (for a band mix), and then inserted the rest of the AuxPander channels on vocals. This gave me three stereo ear mixes independent of the wedge mixes. Compressors were patched on the AuxPander vocal channels. On one vocal — where the vocalist likes a ton of compression — the Insert Assign was set to Local, allowing me to squash her vocal in the ear mix, but "set-and-forget" her level to a wedge mix without worry of feedback when the compressor let go.

The AuxPander provides stereo Direct Inputs to each stereo output bus; the Direct Inputs bypass the mix bus and are fed unity-gain to the associated stereo output (in other words, Direct Input Stereo A is fed directly to Stereo A Out, etc.). These inputs came in handy for getting reverb into the lead singer's ear mix. I patched Stereo D output to a TC Electronic M•One, and then returned the M•One to the AuxPander's Direct Inputs for Stereo A Out. Adding

reverb to the mix was simply a matter of turning up the Stereo D send on the lead singer's AuxPander channel. The lack of master output level controls for the stereo mix busses was a bit inconvenient, but, in light of the fact that my "mix" used only two or three channels, it wasn't a complicated effort to individually bump up levels of the band and the vocal. This type of routing can easily be adapted for multiple headphone mixes during tracking sessions.

Shure's AuxPander is an extremely versatile device, and a problem-solver in the truest sense. Additional applications for the AuxPander's include zone mixing in restaurants or even use as a straight mixer. The manual clearly explains applications for the AuxPander, and includes plenty of hook-up diagrams. Since it can be rack-mounted, it's a great tool for a regional touring act to carry with their ear monitor setup. Build quality is solid, the audio path is clean with plenty of headroom, and the AuxPander's capabilities and applications are close to limitless. ■

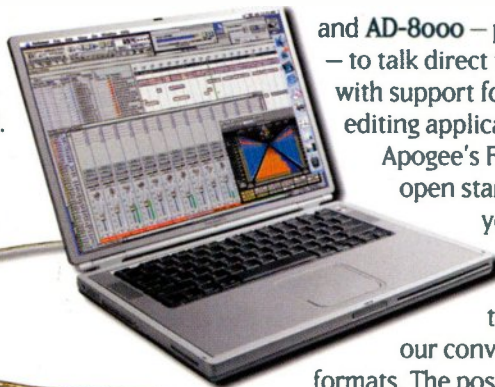
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ROGER NICHOLS

▶ continued from page 130

ed as WAV, AIFF, SDII, or Broadcast WAV?

52. Should the SMPTE timecode be 30 drop, 30 non-drop, 29.97 drop, or 29.97 non-drop?

53. Which device should be the word clock master?

54. Should everything be synced to video blackburst?

55. If recording at a higher sample rate and bit depth, should I charge more for the session?

56. When I mix, should I bounce to disc, print the mix to Masterlink, DAT, CD recorder, or 1/2-inch analog tape? (Sorry, I didn't mean to use the "a" word.)

57. Should I use Apogee or Monster digital cables, or can I just use mic cables for digital audio?

58. There's a 96 kHz DAT and there's a 24-bit DAT, but why isn't there a 96 kHz/24-bit DAT?

59. If I burn CDs, should I use silver, gold, green, blue, or black CD-Rs?

60. Should I use 74-minute CD-Rs or 80-minute CD-Rs?

61. Should I backup the project to AIT, DLT, Jaz, DAT, Exabyte, FireWire hard disks, CD-ROM, CD-RW, DVD-RAM, DVD-RW, or DVD-R?

62. When mixing, should I use reverb plug-ins or hardware reverbs using inserts?

63. Should I take the extra time to label all the audio regions "KICK," "SNARE," "HI-HAT," etc. or just leave them "AUDIO1," "AUDIO2," "AUDIO3"...?

64. A couple of tracks were recorded at low levels because the keyboard player turned down and I didn't notice. Should I normalize the track so the producer doesn't notice?

65. What about sample rate conversion when I mix? Should I use a plug-in sample rate converter or external hardware?

66. Should I master the songs myself or send them to a mastering house?

67. After mastering, the producer wants me to make MP3s to send around to the record companies. Should he send CDs, or are MP3s good enough? Will the A&R guy know the difference?

68. Should I do dithering to 16-bit or should I send the 24-bit file to mastering and let him do it?

69. Should I use limiters during the final mix to get the song as loud as possible, or should I let the mastering guy do it?

70. Are three-band compressor plug-ins good enough, or do I need five-band compressors for my mix to sound professional?

71. What is the difference between mastering at Gateway or Bernie Grundman's and just sending the project to House of CDs in Chula Vista?

72. If this is an independent project where should the CDs be pressed?

73. If the project is on a major record label, should I make them do the stampers at Denon instead of their own plating plant, or should I just go kill myself?

74. Should I do surround mixes now while everything is set up, or wait 'til later?

Oops, it doesn't look like I'll have time to answer any of these questions right now because I am busy trying to get my friend Richard Hoagland on the phone to schedule a seat on the first manned Mars mission. I decided to take the easy way out.... ■

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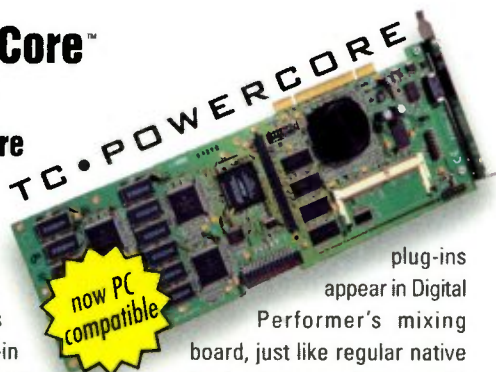
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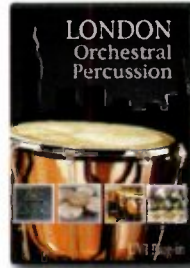


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Cm Labs MotorMix™ Hands-on automated mixing for Digital Performer

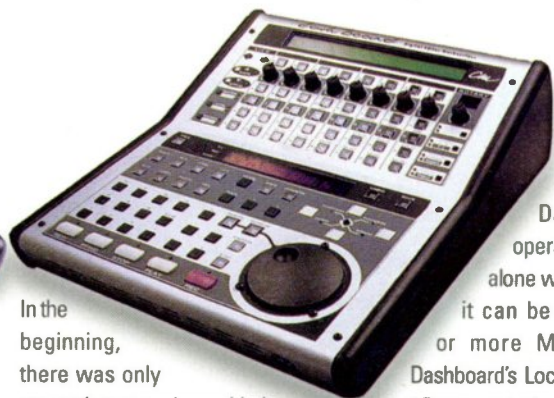
With its new, custom software written specially for Digital Performer, MotorMix becomes a seamless, tactile extension of your MOTU software recording environment. Put your hands on eight 100mm motorized faders and rotary encoders to tweak your mixes in record time. Gain instant easy access to all MIDI and audio tracks with control banks. You'll never even think about mixing with a mouse again. Imagine having tactile control over most of Digital Performer's features with MotorMix's



intuitive layout and easy operation. MotorMix gives you all the advantages of a professional mixing board, at an incredibly affordable price. Bring motorized mixing to your MOTU desktop today. For more info, visit cmlabs.net or contact your Sweetwater sales engineer today to enter the future of mixing.

Cm Labs DashBoard™ Editing worksurface for Digital Performer

In the beginning, there was only magnetic tape and razor blades, but editors could still make over 200 edits per hour! DashBoard restores speed and finesse to editing with DP3 and eliminates fatigue caused by point-and-click editing. DashBoard will bring you the same level of control to Digital Performer as the very



popular Motor Mix. DashBoard can operate as a stand-alone worksurface, or it can be fitted to one or more Motor Mixes. DashBoard's Locator, Navigator and Zoom control sections get you quickly to where you want to edit, and the Clipboard section makes your actual edits. You can arm and record tracks remotely with DashBoard just like machine control. The mixer section provides access to Digital Performer's mixer and plug-ins.

order yours today

Sweetwater
music technology direct.

- Dual-processor G4/MP800**
Capable of 128 tracks with 8-band EQ and dynamics on every track
- MOTU DP3 audio workstation software**
Now with full surround production up to 10.2
- MOTU 1296 12-channel 96kHz audio interface**
Or any MOTU PCI interface like the 2408mkII or 1224



WAVES Gold Native™ Version 3.2

Optimized performance and complete automation



Check out the new Restoration Bundle download the demo at www.waves.com



Waves Native Gold gives you the complete line of legendary "must-have" Waves processing, including C4 MultiBand and Renaissance Reverb. Version 3.2 introduces cutting edge performance optimizations and complete MAS automation. What does this mean for you? Apply more Waves processing to your mixes than

ever before possible. Automate your Waves plug-ins with pristine, sample-accurate precision and 32-bit floating point processing. You get everything you need to track, sweeten, sound design and master. Get Native Gold now and join the top industry pros who rely on Waves to make their mixes Gold everyday.

GLYPH M Project™

High-performance FireWire hard drive storage

M Project is the new FireWire hard drive for your MOTU hard disk recording system from Glyph Technologies. M Project adds up to 75 GB of audio storage to your MOTU rig in seconds, backed by Glyph's legendary service and support. M Project is the only MOTU-approved FireWire drive for the 828 and all MOTU PCI-324-based

systems, including the 2408mkII, 1296, 1224 or 24i. M Project easily shares the FireWire bus with the 828, and even allows you to connect multiple 828s to your computer. And M Project is the ideal alternative to SCSI drives because it frees up a PCI slot. So call Sweetwater today and ask about M Project, the ultimate storage solution for MOTU hard disk recording.



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Smart Code Pro™

Surround Encoder Plug-ins For DP3



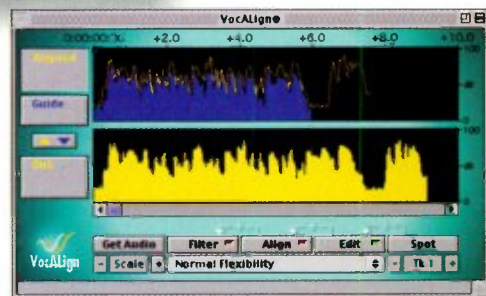
SmartCode Pro is the first and only surround encoder plug-in for Digital Performer. It allows you to deliver fully encoded surround mixes to your clients. Burn CDs or DVDs that you can preview using any consumer DVD player that supports Dolby Digital™ or DTS™ — a crucial final step in producing professional quality surround mixes. By encoding with Smart Code Pro directly within DP3, you avoid having to invest in expensive dedicated hardware encoders (that cost thousands), which saves you both time and money.

SmartCode Pro is available in two versions to accommodate the two most widely used surround formats: Dolby Digital and DTS. Both versions allow you to preview your 5.1 surround mixes in real time 5.1, then encode and decode the mix to create a 6-channel surround master. Smart Code Pro is a must-have for serious surround production with DP3.



SYNCHROARTS VocAlign™ Project

Unique automated audio alignment software



Still spending hours re-recording dialog or vocals? There is another way! Because of its unique ability to align two signals, VocAlign can be used creatively to take guide or even live tracks and create performances with perfectly aligned overdubs. VocAlign also gives the producer the ability to choose the rhythm and pace for a specific vocal, or even lay down the required tempo pattern for the artist. VocAlign gives you

perfectly aligned double-tracked vocals, tight backing vocals, easy re-grooving of recorded vocals for remixing and shorter overdub sessions. For post-production, VocAlign is designed to take a line of replacement dialog and precisely align it with the dialog recorded with picture. And VocAlign Project™ integrates seamlessly with Digital Performer 3. At only \$299 list, can you afford to be without it?

800-222-4700

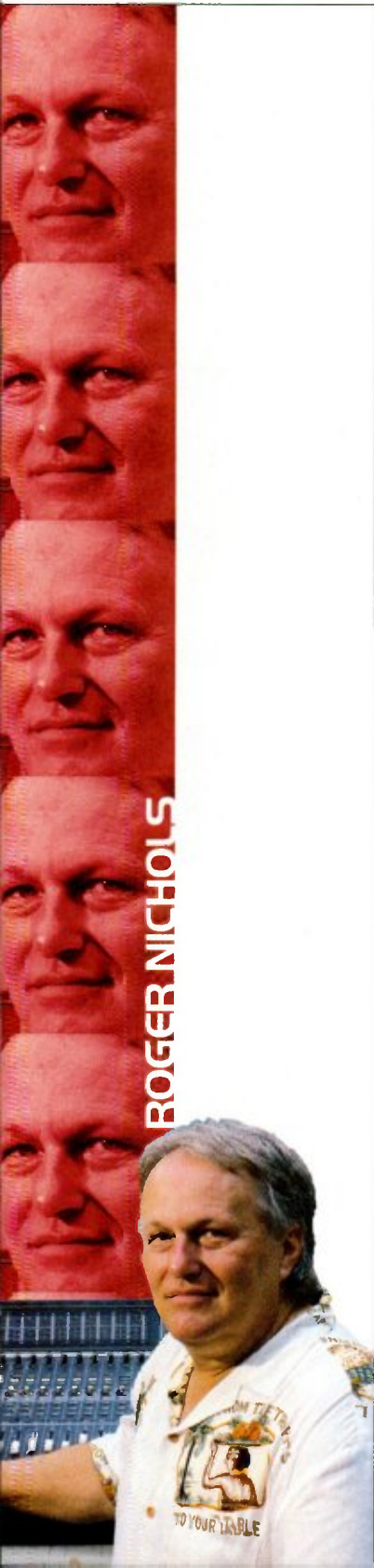
Got Questions?

As you have probably figured out by now, there are as many variables in recording as there are in a manned space flight to Mars. Here are a few of the questions I'll try to answer in this month's column.

1. Where in the room do I put the drums?
2. Can I fit all the musicians in the studio?
3. Did someone call yesterday with the correct setup?
4. How many mics should I use on the drums?
5. Should I use a bottom mic on the snare?
6. Should I take the front head off the kick drum?
7. Am I supposed to stuff a blanket in the kick drum?
8. Does a sandbag work better than the bottom of a mic stand for deadening the kick drum?
9. Should I flip the phase on the snare mic?
10. Do I need a capsule pad on the hi-hat mic?
11. What kind of mics should I use on the tom-toms?
12. Does Roger really use a shotgun mic over the snare drum?
13. How high should the overhead mics be?
14. Should I record room mics?
15. Which mic should I use on the vocal?
16. What if the drums sound crappy?
17. Is there enough isolation for the vocal?
18. Should the vocalist record in the bathroom? She's in there most of the time anyway.
19. Should I compress the vocal during recording?
20. Should I record all the background singers on one mic or use separate mics on separate tracks?
21. Do I have enough DSP to EQ all the drum mics?
22. Should I record the guitar with the effect on the same track?
23. How many mics am I going to need to do this session?
24. Should I have enough working mic cables, or should my studio be like all the rest?
25. Do expensive mic cables sound better?
26. Do vintage mics sound better?
27. Do other engineers' recordings sound better?
28. Are the mic stands going to droop with these heavy mics I borrowed?
29. Do I record the guitar in stereo or mono?
30. Should I mic the bass or go direct?
31. Should I use an active or passive direct box?
32. Which reverb should I use for monitoring?
33. If I had \$12,000 to spend on a reverb, should I get the Lexicon 960 or the TC Electronic 6000?
34. Should I monitor on the NS-10's...naahhh!
35. How many cue systems do I need?
36. Should I get a "more me" headphone system?
37. Which brand of headphones don't blow up as often?
38. If the mic signal is too hot, should I use the pad switch on the mic or the one on the console?
39. Should I set the record levels so all the playback faders are at zero, or max the level on each track?
40. Is it true that some digital machines have a hidden switch to turn off the over lights?
41. I see overs on the recorder, why aren't there overs in my DAW?
42. Do I need to turn off the air conditioner during recording?
43. Should I record on tape, hard disk, or directly to DAW?
44. Should I go over that take or keep it?
45. Am I going to run out of tape/disk space before the end of the take?
46. Should I tell the singer I only have ten tracks for vocals?
47. When the producer asks me if I'm using Dolbys, what should I tell him?
48. Should I record at 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, or 192 kHz?
49. Should I record 16-bit, 24-bit, 32-bit, or 48-bit?
50. When the producer asks me which I like better, should I lie?
51. Should the audio files on DAW be record-

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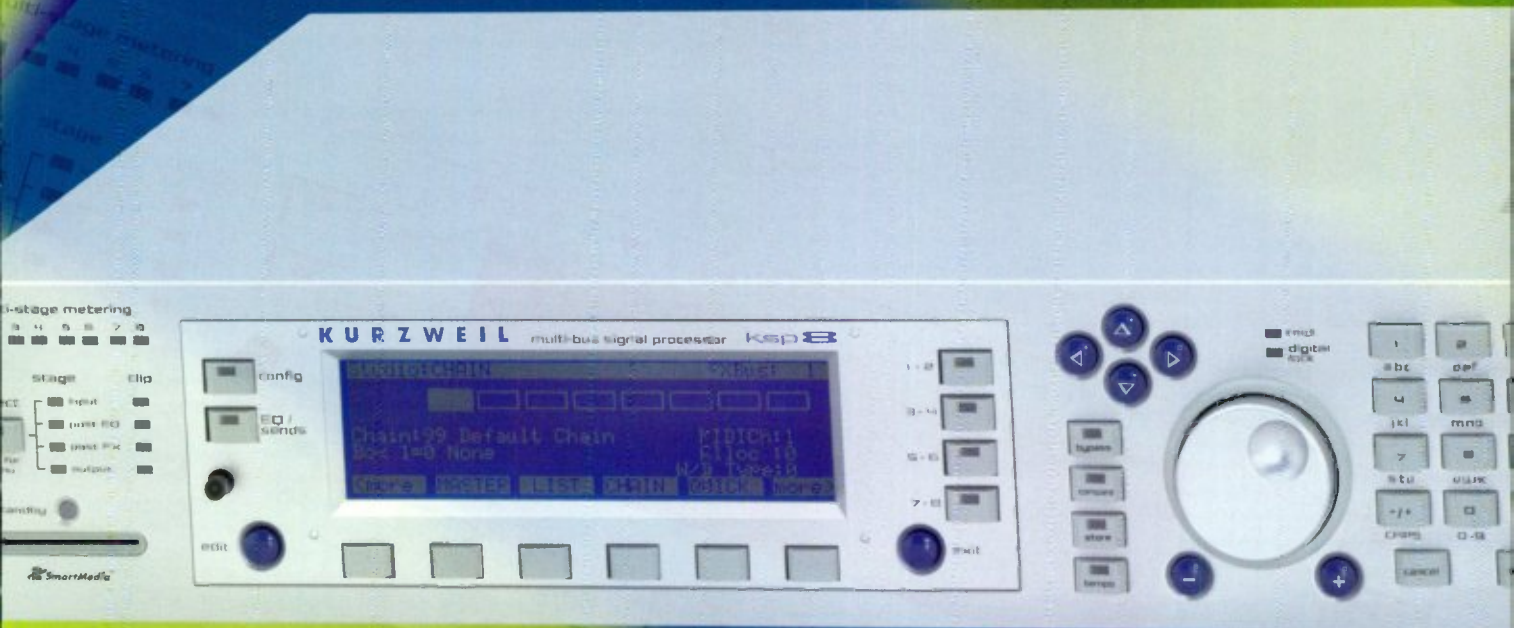
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