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RECORDING
& SOUND

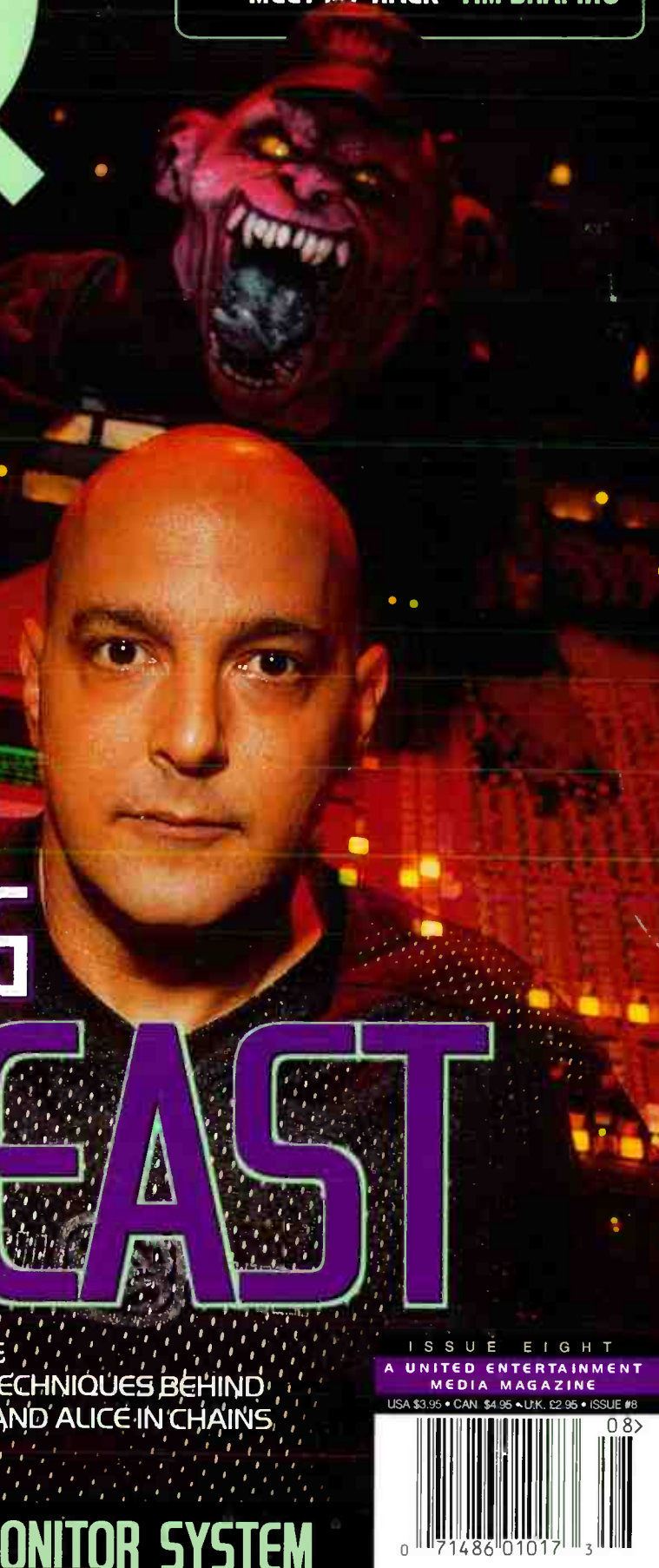
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>> UNLEASHING THE BEAST

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ANALOG/DIGITAL TECHNIQUES BEHIND
ROCK MONSTERS KORN AND ALICE IN CHAINS

ISSUE EIGHT
A UNITED ENTERTAINMENT
MEDIA MAGAZINE

USA \$3.95 • CAN \$4.95 • U.K. £2.95 • ISSUE #8

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IN REVIEW: BLUE SKY 2.1 MONITOR SYSTEM

World Radio History

WE'VE ADDED SO MANY NEW FEATURES THAT WE SHOULD PROBABLY CALL IT THE DIGITAL 8-BUS MK. 3.0



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Pro Audio Review Magazine

“ ...the MX-2424 puts high-resolution sound quality and professional recording features at your fingertips. ”

- *Electronic Musician Magazine*,
2001 Editor's Choice Award

“ ...the TASCAM MX-2424 is a rock-solid, excellent studio recorder that performs well, sounds great and is priced right. ”

- George Petersen,
Mix Magazine

“ The machine alone is impressive enough to warrant close attention, but the implications inherent in the control and networking capabilities make it potentially astounding. ”

- Rob James,
Studio Sound Magazine

You probably machines in is the What you advantages multitracks, transition just getting understand



* based on an average 3 1/2 minute song of 24 tracks at 24-bit/48kHz. Your mileage may vary.

† Offline CD-R backup is possible with an Ethernet-equipped computer. The \$749 (USD) reference is based on TASCAM's CDR-Pro Bundle.

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MX-2424 24-TRACK 24-BIT HARD DISK RECORDER/EDITOR

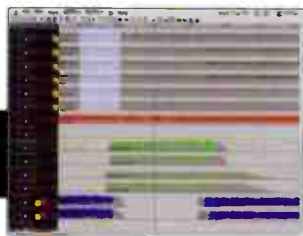
know that with thousands and thousands of use around the world, the **TASCAM MX-2424** most popular 24-track recorder ever made. You might not know is that the MX-2424 offers huge advantages that aren't available on other standalone hard disk recorders regardless of price. Whether you're making the jump from analog and tape-based digital recorders or moving into recording, here's some info to help you truly appreciate the MX-2424 advantage.

Ph.D. in Nuclear Physics Not Required

If you've ever recorded before, you'll find the MX-2424 as easy to use as any multitrack recorder. Flip the Power switch, arm a track and hit the Record and Play buttons. Voila...you're tracking to its internal hard disk. Since TASCAM has been the world leader in multitrack recording for over 25 years, we know how to create gear that's powerful and sophisticated without making the learning curve too steep.

Edit How You Like: MX-View™ Waveform Graphic Interface and Extensive Front Panel Editing

One of the main reasons to get into hard disk recording is the incredible editing power versus tape. Running in native Mac and PC versions and connected via a fast 100Mb Ethernet interface to your computer, the upcoming MX-View is a powerful graphic editing interface that offers sophisticated, sample-level editing on par with full-featured digital audio workstations. You can drag and drop on the fly, get onscreen metering for up to six MX-2424s, set up custom configurable keyboard shortcuts, manage virtual tracks and much more. If you want to use the MX-2424 in the field, its



extensive built-in front panel editing tools let you edit without lugging around a keyboard, monitor and mouse.

True Recording Power: Take the Punch-In Challenge

24-track, 24-bit digital audio requires a powerful hard disk recording engine. The MX-2424 is so strong that it allows for seamless, gapless punches across 24 tracks, with up to 72 tracks of throughput to accomplish this considerable task. If you're brave, try arming 24 tracks on any other standalone 24-track hard disk recorder and quickly punching in and out. It's just one example of the MX-2424's awesome dual-processor recording power and extremely fast SCSI bus. You can choose between TapeMode and Non Destructive recording, and access up to 999 virtual tracks per project with 100 Undo and much more.

Sound Designer II, Broadcast Wave Files and SCSI Drives for Ultra Flexible Compatibility

TASCAM understands the reality that you may need to interface your audio with other pieces of equipment. Since the MX-2424 writes Sound Designer II™ audio files to Mac-formatted disks and

Broadcast Wave audio files to PC disks, it's easy to move sound back and forth between your computer and the MX-2424. With these standard time-stamped file types and professional SCSI drives, you're ensured sample-accurate compatibility with Pro Tools™, Nuendo™, Digital Performer™ and more. With compatibility being so important to MX-2424 owners, it's no surprise that its 24-channel interfaces are ready to connect to just about any console, digital or analog. Or that its analog, TDF and AES/EBU interface modules are 96kHz ready.

Back Up Your Tracks: As Low As A Buck Per Song

Media	Cost of Drive	Media/10 Projects	Total Cost
90 Minute IDE Drive	\$299	10 Drives	\$2990
Orb Drive	\$299	1 Drive + 86 Disks	\$2879
TASCAM DVD-RAM	\$599	1 Drive + 20 Disks	\$1739
Offline CD-R Backup*	\$749	1 Drive + 290 Disks	\$959

If you're forced to use cheap disk drives to backup, you'll pay in the long run. DVD-RAM drives may be connected to the MX-2424's front panel or rear SCSI port, and offline CD-R backup via Ethernet transfer to your computer is the most cost-effective backup method available on any HD recorder by far.

Hard disks are great for recording...but not so great for archiving and transferring audio. That's why the MX-2424 gives you choices like 9.4GB DVD-RAM discs for your backup solution. Or simply transfer your audio to your computer and backup to CD-ROM for as low as one dollar for an average pop tune*.

Get the Advantage of the Most Powerful and Most Affordable 24-Track Hard Disk Recorder Available Today

There's much more to the MX-2424 than what fits on this page, like its award-winning sound quality, professional built-in synchronization tools and TASCAM's amazing online support forums. So if you're getting into the hard disk revolution, you might as well take advantage of the recorder with all the advantages. Just go to www.mx2424.com for the complete MX-2424 story, or check out the MX-2424 for yourself at any TASCAM dealer.

Available soon, the new MX-View graphic editing software offers DAW-style waveform editing power, drag-and-drop editing on the fly, control of up to six MX-2424s with metering and much more.

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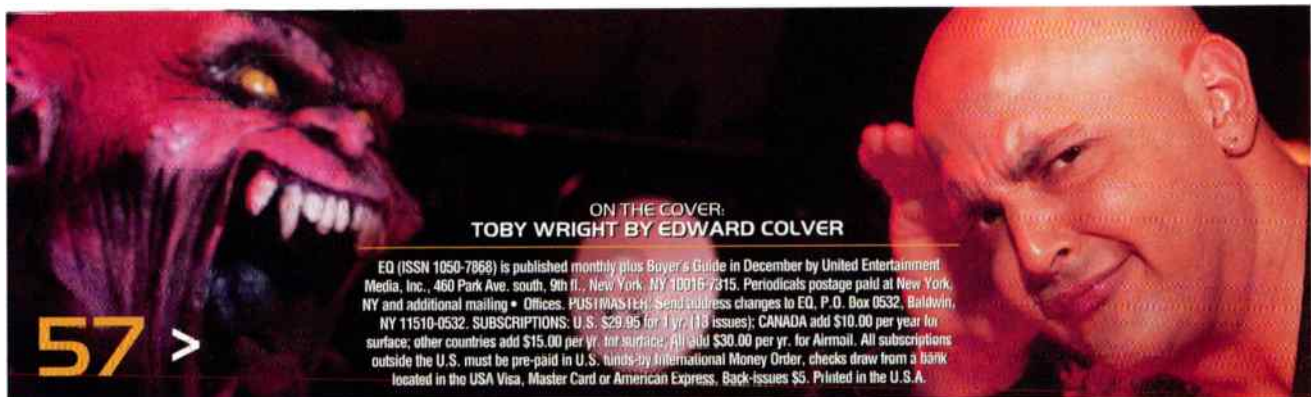
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CIRCLE 44 ON INFO CARD

World Radio History



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TOBY WRIGHT BY EDWARD COLVER

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CIRCLE 61 ON INFO CARD
World Radio History

Lost Along the Way

Recently I upgraded to a shiny Apple Titanium G4 PowerBook. My old PowerBook was getting a bit long-in-the-tooth for running digital audio software, plug-ins, and software synths/samplers. Right now, the old machine is serving as the front end for my home stereo; I'm converting my CD collection to MP3's, and the PowerBook is being used as a server/jukebox for them. Yeah, I know — MP3 is a tool of the devil. But before you retch at the idea, I'm converting the CDs at high variable bitrates; which provide much better sound quality than you find with Web downloads (but less space savings). The sound quality is fine for this non-critical listening environment and application. The CDs will end up in my studio, where I can enjoy them in all their uncompressed glory.

An unexpected benefit of ripping all those discs is that I've rediscovered a lot of really cool music. This sparked my interest in revisiting some of my own older music. But I'm running into problems. It's stored on a variety of tape formats, some of which I no longer have access to. Worse, much of it only exists as data files dating back to Commodore 64 and Atari 1040st, as well as myriad Macs and PCs, using a staggering array of long-gone sequencers and patch librarians, disk formats, synthesizers, samplers, effects processors, automated mixers, and so on. I was pretty religious about transferring basic content as I upgraded, but a lot of little stuff was lost along the way. And in the instances where I did transfer data as I moved from platform to platform, a lot of vital documentary information has gone missing.

Somehow the world will keep turning without benefit of hearing my early masterpieces. I'm the only person who'll likely miss them, and, honestly, I got my full value in the learning process of creating them. But you may have an old back-catalog that's worth more, either financially or artistically. Do yourself a favor; unless you've kept the exact same gear and software over the years (who has?), take some time to revisit and verify your own archives. And make sure that you have a workable long-term archiving plan in place — not just backup (which is mandatory), but true archiving that will let you access and re-create everything. A big part of this is documenting everything accurately, then also archiving the documentation. It takes space and it takes time, but in the long run, it's worth it.

—Mitch Gallagher
mgallagher@uemedia.com



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GET YOUR OWN DAMN COFFEE!

You should have labeled the "Service is King" article in the July 2001 issue "The Egotistical World of L.A. Producers." I used to work at a fairly famous recording studio in the Midwest as an engineer/assistant engineer. I had a bunch of really great experiences with awesome producers from this area who were fantastic mentors. Then, Mr. L.A. producer came to town (I won't say names, but he's a famous and well-respected producer who's been featured in your magazine) and made me hate the music industry with his ego. Since when does vibe come from yelling and screaming at the assistant? Since when does vibe come from treating people indignantly? I'm willing to take the fall for someone a couple of times to save their face — that's part of being an assistant. However, when the producer has obviously made a mistake, blames the assistant, yells at the assistant because the producer spliced the tape incorrectly, then kicks the wall while screaming very vulgar obscenities — you really start to hate your job and the industry that fed the monster.

After three weeks of being blamed for the producer's mistakes, being cursed, and being threatened, it all came to a climax. This nutcase freaked out while the tape was rolling because the tape machine was rewinding too slowly between takes. This was apparently my fault. In the middle of a take, he got up and walked over to me and started

"BECAUSE PRODUCERS HAVE BEEN TREATED AS ROYALTY IN SOME PLACES, THEY FEEL THEY HAVE THE RIGHT TO ABUSE THE HELP"

— JAY LISON, NEENAH, WI

screaming obscenities in my face. The veins on his bald head were practically popping out of his skin. Most people would have left the room or knocked the little pinhead down, but I waited until the end of the song to make sure we got the take, and then left the room.

After about 15 minutes the producer came out of the studio and very calmly asked if he could speak with me outside. So we go outside, and, in a very fatherly way, he told me that I just wasn't cut out for the music business!

Because producers have been treated as royalty in some places, they feel they have the right to abuse the help. They also look at assistants as subservient. This is because of comments like, "When you see my coffee cup half-empty, I shouldn't even have to tell you to fill it." Do you even realize how slimy that sounds? Sure, the assistant is there to do things like get coffee when things are really flowing and vibing. If there's a vibe and a friendship/respect for the assistant, he or she will be happy to get coffee — and know when coffee is needed. I would never treat an assistant, and have never treated an assistant, like slave labor. I treat them with respect and try to teach them what I know.

Jay Lison
Neenah, WI

STEP BY STEP

After reading the review on Pro Tools 5.1 in your April 2001 issue, I found it curious that you state: "Need to feed a stereo mix to a DAT machine, cassette deck, and CD recorder simultaneously? No problem. Want to mult an aux send to feed two different effects boxes? A snap." I've been unable to get that scenario to function. Can you help by giving me a step-by-step explanation on how this is achieved? I've tried in vain to find this information in the manual and have tried many combinations (some logical, some not so logical) in the I/O window, but have been unable to get multiple outputs to be assigned.

Jeffrey Campo
Production Manager

Soweto Productions

[Here's one solution: Say you want to route a stereo mix to three recorders, which are on the first three pairs of outputs on your interface. Create three stereo paths that address those recorders. Instead of busing the outputs of all your tracks to a stereo master fader, bus them to a stereo aux fader.

Assign the output of the aux fader to the first path. Control-click the aux input's output assign and select the second stereo path. A "+" should appear before the path assignment for the aux fader. Control-click again to add a third path, and so on. Audio tracks and aux inputs, as well as their sends, can be assigned to multiple output paths in this way.

This doesn't work for master faders, although you could set up three master faders assigned to the three stereo paths, then send the outputs of all your tracks to those three master faders. DSP-wise, this is better, since master faders don't use any DSP. —Mitch Gallagher, Editor]

LIVING THE DREAM

I would just like to say thanks for all the good stuff that is brought to us by the EQ people every month. Without you guys, I would not be where I am today. EQ gave me the confidence to pursue my studio dreams, and also supplied the know-how on gear and attitude. Mr. Kooper and Mr. Nichols are both incredible people — their articles, whether comedy or business — are invaluable. In regards to the Dr. Dre article in the June issue, thanks again. Being partial to rock, rap is not something I listen to on a daily basis. I must admit to liking Dr. Dre, though. It was good to read how he makes such unbelievable albums.

Mike Lynn
Maple Sound Co.

CORRECTION

In the July issue, in the "Summer Gear" feature, we state that the AD16 and DA16 are 8-channel boxes; they are in fact 16-channel boxes.

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CIRCLE 62 ON INFO CARD

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VOCALS AND DENSE MIXES

I'm working on a "Banga" project for a client of mine. This music is just chock-full of percussion, including dholak's, tablas, congas, bongos, shakers of all kinds, a drum kit, bass, guitars, etc. This mix is very dense and is pretty much "pedal to the metal" from start to stop.

The male vocalist is excellent and quite dynamic, and it's quite difficult getting the vocal to sit right in the mix. Would it be a good idea to thin everything else out a bit to make room for the lead vocal? This could make the percussion track less powerful, though—a big no-no in this style of music. Or is it better to EQ the lead vocal, adding presence and reducing bottom end a bit, and then apply heavy compression and limiting to it? — d&dmusic

Try this: Run the whole mix, except the vocal, through a TC Electronic Finalizer or a three-band compressor plug-in. Put the vocal through its own compressor, but not compressed too much. It's a good idea to thin out some of the bottom end on the vocal so it doesn't compete with the bottom end of the track.

Add the vocal into the track after the track has been limited. Now the vocal can have some dynamics that aren't constrained by the limiter on the entire track.

Sometimes you can use the vocal to feed the sidechain of the track limiter so that the track is crunched just a hair more during the actual vocal, but then the track is allowed to expand a little when the singer is between verses. Don't do this very much; you don't want to hear the track pumping in and out between lines of the vocal. —Roger Nichols

LOW-END TROUBLES

I mix on a pair of Alesis Monitor Ones powered by an RA-100 amp, in a small

room with four inches of rockwool/woodwool everywhere. The bass response at my mixing position is fairly neutral (all notes from various bass instruments and a frequency generator come across at approximately the same volume).

My problem is that my mixes sound like I want them to at my studio, but are bass heavy/muddy/booming at various other places. I wonder if getting myself a subwoofer will help, or is it a better idea to get a 31-band EQ and tune the response of the monitors. I'd prefer the subwoofer approach, as I like to hear a lot of bass while working. Besides, since bass response already seems neutral, I can't imagine I'd accomplish much with monitor EQs. — jsiyer.

Inexpensive, tried, and true: Check your mixes (once you think they're done) on other sources. Headphones (good and cheap ones), boom boxes, car stereos, computer cheapies, and the old home stereo. If there's a problem, it's bound to show up somewhere. Then compare your work with records you like.

Acoustically speaking, completely padding your room has eaten some of the mid and high frequency response, thus increasing the low-mids and bass perception. Funny, because this would cause the opposite of what you're experiencing. Anyway....

Bring your speaker closer if not right against the wall. That will increase the bass response. (It will also mess with the flatness of the whole spectrum, but it's probably not flat to begin with.) Does that help?

From your mixing position, move back and forth within a few feet while listening to some bass content. Loop a short segment for consistency. The

weblink

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

bass perception is probably being greatly altered as you're doing this. Maybe you're sitting in a dead spot. —Emile

MIC SPLITTER

I'm looking into buying a 16- or 24-channel mic splitter for live recording. Can anyone point me in the right direction as far as what sounds good and what doesn't? —Jason

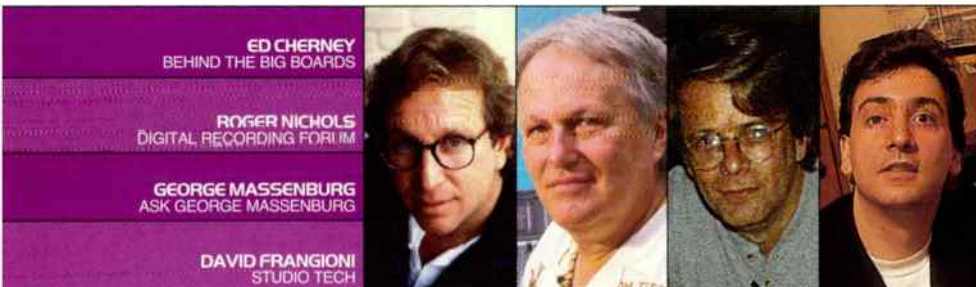
What sounds best is no splitter. So if you're doing a recording breakout, make sure that there's a passive output before the split transformers. One well-grounded, isolated system can generally share the stage ground, which, for well-known safety reasons, should be grounded to the same tie as the mics and stands. We always try to do the recording off of this one.

Nathaniel Kunkel and I have perfected this system of doing live recording with a pile of calibrated mic pres, a few EQs and limiters, and a [Sony] 3348 or two sitting right by the monitor setup. No truck. No separate ground (ground is tied in to stage ground). No hum. Great communication with stage crew, etc. —George Massenburg

WORD CLOCK CABLE LENGTH

Is it important to keep all word clock cables at the same length and, if so, what are the cable specs? I keep all my AES cables the same length, and I also try to keep my other audio wiring the same lengths, like speaker cables, etc. Should one stick to that with word clock? —Chris L.

It's not necessary for each word clock cable to be the same length, but it never hurts to keep them as short as possible. By using very high-quality word clock cable, your lengths can go pretty far (30 ft.). The spec on traditional word clock is BNC-terminated, 75-ohm cable. —David Frangioni





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CIRCLE 49 ON INFO CARD



THE PRODUCT: Fostex DV40

THE BASICS: DVD Master Recorder

THE DETAILS: Designed to record (and playback) audio data directly onto a DVD-RAM disc, the DV40 offers a variety of useful features and takes advantage of the UDF file format for DVD-RAM disc encryption that aids compatibility between multiple computers. The DV40 provides internal file conversion between four-track, stereo, and multitrack mono files. Insert mode allows the user to undo functions by time and date. The other option is Tape mode, which is destructive. This variation does provide data security for accidental power cut (up to the point of power failure).

Sampling frequencies are 44.1, 48, 88.2, 96, 176.4, and 192 kHz (an optional hard drive installation is required for 88.2 and 96 kHz/four-track and 176.4 and 196 kHz recording).

CONTACT: Fostex at www.fostex.com. Circle EQ free lit. #104.



THE PRODUCT: TC Electronic version 2.0 System 6000 Software

THE BASICS: Latest Version of 6000 Software with New Features

THE DETAILS: TC Electronic is now shipping Version 2 software for their acclaimed System 6000 multichannel signal processing platform. The new version includes user interface improvements such as a four-engine overview page, extended preset management and storage to PCMCIA cards, as well as improved surround reverbs and additional factory presets.

CONTACT: TC Electronic at www.tcelectronic.com. Circle EQ free lit. #105.

THE PRODUCT: Eventide Eclipse

THE BASICS: Harmonizer Brand Effects Processor

THE DETAILS: Eventide's handy new Harmonizer unit provides 24-bit digital conversion and 96 kHz sampling, delivering pitch change, reverb, and special effects presets through a dual-engine architecture in stereo, dual-mono, series, or parallel. Digital inputs/outputs include two channels of AES/EBU, and the unit has five-pin DIN output and thru seven-pin DIN input MIDI connections.

CONTACT: Eventide at www.eventide.com. Circle EQ free lit. #106.



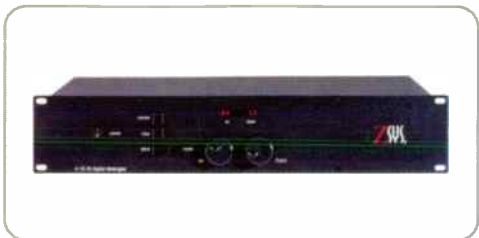
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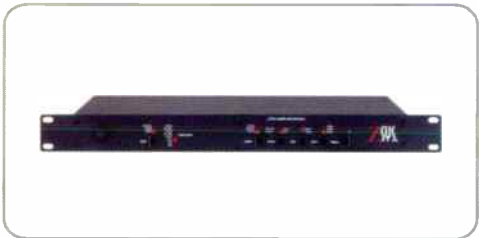
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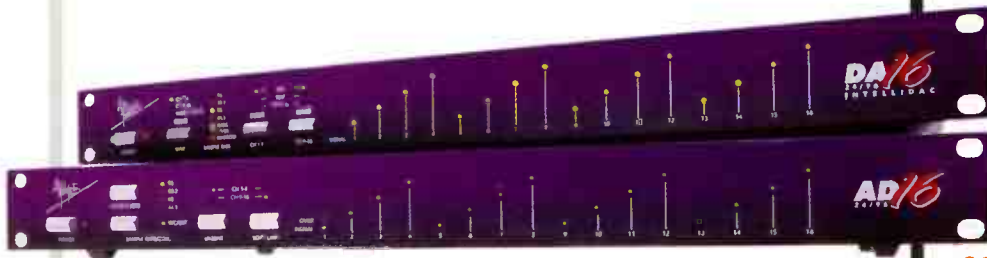
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PRODUCT VIEWS



THE PRODUCT: Korg Electribe EM-1
THE BASICS: Music Production Station
THE DETAILS: Korg's Electribe series continues with the EM-1, which supplies two synth and eight drum parts, 11 insert effects, and real-time and step sequencing. The EM-1's PCM sound engine features 50 synth waveforms and 144 drum sounds.
CONTACT: Korg at www.korg.com. Circle EQ free lit. #107.



THE PRODUCT: Apogee AD16 and DA16
THE BASICS: 16-Channel Converters
THE DETAILS: The AD16 supplies 16 channels of 24-bit A/D conversion at up to 96 kHz. Features include syncable word clock, Apogee's UV22 word-length reduction system, and "Softlimit," which is used to maximize digital output level without overs. The Apogee DA16 provides 16-channels of 24-bit D/A conversion at 96 kHz with AES/EBU, TDIF, and ADAT inputs and the "IntelliDAC" system, which utilizes two-stage re-clocking that processes particularly jittery signals with two clocks.
CONTACT: Apogee at www.apogeedigital.com. Circle EQ free lit. #108.

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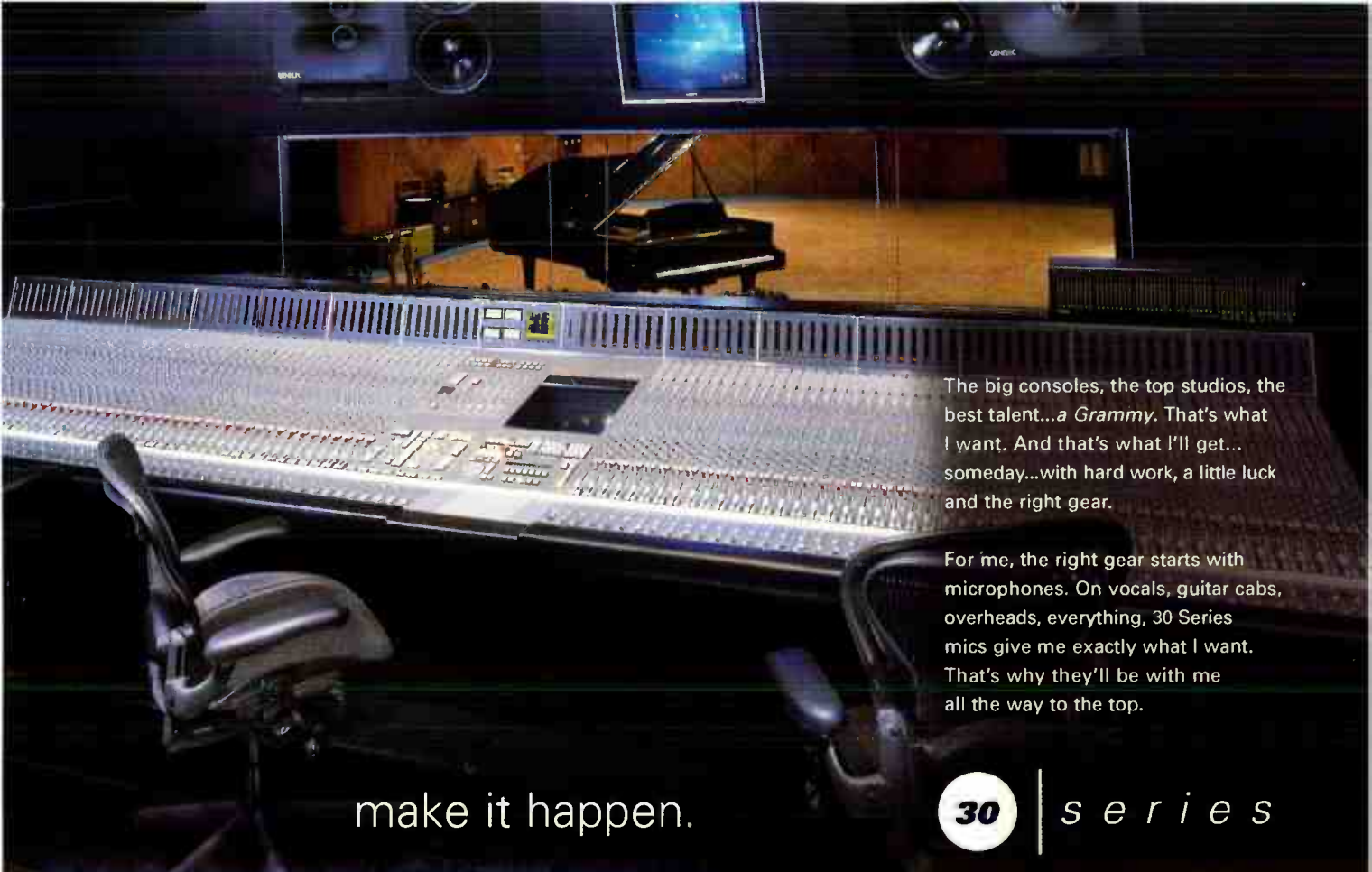
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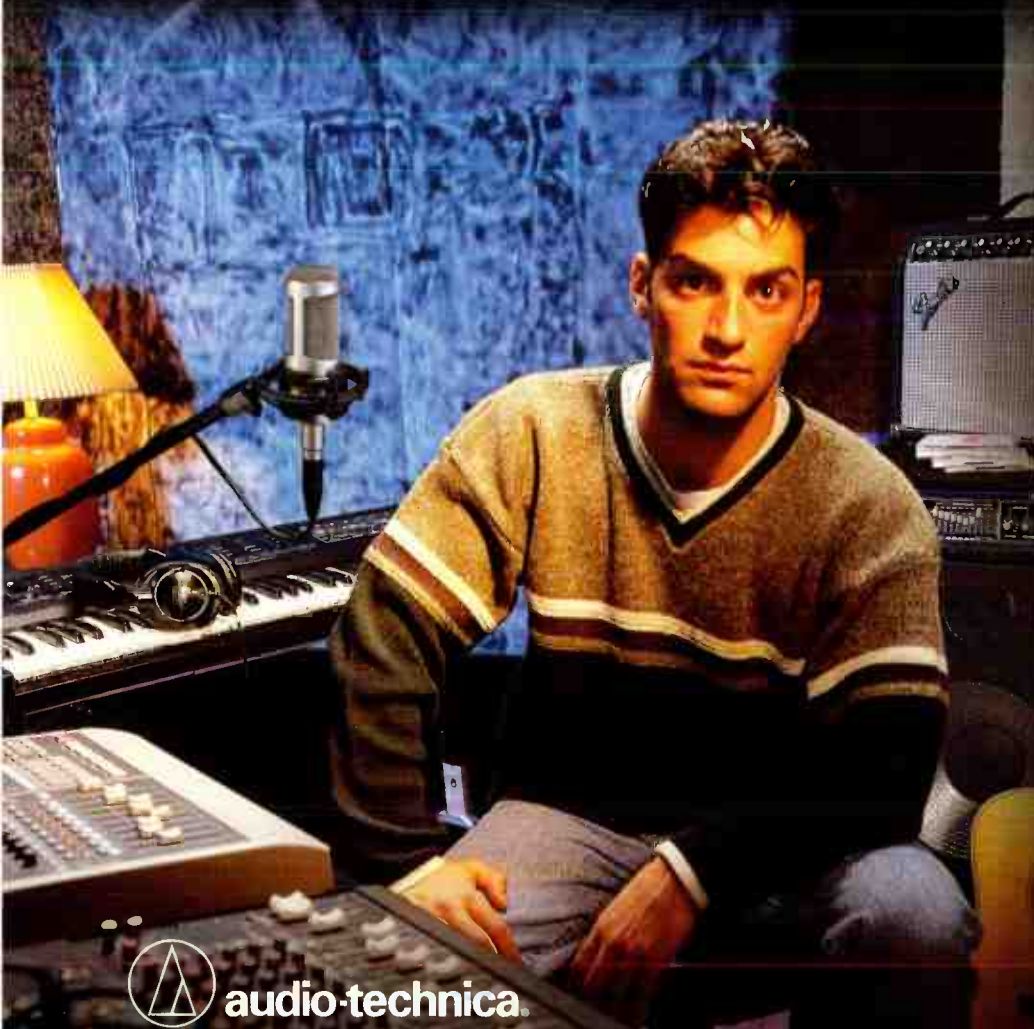


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Top photo: Exstasy Studios, North Hollywood, CA, courtesy of Genelec, Inc.

World Radio History



Dynaudio AIR Series

By Steve La Cerra

Developed as a joint effort between Dynaudio Acoustics and TC Electronic, the AIR Series of loudspeakers is a new line of "intelligent" studio speakers designed to overcome some of the problems associated with 5.1 (as well as stereo) monitoring in recording studio, postproduction, film, and mastering applications. Technology behind the drivers utilized in the AIR Series was developed by Dynaudio Acoustics, while system control and power management technology was handled by TC Electronic. AIR Series speakers combine onboard DSP and networking technology in a compact package, providing remote adjustment of system parameters, and allowing a user to easily integrate their monitors into any given acoustic environment with precision and repeatability.

Initial AIR Series products include the AIR6 and the AIR15. Both of these speakers are biamped, two-way nearfield monitors employing a 1.1-inch soft-dome tweeter; the AIR6 employs a 6-inch woofer while the AIR15's cabinet features a 9-inch woofer. Each driver is powered by an internal 200-watt PWM amplifier. Three

different AIR subwoofers are available, each tailored to a specific acoustic application. Any of the AIR Series monitors may be networked for use in stereo or 5.1 applications.

Many engineers who are working on the 5.1 platform have discovered that there are calibration issues different from those apparent when working in stereo. In

addition to physical placement of the cabinets in the listening room, time-alignment, bass management, and varying mix formats all complicate the 5.1 monitoring process. AIR Series speakers contain DSP tools to help overcome these problems. Precise control over the EQ of each cabinet allows an AIR system to be fine-tuned for a particular listening environment. Through the use of a delay incorporated into the DSP, each cabinet may be aligned for proper arrival time to the listening position. Integrated bass management includes adjustment of the crossover point, as well as low-frequency level. All of these parameters may be stored and recalled to facilitate quick, accurate reset for varying format requirements. In addition, any of the monitors in an AIR system may be muted or soloed for easy isolation of a particular channel.

An AIR system may be centrally controlled from either a dedicated remote or a "Master" AIR loudspeaker. Rear-panel features of an AIR Series "Master" speaker include balanced analog audio input on XLR connectors, AES/EBU digital audio input, word clock input, and CAT5 network connectors. An AIR Master cabinet distributes audio and control data to "slave" enclosures via a single network connection, simplifying the number of cables required for connection of complex systems. The Master cabinet features a front-panel, back-lit LCD, which shows information such as global volume setting, status of high-pass filter, preset number, and level calibration of each cabinet. An AIR system may also be controlled via optional Mac or PC interface. A proprietary software package developed by TC Electronic will offer advanced EQ and delay tools specifically designed for acoustic consultants and installers. ■

DYNAUDIO AIR SERIES

WHAT IS IT? A new series of powered monitors with networking capabilities for distribution of audio and control information.

WHO NEEDS IT? Anyone doing critical listening or mixing in stereo or 5.1.

WHY IS IT A BIG DEAL? AIR series monitors provide store and recall functions for parameters such as EQ, time-alignment, and crossover points.

SHIPPING: Fourth quarter, 2001

PRICE: TBA

CONTACT: For more information, contact TC Electronic at 800-482-4536 or visit www.dynaudioacoustics.com. Circle EQ free lit. #120.

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World Radio History

SESSION FILE



(l-r) Frank Filipetti, David Silveria, Kevin Szymanski

By Lisa Roy

Korn's Drum Sound

Michael Beinhorn and Frank Filipetti help create a monster drum sound

SIGNAL PATH

"We're tracking on an SSL 9000J," explains Frank Filipetti. "Conway has a nice, big tracking room with high ceilings, and it sounds live without being uncontrollable. Michael and I are big fans of putting the mic pres as close to the source as possible. (Hint to console manufacturers: remote mic pres!) We put most of our drum mics through outboard Neve 1053's, 1057's, and 1073's. The mics were bussed to a rack of 24 dB Technologies Blue A-to-D converters. The AES outputs of the Blues were connected to an Euphonix R-1 digital multitrack. The R-1 was running 24-bit/96 kHz. We then ran the digital output of the R-1 to another rack of dB Technologies Blue D-to-A's for monitoring."

MIC POSITION

According to Frank Filipetti, "Michael and I started talking about this record almost a year ago. During our conversations, we both agreed that we wanted to record this album a little differently than usual. Albums that are recorded analog

just don't have the transient response of a live performance. The initial Impact of a snare or bass drum simply gets lopped off on analog tape. On the other hand, most digital recordings don't have the warmth or resolution of analog recordings. We wanted nothing less than the best of

both worlds — digital's transients and analog's warmth and detail.

"Between Michael, myself, and Conway, we had a terrific selection of old and new mics to work with. The first issue was the bass drum. I've always loved putting an AKG D12 on the beater, while putting a [Neumann] '47 FET a foot or so further back to capture the low-end bloom. Sometimes I'd build a little tunnel around the front of the drum for the '47 to keep it focused on the bass drum. And, occasionally, I like to add a [Sennheiser] '421 to the D12, making sure their capsules are time-aligned.

"This time, Jonathan Davis (Korn's lead singer) brought along an AKG D30, which I had never used before. I set it up in place of the '421 and it added a nice bit of punch to the sound. With five U 47's available, we decided to try one on the kick instead of the FET. When we set it up to listen, the 1057 mic pre was too hot and was distorting. Mixed with the AKG's, however, it added an awesome low end. I cut back on the preamp to clean up the signal, but found that some of that 'bloom' around the bottom went away. So, I printed the distorted version!

"The snare mic was — surprise — a Shure SM57! It's still a great combination of transient response and rising high end. Although I love the air a condenser can add on a snare or a tom, I find the transients just too much for the capsules to accurately reproduce. We had a Sennheiser '441 under the snare with the phase reversed. Although the crack of the snare came through nicely with the two mics, we still felt the midrange of the snare was a bit light, so we added an Audio-Technica ATM25 positioned at the air vent on the snare. A bit of

DATE: May–July, 2001

STUDIO: Conway Recording Studios, Studio C

LOCATION: Hollywood, CA

ARTIST: Korn

DRUMMER: David Silveria

PROJECT: Untitled work in progress

TRACK: "Ass Mower" (working title)

PRODUCER: Michael Beinhorn

ENGINEER: Frank Filipetti

ASSISTANT ENGINEER: Kevin Szymanski

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CIRCLE 98 ON INFO CARD



that added in did the trick, and gave us the midrange punch we were missing.

"We started out using Audio-Technica ATM35's mounted on the toms. These are personal favorites of mine, and I've been using them for years. They're small-capsule condensers that are specifically made to handle high SPL. Unfortunately, they also have a relatively high gain structure, and with the Neve pre's lowest setting, we were still getting too much gain. The studio didn't have any in-line pads available, so we put up Sennheiser '421's on the two rack toms and two floor toms. They sounded fine and we decided to stay with them. [Drummer] David Silveria also has a "gong" drum, which is basically a stretched head over a shell. It has very little tone (it's more like a thud), but goes very deep. A '421 over the head didn't give us enough low end, so we added an Audio-Technica AT4047 inside the shell, looking up toward the head (again with the phase reversed).

"For the overheads, we were blessed with a complement of four red-striped Siemens AKG C12's. I had hoped to use three mics to capture the scope of



David Silveria's amply miked kit. Shown here: the four overhead mics and snare drum mics.

David's kit, but it became quickly apparent that his setup was too large. So I ended up using four overheads. The extreme left and right mics were placed equidistant from the snare head. (I like my snare to be in the center of the overhead mics.) The inner two mics were also placed equidistant from the snare. I

tried to get the overheads as close to the kit as possible, while still getting a uniform soundfield from the coverage.

"Then came the room mics. The first step was to have David play while Michael and I walked the room. As a drummer myself, I've always liked the sound of the kit behind the drums. I found

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two spots in back of the kit that had just the combination of power and warmth that I was looking for. I placed two U 47's, in omni, at those spots approximately nine feet in the air. Michael found a spot at the front of the kit, facing the bass drum, that had the additional transients we were looking for. After some experimentation, we finally settled on two Neumann CMV 3's flanking a Telefunken CM51, approximately two feet in front of the kick at beater height.

"Finally, we added a pair of rear overheads to get a sense of room, while still staying fairly close to the kit. After all the mics were placed, I put a phase clicker through them all to check for phase. With over 30 channels of open mics, it's extremely important to constantly monitor phase."

PROCESSING

Frank Filipetti says, "There was no signal processing added, except a little EQ through the Neve mic pres. I added very little EQ to the snare and overhead mics, just a little 10 or 15k on top, nothing serious. I did add some serious low end on the console to the CMV 3's to bring out

the bottom-end transients. Maybe about 7 or 8 dB at 60 Hz. That's it."

TRACK NOTES

Frank Filipetti elaborates, "When Michael Beinhorn first approached me to record the new Korn record, his first comment was that, while he wanted this to be a truly aggressive record, he also wanted it to be 'high fidelity.'

"The key to achieving that would come from two components: First would be the recording medium, and second would be the drum sound. Based on our discussions, I came to feel that an analog tape machine would never get the kind of in-your-face transients that Michael wanted to achieve. We spent our first day in the studio not getting sounds, but choosing a multitrack recorder. For our tests, we had Michael's custom-built Studer eight-track two-inch analog tape machine, a Sony 3348HR, and a Euphonix R-1. Supplementing the digital tape machines was a wide array of A-to-D converters, including those from Panasonic, Apogee, dB Technologies, Sony, and Euphonix.

"The winner in the digital comparisons

was the dB Technologies A-to-D Blue converter running at 96 kHz into the R-1. But what did surprise everyone, including Michael, was the degree to which that setup blew away the analog multitrack.

"Now that we had a recording medium, the next step was to set up David's drums and choose the right kit. We found that David's live kit was not altogether what we needed in the studio. David likes playing an 18-inch bass drum, but we felt it wasn't going to give us the low-end punch we were looking for. We finally settled on a 20-inch (although we found a 22-inch that sounded awfully good). We also tried many snare drums and settled on one for the project.

"One final point is that no matter how good the engineer, or the mics, or the pre-amps, or the console, or the room, the simple truth is that a poorly tuned kit played by a less-talented drummer is going to sound just exactly like what it is. We did come up with a sound we all love, but the bottom line is that Judd Kalish did a wonderful job in tuning and keeping the drums cracking. And David just plain knows how to hit them. In the end, that's the real story behind a great drum sound." ■

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CIRCLE 31 ON INFO CARD
World Radio History

ROOM WITH A VU



By Lisa Roy

The Steakhouse

Adding some meat to the middle of North Hollywood's studio row

STUDIO NAME: The Steakhouse

LOCATION: North Hollywood, CA (in the middle of studio row, known as NoHo)

KEY CREW: Kelle Musgrave, Lee Bench, Rex Coggins, and Justina Powell

CREDITS: Steve Lukather — Luke was one of the first projects done at The Steakhouse, along with a Jeff Beck solo record, as yet untitled and unreleased. According to studio manager Kelle Musgrave, "Since re-opening in May, we've been block-booked with Sally Browder tracking and mixing Pepisito Reyes of the Buena Vista Social Club, the I-10 Chronicles for Virgin Records, and Danni Leigh."

MIXING CONSOLE: 56-input, custom 80 series EMI/Neve

AMPS: H and H MOSFETs

MONITORS: JBL, KRK, Tannoy Gold, Yamaha NS-10

RECORDERS: Studer A827, Ampex ATR-102 w/four speed cards, Alesis M20 ADATs, Masterlink

OUTBOARD: TC Electronic TC1140, Aphex 661, 107, 109, 105, 622, 651, 720, 320A; Anthony Demaria Labs ADL-1000s, Schubert Systems six-band parametric EQ

EFFECTS: Lexicon Super Prime Time, PCM-70, 224 with LARC; Eventide H-3000/SE, H910; Alesis Q20, A/DA stereo tap delay STD-1B, DigiTech GSP-2101, Dynacord CLS-222, AKG stereo

reverb/delay, Roland SRV 2000, SDE 3000; Yamaha SPX 90

MICS: Selection of tracking mics includes AKG, Neumann tubes, Sennheisers, Audio-Technica AT4033's, Shure, and Groove Tube

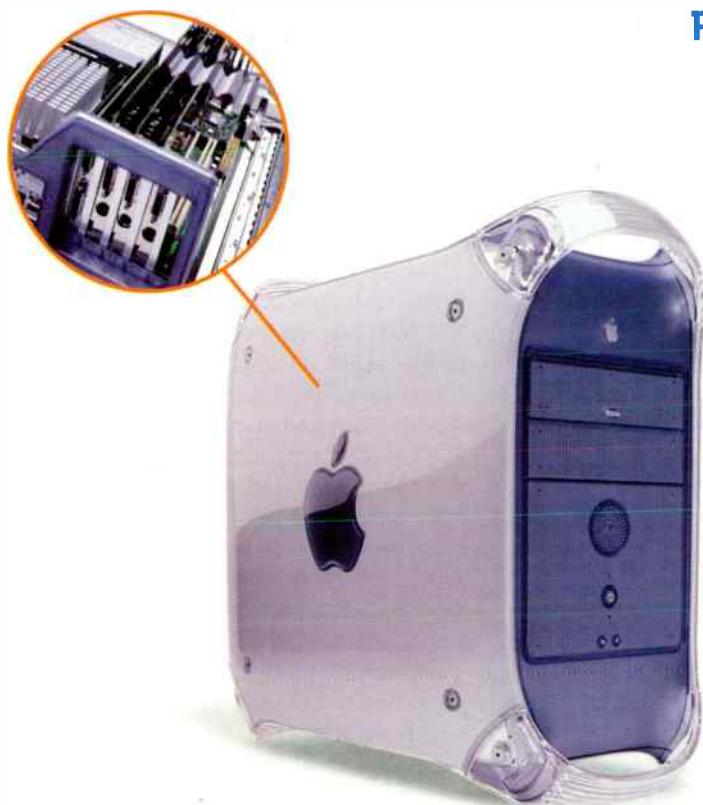
COMPUTERS: Macs and PCs

STUDIO NOTES: Musgrave explains, "The studio was built from the ground up for musicians by musicians. The partners are brothers Lee and Rick Bench, Rex Coggins, and Aaron Reiff. In their eyes it will always be a labor of love and a work in progress. Acoustician Carl Yanchar designed the building with its isolated footings and the studio with its oak performance room. In the fall of 1996, Steve Lukather joined the studio alumni with his real-world experience. This brought The Steakhouse out of its ten-year preproduction period.

EQUIPMENT NOTES: Chief engineer and co-owner Lee Bench says The Steakhouse's centerpiece is definitely the EMI/Neve custom 80 Series. Bench explains, "It was built from two identical consoles custom-made for EMI in 1975. This console was formerly housed at Great Linford Manor Recording Studios and is the largest EMI/Neve in the world. It offers 56 channels with Flying Fader automation, 48 of which have 1064 discrete EQs." ■



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RCA KU-2A

by Steve La Cerra

MICROPHONE NAME: RCA KU-2A

FROM THE COLLECTION OF: Bob Paquette, The Microphone Museum, Milwaukee, WI

YEAR OF MANUFACTURE: Circa mid-1930s

TYPE OF MIC: Dual ribbon

POLAR PATTERN: Unidirectional

FREQUENCY RESPONSE: 50 to 10,000 Hz

OUTPUT LEVEL AT 1,000 Hz: -60 dB into a matched load, 0 dB = 0.001 watts

OPEN CIRCUIT VOLTAGE LEVEL AT 1,000 Hz: 1460×10^{-6} volts at 250 ohms

OUTPUT IMPEDANCE: 250 ohms (as shipped; may be changed for 25-, 50-, or 500-ohm operation)

DIMENSIONS: 4.75 wide, 4.75 deep, and 8.5 long (inches)

WEIGHT: 4.25 pounds

MIC NOTES: Referred to by some people as the "skunk" microphone due to the white racing stripe on its windscreen, the RCA KU-2A (RCA part number MI-3043) employs two separate ribbons suspended in a common air gap. One of the ribbons is open to sound waves from the front and back, and acts as a velocity microphone. The second ribbon element is loaded from the rear using a tube with a damped acoustical labyrinth. The two ribbons are electrically connected in series with their combined output yielding a cardioid directional characteristic. This particular KU-2A is shown with an RCA windscreen (part number MI-3059), and is suspended in a boom mount (part number MI-3040).

USER TIPS: RCA literature on the KU-2A suggests suspending the microphone so that the ribbon makes an angle of 45 degrees with the floor. A minimum distance of three feet from the source is also recommended, since the KU-2A begins to exhibit proximity effect within that distance from the source. Built into the housing of the KU-2A is a small equalization circuit designed to smooth the high-frequency response; disconnecting the EQ will result in an upward bump of about 3 dB at 6,000 Hz.

Technical data courtesy of Arthur Garcia.

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World Radio History



Truly *remote* recording in Western Samoa

Mission: Unforgettable

by Lynn Fuston

It's a dark and stormy night on my scenic hilltop outside of historic Franklin, Tennessee when the phone gives a startling ring. "Wanna go to Samoa and record a kids' choir?" asks the voice on the other end of the line.

"Uh, sure. Sounds great," I answer, as any independent recording engineer is likely to do. Say yes first, gather details later. "One question though. Where is Samoa?"

As I discuss the music producer's proposition further, I discover that this project involves traveling to Western Samoa in the South Pacific. To appreciate how far away it is, flying from Los Angeles to Hawaii will get you halfway there. Our destination is the largest island, Savaii, which has only 40,000 people. The vegetation is lush and green like a rain forest, the people are brown-skinned, and the climate is extremely "tropical," which is a diplomatic way to say hot. It's never cooler than 75°F and the humidity is never below 80%. The villages are small (1,000 people or less), and most houses don't have electricity or running water — many don't even have walls. In many respects, it's like traveling back in time to the late 1800s. That's not insignificant when you're planning a recording session there.

The project we're discussing was tracked on ADATs, but the producer doesn't care how we record the choir overdubs so long as they're recorded well and arrive safely back in the States. We'll travel with the video director and the videographer, who'll be videotaping the kids singing for a presentation at an international missions conference. As we discuss the details further, he adds, "You realize, of course, that Samoa isn't a recording Mecca. There's not a single recording studio in the whole country."

"Hmmm. That will complicate things a bit. What can we get on the island that we won't need to take?" I inquire.

"Hopefully 110V power," is the less than reassuring response.

All of the equipment I need will have to be carried with me on the airplane. Since the only direct flight from the U.S. arrives once a week, anything that I don't bring won't arrive until it's time for us to leave.

THE GEAR

After a week of research, I decide to rent a G3 PowerBook-based Pro Tools system, complete with a tiny Magma expansion chassis that holds the Mix Core and Mix Farm cards, a 9-GB SCSI drive, an 888/24 interface, and a FireWire CD recorder. That takes care of the recorder, giving me 24 tracks of record/playback in one suitcase.

Next comes the critical part — capturing the sound. For microphones, I consider several options but decide to take two Audio-Technica 4050's and a 4060. I choose the 4050 because it's small and sounds good in a wide variety of situations. I can say the same of other mics, but many are larger or less roadworthy, both significant considerations. I'll take the 4060 along for solos and to have another "color" in case I need it. I take an EV BK-1 with a switch for the talkback mic.

I decide to take a Great River MP-4MH four-channel preamp for two reasons. First, it's built like a tank, and reliability is a major concern. Second, I've never tried it on a source where I didn't love the result. That counts for a lot when I'll only have one shot at getting it right.

The next decision is monitoring. I consider small powered speakers, but any that would offer accurate sound will be unwieldy to carry. One big factor is that it's unclear where we'll be recording, since there are no studios. The producer mentioned renting two adjacent hotel rooms (to have air conditioning) and then running cables between them. In that situation, with marginal monitoring conditions at best (a bedroom with parallel walls, no carpet, no wall treatments, etc.) and significant acoustic crosstalk to the recording space at worst, accurate loudspeakers will hardly be an asset.

The other option for a recording space is Samoa's only TV studio. It's large and air conditioned, but that's all I know. In that situation, I might end up with the recording equipment in the same room with the mics, which would preclude using speakers at all. When I find out the TV studio is available for the time we need, I decide to



Lynn Fuston (blue shirt, center) and the children's choir wading for the session to begin.



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work there to have the extra space. It turns out to be a wise choice.

In the end, I decide to use headphones for monitoring instead of loudspeakers. That will save significant weight and space and will ensure consistent monitoring regardless of where I end up with the gear. I decide to take my trusty Fostex T-20 headphones. I've owned and listened to them for years, so I know them well. To drive them, I take a single space Rane headphone amp, which can also drive the producer's headphones as he conducts the choir. That brings me up to one suitcase for Pro Tools, a four-space SBK roadcase for the preamp, 888, and headphone amp, and one case for cables and mics.

The last thing I need is a cue system for the singers — all 16 of them. A studio-style cue system will require headphones, headphone boxes, cabling to each box, and then a power amp. Once I hoist the power amp off the floor, I decide it's not something I want to haul all over a tropical island. The other alternative is a portable FM stereo transmitter that can

transmit to FM Walkman receivers with headphones. That will eliminate all the boxes and cabling. I try out the transmitter and convince myself it's the best option. So, I purchase 17 sets of Sony FM Walkman headphones (16 and a spare), and that fills my fourth and final case.

THE TEST RUN

Now three weeks after the initial phone call, and with a complete 24-track studio in four cases, the Pro Tools sessions loaded on the drive, on the system drive, and also backed up on CDs (what I call the "Digital Triplicate Rule"), and a handful of blank discs, I'm ready to go. I set up the system the night before our flight — a wise precaution for an endeavor like this. Batteries, spare cables, blank CDs, spare hard drive, backup CDs, ground lifts — everything I might need better be in those four cases. There won't be any "Radio Shack runs" for cables on a remote tropical island in the South Pacific!

As I start my test session, I immediately discover two problems. The first is just a bad mic cable (better to find it now than



Yes, that's cooled lava they are walking on.

later). The other problem is that Pro Tools won't play back and record more than six tracks at a time. We discover that the settings for the SCSI accelerator card are wrong. With this remedied, I can get all 24 tracks recording and playing back. I'm reassured, but still slightly unsettled. I'm the kind of person who likes having contingency plans — a Plan C in case my Plan B fails. But I realize that there's no way to

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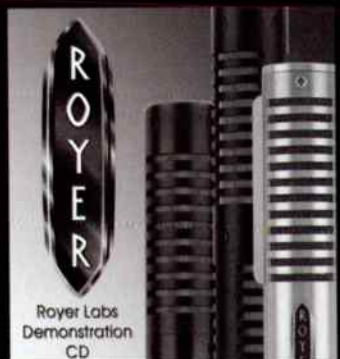
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safeguard against all possible risks.

The next day, I fly from Nashville to Los Angeles, where I'll meet the music producer Dan Smith, video director Tim Schirman, and videographer Frank Gamble. Dan is there at the gate when I arrive to help me carry the recording gear. I'm surprised by how much this seems like a scene from *Mission Impossible*. Four people flying from all over the U.S. to work together in accomplishing an ambitious task on a distant island....

SAMOA, SOUTH PACIFIC, 4 AM

When we arrive, the airport is absolutely bustling. As the only direct U.S. flight each week, if someone is coming from the U.S., they're on this flight. And their family is here to meet them at the airport. That explains all the activity.

After a breathless wait at the baggage carousel, I finally get all four equipment cases. After clearing Customs, we head to the hotel, 45 minutes away. The night sky is amazingly clear with more stars than I've seen before in my whole life.

THE SESSIONS

After a short and restless nap, we head to the TV studio. When I walk in, I discover a rectangular room (40x60) with concrete walls, floors, and ceiling. It sounds like a parking garage. For recording, it will be a challenge.

I decide to set up in one corner where there are curtains on two walls and thin carpeting on the floor. I ask the owner for quilts or blankets to hang up to deaden the space. He laughs out loud, "Blankets? In Samoa?" Right. What was I thinking? So much for that idea. I use the studio "wardrobe," which is a roll-around clothing rack with shirts and dresses to deaden one wall and two movable plywood gobos to cut off the livest part of the room.

I set up my rig in the video control room. After locating the 220V-to-110V transformers (the one thing I didn't bring) and setting up and plugging in all the gear, I press the button and hear that extremely welcome startup chime on the Mac. So far, so good. The system starts up, the Pro Tools session opens without incident, the mics work, and we start recording just after noon. We begin with native Samoan percussion overdubs with wood blocks, cane blocks, and the most unique percussion instrument — Coke bottles rolled up

in a coconut mat, played by hitting them with wooden sticks. We record two native songs, conch shell horns, and then overdub percussion on one song. The players use my headphones to hear themselves recorded for the first time in their lives. I get some seriously big smiles.

After a restless night (can you say jet lag?), we head back to the studio to meet the 49 kids who are in the choir. I was told that only 16 of them would sing, hence the 16 headphones. But they're all so excited about participating, that we decide to use them all. (Good thing we're not in the hotel room!) The 16 best singers get headphones and the others will derive time and pitch from them. First, we record several songs in their native Samoan to let them warm up. Then we move to the overdubs in their memorized English on the two songs with prerecorded tracks. They're so eager, cooperative, and attentive that we finish recording within three hours, including the solos. I breathe a huge sigh of relief. My part is nearly done.

A reporter from Samoa's national newspaper, the *Samoa Observer*, is here to take photographs and report on this event. Four Americans bringing a recording studio and video crew is a big deal to the Samoans. It's a big deal to me, for that matter. After the interview, the crew is invited to be guests on a national Samoan TV show. As they videotape the show, I consolidate the vocal tracks, make transfers to a backup drive and CD, make submixes, and burn CDs for the video shoot. Within two hours of finishing the vocal recording, everything is packed in the four cases, we load our "studio in a suitcase" into the van, and head for the first video shoot location. Mission accomplished.

THE MEMORIES

We'll spend another two days here in Samoa, videotaping the kids, but my part is done. For me, it's been a wild experience in remote recording, an uncanny juxtaposition of high-tech recording in a primitive and isolated tropical setting. It was an experience that I'll never forget. ■

▶ **webink**

For more on this exotic recording session, visit
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Producer JOSH ABRAHAM'S schedule is packed with chart-toppers such as Staind, Limp Bizkit, and Orgy, and he still found time to build a project studio in a historic location. Here's how he does it...



story and photos by **MR. BONZAI**

view from the TOP

MR. BONZAI: What are your main recording tools here at Pulse Recording?

JOSH ABRAHAM: I have a 24-bit Pro Tools rig with an Apogee PSX100 for channels one and two. I also have three 888's. My console is a 16-channel API with Pro Control and a Mackie HUI. I also have a couple of Telefunken U47's for vocals. I use the studio strictly for overdubs, and it works well. Considering some of the vocal talent that I've worked with over the years, this studio is perfect.

What is in this rack you're sitting in front of?

I have a pair of 1073 Neve Pre/EQs, a Focusrite ISA110 Pre/EQ, a pair of [Empirical Labs] Distressors, a pair of DBX 160 XT's, an original black-face

1176, an ADR Vocal Stressor, a Spectra Sonics 610, an LA2A, an Eventide 3500, a Lexicon PCM 41, a Yamaha Rev 7, a Yamaha SPX 900, a Roland SDE 3000, a Roland SRV 300, a TC Electronic Fireworks, a Marshall JMP1, an API Lunchbox with two 312 pres, two 560B EQs, and two Angus EQs.

What new toys have you recently discovered?

The Roland VP9000, which is great for vocal harmonies.

What do you have that no one else has?

I have a Urei 176B compressor, which still sounds great. I wouldn't say that no one else has one, but it's quite rare.

Give me one — just one — of your sonic secrets?

I use the Hyperfuzz pedal by Roland to fatten the guitar sound on some of my guitar tracks.

Tell me about working with Staind....

It was the easiest and most enjoyable record I've worked on. Talent speaks for itself.

What about working with Korn?

Working with Korn rekindled my belief in the power of musical talent. Throughout our sessions, Jonathan Davis and I were able to expand upon our friendship to further expand Korn's music, which I believe has led to a change in popular culture.

Limp Bizkit?

I worked on Chocolate Starfish and the Hotdog Flavored Water with Fred Durst, primarily on the vocal tracks for



“Throughout our sessions, [Korn's] Jonathan Davis and I were able to expand upon our friendship to further expand Korn's music, which I believe has led to a change in popular culture.”



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eight songs, and it was great. We did some vocals in L.A. and ran out of gas, so we took a jet to South Beach in Miami and finished the record. In Miami, we would wake up and go straight to the beach with a portable CD player and discuss what vocal approach we should take for the song we were about to record. The studio was literally on the beach, and we would sit with headphones on for most of the day and bang out the vocals. Sounds posh, but it actually worked.

Fred really knows what's best for his band and what his fans really want. His creative intuition is immeasurable. He's truly in touch with what his fans need.

Depeche Mode?

I worked on a remix. Nothing else need be said — other than when I'm re-mixing I become one with the track.

Orgy?

Jay Gordon and I are like brothers, so working with his band is almost like I'm the sixth member of the group. I've written with them on both of their

records, and there is a mutual trust factor that I have with them that I have with no others. Jay and I have been able to push past the technical boundaries that often plague a project. I know that the band and I both believe that we achieved just that.

Kid Rock?

I re-mixed "Bawitdaba" for the *Ready to Rumble* soundtrack. He and I have a great relationship, and working with him was a crazy experience.

Crazy Town?

I didn't go in thinking that that band would achieve the success that they have. But I knew we made a good record and I'm really happy for those guys. We remain really good friends, and the working experience we shared was one that I wouldn't trade.

Did you ever lose anything?

When you're working in Pro Tools extensively, you need to back up the files on another hard drive. It's the best insurance plan. Just thinking of the stuff I lost — and what it could have been — pisses me off. However, most of the time I back up the files, but careless mistakes happen, drives go bad, computers crash, and some engineers smoke lots of weed. It's part of the process. Even so, every time we've lost something, we've gone back and, luckily, whatever we've re-recorded has been better.

If you were a musical instrument, which one would you be?

The flute — so lips would be wrapped around me all the time.

What's wrong with the music industry?

I think there is a bit of confusion with the way digital audio is being distributed. For example, you have a CD with musical content on it that could easily be converted to an MP3 file, and, with the ability to download such files from the Internet, those who want to access those files can. It has the potential to broaden a band's listener base. However, because of copyright laws and who actually has the right to obtain such product, there's a major hiccup. I think once the majors figure out a way to regulate the distribution to make both sides happy — whereby artists still get their publishing and mechanical fees, the labels and publishing companies

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CIRCLE 33 ON INFO CARD

VIEW
from

TOP



still get paid, and the Internet companies cash in as well — there will be less frustration in the industry.

What music would you like played at your funeral?

The music of This Mortal Coil, a very dark, celestial band.

What do you listen to while you're driving?

Prince, alternative radio, and music that further heightens my road rage.

What's the first music you remember hearing?

John Denver's "Thank God I'm A Country Boy."

What did you learn from Eddie Kramer?

That this studio was the sh*t in the '60s.

Who were your musical heroes when you were getting started?

Pink Floyd, Jimi Hendrix, The Cure, Peter Murphy, and Depeche Mode. There were plenty of others, but if you listen to my work, you can figure them out.

Whom do you respect and admire today?

Andy Wallace, David Foster, Brendan O'Brien, Terry Date, Jay Baumgardner, and Alan Moulder, among others.

Is there anyone in the world you would like to produce and record?

Working with Jane's Addiction would be fun.

How would you like to be remembered in history?

It would be nice to just be remembered.

Do you know any interesting business tricks?

Learn to trust and listen to those who can best provide the best advice.

What was your most ridiculous experience in a recording studio?

I won't mention any names, but an artist asked if we could listen to what we did the night before. So, I put up the rough mix and he was sitting there with an IV in his arm and a bag of vitamin B-12, looking at me like I was nuts.

What old saying do you hate the most?

"Everything happens for a reason."

Any advice for getting a good start in the music business?

Follow your heart and believe in your dreams.

Have you ever really pissed anyone off?

I'm sure I have, but it was unintentional.

great sound
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CIRCLE 16 ON INFO CARD
 World Radio History



Take Control of Your Room!

London-14 Studio



- 1 Europa Flutter Wall
- 2 Scandia Scatter Blocks
- 3 Orientique Washboard
- 4 Australis Bass Trap

Face it. Most project studios and post-production rooms are built in typical rectangular rooms. You spend thousands of dollars on gear only to battle standing waves, flutter echo, and all the hash that makes it difficult to get a good mix. Battle no more.

Introducing Primacoustic. A new concept in broadband acoustical treatment that is easy to install, affordable, and has the look and performance of an architecturally designed studio.

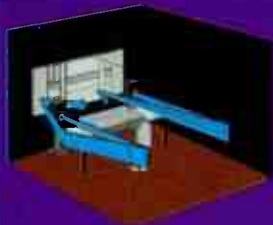
Primacoustic is based on a modular concept whereby precision-cut acoustical absorbers are combined to resolve the four main problems common to all square rooms: The Europa Flutter Wall controls 'front to back' flutter and works with the Scandia Scatter Blocks to reduce standing waves. The Orientique Washboards reduce side wash and powerful primary reflections. The Australis Bass Trap is a corner wedge that tightens up bass and brings balance back into your room.

Calling London for Under \$600*

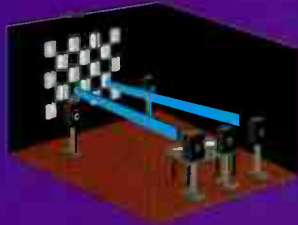
The London-14 is one of the more than dozen studio packages available. London combines all four acoustical systems into one affordable package (London Studios start at \$450*.) Other packages include the New York Voice Over Booths, Rio Video Suites and Montreal Studios. With complete rooms starting at \$200* - no other acoustical treatment is as affordable or so effective! We even include the glue.

For more information call Primacoustic and ask for a brochure, visit our web site, or go to your local pro audio shop.

Tell 'em you want to Take Control



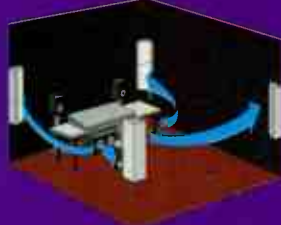
1 Europa Flutter Wall
Reduces 'front to back' echo, standing waves and monitor fold back. Over 28 creative patterns to choose from. Prices start at \$150*.



2 Scandia Scatter Blocks
Affordable alternative to diffusion. Keeps room live and reduces standing waves. Over 12 creative patterns to choose from. Prices start at \$100*.



3 Orientique Washboard
Absorbs primary reflections and side-to-side flutter. Six creative patterns to choose from. Prices start at \$80*.



4 Australis Bass Trap
Effective down to 45Hz, tightens up bass and reduces smear. Can be used in corners or on walls. Priced at \$100* each.

*Suggested US retail price.



BLUE SKY SAT 6.5/SUB 12 POWERED 2.1 MONITOR SYSTEM

By Mitch Gallagher

BLUE SKY SAT 6.5/SUB 12

MANUFACTURER: Blue Sky International, 200 Sea Lane, Farmingdale, NY 11735. Tel: 631-249-1399. Web: www.abluesky.com.

SUMMARY: An integrated full-range powered monitor system that offers great sound at a great price.

STRENGTHS: Smooth sonic transition from subwoofer to satellites. Full-range.

Solid low end. Easy to set up. Built-in bass management. Excellent bang-for-the-buck.

WEAKNESSES: Extended response can result in bright sound in some rooms.

PRICE: 2.1 system (as reviewed), \$1,395; Sat 6.5, \$425; Sub 12, \$545; 5.1 system, \$3,295

EQ FREE LIT. #: 101



BLUE SKY SAT 6.5/SUB 12 POWERED 2.1 MONITOR SYSTEM

bass driver to the satellites. There's no impression that you're listening to a sub and satellites, you simply perceive the full frequency range. I did find that the Sat 6.5's have a "present" quality — the sound really jumps out of the cabinets. The Sat 6.5's extended frequency response can cause high-frequency build-up in certain rooms. In fact, I would rank them as the brightest of the various monitors available to me for comparison.

Imaging was solid and wide, while detail was easily discernible in the highest ranges. However, with the extended high frequencies, the lower-mids and upper-bass were marginally blurred.

I found the Blue Sky's easy to listen to for extended periods of time, whether they were playing Han Zimmer's orchestral score to *Thin Red Line*, Steely Dan's *2 Against Nature*, Rob Zombie's over-the-top *Hellbilly Deluxe*, or George

Massenburg's work on Lyle Lovett's extremely dynamic *Joshua Judges Ruth*.

On my own mixes, the Blue Sky's were flattering, adding a pleasant presence to the sound. Because of the slight brightness, I found myself initially setting mixes a bit dry and dark, but once I accustomed myself to the sound of the speakers, I had no difficulty creating transportable mixes. The system never sounds strained or compressed, even when playing at higher volumes, maintaining good clarity on loud peaks.

FULL-RANGE VERSUS 2.1

Blue Sky contends that few monitoring systems in use in studios today are actually full-range. Their claim is that only an integrated, matched, bass-managed system can deliver true full-range (20 Hz to 20 kHz) in-room response. To that end, they've coined the term "2.1" to label their new stereo satellite/sub system. Unlike 5.1, 6.1, and 7.1, Blue Sky's "2.1" doesn't imply a discrete LFE subwoofer input, rather it's used to describe the physical configuration of two satellites and a matched bass-managed subwoofer.

In the Blue Sky system, the Sub 12 subwoofer contains the bass management capabilities. The stereo output from your mixer (or other source) is fed into the subwoofer, where it's high-pass filtered at 80 Hz and sent back out to the satellites. The stereo input signal is also sent to an 80 Hz low-pass filter and then on to the Sub 12's amplifier/driver. In use, all of this is transparent; all the user needs to do is dial in the subwoofer gain relative to the satellites.

Note that the Sub 12 does contain both a discrete subwoofer input and a subwoofer output. These can be used to daisy chain multiple subwoofers together, or in a 5.1 configuration, the sub input can be used to accept an LFE feed from an external bass management system.

Blue Sky has done an admirable job with their first product. The Sat 6.5 and Sub 12 integrate into a powerful, clean, highly listenable monitoring rig. At its suggested retail of \$1,395, the newly termed "2.1" system is an outstanding value, offering sound quality comparable to significantly more expensive monitors. If you're on a budget, give these speakers a very close look. And even if you're *not* on a tight budget, you should still scope the Blue Sky's out — you won't be disappointed. ■

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Keyboard August 2001

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Future Music May 2001

Keyboard Magazine August 2001:
"SONAR is the only program for Windows that incorporates extensive MIDI editing and processing, digital audio recording, software synthesis, and ACID-style looping. If your needs demand this broad a palette of functions, SONAR is the program to beat."

Digital ProSound.com

Digital ProSound.com:
"Sonar is a serious tool for the professional, yet friendly enough for the beginner to enter into the world of computer music production and not want for more features shortly down the road."

Future Music May 2001:
"Cakewalk SONAR 9 out of 10 rating. Cakewalk catches up. SONAR is a high spec music system, excellent value and written specifically for the PC. The soft synths and loops make it a well rounded package. **PLATINUM AWARD!**"

ProRec.com

ZDnet.com: Rating Five Bullets!
"Perhaps Sonar's greatest achievement is its single, non-intuitive workspace." "Sonar incorporates many much-needed functions and features while maintaining the quality and usability that made its predecessor popular. Great attention to detail makes for a reliable workspace for recording and mixing professional sounding audio projects on your PC."

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"SONAR is a cornucopia of powerful features. If you can make the switch to SONAR and take advantage of what it offers, then you will be both pleased and amazed by its capabilities. At \$299 street, or \$99 upgrade, the capabilities are much more than worth the cost in time and money required to make the change."

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CIRCLE 66 ON INFO CARD
World Radio History

by Scott Aiken

PATRICK O'HEARN makes a
music-recording odyssey from
L.A. to North Carolina

Going with the

FLOW



Composer and multi-instrumentalist Patrick O'Hearn may be a musical jack of all trades, but master of none? No way! A much sought-after session bassist, the man's recorded and performed with a dazzling array of top-notch artists, from world music icon Ravi Shankar to pop music iconoclast Frank Zappa. There have been many others along the way as well — guitar virtuoso Carlos Santana, throaty-voiced superstar Rod Stewart, Hollywood soundtracker Mark Isham (with whom O'Hearn co-founded the modern jazz ensemble Group 87 in 1980), and a host of jazz greats, including saxophonists Dexter Gordon,

Charles Lloyd, and Joe Henderson, to name but a few.

In the early-'80s, O'Hearn endured a brief foray into the cut-throat, disposable world of pop as part of Missing Persons, comprised of vocalist Dale Bozzio and her then-husband Terry (now an in-demand drummer), plus guitarist Warren Cuccurullo, who went on to find fame and fortune revitalizing Duran Duran. O'Hearn did well. Parallel to that blossoming session résumé, he became a successful recording artist in his own right — twice-Grammy-nominated to boot. For many, his name remains inextricably linked with former pivotal Tangerine Dream member Peter

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CIRCLE 20 ON INFO CARD

Going with the
FLOW



Baumann's Private Music label, heady digital days when O'Hearn and stablemates Yanni, Suzanne Ciani, and later Tangerine Dream themselves regularly jockeyed for position on the *Billboard* New Age Albums chart. All were regular visitors to its hallowed heights.

O'Hearn's a man of many musical parts, all of them talented. And nowhere do those talents shine more brightly than on *So Flows The Current*, his first solo album in over four years, and the first on his new Patrickohearn.com independent label.

**LAST OF THE
NEW AGE MOHICANS**

O'Hearn's initiation into the fledgling New Age field was both unexpected and spontaneous, helping launch Baumann's Private Music venture with his *Ancient Dreams* solo recording debut.

"I had no idea whether anyone would be at all interested in the album," confesses O'Hearn, before adding, "but I loved it, and that was all that mattered to me. As it turned out,

lots of people loved it, which was a pleasant surprise."

**CHASING
THE DIGITAL DREAM**

Clearly, *Ancient Dreams* paid off — so much so that Private called for a second album, *Between Two Worlds*, which followed a studio renovation of his home and the rental of a Mitsubishi X800 that saw recording action in his converted laundry room.

Between Two Worlds was followed by *River's Gonna Rise*, in which O'Hearn took another step toward achieving his project dream-studio with 1988's *Rivers Gonna Rise*, his third Private Music outing. Parallels can further be drawn in the sense that both albums credit the high-end, up-to-date equipment on which they were recorded.

And as the high-flying '80s drew to a close, Private Music moved cross-country from New York City to their final Los Angeles resting place on Melrose Avenue. This was just in time for what was to prove to be O'Hearn's full-length

Studio A.O.T.
INVENTORY

- **MIXING CONSOLE:** Mackie 8-Bus (48-channel), Digital 8-Bus.
- **MONITORS:** Genelec 1031 with 1092 sub (mid-field stereo), 1092 sub (surround), Mackie HR824 [5], Yamaha MSP5
- **RECORDING:** Echo Layla [3] (24-in/30-out), Fostex CR-200, Panasonic SV-3700 DAT, TASCAM CD-RW 5000, DA-88 [3], IF-88AE interface
- **OUTBOARD:** API 312 mic pre [4], 550 EQ [2]; DBX PB-48 patchbay [4], Electro-developments Strate Gate [2], Neve 1073 mic pre-EQ [2], 2074 EQ [2], Urei 1178 limiter [2]
- **EFFECTS:** Eventide H3000S, Lexicon PCM 42 [2], PCM 70 [2], PCM 80 [2], PCM 90 [2]; Line 6 Pod
- **MICROPHONES:** AKG C414-TL [2], Solidtube [2]; Crown PZM [2], Neumann M147 [2], Shure SM57 [2].
- **COMPUTER:** Custom-built Pentium III with internal TEAC CD-R and multiple hard drives
- **SOFTWARE:** Sonic Foundry Acid Pro 2.0, CD Architect 4.0d, Vegas Audio 2.0; Steinberg Cubase VST 3.72, various DirectX plug-ins
- **MIDI:** JL Cooper MSB 8x8, MOTU Micro Express, Roland MPU-101, Doepfer MAQ 16/3, Shaltwerk
- **SYNTHESIZERS/SAMPLERS:** Akai S6000, Analogue Systems custom modular, Clavia Nord Lead, Doepfer MS-404, E-mu ProCussion, Oberheim 4-Voice, Xpander, PPG Wave 2.2, Roland JP-8000, Sequential Circuits Prophet 5, Studio Electronics MIDI-Mini, Waldorf Microwave
- **ACOUSTIC INSTRUMENTS:** Fender fretted and fretless basses, lap-steel guitar, Strat; Kay acoustic guitar, German flat-back acoustic bass (c1720), Music Man fretted and fretless basses, Yamaha piano, Armstrong Silver C flute, cello, various ethnic drums, percussion objects, ethnic flutes, drums, and cymbals

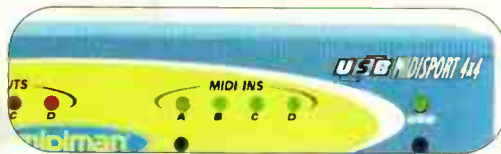
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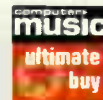
USB MIDISPORT 1x1 - 1 in/ 1 out MIDI interface.



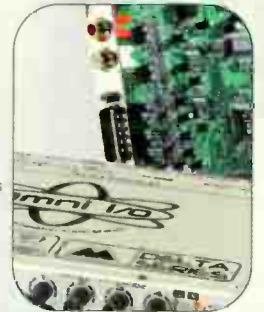
DELTA 1010 - 10 in/ 10 out PCI digital recording system.



USB MIDISPORT 4x4 - 4 in/ 4 out MIDI interface.



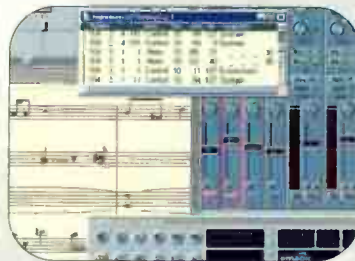
Computer Music says of the Omni Studio the recording quality is supreme, the preamps sound utterly fantastic, versatility at its best. 10/10



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CIRCLE 41 ON INFO CARD
World Radio History

Going with the FLOW

studio epitaph for the label in 1991's well-received Indigo. The O'Hearn family then paradoxically headed south, relocating to Atlanta, GA.

"Our family moved away from Los Angeles in 1989 because we were growing in numbers and needed a larger pad," states O'Hearn, matter-of-factly. "And being that that year was a peak in the ever-cycling Southern California real estate market, we decided to strike the tents and eventually headed to Atlanta, where my wife is from, and where we could afford far more crib for the dollar."

STORMY WEATHER

O'Hearn released the Grammy-nominated *Trust* in 1995 on his newly launched Deep Cave label. As far as this compelling musician was concerned, Private Music's river of dreams had long dried up.

"By late 1994," says O'Hearn, "I was finally 'pardoned' from my recording contract and free to do as I pleased. Artist-owned 'vanity' labels had become commonplace and I, too, joined the new school with my own label. I had high hopes of picking up the pieces and putting the darker Private days behind me."

RIVER'S GONNA RISE AGAIN

Weathering the unfavorable record-industry climate proved difficult, and so 1996's critically acclaimed *Metaphor* proved to be Deep Cave's second and last release. Then Patrick O'Hearn fell silent, at least to the outside world, after the demise of the Deep Cave Web site in 1998. While Deep Cave's catalog remained sporadically available, O'Hearn was already planning ahead, looking to re-enter the music business on his own terms. But he still had to fully realize that serious project studio of which he'd been dreaming for so long. That dream was about to become reality.

Prior to the release of *Trust*, the O'Hearn family was on the move again, this time for the small-town

country lifestyle offered by Bat Cave, North Carolina. "By 1994, Atlanta had rapidly spread out around us," explains O'Hearn. "In Atlanta, what had originally been our rural fringe of the metro area was now being swallowed up in suburban sprawl. We were always taken with the scenic beauty of nearby Western North Carolina, and so we decided to 'head for the hills.' I figured, 'Hell, I'm so far removed from Hollywood now, what difference is 200 more miles up into the Blue Ridge Mountains going to make?'"

Which brings us to Studio A.O.T., credited on this year's *So Flows The Current*. O'Hearn explains, "Trust began and continued in an interim workspace — a rental loft space that I worked in between '94 and '97, when my new studio was ready. My wife convinced me in late '96 that it was high time I had my own 'detached' free-standing structure in which to work. She had an architect friend who agreed to design me a workspace based on a 30x30 footprint. I called my friend, engineer extraordinaire Bruce Swedien, to ask for a few tips on the matter. As soon as I mentioned the 30x30 figure, he broke in and said, 'For God's sake man, whatever you do, don't build a cube!' Bruce gave me important insights on creating non-parallel, non-plumb walls, and being conscious of setting up the interior in such a way as to reduce potential standing waves, all of which was most helpful."

CHANGING GEAR

Light, bright, and ergonomic, the finished product certainly makes for a comfortable and inspirational composition and recording environment. "I wanted a large open space without a ceiling, so we used a traditional hip roof or pyramid design, and included an office, storage, and machine room of dissimilar dimensions to offset the main room," explains O'Hearn. "The structure sits atop a three-foot foundation, which enables me, if and when I get around to it, to run all

cabling under the floor.

"When we left Atlanta, I decided to cut loose the Harrison console and Sony 3324. The Harrison was a great board, but it required regular maintenance — no sweat in Atlanta, but out of the question where we were headed. The Sony, too, was not going to be practical in a 'coon skin' cap, so I replaced them with three TASCAM DA-88's and an expanded Mackie analog 8•Bus. Although the Mackie is well designed and its EQ sounds great, it was a big step backward in terms of overall console. In fact, not until I replaced the 8•Bus with Mackie's newer [digital] D8B did I regain the flexibility I lost with the Harrison. This phase of my home studio experience also cast me out of the secure XLR world that I had happily dwelled in to that of the mixed bag cabling gumbo that is much of today's project studio fare."

SO FLOWS THE CURRENT

"In making this album, I finally kicked the habit and detoxed from using MIDI, SMPTE timecode, and software sequencers as a basis for everything," O'Hearn confesses. "Not since recording *Ancient Dreams*, some 16 years earlier, had I done this. I got so hooked into MIDI and MTC over the years, especially when doing film work, that it was all but essential. It had become my de facto way of composing and recording — so it was tough to let go.

"Along the way, and in my effort to shake loose the software sequencer, I had purchased two wonderful Doepfer boxes — the Schaltwerk and the MAQ16, neither of which are featured on this album, but will, however, shine on future tracks," divulges O'Hearn, before expanding upon his current *modus operandi*. "I also switched from tape to direct-to-disk recording using Sonic Foundry's Vegas Audio and three Echo Layla boxes, a transition that began in '93 with an early [Digidesign] Pro Tools system, but was later abandoned. Using Vegas Audio, I recorded myself playing bass, piano,

Solo DISCOGRAPHY

- **Ancient Dreams** [One Way Records, 2000]
- **Between Two Worlds** [One Way Records, 2000]
- **Rivers Gonna Rise** [Private Music, 1988]
- **Eldorado** [One Way Records, 2000]
- **Mix Up** [Private Music, 1990]
- **Indigo** [One Way Records, 2000]
- **The Private Music Of Patrick O'Hearn** [Private Music, 1992]
- **White Sands O.S.T.** [Morgan Creek Records, 1992]
- **Trust** [Deep Cave, 1995]
- **Metaphor** [Deep Cave, 1996]
- **Patrick O'Hearn • A Windham Hill Retrospective** [Private Music, 1997]
- **So Flows The Current** [Patrickohearn.com, 2001]

synthesizers, and percussion, as well as the other musicians and their respective live instruments. Although some cut-and-paste editing was done — in particular the looped piano phrases on the title track — almost everything is performed as heard."

Live performance recording implies *mucho* microphones, and here Studio A.O.T. doesn't disappoint. "I used Neumann M 147's, AKG Solidtubes and '414's, and Shure '57's," reveals the master of recording ceremonies. A modest yet classy collection of desirable outboard spiced up the production proceedings. "Some of the tracks were recorded through outboard Neve 1073's and API 312's and 550's, but much of the recording was done straight into the Mackie Digital 8-Bus or analog 8-Bus, and then into the computer. I recorded click-tracks and worked in the visual 'bar/beat' format of Vegas to navigate around the tune's different sections in a familiar visual format, and with the aid of markers. Effects used were an Eventide H3000SE, Lexicon PCM 90, two PCM 42's, and two PCM 70's, some D8B internal effects, a UREI 1178, and a Line 6 Pod. Monitoring was handled through the trusty old Genelec 1031's and a 1092 sub."

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Going with the FLOW



few more tucked up his studio sleeve, for while *So Flows The Current* was mixed down in stereo for its initial release on the now not-so-new CD format, Patrickohearn.com confirms that work is underway on a 5.1 surround sound version: "The project will be authored in the Dolby Digital format and released on DVD-Video. Although the disc will have little, if any, video content, this format seems to be the best way to go at present given the fact that so few DVD-Audio or so-called 'universal' players exist. The DVD-Video disc will be playable on all DVD players and anyone who has a Dolby Digital-equipped player or receiver and a 5.1 home theater speaker setup will be able to listen in this most enjoyable new format.

"As far as additional equipment goes," says O'Hearn, "I'm still trying to puzzle it out, as I'm sure many who

are just getting into this format are. I'm using five matched speakers, Mackie HR824's, and a single Genelec 1092 sub, although I believe I'll soon upgrade to a larger 1094 sub for the left-right-center and perhaps use the 1092 for the surrounds. I'm not using the discrete sub channel, and with the left-right-center speakers running through the 1092, and its internal crossover, quasi-bass management is achieved for monitoring. My setup is modest; I don't have a master matrix control such as a Martinsound MultiMax, which would provide options such as fold-down, master volume, calibration, and bass management. But, armed with Tomlinson Holman's excellent reference book, *5.1 Surround Sound Up and Running*, I'm making do with what I've got and slowly feeling my way into this interesting new realm."

BACK TO THE FUTURE

"Last year I put together a custom analog modular synth rig from an English outfit called Analogue Systems — no microprocessor, no keyboard, and no sound unless you grab a wad of patch cables and start experimenting. It's very open and refreshing. That instrument, when controlled with the Doepfer hardware sequencers, becomes most enjoyable, and may well be the basis for my next record." Which just goes to show that there's room for everything in our increasingly varied recording world — including innovative, independent artists such as Patrick O'Hearn. ■

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For more information on Patrick O'Hearn, visit www.patrickohearn.com, or email him at patrick@patrickohearn.com.

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6. Winners will be determined by January 15, 2002, after which each entrant will receive a list of winners in the mail. CDs, Cassettes and lyrics will not be returned.

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Producer **TOBY WRIGHT** reveals the unique recording style that helped make monster sounds from bands such as Alice in Chains, Korn, and Slayer

MAUI BUILT

unleashing the beast

by Howard Massey

unleashing the beast

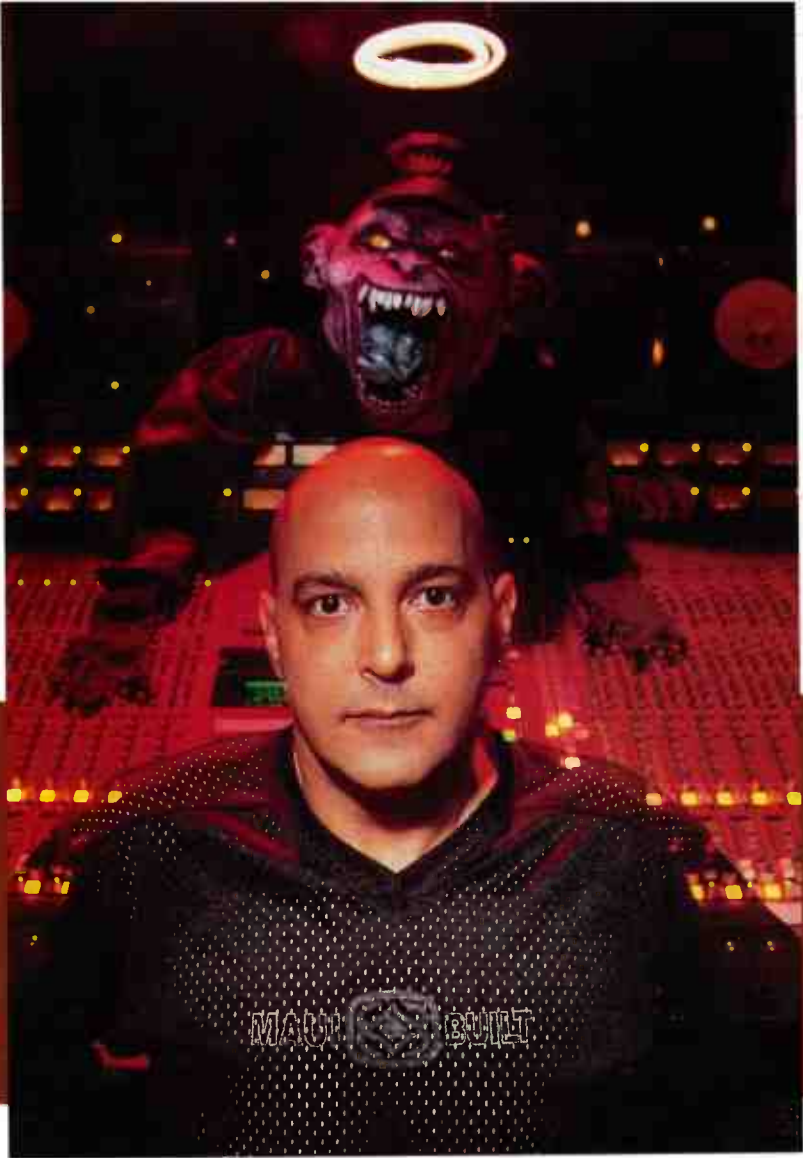
They say that opposites attract, and Toby Wright's successful career as producer of some of the fiercest thrash-rock bands around would seem to lend credence to that theory. Easy-going, even-tempered, and — well, we have to say it, downright pleasant — Wright isn't the kind of guy who would strike you as the in-your-face production and engineering force behind the likes of Alice In Chains, Korn, and Slayer. Wright's equanimity may be ascribed to his varied career, as he started out in the unlikeliest of roles — as a maintenance engineer. He worked in the maintenance department at New York's famed Electric Lady before making the move to L.A. and joining the techno-boffins at Village Recorders. He later landed at Cherokee.

Eventually tiring of fixing gear, Wright made the improbable transition to assistant engineer, then engineer, and is now one of the most in-demand producers in the industry. During the course of his journey, he has crafted hits for an eclectic group of artists — not just the thrashers he's best known for, but also bands such as Primus, Fishbone, The Wallflowers, and Third Eye Blind. Wright shared his unique approach to making records with us at L.A.'s Record Plant one sultry afternoon during a break in finishing up mixes for a new band called Tantric.

EQ: Your productions tend to feature a lot of dense instrumentation, lots of distorted guitars, and lots of vocals, yet the separation is excellent. How do you achieve that with such thick backing tracks?

TOBY WRIGHT: Well, Jar Of Flies [Alice in Chains] was done in about ten days. It was completely written, arranged, produced, recorded, and mixed in that period of time, and there wasn't a lot of time to think. It was basically "capture those guitars and go." We really didn't even have time to sit down and make a plan. "Set up and let's jam," was our motto.

So you didn't spend a lot of time in the recording process focusing on sounds? Was more time spent in the mix process?



PHOTOS BY EDWARD COLVER

No, it was all of the above. We just slammed it to tape and slammed the mixes just as fast. I have a motto that, if it takes five minutes to record, it should take five minutes to mix. If it doesn't, you're overthinking it. It's probably a very simple song if it just took one pass to record; it should be treated the same way when you mix it because that's obviously the intent.

On the other hand, if you spend a lot of time on a song and get out the microscope and get into every little tiny nook and cranny, then you should probably do the same thing when you mix. That way it brings out the shine. I've found that, for a lot of the songs that I record and mix, I can go through them pretty quickly because I've recorded them — I know how I want to hear it. I pretty much know my vision for the song or the entire album, and I just keep pecking away at that. And, as far as getting separation, it's just a matter of getting the tones. I have a few odd, special pieces of gear that I

use for certain instruments here and there.

Can you run down a few of them?

Sure. I use a UREI 546 for my guitars. It's an old four-band parametric [EQ] that has a really crunchy sound. I have Trident A-range modules — ten of them — racked up. I'm probably the only person in the world that has such an array. I'm also a big [UREI] 1176 fan. I have purple ones, I have a black face, and a silver pre-black face, and every single one of them sounds different.

Have you hot rodded them at all?

No, I don't really believe in all that hyped-up electronic stuff. I was a maintenance engineer for a long time, and I've seen mods go bad.

Are these all guitar toys, or do you use them on other instruments?

I use them on pretty much everything. I don't use a lot of EQ. When I'm recording, I use mostly mic placement, dating back to the old

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school. I listen to the source carefully and then, if I like what the source sounds like, I like to get that to come out of the speakers as well, so it sounds really close, if not better, in the control room.

The problem is, if you go for a monster guitar sound every time, it's going to get pretty crowded in that little song if you also have big monster drums and monster bass. If everything's monster tone, you're not necessarily going to have a monster-sounding

record; you're going to have a pretty compressed, small-sounding record.

Plus it's going to be very hard for the vocal to sit on top of that track.

It sure is. Sometimes band members will say, "Hey, solo up my so-and-so," and it kind of sounds sh*tty to them in solo, but when you drop it in the track, sometimes it complements everything around it, and that's pretty much what I'm looking for. It doesn't matter what it sounds like in solo to me. It can sound like

the weirdest thing on earth; as long as it fits and complements the track and what's going on around it, it's there to stay.

Obviously, the signal is passing through lots of tubes. Are you an analog guy, are you a digital guy, or are you both?

I guess I would be a "digilog" guy. I capture things on analog initially, but I'll dump it into Pro Tools to preserve the sound, because, as all of us analog freaks know, once you run the tape over the heads five times, your sound is gone. Remember that sound you once fought with the guitar player for a third of a dB at 3k? The point is moot because it's gone now! So I use Pro Tools to save the sound, and then I'll edit it, push it around, clean it up a bit, and then spit out the drums and the bass and any low-end type of stuff back onto fresh tape before I mix. I'll keep the vocals and the guitars coming digital out of Pro Tools. It keeps the crispness so the original sound you've recorded makes it to your mix.

I did one project completely in Pro Tools and it sounded thin and silly; it didn't have any balls at all, and I was not very happy with it. I don't know any digital medium at this point in time that can replicate warm music. It just doesn't happen, to my ear.

How are you getting from your rack into Pro Tools? Are you using stock A/D converters?

Just stock 888's. I did a test a long time ago: I bought a 16-bit system and put it up against some drums I'd recorded on tape, and I could tell the difference, so I got rid of it. I did the same thing when 24-bit came out, and I couldn't tell the difference, so now I own a 24-bit system. I can't tell the difference; it doesn't matter after that. There are a lot of tech people that will tell you I'm wrong, but my ears don't lie to me. What I hear is what I hear, and I think that, at the end of the day, the consumer can't hear the difference.

They *can* hear the difference, however, between an all-digital recording and a mixed recording. I can hear it on the radio quite well. Compression grabs digital on the radio in a very strange way — it's got a weird top end, even coming over a

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radio speaker. It's just strange and pointed. It's just not right, not pleasing to my ear, anyway.

That's probably because the transients are different.

Yeah, it's a strange thing. But analog tape will warm things up, though it can still be really crisp and clean on the top end. I don't over-compensate when I record, though; I record exactly what I want to hear.

Do you work at 44.1 or at one of the higher sampling rates?

44.1. I can't hear the difference in using higher sampling rates; it just makes for longer, bigger files.

Plus you don't have to do any down-conversion.

Exactly.

So the basic signal chain is good mic positioning, rack of tube vintage gear, then to tape, then Pro Tools....

Yeah, everything goes to tape. Sometimes I'll use that tape compression, and sometimes I'll hit it a little lighter and I'll just capture it. Generation loss, to me, just doesn't matter. I work at 30 ips, +5, non-Dolby. Traditional.

Do you use plug-ins much?

Yeah, but mostly for effects. I don't use a lot of compression, but if it calls for it and I can get what I want with a plug-in compressor, I'll definitely put it on there. I'm not afraid to use anything, but I don't use things that I don't need. I'm a minimalist, I guess.

How do you decide whether to use an analog processor while you're still in the analog domain versus using plug-in processing?

It depends on what I'm hearing. If I just need a simple delay, I'll probably take it from an outboard source. But if I'm after something that's a little bit more insane or off-the-wall than comes with normal outboard gear, I'll twist it up with a plug-in because plug-ins can be a lot more drastic.

From what I've experienced thus far, I can twist sounds and make them more unreal in the digital domain than I can in the analog world; it just adds some weirdness. A reverb is usually a little smoother in the analog world than it is in the digital world. But for effects — flanging and ring modulating and all that kind

of stuff — you can get a little more drastic in the digital world.

After you've done your editing and plug-in work, do you go back out again from Pro Tools to tape?

When I mix, yes. I'll take a rough mix out of Pro Tools as a starting point, but then I'll dump drums and bass to tape. Sometimes I'll use 16-track, sometimes I'll use 24-track.

So you don't dump all the tracks to tape, just the ones that need warming up?

That's right. I'll put the drums and bass back where they belong, on analog, and sometimes vocals, depending on how they're cut, depending on the DSP power of my computer. If I have eight tracks of vocals and I'm running AutoTune on all of them, I'm going to print them to tape so that I can have the DSP power to help me out if I need a ring modulator on a guitar, for instance. I then use the stock D/A converters out of Pro Tools to get the signal into an analog console.

Is the final mix to half-inch?

Half-inch, 30 ips, ATR 104/102, always, and again at +5; I don't hit it too hard. I back up on DAT and on Pro Tools, but I never use the digital mixes. The analog wins every time. Never had any kind of digital device win. And I've been through pretty much all of them.

With this recording technique, is there any kind of problem with tape hiss buildup? Because it sounds like some tracks are third generation by the time you get to the mix.

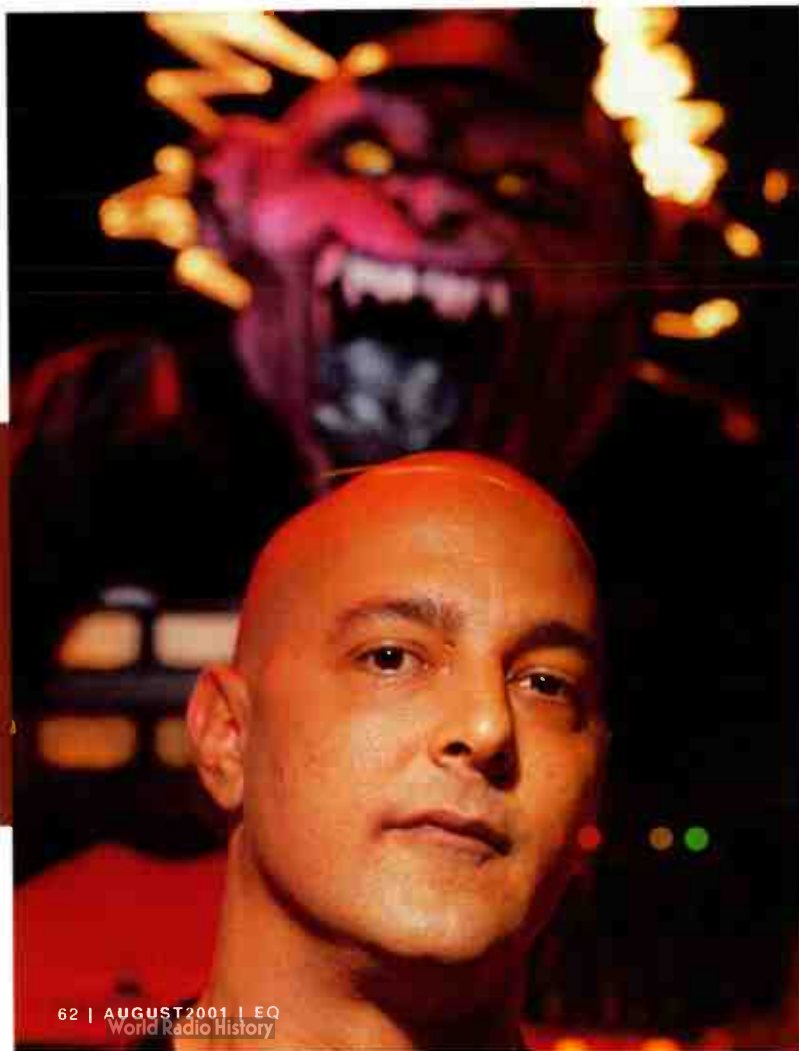
Well, digital, to my ear, doesn't count as a generation. If I go off of tape to digital and then go back to a piece of tape, it's the same exact sound, it's not a generation loss.

But you've got some hiss from the first tape recorder...

And Pro Tools preserves that...

...and then you're going to another recorder and adding a little bit more hiss.

Ah, but I do go through a special program on the way out from Pro Tools. [Whispers.] That's a secret,



though! [Laughs.]

So there's some kind of processing used for removing the hiss?

Yes, coming back out. Going in, I don't really care 'cause I get rid of it when it comes back out. Mostly.

Is that same process used before you mix to tape?

Yes, it is. Everything is de-hissed, making for just one generation of hiss, at maximum, which might attribute to the good separation. That's achieved by just keeping the sound clean and free of tape and hiss distortion.

I gather you're not slamming the tape very much either.

Not really. Sometimes I do for an effect, for the compression. But I'm pretty conservative. If I record a drum kit, for instance, and I really want the kick drum to be compressed, I'll compress it outside and then I'll slam it to tape and get that extra boom going on. Then I'll reduce it when it comes into Pro

Tools 'cause it's usually too hot. I'll make it so the meter doesn't move, ever. The song starts, the meter moves, the song ends, the meter moves. [Laughs.] That's the last time it moves.

That's something some engineers talk about with some degree of despair, but I suppose those are the demands of modern recording today.

Back in the days when I was a maintenance engineer at Cherokee, Roy Thomas Baker was working on a Cars record — Candy-O I believe it was — and he owned a 40-track Stevens machine, two-inch. We called it the cricket machine, because all you heard was [makes cricket noise] and that was the sound of his meters bouncing off their stops, and if he didn't hear that, it wasn't good enough. So he got me into that train of thought a long time ago, and I guess when you learn from those who are considered the best, you tend to follow in their footsteps.

I don't believe in having records sound the same internally within songs. I like to take one song at a time, build it until it's completed, and then sit back and listen to it and say, "Okay, I like where that's going, I like the vision that that song creates, I like where that takes me." Then I'll move on to the next song. There are certain records out there that use the same sounds from top to bottom, and they sound like one long song. Boring. I don't care who you are or who the band is, it's boring.

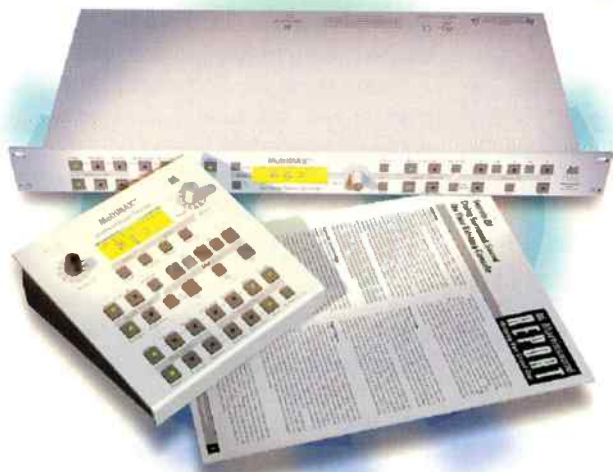
I like the listener to stay interested. It's my own personal thing: I get bored easily and can't even make it through a 400-page book! [Laughs.]

Does that extend to things like mic selection and placement? Would you re-mic the same drum kit for different songs?

Absolutely. On this Tantric record that I'm working on now, I moved the drums six times in 14 songs and even changed out mics here and there. Some things stayed the same, some

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things didn't. I also used a few different vocal mics, depending on the song, depending on what I was after. Same thing with guitar mics: we used tons of different equipment. The guitar player came with one guitar, one cabinet, and we probably rented about \$50,000 worth of gear because you can't do a record with one guitar and one cabinet. Well, you can, but it's not going to have a lot of variation in it.

You're the first person I've interviewed who made the transition from maintenance engineer to successful producer.

I don't think there are many. It's taken a long time; it's been about 20 years. But when it comes to physics and the properties of sound and how sound travels and what instruments do and how their sound resonates, it's all very, very useful information. I can look at a guitar and pretty much tell you where is going to be the best place to mic that guitar after hearing it strummed once; it's all physics. And if you've got a little electronics background, you can figure out how things work under their specifications, and then you can learn to push them even harder if you need to. And you can learn what they do when they're pushed harder, so you don't blow stuff up. [Laughs.]

It's real easy to blow stuff up, you know. I've seen people literally smoke modules and catch consoles on fire just because they had no idea what they were doing. I would love to see more engineers come up through the maintenance department.

Most people who want to be engineers don't gravitate to being in the maintenance department — they'll be the runner or assistant.

Yeah — runner, then assistant, then go on to engineer, but then you have really no background on how a Pultec works. Why does it sound so sweet and why does this digital EQ sound like sh*t?

But do you really need to know how to fix gear in order to understand that?

No, I don't think so. I just chose that path. I needed to know how to operate gear better than an engineer did, because, if I walked into a room

and there was a problem, I had to be able to solve that problem.

Some engineers know just enough to be dangerous. I was doing a demo about 10 years ago in a little project studio and I asked the guy who was aligning the two-track machine, "When's the last time the azimuth was checked on that machine?" and he said "Oh, the azimuth? The azimuth is great in this room." [Laughs.] I got in my car and left.

I'll never forget that as long as I live. Obviously, he had no idea what he was talking about, yet he called himself a producer. Very interesting.

I would imagine that tech engineers quake when they hear you're coming in to do a session at their

"If it takes five minutes to record, it should take five minutes to mix."

studio, because they know that they're going to have to deliver.

Yeah, some do. Some get awfully mad at me, because I can't work under circumstances when I have no reference. I'll pretty much work anywhere, but technically it's got to be pretty close to correct. I can work around certain things, but if the monitors sound like sh*t and that's your reference, how are you going to tell what you're actually doing? My traveling reference is NS10, so I bring my CDs with me in a little CD player and plug it in and I know, "Okay, if it sounds like that, that's right." I can tell when NS10 woofers are worn and when they've been beat up by the client before me. A lot of people can't hear that; they haven't trained themselves to hear like that.

When I was at Cherokee, one of my fortes was monitors. I used to go in and tune the rooms and hear exactly what 3k sounds like. You know, when you're EQing something and you think,

"Oh, that needs a little dip at 2.5k?" Well, how do you know it's 2.5k? I've trained my ears to tell me it's 2.5k.

There are a lot of people who don't even know what phase is. You walk into somebody's house and they say, "Man! I don't have any bottom end on my speakers, what's going on?" I'll be saying, "Whoa, sh*t, I'm getting dizzy now. I'm going to throw up. You're out of phase." They say, "How do you know that?" "Well, put your face right here, don't move...hear that?" "Yeah, it's coming from all over the place." Then I ask them, "Where's the kick drum? Where's the bass?" "Well, I don't know...." Then you switch polarity, get it in phase, and all of a sudden it's smaller, and then there's the kick drum and the bass in the center. "Ahh!" But a lot of people — unfortunately, there are engineers in the business who are guilty, too — have no concept of the difference.

What's the craziest studio trick that made it onto record?

Recording guitar through a fan. [Laughs.] I was doing the Korn Follow The Leader record, and we were looking for some weird, wobbly sound — that whole record is pretty much based on experimentation. So, I was messing around out in the live room with a little Pignose amp and I laid it on its back and there was a fan in the room going at half-speed, so I put it on top of that, and I put one mic right down in it so you hear the sound of the fan. That's one of the guitar sounds on the record; I don't exactly remember which song, but it's one of the focal point sounds on that song. That one surprised me; it just worked.

I also noticed that in the Alice In Chains track "Shame In You" you managed to do what a lot of engineers have told me they'd love to have the guts to do and never succeeded, and that's putting the kick drum on one side.

Yeah.

Was that planned or an accident?

Planned, for sure. You know, "The whole record sounds like this, so let's make this song sound different." How? Well, it sounded exactly the same as every other song, so we decided panning was the best way.

It works because the kick drum pattern is so sparse, it's almost like another floor tom.

Exactly, that had a lot to do with it. I couldn't do it on a speed metal song — it just wouldn't be right — you wouldn't be able to distinguish anything!

Any final advice for our readers?

Just learn as much as you can. Never think you know everything; the minute you do, you don't.

Howard Massey's latest book, *Behind The Glass*, is a collection of interviews with record producers, now available from Backbeat (Miller-Freeman) Books.

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CIRCLE 29 ON INFO CARD

World Radio History

Korg D1600 Digital Recording Studio

Korg re-thinks their all-in-one digital recorder

"Studio-in-a-box" recorders just keep getting better. Formerly sneered at by those with more macho studios, it's hard to ignore the fact that you can now produce truly pro-level recordings with a compact, budget-friendly box.

The D16 already had an extensive review in the September, 2000 issue, so many aspects of the D1600 will already be familiar to readers. We'll concentrate on the major changes, but this box is definitely not an example of bolting a few new features to an existing chassis. Several small but significant improvements, such as the faders being extended from 50 to 60 mm, are indicative of a complete re-think; the cumulative total of these smaller changes add up to a more streamlined and functional unit.

The problem with hard disk recording has always been where to put all that data. Although the D1600 has a SCSI connector for external drives, Korg offers an optional, internal, swappable 20 GB hard drive (check with Korg for recommendations on other compatible 3.5-inch IDE drives). Swapping is a simple procedure — remove the front panel, unscrew a couple screws, swap hard drives, and button everything back up again.

There's also a drive bay for installing an optional CD-RW drive (of course, you can also burn CD-Rs). This is a neater alternative than swapping out hard disks if you don't need to back up gigabytes of data. However, if you do, the D1600's backup routine can spread the data over multiple CDs.

The backup process is similar to the kind done with computers — data has to be restored to the hard drive before you can use it. A second option, Copy, simply copies contents over to the CD, and



► KORG D1600

MANUFACTURER: Korg, 316 S. Service Rd., Melville, NY 11747. Tel: 516-333-9100. Web: www.korg.com.

SUMMARY: All-in-one recorder is easy to use, expandable, and offers quality sound.

STRENGTHS: Cost-effective. SCSI-2 interface. Optional CD-RW drive and internal, swappable hard drive. Four mic pres with XLR connectors and phantom power. Touch screen interface. Obvious operation. Stereo digital I/O. Imports/exports WAV files via SCSI, imports via CD drive. 16- or 24-bit operation. Lots of effects, including some esoteric ones.

WEAKNESSES: No multichannel outputs (analog or digital). Single aux out. No Disc-At-Once CD-burning mode. Track midrange EQ has variable frequency but not bandwidth.

PRICE: \$2,000

EQ FREE LIT. #: 103

data can be read directly from it.

The D1600 can import WAV files from CD, so you can bring in material from a sample CD with no extra steps (you can also bring WAV files in via SCSI). Cool. And once you've mixed your tune to stereo, you can burn a standard Red Book audio CD. One of the arguments in favor of computer-based systems has always been that you can take a piece of music from original inspiration to finished CD, but you can follow the same path with the D1600.

However, like other CD-burning programs that work in Track-At-Once mode, the D1600 always inserts two seconds of silence between tunes. So if you're doing a continuous dance mix, you'll need to use a computer-based burning setup (however, make sure the program can burn CDs in Disc-At-Once mode, or you'll still have the same mandatory two second break as the D1600).

The D1600 offers 16-track playback/eight-track simultaneous record with 16-bit/44.1 kHz recording, and eight-track playback/four-track simultaneous record with 24-bit/44.1 kHz recording. Higher sampling rates aren't available, which makes



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sense because keeping everything at 44.1 avoids sample rate conversion when burning audio CDs. Note that recordings aren't data-compressed — which is important if you want to export in WAV format.

When it's time to mix, the D1600 doesn't include automation *per se*. However, you can program up to 100 "scenes" and cause them to be selected automatically. Furthermore, the mixer level, pan, effects send, EQ, and several other parameters can transmit or receive MIDI data. Thus, you can do true automated mixing in conjunction with an external MIDI sequencer.

Even though there are channel faders and panpots, you might be taken aback by the seeming lack of channel switches. However, the D1600 uses Korg's "TouchView" touch screen, so basically your "switches" show up on-screen. The touch screen is quite wonderful; I could get around the unit fast by touching with my left hand and working the data wheel or increment/decrement buttons with my right. On a more subtle level, the touch screen makes using the D1600 somewhat of a tactile experience.

As you can master/burn tunes within the D1600, Korg has beefed up their selection of effect algorithms with a bunch of mastering-oriented effects. The effects in general are a strong point, not just an add-on: there's stereo multitap delay, multiband limiter, four-band parametric EQ, bit reducer (for lo-fi effects), ring modulator, formant synthesizer for "vocal synthesis," auto wah, multiple effects chains...you get the idea.

There's way too much to cover, even in a reasonably long review — I particularly like the built-in rhythm patterns for when you can't wait to program a drum part, but there are also virtual tracks for putting together composite parts, a flexible effects architecture, and even a ventilation fan with on/off switch to reduce noise (never fear; it turns on automatically if the internal temperature rises to unacceptable levels). About the only feature I miss is something like ADAT I/O so you can bounce tracks over to a computer-based system for extensive editing. On the other hand, if you need to do that much editing, you're probably not looking at a studio-in-a-box type of product anyway.

As this issue was going to press, Korg announced new operating system software versions for both the D1600 (v2.0) and the D16 (v3.0). Here are the highlights:

- Support for up to 8X speed for burning audio CDs, making data backups, and exporting/importing WAV files from CD-R/-RW (D16 v3.0 supports up to 4X speeds using external SCSI drives only)
- Automatic data validation when making backup files
- Make multiple copies of an audio CD
- Export multiple WAV files at the same time
- Export WAV files to CD-R/-RW media (makes an ISO 9660 format disc)
- New "Format FAT16" command for preparing media for WAV file export
- Ability to erase CD-RW media
- Improved track display
- More accurate metering
- Faster previewing of WAV files
- Faster locating
- D16 Version 3.0 increases size and zoom resolution of waveform display

The competition in this product category is fierce, but the D1600 more than holds its ground. It sounds great, is intelligently designed, and easy to use. And it's shocking to realize that, adjusted for inflation, it costs about the same as my first four-track reel-to-reel recorder. Now *that's* progress! ■

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CIRCLE 68 ON INFO CARD

Manley Laboratories Vari-Mu Tube Limiter/Compressor

A classic gets hot-rodded

When does a unit become a "classic"? That's easy — when it becomes so widely used that it's considered standard studio fare. One piece of gear that definitely fits this description (certainly in mastering facilities) is the Manley Laboratories Stereo Variable-Mu limiter/compressor.

To illustrate this point, while doing research for my latest book, *The Mastering Engineer's Handbook*, I asked most of the major mastering facilities exactly what equipment they were using. As you'd expect, the answers were all over the board in terms of gear preferences, but one piece consistently showed up on virtually all their lists: the Manley Variable-Mu. In fact, the Variable-Mu (or "Vari-Mu," as it has fondly become known) was one of the units that most mastering engineers singled out as indispensable to their work. That certainly spells standard by any definition! And now, more than ever, I've been seeing the Vari-Mu show up not only in the racks of major studios, but in independent engineer's racks as well.

So why is the Vari-Mu everywhere? From my personal experience, I can truly say that it's because it makes a mix sound better. The Vari-Mu adds a certain "glue" to a mix when used as a bus compressor that's difficult to get with all but a few other boxes.

THE BASICS

The Manley Variable-Mu is an all-tube compressor/limiter featuring real transformer balanced input and outputs and three dual triodes in a fully symmetrical all-tube circuit. This is the basic circuit configuration made famous by the hard to find and outrageously expensive Fairchild 670. Although originally designed around a 6386 variable MU tube, Manley switched some years ago to the more easily obtainable 5670. A 7044 is used in the output section, which features a higher output current and better consistency than the original 12BH7 that was used.

The unit is built like a tank, yet with a craftsmanship and precision way beyond the norm



▶ MANLEY LABS VARI-MU

MANUFACTURER: Manley Laboratories, Inc., 13880 Magnolia Avenue, Chino, CA 91710 Tel: 909-627-4256. Web: www.manleylabs.com.

SUMMARY: A stereo vacuum tube compressor/limiter with a classic variable-mu design.

STRENGTHS: Excellent design and workmanship. Highest quality sonics. The ultimate "glue" for a mix.

WEAKNESSES: Ganged input control makes it slightly difficult to use in dual-mono mode.

PRICE: \$4,000

EQ FREE LIT. #: 121

— which is the level of quality we've come to expect from Manley. The meters, attenuators, and input and output transformers were all custom designed, with the all-important mu-metal encased transformers wound in-house at the Manley Lab's magnetics department (a very impressive part of the facility). And, indeed, the specs are equally impressive, with the input of the Vari-Mu capable of up to +36 dB (that's 52 volts RMS) with only 1% distortion. Output is capable of +30 dB, which, in this world of transformerless output stages, is an impressive spec that harkens back to pre-IC days.

Though brief, the manual is one of the best in the industry, covering everything from installation to example settings and operational tips, to service adjustments, and even including a section about correct interfacing and cable wiring.





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SIMPLE FEATURES

One thing about the Vari-Mu is that it's not over the top feature-wise. In fact, the unit has exactly what's needed to get the job done — nothing more and nothing less. Essentially, there are two channels that are mostly independent except for one important exception — they share a common input gain control (more on this later). Each channel has a threshold control, output gain, attack and recovery (release), and a switch that selects between compression at about a 1.5:1 ratio and limiting at about 4:1. The ratios are deceiving in that they actually increase as the amount of compression/limiting increases, with the ratio climbing up to 20:1 at 12 dB of limiting, hence the name "variable-mu" or variable gain.

A nice thing about the Attack and Recovery controls is that they have "slow" and "fast" panel designations that make them much easier to quickly set than those on other units that only have timing numbers. The envelope

section provides quite a lot of control with the Attack settings available from "fast" at 25 ms, to "medium" at 50 ms, and the "slow" position at 70 ms. The Recovery control switches between five selections, starting with "very slow," with a time base of eight seconds, to "very fast," with a recovery time of 2 ms. There's also a hard-wire bypass and two large precision meters that indicate gain reduction. A link switch connects the left- and right-channel control circuits for stereo operation, although the individual controls aren't over-riden, so you still need to set up both channels to similar parameters.

There are several hot-rod options available for the Variable-Mu from the factory: the mastering version features precision 1% metal film resistors, Greyhill rotary switches with gold contacts, and stepped threshold attenuators and output controls. The surround version enables three units to be linked together via a common detector (see the upcoming review in Surround Professional on this version).

Another version contains a true M/S feature that allows for Mid/Side recording, playback, and processing. And, lastly, the M/S or Vertical/Lateral Mod allows for Mid/Side recording, playback, and processing, which can be used to give a wider sound by making the unit only compress the in-phase information, leaving the out-of-phase info unscathed. Conversely, as in the Fairchild 670, one can achieve a more mono sound (helpful in disc cutting to minimize groove liftout) by setting the Vari-Mu to compress more out-of-phase info.

IN USE

Over a period of months, I used the Vari-Mu on numerous projects. On bass, the tubes of the unit helped round out the sound, while controlling the peaks and evening out the quieter notes. On vocals, the tubes enhanced the sonics in a way that only tubes can do, adding both clarity and warmth. As stated before, the left and right channels share a common input gain control, which means that you have to adjust the source feed into the channel and work the threshold control a bit more than usual when in dual-mono mode, but this isn't much of a problem after you get the hang of it.

But it's across the mix bus where the unit shines. At 4 to 6 dB of limiting, you don't even know that the unit is there (except for its effect on the dynamics); it's that transparent. Kick it up to something obscene, like 15-20 dB, and it squeezes the track like a silk glove, getting the effect without any nasty artifacts. There's something to this unit that just glues everything together and makes the track sound, for want of another term, "better." No wonder it's been the secret weapon of mastering engineers around the world for so long.

At \$4,000 retail, the Manley Labs Vari-Mu isn't what you'd consider inexpensive. But there's a reason why everyone uses one and it's because it has that "sound." It's not a smash-you-in-the-face type of sound, it's more gentle and subtle, yet equally as effective. You can't really compare it to anything else because it is indeed unique, a quality that's getting more and more difficult to find in this digital age. Once you try one, you'll be hooked forever. ■

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CIRCLE 50 ON INFO CARD

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JBC/ROD2959aEQ

Toast 5 Titanium CD-Burning Software for the Mac

Is Toast 5 Titanium worth the bread?

Since I often burn my toast, Toast seems an appropriate name for software that burns CD-R discs. Toast 5 Titanium from Roxio (software arm spun off from Adaptec) supports almost every CD burner on the market, including SCSI, IDE, FireWire, and USB. Toast 5 will burn CD-R, CD-RW, DVD-R, DVD-RAM, and DLT tape. You can burn data, audio, video, photos — you can make bootable CDs, Mac CDs, cross-platform CDs, and two-hour DVD-Rs. Toast will do everything that you need to do, and do it well. Well, that's it. The world's shortest product review. Okay, for those of you who want to stick around for the details, I will continue.

Toast is by far the most-used CD burning product for Macintosh. Toast 4.xx is bundled with most CD burners. The commercial version of Toast was called Toast Deluxe. The major difference is that the deluxe version burns in Disc-At-Once mode, while Toast OEM (bundled version) uses Track-At-Once mode. Toast 5 Titanium uses Disc-At-Once mode. For audio CDs, Disc-At-Once allows you to have no space between songs because the disc is recorded without any pauses. Track-At-Once, as its name implies, records each track separately, leaving a slight pause between cuts. (There's actually an error



► TOAST 5 TITANIUM

MANUFACTURER: Roxio, Inc., 461 S. Milpitas Blvd., Milpitas, CA 95035. Tel: 408-635-7694. Web: www.roxio.com.

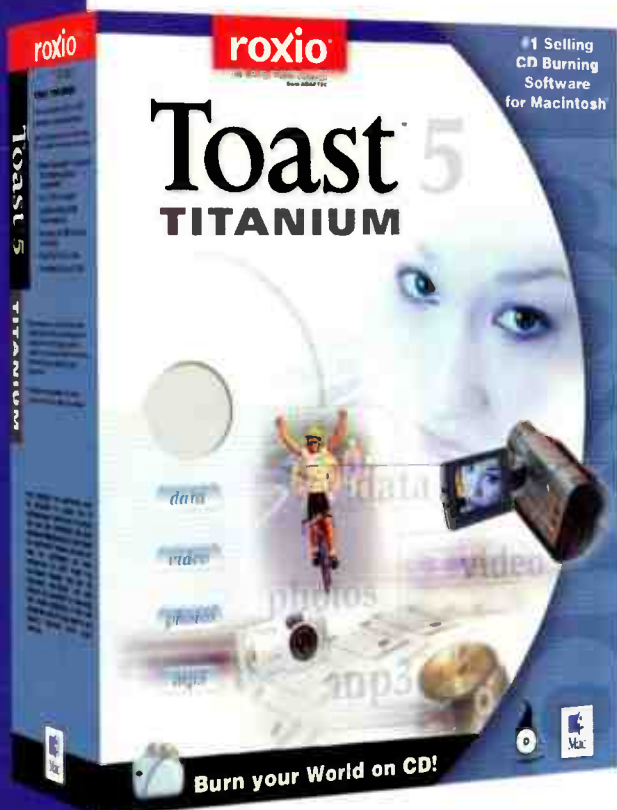
SUMMARY: Easy-to-use CD and DVD mastering software with a host of useful features.

STRENGTHS: Highly accessible drag-and-drop interface. Supports nearly all CD burners. Allows you to burn a wide variety of formats. Many helpful extras such as Spin Doctor and Track-At-Once software.

WEAKNESSES: None to speak of.

PRICE: \$89.95

EQ FREE LIT. #: 102



produced at the junction between the tracks because the laser is turned off and then the recorder "punches in" for the next track.) If you're transferring a live recording with audience reaction (hopefully applause) between cuts, then you need Disc-At-Once.

Toast 5 Titanium uses a drag-and-drop interface to make CD burning as easy as possible. All you have to do is drag the file you want burned onto the Toast window. Toast detects whether the file is a data file that should be burned as a CD-ROM, or an audio file that should be burned as an audio CD. If your CD-ROM drive is fast enough, you can even copy a CD or CD-ROM by dragging it onto the Toast interface. The information from the CD-ROM drive is then copied directly to the CD recorder. What could be easier than that?

If you have a fast 16x or 24x CD-R drive and you're trying to copy a CD, you may want to copy the information to your hard disk first to avoid the dreaded "Buffer Underrun" error. This is sometimes referred to as "Beer Can Coaster" production. Audio tracks that you've dragged to Toast can be re-arranged in any order you want. You can even preview the songs in Toast and change the space between songs if you want to.

Before we move on, let me point out that you can also record CDs filled with MP3 songs. The

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MP3 format will play back on your computer CD-ROM drive or a CD player that recognizes MP3 format CDs. Remember that you get much more playing time, but the quality is not as good as CD-quality audio.

VIDEO CDS AND DVDS AND DATA

Toast 5 Titanium will produce Video CDs from QuickTime files, MPEG-1 streams, iMovies, or Video CD disc images. A Video CD can contain up to 70 minutes of video. Video CDs can be played back in Video CD-capable DVD players, as well as most CD-ROM drives. To make a Video-CD, just select Video CD as the format and drag the video files to the Toast window. If conversion is required, Toast will ask for a folder to save the new file. After conversion, you're ready to burn a Video CD.

To save movies on DVD, select DVD from the menu and drag the Video_TS file that was produced in a DVD authoring package into Toast. Because Toast isn't a DVD authoring program, you can only store one movie. The movie can be up to

two hours long, though. This is twice as long as iDVD allows. A more appropriate task for Toast is to produce DVD-ROM discs with video and program files on the same disc. It works like a charm.

You can also write DVD-ROMs. Just like archiving to a CD-R that holds 700 megabytes, but DVD-R holds about 4,200 megabytes of data. And any of this data and video can be written to DVD-RAM or DLT tape, if that better suits your needs.

OTHER GOODIES

Don't stop here. Toast will also write CD-ROM-XA, Mixed Mode, Enhanced Music CDs, and CD-i. If you're too lazy to type in the song titles when importing CD audio, Toast will get the track names online automatically from a CD name server site. Cool.

SPIN DOCTOR

The Toast 5 Titanium package comes with a program called Spin Doctor. Spin Doctor is designed for converting analog audio from cassettes, old LP records, or

other sources into files for burning onto CD. You can set the record levels and record in an entire LP side at once. After the recording process, Spin Doctor will automatically detect the space between songs and mark them as separate tracks on the CD. If the LP is too noisy, Spin Doctor contains pop and click filters to remove some of the noise. You can also enhance the stereo, add more bottom end, or excite the highs without going to an external program for help.

FINALLY

What can I say? I like Toast. For me, it was a no-brainer. Toast has been my flagship CD burning software for seven years. I've purchased all of the others and tried them, but nothing comes close. I rest my case.

Remember: Where there's Toast, there's Jam. Jam is Roxio's audio-only CD burning solution for those who need control over ISRC and UPC codes, level control of tracks, and the ability to cross-fade between cuts. I have both, and use them every day. Happy burning! ■

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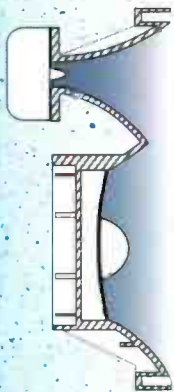
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Protect Your Investments!

A few weeks ago, I mixed an outdoor show somewhere in the wilds of Michigan. Since it was a typical outdoor concert/motorcycle rally, I didn't expect the production to be first-rate. Imagine my surprise when I went out to FOH and found a beautiful new console — state-of-the-art, all under microprocessor control. I have to admit: I have a chip on my shoulder regarding this type of desk. The last time I used a computer-assisted live console, it crashed right before the show. I politely asked the systems tech to disconnect the computer — which he did, and the show went fine. Such was not to be the case on this day: disconnecting the computer would render all VCAs and mutes useless on this desk. The systems tech assured me all would be fine, especially with a redundant power supply racked and ready.

During my line check, the console went down and with it came the most thunderous blast of noise that anyone ever heard from a PA. You *know* it was loud because even the bikers were scared. After we ducked a couple of thrown beer bottles, the system tech re-booted the desk and, a few minutes later, all was fine (accept for some broken glass underfoot). Maybe. Three songs into the show, the computer crashed again and the entire system became silent. Half a song later, the CPU re-booted and the system came back up.

What astonished me about this experience was the total lack of respect on the part of the PA company for such a sophisticated (and costly) piece of gear. After spending thousands on the desk, they didn't have a \$200 uninterruptable power supply or even a surge suppresser on the PSU. It's one thing when you're using a desk like this in a theater where the AC is relatively stable, but to expect a computer to run happily via power supplied from an AC generator on a hot summer day is just plain foolish. I don't want to hear about how well designed the PSU may be, and how the failure rate is below 1%, because I live in that 1% — and so do most other live sound engineers. You wouldn't take your Pro Tools rig to an outdoor gig without AC protection, so why do it with a CPU-controlled desk? Take care of your gear. It's your bread and butter.

Thank goodness the show was over before the lightning hit...

—Steve La Coma
slcomax@uemedia.com

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Raising low end to the next level.



EQ LIVE: NEW PRODUCTS



AUDIO TECHNICA WIRELESS

THE PRODUCT: Audio-Technica Freeway Frequency-Agile UHF Wireless Systems

THE BASICS: ATW-600 Transmitter System and Transmitters

THE DETAILS: This complete transmitter system kit features the ATW-R600 receiver and one of five transmitters, allowing you to select an Audio-Technica mic or guitar wireless system to fit your needs. The system offers 10 selectable UHF channels with frequency in two bands (470–480 MHz) and (482–492 MHz). It features an adjustable squelch control and a removable docking power supply, which inserts into the back of the receiver.

CONTACT: Visit Audio-Technica at www.audio-technica.com. Circle EQ free lit. #109.



CREST AUDIO X-MATRIX

THE PRODUCT: Crest Audio X-Matrix

THE BASICS: Expander Module

THE DETAILS: This companion product to the Crest X-VCA console features front-panel rotary pots, 1/4-inch TRS balanced inputs and XLR output connectors, and LED level and master level control for all channels. The Expander can accept additional matrix mixes from the X-VCA console (up to four units can be powered from one X-VCA), and also has the ability to serve as a standalone matrix mixing system with the use of optional external power supplies.

CONTACT: Visit Crest Audio at www.crestaudio.com. Circle EQ free lit. #110.



SABINE SWM-5000 SERIES

THE PRODUCT: Sabine SWM-5000 Series

THE BASICS: Wireless Microphones and Receivers

THE DETAILS: Sabine has released the SWM-5000 series of True Diversity microphones with 2.4 GHz spread spectrum technology. It's the first wireless microphone system that allows up to 50 units to operate simultaneously at one location. Available in one- or two-channel varieties, the microphones feature FBX Feedback Exterminator, Target Input Processing, a compressor/limiter and de-esser, and, last but not least, mic modeling, which offers several popular dynamic and condenser mic elements.

CONTACT: Visit Sabine at www.sabineusa.com. Circle EQ free lit. #111.



MARTIN AUDIO LEQ2JB

THE PRODUCT: Martin Audio LEQ2JB

THE BASICS: New LE Series Wedge

THE DETAILS: London's Martin Audio has added the LEQ2JB to their LE wedge monitor series. The LEQ2JB is a two-way active/passive multi-angled enclosure offering differential dispersion that varies from wide to narrow with distance from the monitor; this helps to throw the signal further and aids in reducing excess spill. Built with road-ready multi-laminate birch ply, the enclosure is available in left- and right-handed versions.

CONTACT: Visit Martin Audio at www.martin-audio.com. Circle EQ free lit. #112.

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TIM SHAPIRO

The sound of Bacon

NAME: Tim Shapiro

RANK: Front of house engineer

CURRENT ASSIGNMENT: Bacon Brothers Band

PRIOR ASSIGNMENTS: Gladys Knight, Duncan Sheik, Fisher

TRANSPORT: 18-space road rack by Hybrid

HARDWARE: Yamaha SPX90, SPX 50, Rev7; Roland SDE1000, TC Electronic M•One, Behringer Tube Composer [2], Composer MDX2100, Multicom, Intelligate, Autoquad gate, PEQ5 parametric EQ

CABLING: Horizon 1/4-inch to 1/4-inch

COMMENTS: "I love the Behringer Tube Composer for vocals," says Tim. "When I was on the road with Fisher, I used it on [lead singer] Kathy's vocal. They do a cover of Aerosmith's 'Dream On,' and in it her voice can go from barely touching the compression threshold to around 24 dB of gain reduction within about three notes — and you can't hear the tube composer working. It just limits the level. With the Bacon Brothers Band, I use tube composers inserted on the vocal channels for Kevin Bacon, Michael Bacon, Paul

Guzzone, and Ira Siegel. I use the Multicom's four channels for Kevin's two acoustic guitar channels (he has a six-string and a twelve-string), Michael's six-string guitar, and the bass guitar.

"The Bacon Brothers have a very diverse show — they go from doing a full-out rock song to a quiet song with a cello in it. Unfortunately, getting a cello to be loud enough in some venues isn't the easiest thing to do! I use a Shure Beta 98 mounted in the f-hole of the cello, and sometimes I get a little bit of feedback. If I don't have adequate EQ on the console, I insert the Behringer parametric on the cello channel and use it to tune out the feedback. It's saved my butt on more than one occasion. I also use the autopan program from the Yamaha SPX90 during the 'Sooner Or Later' cello solo. It adds a bit depth whereas a delay or reverb didn't quite sound right.

"Generally, the Bacon Brothers do a quiet show — when we play a theater gig, we're typically at 95 to 97 dB SPL. You can hear every note they play. The only thing that sometimes gets out of hand is the cymbals, so I use the Behringer Composer inserted on my overhead mic channels [overhead mics are Shure KSM44's]. If I were to compress the kick and snare drums on the subgroup, I'd lose the drummer's dynamics. By compressing the overheads, I can mix the show using mostly the overhead mics and the kick mic [Shure Beta 91]. If I'm mixing on a console with a low-pass filter, I actually roll off some of the high end to reduce the amount of sizzle, because we have no need for that kind of cymbal sound. I never understood why people put up expensive condenser microphones for overheads and then roll off all the bottom end. With the right placement, they'll sound great.

"On one particular song, 'Woodstock '99,' there's a part where Kevin's voice needs to sound like he's talking on a telephone. I use a program from the TC Electronic M•One that simulates that sound by rolling off the bottom and top, and leaving mostly midrange. I run that from an aux send. I also use the M•One for chorus on the background vocal for a couple of other songs." ■



Tim Shapiro may be reached via email at ldoaudio@aol.com.



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BY STEVE LA CERRA

AC/DC TAKES FLIGHT

RAISING LOW END TO THE NEXT LEVEL

If there's any band that can shake you all night long, it's got to be AC/DC. Currently on tour in support of their most recent release, *Stiff Upper Lip* [Elektra, 2000], the band has been performing around the world with Paul "Pablo" Boothroyd mixing front-of-house on a system designed and provided by db Sound (Chicago, IL). What's unusual about this system is that, instead of ground-stacking the subwoofers, subs are flown along with the rest of the system.

SUCH A NICE COUPLE

PA companies have been ground-stacking subwoofers for years. Subs are more efficient when located on the floor due to the result of what's called half-space loading: when a speaker cabinet is placed next to a single boundary (i.e., a wall or floor), bass response is increased. Here's why: Low-frequency energy is reflected off of the boundary. Due to the fact that low frequencies have long wave-

lengths, sound reflected from the boundary arrives at the listener almost perfectly in phase with the direct signal being produced by the low-frequency driver. This reflected energy adds together with the direct energy, increasing the system's low-frequency efficiency. Yours at no extra charge, this is often referred to as "coupling." Of course, there's a tradeoff.

As frequency increases, sound waves get shorter, so reflected energy arrives at the mix position late compared to the direct sound — causing phase problems and comb filtering. Picture this in the context of a live concert situation. People in the front rows get the direct energy and the reflected energy from the PA adding together (big bass). But, as distance from the PA increases, some of the reflected sound is out of phase with the direct sound, decreasing apparent bass response. An engineer at the mix position is likely to hear less bass than the front rows, and thus mixes

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AC/DC TAKES FLIGHT

the show accordingly. The mix sounds balanced at the FOH position, but the front rows get pounded with excessive bottom end.

Flying the subwoofers can reduce or eliminate low-frequency phase problems. The tradeoff has been lower efficiency, a need for more cabinets (thus raising touring costs), and increased stress on the rigging used to hang the cabinetry.

For the AC/DC tour system, db Sound has managed to overcome many of these problems, resulting in a PA that provides tight, phase-coherent bottom-end while maintaining efficiency and the ability to fly the entire system. The rig comprises Electro-Voice X-Array and X-Line cabinets. According to db Sound president Harry Witz, "The design of the AC/DC rig is not dissimilar to much smaller X-Arrays we have put out on tours. We arrange the system in 'stripes' similar to multiple line arrays of E-V Xf mid-high cabinets (2x12-inch, 2x2-inch, 40-x20-degree pattern) with Xf bass columns (2x18-inch) in between to correct interference problems associated with overlapping adjacent column patterns.

"The columns of Xf's keep the mids and highs horizontally aligned, and [due to the nature of the cabinet pattern and spacing between components] allow the mids and highs to be pointed in the direction where we want to focus the power," Witz continues. "The columns of Xb's in the array help control the vertical pattern of the lows in exactly the same manner as a line array. Near the bottom of the array we use Xn's (a full-range cabinet with 1x18, 1x12, 1x2, 60x40 degrees) because they have a wider pattern and put out less energy to the nearfield. The bottom row serves as the front fill, combining Xcn's (a compact mid-high cabinet with 1x12, 1x2, 60x40 degrees), and Xcb's (a complementary bass cabinet with 1x18).

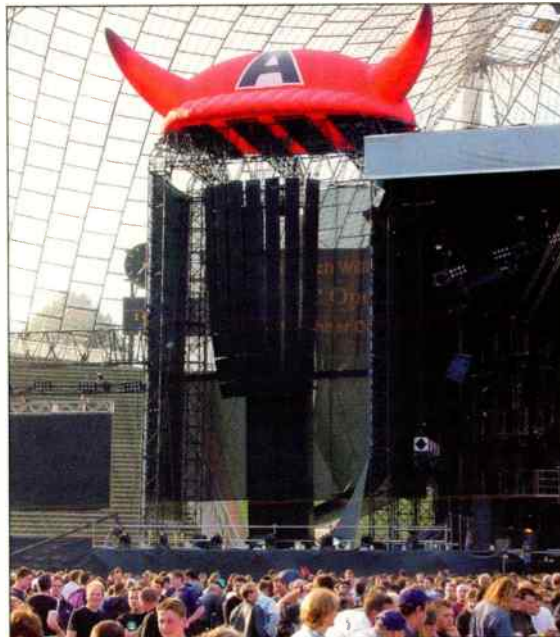
"This arrangement provides extremely high-output, consistent front-to-back coverage, and a long throw. Since high frequencies suffer the greatest attenuation over distance, getting highs to throw 400 feet is a chore. The secret weapon for the longest of throws is the Xo cabinet, an extremely long-throw, high-frequency cabinet. Each cabinet has a line

array of five 20x10-degree, two-inch HF units — putting out basically an additional 10 dB of HF output to the extreme distances."

For the larger venues on the tour, an array of eight Xvls cabinets (full-range, 90x5-degree with 2x15, 2x8, and 3x2) is hung on the back of the mix tower for a delay system; the focus of this array effectively starts at about 300 feet from the stage.

"Flying the system is faster and takes less people than stacking," reveals Harry. "Hanging subs twelve deep is a matter of rolling three stacks under a motor, and up and away they go. Under good conditions, the system can be up and running in about four hours from the time the truck doors are opened (load out is less than two hours). A column of subs controls the output pattern of the cabinets in a proportion of column height versus frequency. We use a program called Array Show, which simulates the polar patterns of an array. A 12-cabinet-high column effectively controls the pattern down to 40 Hz and eliminates energy from going where you don't need it (up and out). The increase in power focused forward is phenomenal — at least 6 dB — which is equal to a ground stack four times greater than the sub hang! Also, hanging the subs allows us to get them high enough off of the ground so that there isn't just pounding bottom end in the front rows only. Flown at a proper height, the subs blend into the rest of the frequency range as you move away from the stage. Bleed from the PA onto the stage is decreased, and the reduced height allows us to put the subs directly under the main hang."

When mixing the show, AC/DC FOH engineer Paul "Pablo" Boothroyd has noticed that the system is "less peaky below around 50 Hz because of de-coupling with the floor." He adds, "this suited our show and music. There's a great improvement in low-frequency definition and a great improvement in the vibration



Flying subs gives the FOH engineer a better perception of the low end than stacked subs. It's also better for the people up front.

and feel aspect that the musicians' experience from the stage floor through their feet during the performance — which was a main factor in the decision of the end design of our PA configuration. Obviously, you do have a change in coupling response, but I wouldn't say it reduced the bass response of the system that much. The X-line subs are very efficient and powerful. Gain make-up was never a problem, which is especially important when you're outdoors and trying to retain punchy lows.

"I always feel better knowing the front rows are getting less of a pounding and that the sound is hitting them more evenly by having it overhead," concludes Boothroyd. "This can be a problem in arenas where people are blasted from the typical ground-stack scenario with a loud show like this. When interacting with the PA during line-checking, etc., monitor world also reported an improvement in consistency of stage sound set-up on a day-to-day basis. The band doesn't soundcheck, so this all added up to a better start to the show, and less first song surprises!" ■

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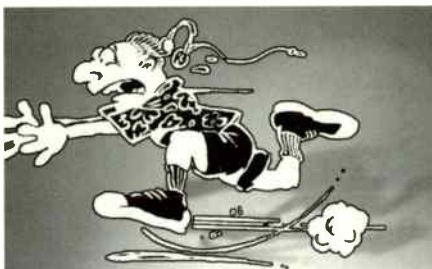
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CIRCLE 10 ON INFO CARD

Instead of bouncing a signal with processing, set the processing for no dry signal and bounce just the processed sound to a track. As one example of why you'd want to do this, let's suppose you'd like a reverse reverb effect on the lead vocal. Here's how to do it:

1. Duplicate the vocal track and reverse the copy.
2. Bounce the reversed vocal through reverb to a track. Make sure the reverb has no dry sound so the bounced version is reverb-only.
3. Delete the reversed vocal track.
4. Reverse the reverb track. You may need to shift it forward or backward so that the reverb swells up to the exact beginning of the vocal notes.
5. You can get creative with the reverb track — pitch shift it, slide it forward or backward in time to create different delay effects, and so on.

FINALIZING COMPOSITE VOCALS:

It's a common technique to record vocals in sections, then stitch together the best parts to make a composite performance. For example, you might decide that the chorus on take #3 was better than the chorus on take #1, but the second verse was best on take #2. So you cut out the unwanted sections of various tracks, leaving nothing but the good bits. To make it easier to work with all these different pieces, as well as making it easy to have common processing (e.g., limiting, EQ, reverb, etc.), bounce all the sections to a new track. Be sure to match the levels and EQ (if used) as you bounce.

BOUNCING THROUGH HARDWARE:

Although plug-in signal processors have come a long way, there's much to be said for bouncing through high-end hardware. To do this, send the signal to the hard disk recorder's output, route it through the physical processor, record-enable a track (or two, for stereo) on the hard disk recorder, then record the processed sound.

I do this in conjunction with a digital mixer, but there is one caution: the mixer, converters, and processors will add some delay. Copy a bit of a drum intro or click to the beginning of the

track being processed; when mixing down, you can shift the track to line up with the original click, thus negating any timing errors caused by going "outside the system."

CREATING A STEREO MASTER:

This is fairly basic. Just bounce everything down to two tracks, and voilà, there's your final mix. Export the mix as an AIFF or WAV file, or use a program's "bounce to stereo" option if available.

But there's a not-so-obvious advantage to this technique. Suppose, as you listen back to the track, you find there's one section where the piano needs to come up just a tiny bit. Rather than start over from scratch or mess with automation settings, just set the piano level as desired, select the region where you want the piano to change, set up punch recording, and bounce just that section. The splice points should be sample-accurate, meaning that you should hear no click or transition as the old mix transitions into or out of the new section, unless level changes occur in the middle of a note.

Before we go, remember one important thing about bouncing: make sure your levels are set correctly. When bouncing multiple tracks (or tracks with effects) you don't want them to add up to the point where they cause distortion, nor do you want to lose any dynamic range as you bounce — always make sure the bounced signal attains the highest level possible short of distortion.

Craig Anderton is the author of the classic texts *Home Recording for Musicians* and *Multieffects for Musicians* (published by AMSCO). He is also creative director for MusicPlayer.com — stop by his forum and say "hi." His last appearance on CD was with Dr. Walker on the album *Time Stretch Paradise* (Hotel Lotte #4-039691-020093).

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Dr. Al looks at mice vs. fingers

You May Not Need Consoling

AL KOOPER

First we lost vinyl, then the audiocassette, then camera film, and finally recording tape. Now it looks like faders (or tactile controllers, as they're politically correctly known today) are going to get tossed on the scrap heap. Recently, I mixed an album on a Neve with Flying Faders and was pleasantly surprised at being able to get every cue the way I wanted by punching in updates without disturbing the "soul" of the mix. I know this has been going on for years, but I'm descended from the first generation of engineers — mono. I've been moving faders since they were rotary knobs. I'm used to doing that. With the latest generation of digital audio software, it's possible that my arguments for keeping faders around are getting weaker.

One can put up a mix at unity gain on the screen, and then, with experience and facility, tweak each fader, one at a time, to its absolute best position in the mix in various audio and visual settings — some previously unavailable before this era. Now this is a completely different technique than putting ten fingers down on a console, but what is our collective goal, after all? It's to create a perfectly balanced sonic landscape from the various tracks that we have recorded. Perfection is in the ear of the beholder.

I've been mixing all my productions for decades because I simply can't find an engineer who hears it exactly the way I do. I would be elated beyond explanation if there were such a person, because it's not an ego thing. I'd love to finish recording and dump the tedium of mixing into somebody else's hands. It just hasn't worked out that way for me in this life.

With the advent of home studios, my plight became hopeless — who am I going to call when I finish recording at 3 AM to come mix something that's due at noon that same day? If you can do it, a home studio *cruises* as a one-man vehicle. It costs less, and it's roomier.

However, two heads are better than one, and I miss the opinions and the gosh-darned *companionship* of the vestigial engineer of yesteryear.

In today's technology, I'm happy/sorry to announce that you can't achieve with a hard-

ware fader the comparative complexity that you can with a computer-screen fader program such as Digital Performer 3. However, if you're Bruce Swedien or Bill Szymczyk, and you're the absolute best of the past generation of engineers, people are not going to quibble because you work in a comparatively antiquated manner. It's the end result that counts. Many quality products are still produced in "grand traditions" in many fields; *i.e.*, with the advent of quality videotaping, did filmmaking cease?

So, if you're still a tactile controller person, take a trip to the store and get a demonstration of the digital competition. Hey, if it ain't for you, it ain't for you. I try to keep an open mind, but I never jump into a new technology until enough time has passed for the bug exterminators to have made their rounds.

I think now is a good time to examine one's alternatives all the way around the studio. Outboard gear, plug-ins, or both? Plug-ins offer emulations of great gear at a fraction of the cost and space. Some say plug-ins are a vote for quantity versus quality, cost-wise. You have to try this stuff out for yourself. Everyone's got a different groove. I've been poised to change my studio over from tape to hard drive and console to software for nine months now. I'm still auditioning systems as I stand at the edge of the cliff, uncertain into what company's terrain I'm going to fall.

I'm looking for something that's Pro Tools-compatible, though not necessarily Pro Tools itself. A full Pro Tools system is way out of my budget. Companies like Yamaha, Korg, Emu/Ensoniq, Steinberg, and MOTU are offering comparatively inexpensive alternatives that can swim in the same pool as Pro Tools. I once had considered the Paris Pro system, but now I'm leaning toward Digital Performer 3.

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ISSUE #12

SoundByte

THE SONY PRO AUDIO NEWSMAGAZINE

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Also Inside:

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Peter Moshay

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Michael Omartian

R100 Goes to School

Raul Esparza stage center as Riff Raff in the Broadway version of The Rocky Horror Show.

Wireless Broadway

Rocky Horror Show Uses Sony Wireless Mic Systems
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Producer Michael Wagener And His Twin R100 Consoles

Producer/engineer Michael Wagener of Double Trouble Productions, Inc. recently installed two Sony R100 digital consoles

mixing the debut album from rock band Olive Carpet. The CD is scheduled for a fall 2001 release.



Producer/engineer Michael Wagener with his twin DMX-R100 digital consoles.

"I wanted a full-fledged 5.1 studio," comments Wagener. "So, I needed a digital board. In-depth research led me to the Sony R100s. In addition to its 5.1 capability, the console has really clean converters, great mic pres, extremely flexible input/output routing, and incredible sonic clarity. I was also impressed by its total recall capability. Sometimes, after finishing the mixes for an album project, I go back and do some remixes. The ability to recall a complete setup within seconds is critical to the studio's workflow."

Wagener began working on Olive Carpet's album immediately after installing the R100s. "I have engineered on digital boards before so there was only a short learning curve," he says. "The console is really intuitive. We recorded the album with surround sound in mind. In fact, we just wrapped up the stereo mix, and in a couple of months, we plan to mix the whole project in surround."

in his Nashville-based WireWorld Studios to ready the facility for multichannel surround sound projects. Renowned for his work with such artists as Ozzy Osbourne, Metallica, and Janet Jackson, Wagener just completed his first project on the R100s—recording and

With a number of projects on the horizon, including the latest release by Brazilian artist Badi Assad, Wagener is totally pumped by the performance of the new Sony boards: "I received a lot of support from Sony. The first project went smoothly – the sound just blows me away."

Sony Supports All Star Guitar Night

Sony Professional Audio once again lent its support to guitarist Muriel Anderson's All Star Guitar Night (ASGN), held Friday, July 20, 2001 at 8PM at the Wildhorse Saloon during Summer NAMM. The ASGN benefits the Music for Life Alliance, a charity founded by Anderson to provide musical instruments and music education to underprivileged children via grassroots organizations.

The show's lineup was highlighted by the appearance of legendary guitarist Steve Cropper, co-writer of soul standards "(Sittin' On) The Dock Of The Bay" and "In The Midnight Hour." Also performing were five-string banjo trailblazer Eric Weissberg, composer of "Dueling Banjos" and a member of Art Garfunkel's band; prolific, Grammy-nominated guitarist, Phil Keaggy; Thom Bresh, the charismatic son of Merle Travis; Australian guitar phenomenon Tommy Emmanuel; blues guitarist and leading pickup manufacturer, Seymour Duncan; Nokie Edwards of the seminal surf band, The Ventures; Jim Hurst, known for his session guitar work with Sara Evans and Claire Lynch; and Nashville multi-instrumentalist Wanda Vick and Sentimental Journey; as well as the inimitable Anderson and special guests.



All Star Guitar Night
Founder, Muriel Anderson

Producer Michael Omartian Gets Instrumental With Sony R100

Producer/musician Michael Omartian recently installed a Sony R100 digital mixing console in his Nashville-based private studio Sound House. Using the board for both commercial and personal projects, Omartian's first completed effort on the R100 is his own instrumental album titled *Animator*, which features both original material and variations of hit songs that he produced in the 80s such as "Glory of Love," sung by Peter Cetera and "Sailing," sung by Christopher Cross. The album is scheduled for release on RCA/Victor this summer.

"My long-time engineer Terry Christian was asked to write a review of the R100 for a trade publication so we experimented with it here, and it immediately became our central tool," reports Omartian. "The delivery of the R100 coincided perfectly with the final stage of *Animator*. We decided to do the mix on the console, and were really impressed. I've worked on the Oxford, and after using the R100 it was evident that the same high-quality technology and engineering were put into this desk as well. Sonically, the board is wonderful. It's compact, easy to navigate, and offers tremendous power and capability."

"The R100's full automation saves me critical studio time because I rarely work on one production at a time, and I need to go

back and forth between projects seamlessly," adds Omartian. The studio is also equipped with Pro Tools and a Sony digital 3324 recorder. "The R100 was the final piece in the puzzle," he says. "In



Producer/musician Michael Omartian with his DMX-R100 digital console at Sound House.

the past with digital, you had to go through some type of conversion process somewhere in the chain, and, sonically, the recording would sound thin. Now, we are able to stay in the digital domain, and the sound is genuine and rich."

Omartian is scheduled to use the R100 on upcoming projects for R&B group Sons of Soul and traditional country singer Barry Smith.

A-Pawling Turns To Sony DMX-R100

Peter Moshay of A-Pawling Studios in Pawling, NY, is one of a growing legion of audio professionals switching to the powerful Sony DMX-R100 digital mixing console. Having used virtually every console on the market, and after researching all the latest available models, he selected a Sony DMX-R100.



Peter Moshay at A-Pawling Studios with the Sony DMX-R100 digital console.

"It's the sound of this board that impressed me," says Moshay. "This is the only console at this level that sounded like I could make a serious record with it, and be 100 percent satisfied with the results." With the level of projects that Moshay undertakes, one can understand why the sonic qualities of a console are so important.

Nestled in the rolling hills of New York State, A-Pawling

Studios' rooms are filled with racks of the latest analog and digital gear. Moshay has recently moved his large-format analog console out of the control room, to make way for the new R100. This "changing of the guard" is a major step for any audio professional, but Moshay is particularly excited about the transition. "I feel no remorse at all in switching from the analog console to the R100," he states. "In addition to its terrific sound, I love the instant recall capabilities, the input re-routing functions, and the dynamic automation. Unless you consider six figure boards, no other console has these features."

Moshay is equally impressed with the board's flexibility, and notes that having every function at his 'fingertips' with the touch sensitive screen puts the R100 in a class by itself. "The first projects I did on the R100 sounded phenomenal," he comments. "For example we did a very organic acoustic record with just a Hammond B-3, a drum kit with brushes, acoustic guitars, and vocals. I had done a previous mix a few days before on my old board. I quickly put up a mix on my R100, took the same 24 tracks and finished in about an hour, just learning the console as I went along."

"The R100 has become my main console," Moshay concludes. "People who work with me realize how hyper-critical I am about every piece of gear in my studio. I do my research, and everything must be the best. Sonically the R100 is as good as it gets."

University Selects R100 As Digital In-Class Teaching Tool

Webster University Professor Gives Console High Grades

By Barry Hufker
Associate Professor, Audio Production Degree Program
Webster University School of Communication

When it came time to purchase new gear for the Audio Production program here at Webster University, I went through a lot of trouble to have the school administration ready, and to have a dealer lined up so that we would be among the first to own a DMX-R100. I saw it as "breakthrough product." In the Audio Production program, we try to offer our students professional experiences and professional equipment. We also try to get good value for the money we spend. I was confident the DMX-R100 would be a great choice.

The DMX-R100's possibilities for audio education are obvious. If the day's topic is "signal flow," then the students can use the DMX-R100 to "build a console." We'll assign inputs to channels and channels to buses and buses to monitors and outputs. If the class needs to study signal processing, there is a very flexible EQ, with gating, compression, limiting, expansion on every channel. Automation and synchronization are also well demonstrated by the console.

The console is a great tool for class work, but an even better tool for production. The DMX-R100 enables each student to arrange the console to suit his style. If a student prefers a certain arrangement of inputs or monitoring, it can all be had. Further, the students don't have to worry they are "missing a switch" that hasn't been "normalled" by the previous student. The new student can insert the floppy disk with his or her setup on it, recall the desired parameters, and begin work. And, because production time can be limited, each student doesn't have to feel frustrated at having gotten everything "just setup" as the allotted studio time has come to an end for the day. A quick "save" to the floppy and all is ready for the next time.

While all of that is important, what I like best about the console is its sound. I enjoy the sound of the EQ as well as its flexibility. Because the faders have such high precision, it is easy to get and recall an accurate mix. The students are also able to experiment. They can save what they like. They can undo what they don't like. They aren't limited because they've run out of compressor or gates. And maybe best of all, they can actually

learn something of aesthetics. The students can hear their progress when they compare their new mixes and setups to old ones. They can grow in sophistication as "critical listeners." And, because the students aren't limited by the console's sound or features, they are free to turn out their best work.

All of the Audio Production faculty are audio professionals as well as teachers. In the time we've had the console, I've mixed two compact discs on it and an opera, Scott Joplin's "Treemonisha," recorded live in performance. One of the discs was a collection of acapella music sung by a local dectet. The



Left to right, Associate Professor Barry Hufker, with students Joni Gibson, Vince Sievers and Peter Schmalfeldt.

music ranged from madrigals, to folk, to pop, to rock. The console was clean enough and versatile enough to give me those styles quite easily.

When it came to "Treemonisha," I was able to employ some lesser known features in the DMX-R100. The first is the console's "M/S" facility. The main microphone pair for recording the orchestra consisted of an M/S arrangement. The console and its polarity inversion feature on each channel made that a quick setup. The "time delay" on each channel also proved to be very important. There were a number of spot mics in the orchestra pit. Using time delay, I was able to delay the audio from the spot mics so that it coincided with the sound directly reaching the main pair. This greatly reduced phase problems and cleaned up the stereo imaging immensely.



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Raul Esparza, center with cast members of *The Rocky Horror Show* on Broadway.

Wireless Broadway

By Dan Daley

Sony 800 Series Wireless Stays Steady And Reliable While "The Rocky Horror Show" Gets Wild

The Rocky Horror Show is one of those rare anomalies of pop culture: it has managed to maintain its charming weirdness even in the face of mass-market success. Over a quarter of a century old now, the seminal gender-bending rock musical – which has served as a visual and philosophical inspiration for everything from Goth metal music to the off-off-Broadway hit *Hedwig and the Angry Inch* – is now a full-fledged Broadway hit. Yet it remains as interactively chaotic as ever, with the audience anticipating the dialog and adding their own, often scatological, observations. But, they never overpower the show, thanks in large part to the performance of Sony's 800 Series wireless microphone system, which has managed to keep up with perhaps the wildest show ever to hit Broadway.

Before it opened – around last Halloween, appropriately enough – at the intimate Circle In The Square Theater near Times Square, the staging of the show presented a true challenge to sound system designers Domonic Sack and Richard Fitzgerald, of New York's Sound Associates, which specializes in live-theater sound.

"The biggest issue was the fact that this is a small theater in which the action takes place almost in the round," explains Sack, noting that the stage has a huge thrust, on which 90 percent of the show's action takes place, allowing it to be su-

rounded on three sides by the audience. "This is not a traditional proscenium-type stage," he says. "In fact, the part of the stage you'd consider traditional is where the band is set up, not in an orchestra pit. Making the sound work on this was interesting, to say the least."

Sack and Fitzgerald responded with a dual-sound system design approach. A stereo system, using Meyer CQ-1 and 650-P speakers, was the main music system, projecting the band, which was playing from the rear of the stage area. The second system was designed specifically for vocals and dialog, utilizing three rings of Meyer and EAW speakers in a concentric distribution system flown from above and which amply covers each of the theater's 700 seats.

"The key to making these two systems work together was time alignment," explains Sack. "Each speaker, or pair of stereo speakers, has a separate channel with adjustable time delay and EQ. But, the amazing thing about it is that, even though it's two systems, and even though the performers are all over the place – even in the audience at times – the perception of the viewer is that all of the sound is still coming from the stage. And, we can give each seat upwards of 107 to 110 dB of great sound, all perfectly time aligned between the music and the vocals."

At the heart of the vocal sound system is the Sony 800 series wireless system. It was, says Sack, the wireless system of choice to keep up with the frenetic pace of the show, in which cast members climb ladders, enter the audience, and generally break every

Alice Ripley as Janet in *The Rocky Horror Show*.



Wireless Broadway



rule of theatrical production, just as the original film broke the rules of the relationship between music and the movies. "We needed a compact and stable wireless system that would be frequency-agile and work reliably under any of these conditions," he says. "Sony's 800 series [the WRT-860A transmitter, the MB-806A multi-channel receiver, and WRU-806A module] gave us exactly what we were looking for."

A dozen Sony WRT-860A transmitters are coupled with DPA 4065 microphones and deftly hidden in the performers' often-scanty costumes. These send a full-bandwidth audio signal to the Sony WRU-806A modules in the Sony 806A multi-channel receiver. And, this wireless system, says Sack, has performed flawlessly since the first night of the show.

"The 800 series is frequency-agile, so we can adapt it to the environment it has to work in," says Sack. "We have to be able to work around the enormous amount of RF that is generated in a location like Manhattan, such as emergency broadcasting frequencies, local television stations and other Broadway shows. In a two-block radius, you may have as many as five Broadway shows running simultaneously, all using between 24 and 40 channels of wireless on stage, plus walkie-talkies and wireless intercoms. The Sony 800 series gives us the flexibility to maintain signal intensity and integrity night after night in the most dense RF environment you can imagine."

Sack also cites the 800 series' range performance, critical for a show like *Rocky Horror* since the performers use almost every inch of the theater, let alone the stage. "You need good performance out of the RF side of the system," he notes. "You can't have any dropped signals."

Wally Flores, production sound engineer and FOH mixer for *The Rocky*

Horror Show cast member Aiko Nakasone applies the Sony 800 Series WRT 860 transmitter back stage before the evening performance.

Horror Show, concurs, noting that the advent of digital television broadcasting in New York has added a new dimension to potential problems for live theater sound – and one the Sony 800 Series is particularly well-suited to dealing with. "The 800 Series makes it easy to dial around frequency problems like that," he says. "DTV is beginning to crush the margins [between frequencies] we have in New York. I've actually had the situation change literally between sound check and show time due to that. You don't get any warning when they're going to turn the DTV transmitter on. And when that happens, you simply lose audio on that frequency. The 800 lets me get around that problem faster than any other wireless system I've ever used."

Equally important was the Sony WRT-860A transmitter's slim profile, which made it much easier to integrate into the performers' costumes. "We were able to fit them into wigs, lingerie, even a dog collar," says Sack. "And they have held up performance after performance – the Sony systems have taken a lot of abuse since the show's opening, but they continue to perform extraordinarily well."

Sony 800 Series Takes Broadway On The Road

Sound Associates is one of the foremost sound companies working in the theatrical business today. It was also one of the first companies to embrace the Sony 800 series wireless system, and the first to bring it to Broadway.

Says sound system designer Domonic Sack, "We used the Sony 800 series system on the initial version of *Beauty And The Beast*, the very first use of the system on Broadway, and on *42nd Street*," he recalls. "In addition, we have it out on a number of touring shows, including *The Civil War*, *Cinderella*, *Show Boat* and *Funny Girl*."

Sack says that one of the main advantages that the Sony 800 Series components confers is adaptability. "You go into so many theaters and every theater is different, as is every production," he explains. "You face a lot of challenges as productions become more and more complex and elaborate. So, the Sony also gives you a sense of confidence, that you have a secure RF system that's not going to let you down no matter how complex the RF environment is."

Two other advantages Sack cites of the Sony 800 Series wireless system are less immediately noticeable but every bit as critical. "With more and more productions going on, you'll see a lot of ongoing personnel changes on the technical side of the production," he explains. "The 800 Series is extremely simple to use, so engineers can master it almost immediately, and has engineer-friendly features on the transmitter such as long battery life, signal strength and audio level. Secondly, there's a cost-effectiveness that the 800 Series brings to the production's bottom line. I can say that I have personally seen the 800 Series reduce the wireless audio costs of a show by as much as twenty-five percent. So, all I can say is, if you haven't tried this system out yet, you really need to." — DAN DALEY



Palmer-Grassi On The Oxford

Jazz At Lincoln Center's Educational Curriculum Taps Sony Digital Technology

Over the past several months, independent recording engineer Sandy Palmer-Grassi has mixed hundreds of music elements by legendary trumpet player Wynton Marsalis and the Lincoln Center Jazz Orchestra. Working on a state-of-the-art Sony Oxford digital recording console in NY's Sony Music Studios, Palmer-Grassi is incorporating the material into a comprehensive interactive music curriculum (30 lessons-available on CD) funded by the Louis Armstrong Educational Foundation. Produced by Jazz at Lincoln Center in collaboration with Sandy Feldstein of PlayinTime Productions, the Louis Armstrong Jazz Curriculum, which is based on the Jazz for Young People concert series, is designed to educate elementary and middle school students about jazz. Multi Grammy 'Classical Producer of the Year' Award-winner Steve Epstein is producing.

According to Palmer-Grassi, each lesson focuses on a different topic ranging from What is Bebop? to What is New Orleans Jazz? The package includes a teacher guide, student books, and a series of CDs featuring over 10 hours of music with informative narration by Wynton Marsalis, the Artistic Director of Jazz at Lincoln Center. "It's a huge project with many music elements, many with different versions," Palmer-Grassi explains. "We just finished Program #19, What is Big Band-Part I, which incorporates both complete songs and segments from Happy Go Lucky Local, Limbo Jazz, and Twinkle Twinkle Little Star. The series teaches kids everything about the music-from the instruments to what it means to swing.

Jazz at Lincoln Center is the world's largest not-for-profit arts organization dedicated to jazz. With the world-renowned Lincoln Center Jazz Orchestra and a comprehensive array of guest artists, Jazz at Lincoln Center advances a unique vision for the continued development of the art of jazz by producing a year-round schedule of education, performance, and broadcast events for audi-

ences of all ages. These productions include concerts, national and international tours, residencies, a weekly national radio program, television broadcasts, recordings, publications, an annual high school jazz band competition and festival, a band director academy, a jazz appreciation curriculum for children, advanced training through the Juilliard Institute for Jazz Studies, music publishing, children's concerts, lectures, film programs, and student and educator workshops. Under the leadership of Artistic Director Wynton Marsalis, Jazz at Lincoln Center will produce

more than 400 events during its 2001-02 season. Currently, Jazz at Lincoln Center is building its new home - Frederick P. Rose Hall - the first-ever education, performance, and broadcast facility devoted to jazz, slated to open during the 2003-04 season.

"The flexibility and reliability of the Oxford has been vital to the success of this project," continues Palmer-Grassi. "The Instant Recall is particularly helpful. We have more than 200 titles so far, and with all the different takes and topics, we frequently do adjustments and reprints. I don't have a script in front of me during the mix. Without always knowing what Wynton is saying or the intent of the element, sometimes my mix doesn't demonstrate the example as well as it could. When I'm finished mixing a

section, Wynton reviews it, and then I incorporate his revisions. With the Oxford, I have had no problems recalling anything."

This is the first project Palmer-Grassi has completed on the Oxford, and she is looking forward to future assignments. "I was given a brief tutorial and within a couple of hours, I was mixing on the board," she says. "The learning curve is small. The console sounds great too, and it interfaces well with every piece of equipment in the studio."

Murray Street Enterprises handled audio production for the Louis Armstrong Jazz Curriculum with Steve Rathe as senior producer. The series is slated for release in the fall.



Steve Epstein, left, and Sandy Palmer-Grassi at the Sony Oxford console.

themix

Going Mobile in NY for Gathering of the Vibes Festival

Chris Andersen, engineer-in-charge and owner of Neveva Production Woodstock, reports that two Sony DMX-R100 digital consoles were used to record over a dozen bands at the recent Terrapin Presents'



L-R, with the DMX-R100, producer Warner Swain, engineer Dominick Campana and Neveva Production Woodstock owner Chris Andersen.

Gathering of the Vibes festival in Red Hook, NY. The three-day event featured such artists as Bruce Hornsby, the Dickey Betts Band, Buddy Miles, and Medeski Martin & Wood. The R100s were installed in

Andersen's Unit 2 mobile recording truck. Neveva provided complete audio and video services for Vibes.

"Terrapin's Festivals are famous for having two adjacent stages where bands play back-to-back," states Andersen. "Quick transitions are mandatory. The R100s sound great and are very reliable. I've never experienced a crash or a lock-up." Audio engineer Dominick Campana piloted the two R100s—processing 48 inputs from the stage and feeding 48 DTRS tracks. Neveva's new Unit 3 truck was used in conjunction with the Unit 2 to provide four-camera video coverage and allow for flawless transitions and simultaneous recording of both stages for Terrapin's archives.

Neveva also provided on-site encoding services in multiple bit-rates and formats for streaming Internet distribution and feeds to WDST-FM to simulcast portions of the festival.

"Featuring the best artists of the jamband genre, the sixth annual Gathering of the Vibes pulled out all the stops topped off by a huge three-hour-long jam session that showcased various musicians," states Andersen. "We flexed the technology muscle all weekend. The R100 set-up worked flawlessly."

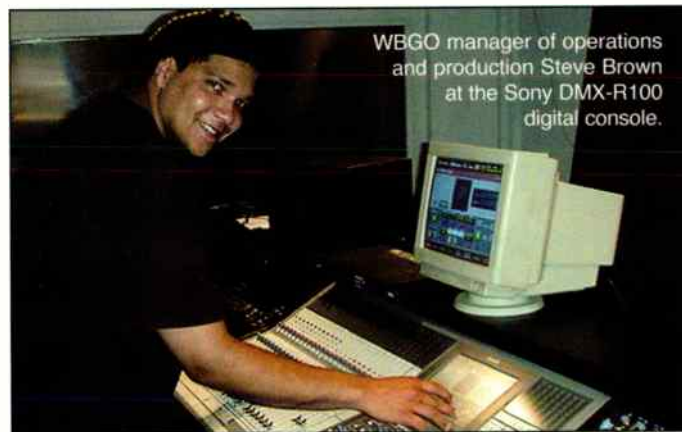
Sony R100 Jazzin' It Up At NJ Radio Station WBGO

WBGO, the NY/NJ market's only 24-hour classic jazz station (88.3 on the FM dial) and the only station to regularly broadcast live from the area's jazz clubs, has installed a Sony DMX-R100 digital console.

The R100 complements a major \$1.9 million renovation of WBGO's downtown Newark headquarters. To celebrate the facility's grand re-opening, WBGO recently hosted an on-air Jazz Radio Festival featuring the Joshua Redman Quartet, the New Jersey City University Jazz Ensemble, and the William Paterson University Jazz Ensemble.

WBGO manager of operations and production Steve Brown reports that the R100 was installed one day before the festival: "I've worked on digital boards before so the learning curve was short. The console sounds great – it's a real thrill to hear a live performance and have it sound like a record. The board's headroom and dynamic range allow me to get the sound I want without having to rely on compressors and limiters.

"Nowadays, a lot of jazz engineers have come to expect poor digital sound from low-cost digital boards," continues Brown. "Sony changed that stereotype by introducing the R100 – a cost-effective digital console with superior sonic clarity. We're trying



WBGO manager of operations and production Steve Brown at the Sony DMX-R100 digital console.

to push the envelope here at WBGO. My goal is to surpass CD-quality sound and dynamics with our live performances, as opposed to presenting heavily compressed and limited FM sound. Sony has been very active with NPR headquarters and member stations like us to make this technology affordable. We really appreciate their support."

SoundByte: The Sony Pro Audio Newsmagazine is published quarterly by Sony Electronics Inc. in association with MP&A Custom Publishing, a division of United Entertainment Media. **Editorial Director:** Anthony P. Montezano; **Managing Editor:** Anthony Savona; **Art Director:** Marshall Moseley; **Associate Art Director:** Greg Gennaro; **Design Associate:** Brian Jackson. **Cover Photo:** Courtesy of The Rocky Horror Show. Used with Permission.; **Photo Credits:** pg 101, bottom, Courtesy of Muriel Andersen. Used with Permission.; pgs 104-105 Courtesy of The Rocky Horror Show. Used with Permission.; pg 106 Howard Sherman (4); pg 108, top Kristen Myers. **Editorial Office:** 6 Manhasset Ave. Port Washington, NY 11050. Ph: 516-944-5940; Fax: 516-767-1745. Entire contents Copyright © 2001 Sony Electronics Inc. unless otherwise noted. The opinions expressed in bylined articles herein represent those of the author alone and not of Sony. No part of the publication may be reproduced without the written permission of Sony Electronics Inc. Sony is a trademark of Sony. For more information on any of the Sony products mentioned in this magazine, please contact: Sony Pro Audio at 1-800-686-SONY. Product features and specifications subject to change without notice.

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World Radio History

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ACROSS THE BOARD

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you added the two channels together for mono, information that was placed in the center of the mix got louder than material that was placed on one side or the other. Engineers were very careful with phase relationships in stereo recordings because out-of-phase portions of the recording would cancel completely when combined to mono. In the early days of stereo records and stereo radio broadcasts, very few people had the newfangled stereo gear to playback this high-tech source material, so stereo records and stereo FM broadcasts had to be compatible with existing mono playback equipment.

MONO MIXES

Because of the way the left and right channels add together when combined, the balance of the stereo mix is changed when listening in mono. All of the material panned to the center in a stereo mix (lead vocal, kick drum, bass, and snare drum) will be louder when listening in mono, while instruments panned far left and far right will be very low. This isn't good if you're trying to promote your

record from airplay on a radio station that's being heard in mono.

When a group was in the studio mixing their album, the record company required mono-only mixes to be done at the same time the stereo mixes were done for the album. The artist punched the Mono button on the console and made the balance changes necessary to make the mix sound good in mono. Bring down the stuff in the middle, and ride up things that were panned way out to the sides. Sometimes you had to change the reverb and other effects because of the mono combination. The mono version was used to press the 45-rpm singles and promotional copies that were sent to the AM radio stations. FM radio usually played the album version of the song, which was in stereo.

QUAD

And then in the '70s came Quad. There were basically two commercial Quad formats competing for the market share (I won't even mention Quad eight-track

tapes). One was the JVC CD-4 system that worked a lot like FM transmission (45 kHz recorded on a vinyl record). The main stereo channels were in their normal groove configuration so as to be stereo-compatible. The back channel difference information was added into a 30 kHz sub-carrier that could be read by a Quad decoder. The second system was the Sansui QS system that used phase encoding to get the rear-channel information in and out of the stereo mix.

Because of the phase encoding system, there would be some strange artifacts when listening to a stereo record on a Quad system or a Quad record on a stereo system. Separation from front to rear channels was bad in the phase-encoded systems, and the calibration and noise from the JVC system was horrible. Quad made a sad attempt at a format and died a slow death by the end of the '70s.

STAY TUNED

In the next two installments I'll cover cassette, eight-track, EL-cassette, PCM-F1, DAT, DBX, CD, MP3, DSD, DTS, AC-3, MLP, MPEG-2, DVD, DV, DV-PRO, DVD-A, Digital Radio, and anything else I can dig up. ■



You can contact Roger Nichols at rogernichols@earthlink.com.

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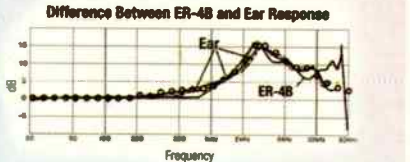
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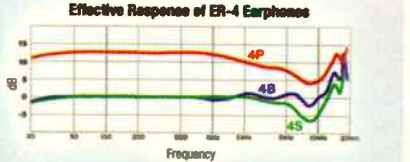


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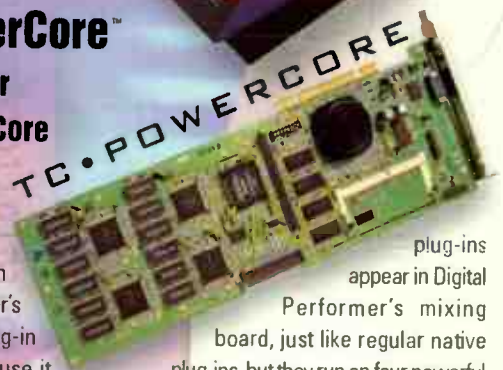
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How many audio formats are too many?

Format Overload (Part I)

Back in the Good Old Days, there was one final mix format — mono. Actually, there was no mix; even the recordings were in mono. How easy could it get? Records had evolved from the cylinder to the 78, and then finally the 45 and 33-1/3 rpm LP, but they were all monaural. It took over 20 years from the time they started messing around with stereo recordings until there was actually a stereo product for the consumer.

One of the earliest stereo recordings was done in 1932 in Philadelphia for Bell Labs — the recording by Stokowski of Scriabin's Poem of Fire. It was done on a vinyl disc using two grooves, one for each channel. Two years later, stereo recordings were being done at Abbey Road studios using a vertical-lateral technique. Decca records released the first stereo records in 1945 using the vertical-lateral system. They could not be played well by the then-current playback systems. The Robe, in 1953, was the first movie to be released in Cinemascope with a stereo (actually four-channel) soundtrack. There were more than 30 other stereo films released that year.

The following year, 1954, was a good one for stereo recordings. RCA made the first commercially available recordings with a RCA RT-11 two-channel recorder and a pair of Neumann U 47 microphones. RCA actually released open-reel tapes of stereo recordings. These tapes sold for about four times the price of an LP. EMI was recording "stereosonic" recordings at Abbey Road, and Decca was using the first Ampex 350-2 15 ips, two-track recorder for their stereo recordings.

LP format wars raged until 1958 when the RIAA adopted the Westrex 45/45 system as the standard for stereo records. The 45/45 system was actually patented by Arthur Keller for Bell Labs in 1932. The application wasn't actually filed until 1936 because Bell saw no useful purpose for the invention. I wonder what else he didn't patent?

The 45/45 system is a technique where each wall of the record groove moved independently of the other. The left channel modulated one wall and the right channel modulated the other wall. If the material recorded was mono, the groove moved laterally. If the material was

completely out-of-phase, the groove moved vertically. Mono phonographs only recognized lateral movements of the stylus, which would only play back the in-phase portion of the recorded material.

Talk about format wars — FM stereo was having a battle of its own. There were two competing formats: the Crosby system, which used a FM sub-carrier for higher fidelity, and the Zenith/GE system that used an AM modulation system for the sub-carrier. In 1961, the FCC chose the Zenith/GE system as the standard. That's why FM stereo is noisier than FM mono. The signal that gives you the stereo is AM.

The matrix system used in FM worked this way: The left and right channels were split into two stereo streams. In one stream, the right and left channels were added together to form a mono signal. In the other stream, the right channel was phase inverted and subtracted from the right channel, resulting in a difference signal. The main carrier of the FM station broadcasts the mono signal. All mono FM receivers could demodulate this signal. The difference signal was broadcast on the sub-carrier frequency that could be decoded by a stereo FM receiver. For the left channel, the difference signal was added to the mono signal. For the right channel, the difference signal was subtracted from the mono signal. In the Zenith/GE system, the AM difference channel is where the noise comes from.

Also around 1961, a dual-optical system was developed that allowed two-channel sound for film. Yes, films started driving the market for multichannel (only two back then) audio in the home.

MONO COMPATIBILITY

Early stereo recordings were exaggerated in their stereo placement. Most consoles didn't have pan pots yet, so the program material was assigned to the left channel or the right channel. When the two signals were combined for mono radio broadcast, the results were pretty good. As production techniques added panning to the bag of tricks, stereo started calming down, and most stereo program material tried to realistically represent the left/right spread of a true listening environment. When

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