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RECORDING &
SOUND
MAGAZINE

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New DAT Machines
In Review

JULY • 1997

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"SONY IS THE ORIGINAL DEVELOPER OF THE MINIDISC FORMAT, AND THAT MAY HAVE HELPED THEM REALLY NAIL IT WITH THE MDM-X4."

LOREN ALLDRIN, PRO AUDIO REVIEW.

As if inventing the MiniDisc format weren't enough, Sony took that technology one step further, with the introduction of the MD Data format rewritable optical disc—the heart and soul of all four-track MiniDisc recorders. It made it possible to record digitally on four tracks instead of two, which in turn led to the creation of the MDM-X4 MiniDisc Recorder. So don't be fooled by imitations. If anyone understands the capabilities of the MiniDisc format, it's Sony.

"SONY HAS DONE A WONDERFUL JOB WITH THE MDM-X4'S EDITING CAPABILITIES. YOU CAN NOT ONLY COPY AND PASTE SECTIONS OF SONGS AND ENTIRE SONGS, BUT, UNLIKE THE YAMAHA AND TASCAM UNITS, YOU CAN EVEN COPY PARTS OF TRACKS TO OTHER TRACKS AT DIFFERENT TIMES AND AMONG SONGS."

MAY 1997, KEYBOARD MAGAZINE.

Sony's exclusive Track Edit function allows you to edit freely over all four tracks, so you can combine the best parts of a multi-track recording to create the perfect take. And with MixWrite you can continually mix four tracks down to one or two, freeing up the third and fourth for additional recording. But best of all, you can use Track Edit to make a digital backup of each track, allowing you to complete as many mix downs as you want, without losing any of your original elements. Listen to the experts, without Sony's exclusive individual track editing you'll be settling for a lot less than the MD format has to offer.

"THE SOUND (OF THE MDM-X4) IS ALMOST AS GOOD AS DAT, AND LIGHT YEARS AHEAD OF CASSETTES."

CRAIG ANDERTON, EQ MAGAZINE.

Sony's MDM-X4 uses version 3.5 of ATRAC, the latest generation MiniDisc technology. It improves the resolution of mid-range sounds and expands the dynamic range even further, so the music you record will stay true to your original performance. And what's more, version 3.5 delivers sound that's as close to DAT as you can get in an MD multi-track. It simply blows away the old cassette based four-track machines, not to mention some of the toughest critics in the business.

When it comes to MiniDisc recorders, there's no comparison. Call 1-800-635-SONY, ext. X4, or visit your nearest Sony dealer for a hands-on demo and see why the people who know most about music choose Sony.



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SONY

CR1604-VLZ

More professionals channel their creativity through

When you page through this magazine, you're going to see a multitude of ads for compact mixers. Some of the mixers look a lot like our CR1604-VLZ™. Heck, even some of the ads for other 16-channel mixers look a lot like Mackie ads¹.



■ Pretty soon, you may start to wonder how much difference there really is between all the various mixer makes and models.

■ Naturally, we're going to tell you that there's a VAST difference between the CR1604-VLZ™ and other 16-channel mixers².



■ But luckily, you don't have to take our word for it. One of the best, unbiased benchmarks of mixer performance is who uses it. And that's where the CR1604-VLZ™ blows the competi-

tion in the weeds. We're the overwhelming choice of professionals who can afford any mixer they want. And who have taken the time to listen to every mixer on the market.

■ Send for our thick, color tabloid brochure¹ and we'll include a comprehensive list of distinguished CR1604-VLZ™ users. It includes familiar names like the Tonight Show, The Late Show and Saturday Night Live bands, The Presidents of the United States of America, Ronnie Montrose, Microsoft®

¹ Dense, fine print type. Lots of lines and arrows pointing to features. Textured backgrounds.

² There ARE vast differences too numerous to mention without resorting to dense, fine print...with textured backgrounds.

A short Grant Reeves bio:
Music for Sony, U.S. Navy, Anheiser Busch, Apple, Fujitsu, Hewlett-Packard, Hitachi Data Systems, NASA, Siemens, UNISYS, United Way, Airborne Express, LSI Logic, McKesson Health Systems, Pyramid, Las Vegas Chamber of Commerce, Austin Chamber of Commerce, Applied Materials, Weyerhaeuser, KIRO-TV, KICU-TV, KMPG Peat Marwick, among others. Six Gold Tellys, Joys and other industry awards. For more information, log onto www.GrantReeves.com.

³ Mention in this ad is intended only to denote usage or ownership as reported to Mackie Designs. Mention is in no way intended to represent a specific or implied endorsement by the individuals, groups, programs or production companies listed.

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CR1604-VLZs™ than through any other 16-channel mixer.

sound design wizard Frank Serafine, Jet Propulsion Labs and all four national TV networks³.

■ The list also includes a lot of folks you may not have heard of... a huge group of pros who make their living creating music for ads, documentaries, corporate videos and multimedia. Real live, bonafied electronic musicians like Grant Reeves, shown below with his CR1604-VLZ™, sequencer and air guitar.

■ Bottom line, part one: Everything you track and mix down goes through your mixer. It needs the low noise floor, maximum mix headroom,

pristine microphone preamps, and musical, natural EQ for which Mackie is renowned.

■ Bottom line, part two: You spend more session time in front of your mixer than you do with any other single component in your studio. You want a console that's intuitive, flexible and easy to use... for thousands upon thousands of hours. Ask somebody who owns a Mackie CR1604-VLZ™ and one of the first things they'll probably mention are the "little things," the myriad small details that

make the mixer a joy to work with.

■ Then visit your nearest Mackie Dealer and start channeling your creative impulses through a real CR1604-VLZ™.

No way were we going to get this ad past Greg Mackie without at least SOME informative fine print. First, the CR1604-VLZ basics: 16 x 4 x 2 configuration

- with 16 mic and 16 line inputs
- 16 inserts & 8 direct outs
- 6 aux sends per channel
- 2 master aux sends & 4 aux returns
- 4-band EQ with wide sweepable midrange
- AFL/PFL solo
- Large emitter geometry discret mic preamps. There's more! Here's a list of CR1604-VLZ features and components NOT found on other comparably-priced 16-channel mixers.
- Unique multi-way rotating input/output pod
- In-place stereo solo



One of the six industry awards won by the CR1604-VLZ.

- Constant-loudness pan pots
- UnityPlus gain structure for easy level setting, low noise and high headroom
- Negative gain mix amp architecture to handle 16 simultaneous HOT inputs without distortion
- Wideband sweepable midrange EQ
- Sharp, 18dB/octave low cut filters on every channel
- RUDE solo light
- Control Room/Phone source matrix
- Effects To Monitors on Aux Returns 1 & 2
- True logarithmic-taper 60mm faders
- Balanced inputs & outputs (except headphone, tape in/outs, and direct outs)
- Comprehensive, easy-to-read manual.

Below: a few of the 400+ folks and one incontinent Chihuahua (not shown) who work at Mackie Designs in Woodinville, WA, 20 miles northeast of Seattle.

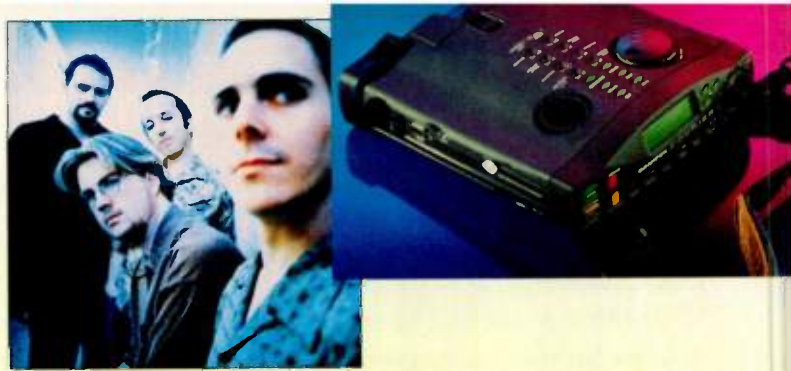
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EQ

PROJECT RECORDING
& SOUND TECHNIQUES
VOLUME 8, ISSUE 7
JULY 1997



LIVE SOUND SPECIAL

It's time once again for EQ's annual take on summer sound reinforcement. Stories include:

RUSH'S LIVE MIDI SECRETS REVEALED By Jack Secret	78
<i>How does a three-man act like Rush sound like so much more? The secret's in the MIDI rack, as is revealed here by the band's guitar and keyboard tech.</i>	
JUNIOR VASQUEZ'S LIVE DANCE MIX TIPS By Liana Jonas	86
<i>The famed DJ and remixer discusses how he takes dance music from the club to the studio, and then back again.</i>	
CLUB PROFILE: ARENA By Steve La Cerra	92
<i>A look inside this Hollywood-based club that was recently upgraded to handle both DJs and live acts.</i>	
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ON THE COVER:

Geddy Lee (left) and Alex Lifeson of Rush next to their MIDI rig. Photo by Rick Gould/ICP

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EQ Wins TEC Award!

(Yeah sure)

"And this year's TEC Award for Best Recording Magazine is..."

Pan the Broadway Ballroom at the Marriott Marquis in late September where MIX Magazine has assembled the hoipolloi of the recording community to pat themselves on the back. There's a hushed silence while the envelope is opened "...EQ Magazine."

Wild applause. Pats on the back. Executive Editor Martin Porter heads to the stage. The losers force a smile and pretend to be good sports about it. Hell, there's always next year.

Porter takes the mic. He clears his voice. He raises the bronze trophy overhead and he proclaims: "I accept this award on behalf of the tens of thousands of unrecognized project studio owners out there who someday will have an award all their own."

The place goes wild. Even the studio execs and honcho producer/engineers jump to their feet. The applause is deafening. Porter jogs through the crowd and out the back door, downstairs to Broadway where the entire readership of EQ Magazine is being held back by New York City police on horses. Placards are raised: "EQ Rules!" "Recording Belongs to the People." Traffic is at standstill. Cabbies are honking. The people have spoken.

Could it happen? Come on, you can't blame a guy for dreaming. Besides, there's no category for Best Recording Magazine in the TEC Awards anyway. Hell, what would you expect from an awards program that still ignores the largest, fastest growing, and most significant portion of the recording community every year — the project studio? Not much.

That's right, the project studio owner — the lone ranger, creative pioneer, guerrilla warrior of the recording business has no category for recognition in the TEC Awards. You'd think they'd at least read a copy of our magazine to find out what's going on. And besides, they wouldn't have to recognize some Joe Schmo Nobody who happens to make a damn good living pushing the envelope of creativity day-in, day-out in their project rooms. They could also recognize the tens of thousands of Joe Schmo Somebody's who have also realized that the most creative way to record, compose, or produce their music is in a project room where they can take charge of their own technology and push the limits of creative recording techniques — without watching the clock and forking out \$250 an hour.

So what can we do about it? First off — we're going to give our own awards to those pioneering producer/engineers and technology innovators who are making the project studio revolution happen (stay tuned for details). Second — we encourage you to tell those folks over at the TECs that we're mad as hell and we're not going to take it any longer. So, here's what you do:

When (if) you cast your ballot for this year's TEC Awards, write in EQ Magazine for the Best Recording Magazine. Just scribble it in on the ballot anywhere you can find room. Send them an e-mail. Jam their fax machine. Spread the word. We have the power (if we choose to use it).

If (when) EQ wins, we promise to accept the award on behalf of our readership of 40,000 hard-working project recording owners out there. The award really belongs to you!

—Martin Porter,
Executive Editor



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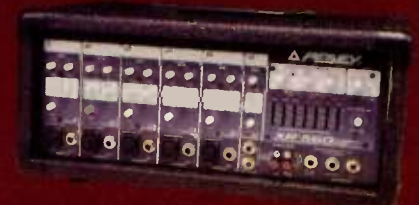


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STUDIO OR BUST

Wow! Just what we need, another joker pontificating about how cool it is to have worse than slovenly recording habits. Maybe Ben Vaughn [EQ, May '97] could stuff his recording gear up his arse for his next project and you guys would put him on the cover and explain in breathless detail how the sound was so great due to his colitis or something.

I own and run what Ben describes disdainfully as a "real recording studio." Not infrequently, someone will bring in something that they recorded at home on their ADAT or to transfer to my multitrack and complete. Without exception, the ineptitude with which it was recorded screams even louder than the distortion, buzzes, horrendous sound quality, and lack of any type of documentation (not to mention bounces with unintentional additions of unwanted tracks included). If the performances were brilliant, I could almost believe that all the hours spent on the great creation was worth the audio nightmare, but usually the musical quality is about equal to the rest.

Laughing about not ever looking at meters and never doing any kind of maintenance on equipment (track 2 on Ben's machine hasn't worked since lightning struck ha ha ha...) is dumb, and rings like a 5th grade joke about wee wee. By the way, why did Vaughn bother to trouble himself with taking all that great gear into his house to mix when he could have just crawled under the hood and tried for another EQ cover story?

Brendan Harkin
Wildwood Recording
Nashville, TN

TO BOLDLY GO

In response to Martin Porter's "You're Surrounded" editorial in the May '97 issue: AMEN! and AMEN! I currently serve as senior engineer with a major southwest postproduction facility. Having spent 15 years as a musician, engineer, and producer before entering the postproduction world, I am amazed at the lack of commitment to surround mixing by the music industry.

We continue to see surround sound use grow in commercial, corporate, and, of course, theatrical projects. Our SSL digital systems in Russ Berger-designed rooms provide Dolby and 5.1 surround mix formats. All channels (tracks, returns, groups) are surround-panning

capable and each move is fully automated and recallable instantly. It doesn't necessarily take longer to mix surround, it's not a difficult process; all surround monitoring can be collapsed to listen in stereo or mono with the push of a button and any phasing caused by a slight time delay can be corrected to the sample. Surround mixes are printed in stereo just as any other. Mastering does not affect surround mixes, so what's the problem?

I heard someone say that consumers were purchasing 30,000 surround units monthly. I can't verify that figure, although we happened to join the ranks last month. We found that movies and television programs mixed in surround were great. Our favorite CDs, however, confused our dog as now and then we'd get a swell from the rear speakers. I tried to explain to him that there was probably a lot of 'verb in the mix, which the decoder saw as rear speaker material, but I don't think he understood.

Recording studios continue to offer the best consoles, recorders, and technology demanded by their clients. However, until the producers, the creative forces, or at least those responsible for translating the creative, commit to surround mixing, it's going to continue to be slow going. I still listen to my Beatle records (OK, CDs), and you can bet that if George Martin had the technology available to him back then, I'd be listening in surround 20+ years later. Are there any pioneers out there?

Joe Mac
via Internet

THE INS AND OUTS

Roger didn't mention it, and it may not be the biggest thing, but the S/PDIF In and Out on the Lexicon MPX-1 [reviewed in the May '97 issue] is 44.1 kHz only. Period. It won't lock to an externally generated rate other than 44.1 either. I found this when they first shipped a few months back and was attempting to hook up the MPX's input from a Yamaha ProMix01's output.

Just more useless info FYI.

Dale L.
via Internet



OMNI PRESENT

While I enjoyed the informative article written by David Miles Huber on mic techniques in the April issue of EQ, I would like to point out that the recommendations on the use of omni microphones to reduce proximity effect should be elaborated upon. Simply switching a multipattern mic to omni from cardioid may not induce the required result. Most modern multipattern condenser mics are actually comprised of two cardioid capsules back to back. The omni pattern is derived by adding the two cardioids in phase. While this will result in a pseudo-omni characteristic, the mic will still exhibit the same proximity effect as the cardioid pattern. A true omni is an acoustically derived device and not an electrical simulation. Otherwise, thanks for the good advice.

Jeff Wolpert
Chief Recording Engineer
McClea Path Recording and Post Production Studios
Toronto, Canada

UNPLUGGED AND GRATEFUL

Thanks for Mike Sokol's much-needed article concerning the miking of acoustic instruments. As we deal primarily in bluegrass music, we have seen many of the pitfalls Mike mentions happen to otherwise competent sound professionals.

continued on page 12

How to buy your next reverb without listening to it.

The first criteria in choosing a reverb is always sound quality.

Everyone claims they sound the best but the



Yamaha REV500 has superior 32-bit internal processing and 20 bit A/D and D/A conversion. Most everyone else has 24-bit or less processing and 16 or 18-bit conversion.

The difference between 32-bit and 24-bit is audible: 32-bit processing gives you significantly smoother decay so your reverb fades imperceptibly into "silence." The difference between 20-bit and 16/18-bit conversion is also dramatic; 20-bit A/D D/A means the REV500 is excep-

plates and special reverbs. These simulations of actual environments place your signal in "real" locations far unparalleled realism. And the REV500 also gives you 100 spaces to store your own settings.

The third criteria is the ease of accessing the effects. REV500 true stereo halls, rooms, plates and special reverbs are instantly recalled from the front panel. The REV500 has front panel controls for reverb time,



pre-delay, high-frequency decay and early reflection level. If you want to change these settings, just turn that control and the LCD instantly shows a picture of what's happening. You can see what you're hearing.

If you want to hear it, too, only Yamaha has built-in drum samples so you can hear the effects without an external sound source. Just hit the "audition" button as you select and customize your effect.

The fourth criteria is price.

Once again, the REV500 delivers like no one else: \$499 for a professional reverb. But if you'd rather pay more, you can buy the \$1299 Yamaha

ProR3 which has the same 32-bit engine and 20-bit A/D D/A with a keypad for calling up effects, two types of EQ and a gate which can be placed around any reverb.

Now that you know enough to buy the REV500 sight unseen, we recommend you go listen to it. The sound quality will blow you away. Call (800) 937-7171 ext. 680 to find the Yamaha REV500 dealer nearest you.



Large LCD display shows effect type, name and current settings.



Turn the reverb time control, see the reverb time displayed graphically.



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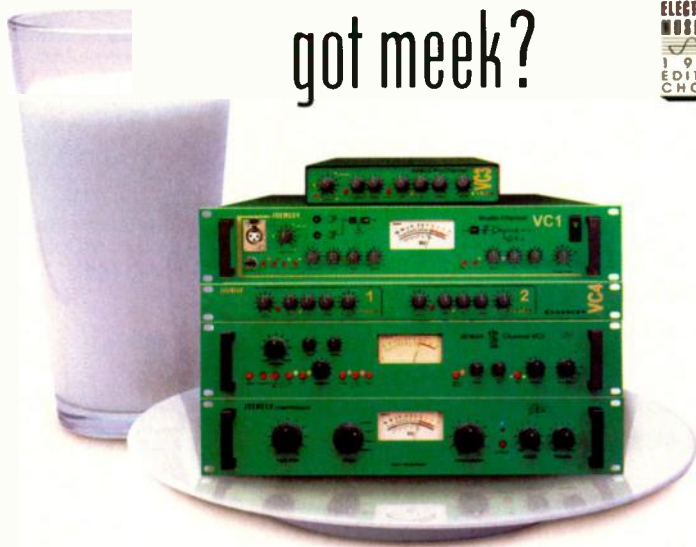
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CIRCLE 44 ON FREE INFO CARD

JULY 1997



His suggestion of taking an unfamiliar instrument to the side of the stage for a "primer course" is a gem. Many of today's bluegrass performers take great pride in their vintage instruments, and, if this extra effort is put forth, their time-honored sound can be conveyed in larger settings.

His tips for the studio are winners as well. As most bluegrass projects do not have major-label budgets, his advice on mic selection/placement can save precious time (i.e., dollars) while achieving stellar results. Check out the Peter Rowan and Jerry Douglas release "Yonder." It was recorded in Bela Fleck's living room using a couple of vintage tube mics going direct to digital. You can almost feel the history of the classic instruments used.

Lastly, the best advice issued was to trust your ears! Whatever the style of music, this simple call to reason is so often overlooked.

As usual, EQ is on top of the professional audio world. Keep it up!

Cort Riggs

Vice President of Radio Operation

The ABN Group

Orlando, FL

YOU'RE WELCOME

I'm new to the project studio field, and your magazine has been invaluable to me in not wasting my hard earned money. Without your editorials and product reviews I would not have purchased my Mackie SR24•4, Roland VS-880, Event 20/20 Bas, and RODE NT-2 mic. Your pages keep my dreams alive and add a few more to think about. This has been the fastest year of my life, and I'm proud that for once in my life I'm learning the field I've always loved. Thanks for helping me do it right.

Gregory P. Booker
Beachwood, NJ

WRITE TO US

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Punch Knockout

POWER

t.c. electronic

The Wizard Series
Finalizer
STUDIO MASTERING PROCESSOR



FUNCTIONS

MAIN PAGE

TOOLS

WIZARD

UTILITY

PROGRAM

Want your mixes to deliver the punch and clarity of the industry heavyweights?

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Bob Ross, Recording Magazine

"My wife stole mine and put it in her studio"

Roger Nichols, EQ

"- the Finalizer offers a tweaker's paradise"

Ty Ford, Pro Audio Review

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Mix Magazine

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CIRCLE 82 ON FREE INFO CARD

CASE OF THE CREEPING TAPE

Q My problem involves new DAT tapes put into our TASCAM DA30MKII DAT machines. The MKII's manual says that when you put a new tape in, push Rewind to make sure the tape is at the very beginning and to tell the deck to wind past the leader so ABS will function properly. Most of the time this works fine; the deck either performs this function or says "TOP." In the latter case, you push Record and Pause and the deck winds past the leader and shows "66" and everything's cool. You can then record normally and ABS works.

Sometimes, however, the deck starts moving the tape forward slowly. Once in a great while, it'll do this for a short time, then stop and you can record normally (i.e., ABS works). Most of the time, though, the tape never stops. Pushing Stop, Play, etc., has no effect; the deck is oblivious. The only way to get it to stop is to turn the power off and back on. When I do so, if I hit Rewind, the tape winds back to the beginning, then starts creeping forward again, and the vicious cycle begins anew.

Given the fact that not all DATs I put into the machines do this, it seems the problem may be tape related, not machine related. Do you have any thoughts that might help me?

Eric Smith
President
Auralex
Acoustics, Inc.

A I don't have a precise answer for you, although I am not convinced the problem is tape related. You did not say that the problem happens to specific tapes when put into either machine. Unless it does this consistently, I wouldn't blame the tape.

I also suspect you use the machines frequently and wonder how long you've had them and whether

they've ever been serviced. I don't have a MKII here in my shop to attempt to replicate the problem, but my guess is that your problem might be an optical sensor problem. In order for the machine to know that a blank tape is at the head, it must see clear leader. (You also didn't mention any tape brand names, not that I suspect any but DIC.)

Eddie Ciletti
Manhattan Sound Technicians
NYC, NY

SEQ AND FIND

Q I'd like to know more about how sequencers interact with Windows drivers, particularly what conditions allow you to get more tracks for a given processor speed.

Liggett
via the Internet

A In most cases, the choice of wave driver has little or no effect on the max-

imum number of possible tracks. However, wave drivers do factor in because they determine whether or not you can do simultaneous record and playback. Also, there's a host of new cards that provide multichannel output via multiple wave drivers (Antex, AdB, and Frontier Design make such cards). In these cases, you may be able to get a modest increase in the maximum number of (virtual) tracks.

Regarding disk drivers, in Win95, make sure you're using a 32-bit disk driver. Ninety-nine percent of the disk drivers out there are 32-bit, so that's usually not a problem. Of course, you want the fastest possible disk attached to your system; PCI is generally faster than ISA, and SCSI has a higher maximum data rate than IDE.

In summary, the best way to get more tracks for a given processor speed is to get a faster hard disk and more RAM.

Carl Jacobson
Marketing Communications Specialist
Cakewalk

IT'S DAT TIME

Q I'm a regular reader of EQ, and I hope you can help me with an intermittent problem that I am having with my Panasonic SV-3700 DAT.

When I play back a tape, I hear what sounds like "digital noise," and then the machine "hangs" or "crashes." None of the transport buttons respond, and the program number and absolute time display read "-----". When this first happened, I ejected the tape only to discover that it was still wound around the head mechanism, so that part of my tape was ruined.

When this happens, I power down, then power up again after a few seconds, rewind the tape until I get



CIRCLE 93 ON FREE INFO CARD

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SoundDiver – The Ultimate in Synthesis Patch Management. Universal Editor/Librarian for Mac or Windows 95.

* Available Third Quarter 1997

Logic Audio Discovery: Digital Audio and MIDI made easy!

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real-time digital
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CIRCLE 89 ON FREE INFO CARD

absolute time readout again, and then resume playback. At first I thought the problem might be with the tape, but this has happened with both old and new tapes, and at different locations in the same tape. Everything else about the machine works perfectly. I get great sound, and the AB heads error readings are way below the allowable limit because I clean the heads regularly. The problem is intermittent. Sometimes the machine crashes and sometimes it runs perfectly. But it's happened often enough for me to get paranoid whenever I play a tape. The problem doesn't occur when I am in Record mode.

Can you diagnose the problem?

Vic Santiago

Manila, Philippines

A Here's an SV-3700 (or any in that family, e.g., 3200, 3800, 3900, and 4100) checklist:

1. The serial number begins with "AA." The number following will be a "0," "1," "2," etc. and these numbers represent the year of manufacture (90, 91, 92, etc.). Units made before 1993 require a circuit trace to be cut and a back tension lever to be replaced.

2. After removing the loading mechanism, look for bits of broken cassette shell that might jam the mechanism.

3. Inspect the Mode and Load switches. (These report transport status to the micro-controller.) One is located on a yellow PCB near the capstan and the other is on the underside of the mechanism. The contacts are gold plated, but the plating wears off. If the silver traces that lead to the switch contacts have turned black, change both switches.

4. The primary brakes are usually worn out after two years of use. Replace these as well as the reverse-play soft brake located under the take-up reel table.

5. Repeated tape jams will chip teeth off of a large transfer gear. This should also be replaced.

Take note that these are not user-serviceable items — unless you already have extensive transport experience. Basically, it's time to send the machine out for service.

Eddie Ciletti

*Manhattan Sound Technicians
NYC, NY*

BURN BABY BURN

Q *My studio is hard-disk based, using Innovative Quality Software SAW Plus, so my songs are all in a digital format, inside the computer. How could I put these files onto a CD-R that any CD player could read?*

*Anonymous
via Internet*

A The answer is to use the "Build Mix" function of SAW Plus to create a WAV file from the multitrack production. There is usually software that comes with just about any CD-R system that can see WAV audio files and then put that data on the CD-R. Our software ends at putting out your audio mix as a WAV-formatted file. At this point, the CD-R software should be used to put the audio file onto a CD in the manner desired by the user.

Thomas Stewart

Innovative Quality Software

Las Vegas, NV

SPLITTING TO BRAZIL

Q *I love Eddie Ciletti's technical but not too profound tips in EQ. I receive the magazine via a friend who brings them down to Brazil on frequent flights. I have been active as a (self-educated) soundman and contractor for the past 16 years, and in the past year I have undertaken consulting and systems design for church systems and church bands. I understand that due to my nonformal instruction, there are probably many things I've missed, but as this field in Brazil is very undeveloped, I have been able to help quite a few people out.*

The reason I'm writing is to ask for an explanation of the term "load" or

continued on page 149

ASK US

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When you do a side-by-side comparison between our 168RC and Yamaha's 03D, you'll wonder why theirs costs so much more.

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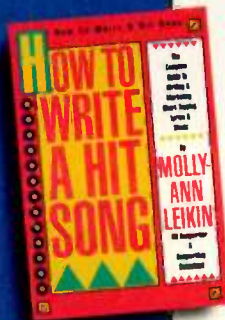
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CIRCLE 29 ON FREE INFO CARD

THERE'S NO



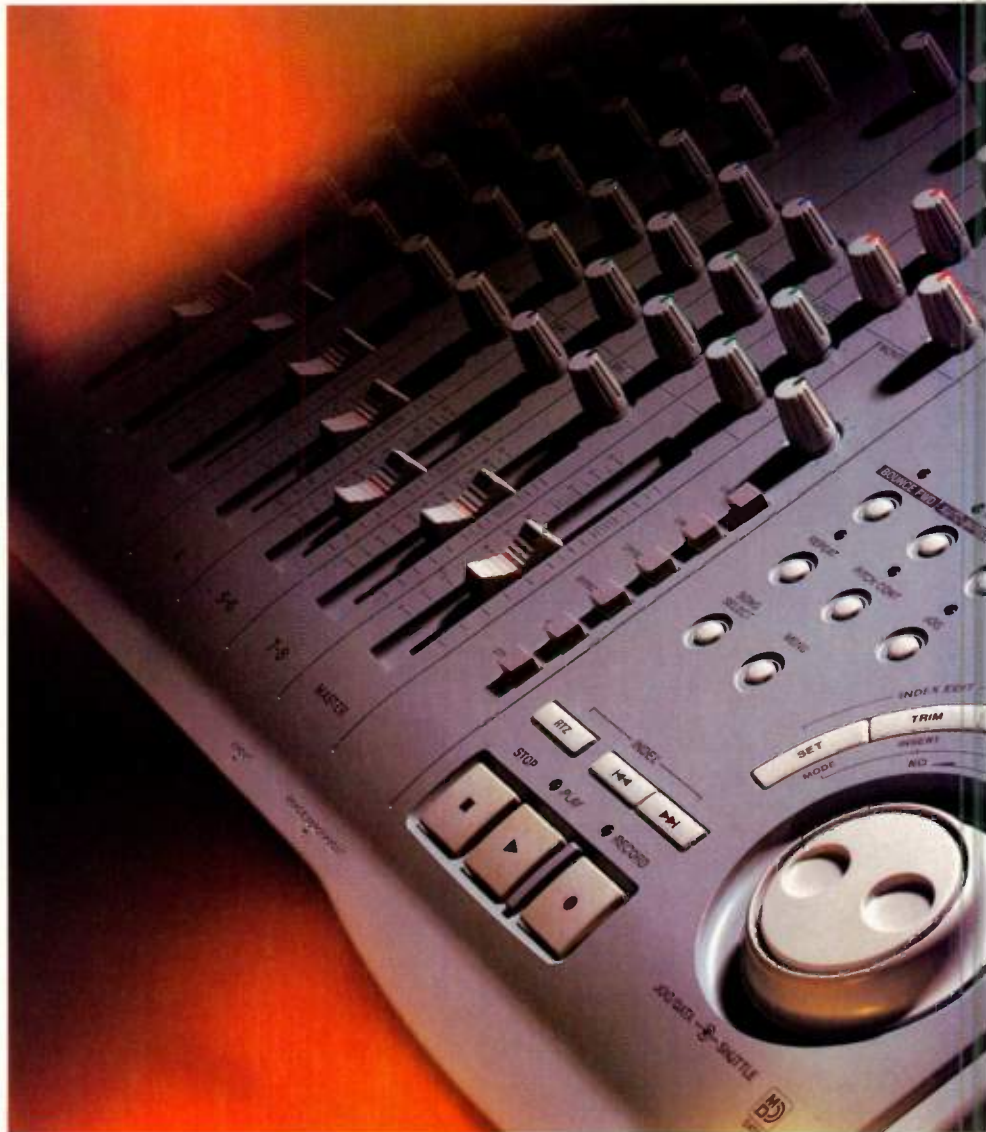
The MiniDisc format has created a recording revolution. TASCAM's 564 makes the most of it to give you more creative power than any other MD multitrack available. It's the only MiniDisc multitrack system built with TASCAM's recording experience and reliability.

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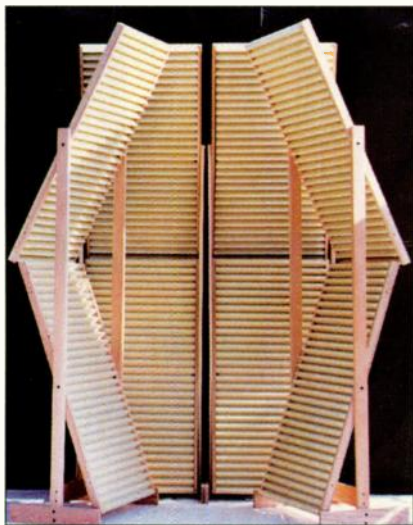
CIRCLE 65 ON FREE INFO CARD

EQ

PRODUCT VIEWS

VOX ROCKS

Developed primarily to overcome problems associated with recording voice, the Vox Box system from Folding Space Technologies is an effective way to improve the sound of any "open mic" recording. The Vox Box acoustic conditioning system limits the effects of close walls and confined areas without the use of permanently installed fixtures, treatments, or dedi-



cated rooms (booths). The system is comprised of eight 2-foot x 4-foot Cloaking Device acoustic panels arranged on four double height swivel stands. Each panel has an absorptive side, as well as a reflective side. Maximum system height is 7 feet, 6 inches. The Vox Box carries a suggested retail price of \$699. For additional information, contact Folding Space Technologies, 1004 Fairwood Lane, Acworth, GA 30101. Tel: 770-427-8288. Web: www.mindspring.com/~fspace. Circle EQ free lit. #103.

WEAPON OF CHOICE

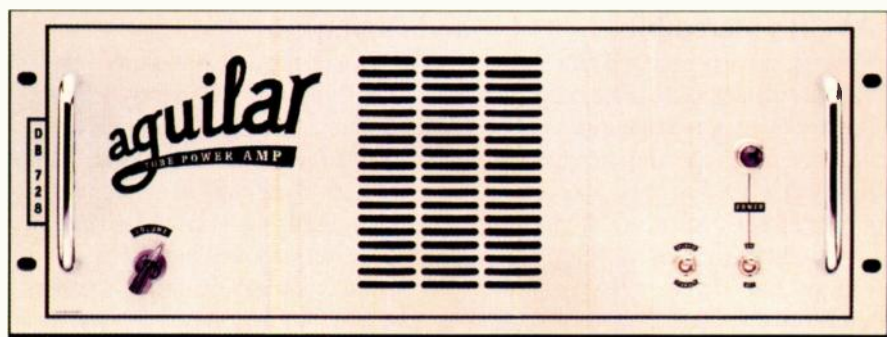
The new CK 69-U1S microphone from AKG meets the needs of both near- and far-field situations through the use of a unique two-part interference tube. The full-length tube creates a long shotgun mic for medium distance recording outdoors, or front-of-stage recording indoors at distances of approximately 20-24 feet. The front half of the interference tube unscrews to create a short shotgun that can be used for film, TV, or video close-ups, as well as front-of-stage miking from 10-17 feet. When used in conjunction with AKG's C 480B preamp,



the CK 69-U1S offers ultra-linear frequency response and transfer characteristics, along with low noise and high sensitivity. The C 480B preamp is a 48-volt-only unit for AKG's ULS series of capsules. In addition to offering increased sensitivity, high overload point, low self noise, and extended frequency response, the C 480B also offers a built-in switch that allows the preamp gain to be increased by +6 dB or preattenuated by 10 dB. It also offers a built-in 12 dB/octave bass cut filter switchable to 70 or 150 Hz. For further details, contact Harman Pro North America, Inc., 1449 Donelson Pike, Nashville, TN 37217. Tel: 615-399-2199. Circle EQ free lit. #101.

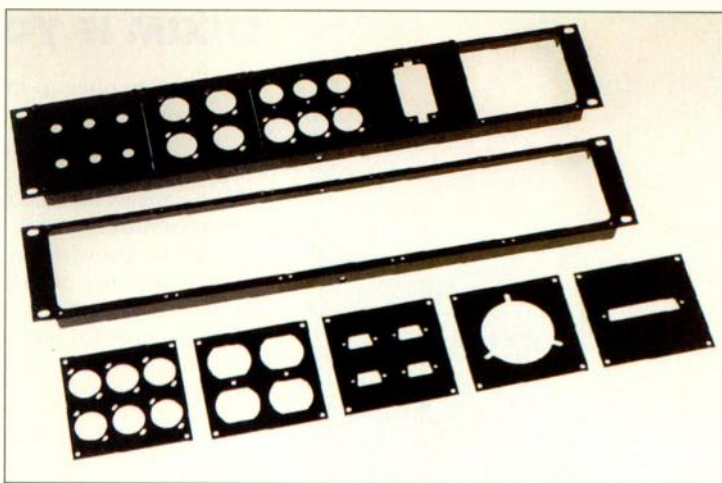
TUBE TIME

Following the success of their DB 680 tube bass preamp, Aguilar has launched the DB 728 400-watt all-tube power amp. Ten vacuum tubes — eight Tesla KT88 power tubes, one 12AX7, and one 12AU7 — help to generate the amplifier's 400 watts of harmonically rich tone. Aguilar has also utilized a custom designed toroidal output transformer for ultra-wide bandwidth. Inputs include one 1/4-inch unbalanced input and one input thru for patching a preamp signal thru to an additional power amp, while output options include two sets of banana plugs (posts) and two 1/4-inch outputs. Aguilar has also included a three-position switch that provides switching for 2-, 4-, or 8-ohm output impedance. Weighing in at 53 lbs., the DB 728 features aircraft-quality aluminum construction that provides sturdiness. Access to tubes is provided through the top of the unit for convenience, and is isolated from any dangerous voltages. For more information, contact Aguilar Amplification LLC, 1600 Broadway, Suite 1004T, New York, NY 10019. Tel: 212-757-2823. Web: www.aguilaramp.com. Circle EQ free lit. #102.



TO PROTECT AND SERVE

Middle Atlantic Products' MPS system offers a one-piece frame and a wide range of assorted modular panels that are prepunched to accommodate virtually any connector. The MPS frame, which is designed to bolt to a pair of rackmount "ears," accepts up to five MPS modules, each of which is punched with either two, three, or four connectors of the same type. Middle Atlantic Products offer 23 MPS modules, accommodating everything from XLR, Neutrik, Switchcraft, Cannon DL, and Elco connectors to 50-pin data punch-outs. Blank and vented modules are available as well. Each MPS module is constructed from 16-gauge steel to resist deflection while connectors are inserted. Suggested retail prices for complete MPS Systems start at \$38.50. For more details, contact Middle Atlantic Products, Inc., North Corporate Drive, Riverdale, NJ 07457. Tel: 201-839-1011. Circle EQ free lit. #104.



MORE IN THE FAMILY

The newest member of TASCAM's DA family of digital multitrack recorders, the DA-98, offers many features and enhancements that will appeal to both the production and postproduction fields. Among its new features, the DA-98 has confidence monitoring, individual monitor select switches, switchable reference levels, an integrated electronic patchbay, digital track copy capability, dedicated function/numeric keys for system operation, a built-in synchronizer, a D-sub connector for parallel interface control, and the optional RM-98 rackmount ear adapter. Users will find full compatibility with both the DA-88 and DA-38. The suggested retail price of TASCAM's DA-98 is \$5999. For more details, contact TASCAM, 7733 Telegraph Road, Montebello, CA 90640. Tel: 213-726-0303. Circle EQ free lit. #105.



D4 AND AFTER

Utilizing a new capsule specially designed to capture high SPL instruments with extended frequencies below 100 Hz, Audix's latest creation, the Audix D4, will help put the bottom back in kick drum mics. The D4 employs sub-impulse technology that samples sounds at a higher rate than most mics, offering a flat response down to 63 Hz. Applications for the D4 include kick drum, timpani, toms, piano, and sax, as well as any other instruments that require extended enhanced low-frequency reproduction. The D4 has a suggested retail price of \$289. For more details, contact Audix, P.O. Box 248, Lake Forest, CA 92630. Tel: 800-966-8261. Circle EQ free lit. #106.



CANS DO

DOD's SR460H studio headphone amplifier features six 1/4-inch stereo headphone jacks with individual level controls on the front panel, as well as a master level control. Rear-panel inputs include 1/4-inch TRS jacks, while unbalanced TRS stereo inputs are found on both the front and rear panels. DOD offers hearing protection through a gradual Auto Ramp start-up system. Maximum stereo power is one watt per channel, while THD is 0.2 percent at 0.5 watts. For more information, contact DOD, 8760 S. Sandy Parkway, Sandy, UT 84070. Tel: 801-566-8800. Circle EQ free lit. #107.



EQ

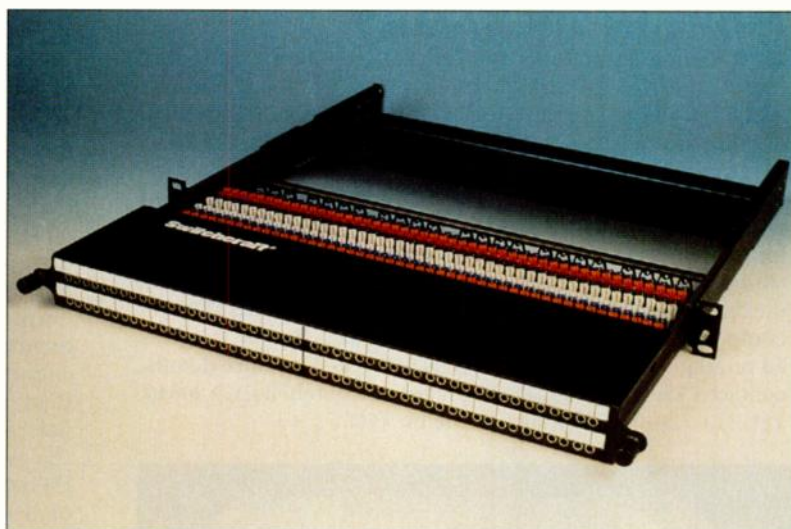
PRODUCT VIEWS

MIXIM IF YOU GOT 'EM

MIDIMAN has begun shipping the MIXIM 10, its new 10-channel ultra compact audio mixer. MIXIM 10 features include: two ultra-quiet mic preamps with balanced (XLR) or 1/4-inch inputs and individually switchable phantom power; four channels with gain, pan, send, and 3-band EQ controls; two stereo channels with gain, balance, and send controls; two channels of straight left and right unity gain; a stereo return; stereo RCA tape sends and returns; a stereo headphone jack; stereo LED ladder showing level and clipping indicators on the main outs; and a frequency response of 5 Hz–50 kHz. Channels 1 through 8 gain pots and main level pot are true gain controls — not just faders, which helps to offer the most headroom possible for either the quietest or the hottest signals. Suggested retail is \$229.95. For more details, contact MIDIMAN, 45 East St. Joseph Street, Arcadia, CA 91006. Tel: 818-224-2842. Circle EQ free lit. #108.

PATCH MADE IN HEAVEN?

Designed for installations where space is limited, Switchcraft's TTP96FA patch panel features a heavy-duty slide-out tray to offer easy access to the 96 jacks from the front of the unit. The 96 corrosion-resistant, TT, nickel-plated Switchcraft jacks have gold-plated switching contacts and IDC terminations. The TTP96FA offers paired jacks for easy identification of left and right channels and a wide designation strip offers easy identification. The unit will fit into a standard 19-inch x 1-3/4-inch rack application. The TTP96FA is available in two configurations: normals brought out and normaled at jacks. For further details, contact Switchcraft, Inc., 5555 North Elston Avenue, Chicago, IL 60630. Tel: 773-792-2700. Web: www.switchcraft.com. Circle EQ free lit. #109.



VAST POSSIBILITIES

The K2000VP from Kurzweil Music Systems is a 61-key, 24-voice professional keyboard with V.A.S.T. synthesis modeling technology, a built-in 32-track sequencer, DSP software, a 3.5-inch high-density disk drive, and an array of sounds. The K2000VP builds on the design of the K2000 with more RAM and Kurzweil's new 3.54 operating system. In addition, Kurzweil will also be offering the new Analog Collection of synthesizers for a limited time with the K2000VP. This special 30-disc library contains the re-created sounds of a number of popular vintage analog synths including sounds from Arp, Korg, Moog, Oberheim, Roland, Sequential Circuits, and Yamaha. The K2000VP will feature a retail price of under \$2000. For more information, contact Kurzweil Music Systems, 13336 Alondra Boulevard, Cerritos, CA 90703. Tel: 310-926-3200. Web: www.youngchang.com/kurzweil. Circle EQ free lit. #110.



Your brain on Mojo.



MH4 *mojo cans*



[WE RACKED OUR BRAINS]

Use your brain. The MH4 Mojo Cans Amp offers way more gain for the buck! Use our MH4 and your ears will thank you while your wallet remains your friend. Think about it. Rane quality and reputation for a small investment.

This is a no brainer! Available at select Mojo dealers.



linear activation



From now on, PA stands Performan



The truth is that most PA systems are not designed for live performance. They borrow cone drivers from instrument amps and crossovers from home hi-fi sets. They can't handle the power and they don't disperse the sound evenly. Basically, they're useless.

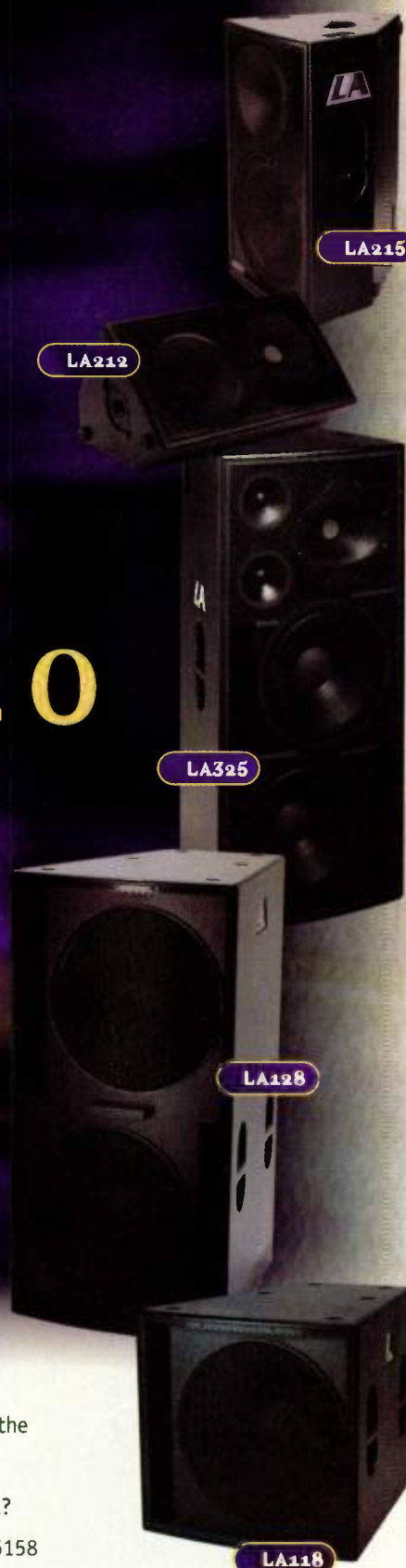
Linear Activation from EAW is not just another PA. It redefines the word.

LA offers a complete line of PA systems engineered by EAW – the world standard in professional touring sound. LA features the same professional cones and compression drivers, the same heavy-duty, computer designed crossover and the same road-proven

for ce Audio

construction techniques and materials. All designed to solve the specific problems of small-venue live performance.

You're a professional. Don't you deserve a professional PA? To find out more about a truly professional PA, call 508-234-6158 and request a copy of the Linear Activation Technology brochure.



LA215 and LA212 Two-way Multipurpose Systems

- 15-in (LA215) or 12-in (LA212) woofer, 2-in exit compression driver on Wave Guide Plate™ (WGP™)
- Stands vertically as a main, sits horizontally as a monitor
- Features rubber footpads for both configurations plus a standmount cup

LA325 Three-way Main System

- 2x 15-in woofers, 2x 7-in mids, 2-in exit compression driver on WGP™
- Switchable powering mode – passive or biamped
- Balance-optimized handles and optional casters

LA128 or LA118 Subwoofer Systems

- 2x (LA128) or 1x (LA118) 18-in subwoofers
- Optimally vented enclosure
- Recessed cups for stacking LA325 or other subs
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CIRCLE 30 ON FREE INFO CARD

the Missing Link?



How can you edit your **adat** recordings? If you have a PC & **STUDI/O**, it's easy.

Pick any of a number of programs: Sound Forge[®], SAW⁺, Samplitude[®], Cubase Audio[®], Wavelab[®], CoolEdit[®], GoldWave[®], etc. It's amazing what you can do with a computer these days! But... how do you get those 16-mic drum parts into the computer in the first place? Or, once you've stacked and fattened those vocal harmonies, how do you get them out?



we've Found it.

With the **STUDI/O** multichannel sound card you get two sets of optical in/out: that's two **adats**!

16-channels, phase-locked and in sync. No ground loops, no noise. Switch to SPDIF format and digitally record from a sampler CD. Bring it in at 48KHz on the fly, using the onboard sample rate converter. Transfer to and from your DAT machine. Convert to 44.1 KHz on the way. Use your ADATs in pass-thru mode to go direct to disk. Or, connect **STUDI/O** directly to your favorite digital mixing console.

STUDI/O.



GET it!

Get 16-channel, 24-bit record and playback. Get 18-bit stereo analog monitor mix. (Steerable to digital outs too!) Get top-quality stereo sample rate conversion. Get full compatibility with Windows[®] Sound System.

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CIRCLE 77 ON FREE INFO CARD

EQ STUDIO WARE

STAY TUNED

Justonic's "Pitch Palette" analyzes the harmonic content of each note as a given piece of music is played by an electronic keyboard or guitar (or other fixed-tune instruments), then corrects the tuning of each individual note. Priced at \$189, Pitch Palette requires a 486-class PC or better with at least 8 MB of RAM, a MIDI interface, and a microtunable synthesizer or sound card. For more details, contact Justonic Tuning, Inc., Suite 103, 1650 Alberni Street, Vancouver, B.C., Canada V6G 1A6. Tel: 888-688-3456. Web: www.justonic.com. Circle EQ free lit. #115.

OUT THE DAW

Sonifex's Courier portable hard-disk recorder records high-quality digital audio to a PCMCIA hard disk and offers nondestructive, graphical, scrub-wheel editing, and can transfer audio via mobile telephone, modem, and (optionally) ISDN communications. Recordings can be made using MPEG layer 2 or 16-bit linear WAV. The recorded files are DOS and Windows compatible and the PCMCIA hard disk can be slotted into any suitably equipped digital audio workstation for instant editing applications. The PCMCIA disks can be changed quickly and are capable of holding over four hours of mono recordings. Two inputs are available for either a single stereo source or two mono sources, which can be either at microphone or line level. Each input has a level control, which can be used separately or ganged together. The Courier's graphical display offers a visual account of recording level and time count-up, while also giving an indication of disk space remaining and battery condition. The unit uses standard camcorder batteries and can be charged without interrupting the recording process. For further information, contact Sonifex's U.S. agent, Independent Audio, 43 Deerfield Road, Portland, ME 04101. Tel: 207-773-2424. Circle EQ free lit. #116.



The EVENT you know... (and love :-))



Even if you've never heard of Event (possible—especially if your last name is van Winkle), you already know us very well. Because Event is made up of folks who've been major players in the music and audio industries for a long, long time. Folks who've designed and manufactured some very highly respected and innovative pieces of gear—some of which you may very well own (all the cool people do).

We founded Event on the principal that “the customer is precious.” That means we make only those products that our customers want, need, and can afford. Products that provide access to new levels of musical expression. Products that put high-end, professional tools in the hands of us mere mortals. (That's right. We use the gear we make, so we build the stuff that we want in our own setups.)

We began our business with the microphones and speakers you see pictured on this page. Thanks to you—and to the kind support of the industry at large—these products have been tremendously successful. We want to give our heartfelt thanks to all of you who have bought a set of our speakers or a RØDE™ microphone. We hope you've gotten as much pleasure out of using them as we have.

...is just getting started. And now...

...the EVENT you've been

LAYLA:
CARD, CABLE, FRONT AND BACK PANEL
\$999



GINA
\$499



DARLA
\$349



Affordable Digital Recording Hardware

Introducing our new family of cross-platform PCI-based multitrack audio recording systems, designed by digital audio gurus (and Event strategic partner) echo Corporation. Our proudest offering: Layla by echo™, a rack-mount audio interface with eight balanced analog inputs, ten balanced analog outputs (ins and outs are all simultaneously accessible), digital I/O, a 24-bit signal path, massive on-board DSP, word clock (for sync and expansion), MIDI, and much, much more—all for an amazingly low \$999.

Or meet Gina by echo™: two analog inputs and eight analog outputs (all 20-bit, of course), digital I/O, and on-board 24-bit DSP. Appreciate clean design? So do we.

That's why all of the audio connections on Gina are pro-quality 1/4" jacks mounted in a rugged breakout box. Appreciate reasonable pricing? Gina's \$499 tag is sure to make you smile.

If you only need two analog inputs and eight analog outputs (again, all 20-bit!), on-board DSP, and a breakout box loaded with RCA audio connectors, then say hello to Darla by echo™—priced to fit just about anyone's budget at only \$349. (No, that's not a misprint.)

All three systems are compatible with audio recording and editing software applications that "talk" to the Microsoft Windows 95 .WAV device driver—which means you

don't have to give up your favorite software in order to take advantage of the fantastic sound quality that Layla, Gina, and Darla offer. You can, for example (with full apologies to all of the fine software programs we're unintentionally leaving out), run Cakewalk Software's Cakewalk Pro Audio™. Or Steinberg's Cubase Audio™ and WaveLab™. Or Emagic's Logic Audio™. Or Innovative Quality Software's SAW Plus™. Or Sonic Foundry's Sound Forge™. Or Syntrillium Software's Cool Edit Pro™. (In fact, a custom version of Cool Edit Pro comes with each Layla, Gina, and Darla system, so you can be up and running even if you don't already own multitrack recording software.)

Plug-ins? You bet. Including perennial favorites from Waves and Arboretum Systems.

And since getting up and running is half the battle (a battle we firmly believe you shouldn't have to fight) all three systems are true Plug-and-Play™ compliant. We even give you a utilities disk that examines your system before installation, so you know exactly what performance you'll be able to achieve.

Don't worry. We haven't forgotten our Mac-based friends. Our PowerPC-compatible systems (same hardware, new drivers) are coming this summer. Prepare to be stunned.

Precision Monitoring Systems

Building on the technological innovations that arose from the 20/20bas development, our intrepid engineers, Frank Kelly and Walter Dick, set out to create an active monitoring system that would be a perfect complement to the digital audio workstation environment. Requirements: small footprint, reference-quality frequency response, non-fatiguing to the ears over long periods of use, magnetically shielded, and way cool looks (!). The result: the Tria™

Triamplified Workstation Monitoring System.

This integrated three-piece system comprises a floor-mounted VLF (Very Low Frequency) driver housed in a station that is also home to five separate power amplifiers, active crossovers, and a full set of calibrated trim and level controls, plus

RØDE™ NT1

Large Diaphragm Condenser Microphone

Hot on the heels of the awesomely successful NT2 comes the NT1, a true large diaphragm condenser microphone. Like its predecessor, the NT1 boasts low-noise transformerless FET circuitry, and features the highest quality components. With a 1" gold-sputtered diaphragm inside a proprietary shock-mounting system, a unique head design that provides both durability and pop filtering (while remaining acoustically transparent), and a wide dynamic range that makes the mic ideal for use in a wide variety of applications, the NT1 is destined to become a fixture in the modern project and professional studio. And at only \$499, it's just plain scary.

waiting for.

two biamplified satellite speakers, each with a 5-1/4" polypropylene cone driver and 1" neodymium soft dome high frequency driver.

What's truly remarkable is that the biamplified satellite speakers reproduce frequencies down to an incredible 55Hz, so the listener experiences full-range sound when positioned in the direct field (that is, sitting in front of a computer screen). With the addition of the VLF station, the system response reaches down to 35Hz, resulting in full

bandwidth audio reproduction that is as accurate, precise, and pleasing to the ear as our award-winning 20/20*bas* system. You simply must hear **Tria** to believe it. Even then, you may not believe the price: \$849. (Yes, that's for the *entire* system.)

The 20/20*p*[™] is a direct field monitor designed to provide an affordable pathway into the world of powered speakers. Utilizing the proven 20/20 design, the system comprises a 20/20 cabinet with two full-range 100 watt power amplifiers—one of the amps drives the powered cabinet, the other

drives a passive 20/20 satellite. The resulting sonic clarity is exactly what you'd expect from a system bearing the 20/20 name: extended low frequency response, exceptionally clear midrange, and sparkling high end. What does this kind of audio quality cost? A low, low \$599 per pair.

As with all of our active monitoring systems, the **Tria** and 20/20*p* offer continuously variable high and low frequency trim controls, input gain controls, balanced inputs with gold combination 1/4"/XLR connectors, and full magnetic shielding.

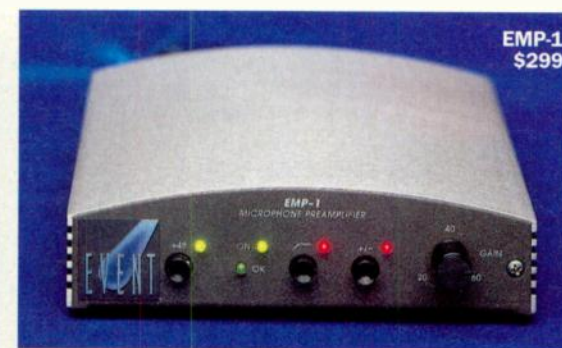
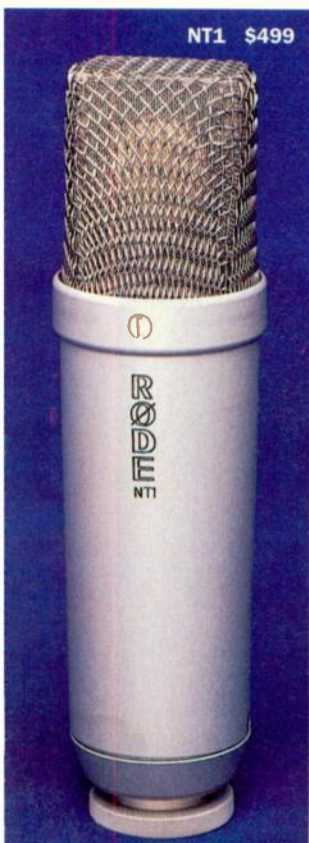
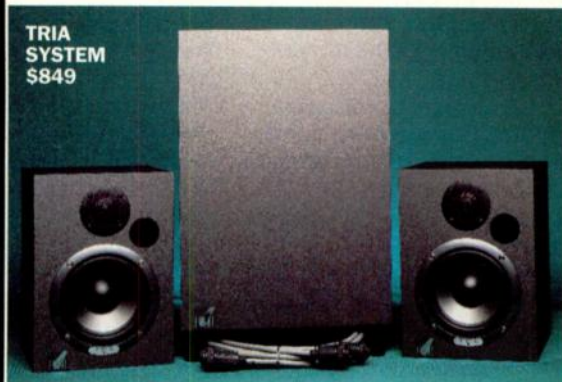


ESW-1 Speaker Switcher

But you were almost going to pass over this part. After all, a speaker switcher isn't exactly the most exciting product in the world. But the **ESW-1[™] Speaker Switcher** delivers breakthrough performance and functionality, thanks to the clever engineering of Peter Madnick, who has long been a fixture in high-end audio equipment design. (He's actually pretty scary, possessing serious chops in both the analog and digital domains.)

What makes the ESW-1 unique among switchers is

its ability to simultaneously handle both active and passive monitoring systems. Of the six pairs of speakers that can be connected, up to three sets can be active. Switching among them is as easy as pressing a front-panel button. Or use the included remote control so you never have to leave the sweet spot when switching. Naturally, the audio path is beautifully transparent and the switching noiseless. There is one thing about the ESW-1 that we haven't quite figured out: If you own a pair of Event monitors, why would you have any other speakers that you needed to switch to?



EMP-1 Microphone Preamp

What better to complement a RØDE Classic, NT2, or NT1, than a custom microphone preamp that combines superior sonic performance with the features demanded by today's studio professionals? (Okay, we admit the thing sounds pretty amazing with other brands of mics as well.) First off, you should know that the **EMP-1[™] Microphone Preamp** was designed

by engineering wizard Peter Madnick. Why is that important? Because, in Peter's own inimitable words, it means that the unit features a transformerless design utilizing a common-mode choke input [translation: *RF interference is virtually eliminated*], a superior differential input *amplifier* [translation: *EM interference is suppressed*], and servo control to maintain

zero DC offset [translation: *There are no distortion-inducing capacitors*]. Ahem. Thank you for those fascinating explanations, Peter.

Put in terms the rest of might have a chance relating to: The EMP-1 offers ultra low noise operation, selectable phase, low cut filtering, phantom power,

a line output (for running directly into *Layla*, perhaps?), and an internal power supply—all in a downright sexy little box. Now, what does all that mean? It means that the EMP-1 is a mic pre worthy of your finest microphones. (Don't let its low \$299 price tag fool you. This preamp is the real thing.)



We're Event Electronics. Thanks for taking the time to see what we're about. We hope you like what we're doing; please let us know. We'd love to hear from you.

For more detailed information on any of our products—and for amusing photos of prominent members of our industry caught in embarrassing situations—visit our Web site, www.event1.com. Or e-mail us directly at info@event1.com. Literature on specific products may be obtained by calling 805-566-7777, ext. 555.

Specifications and features are subject to change.

"Art Of" Facts

This Michigan-based studio is home base for electronic-dance-man
Kenny Larkin

STUDIO NAME: Art Of Dance (also the name of their record label)

LOCATION: Birmingham, MI

KEY PEOPLE: Kenny Larkin (owner, engineer, producer, artist); Kelvin Larkin (label manager)

PROJECTS RECORDED: Kenny Larkin: *Azimuth*, *Metaphor*; Dark Comedy: *7 Days* (and the forthcoming *7 Nights*). Kenny has also released electronic dance albums on TVT/Waxtrax.

COMPUTER GEAR: Apple Macintosh 8100 PowerPC with 1.2 GB and 800 MB drives; Mark Of The Unicorn MIDI Express and AV MIDI Timepiece interfaces; Digidesign Audiomeia II card

SOFTWARE: Emagic Logic Audio 2.5.4; Masterlist CD 1.3; Sound Designer II 2.82; Opcode Galaxy Plus Editor; Steinberg ReCycle

CONSOLE: 44-input Amek Big; Yamaha ProMix01 (submixer)

MONITORS: Genelec 1031A; Tannoy System 12 DMT

AMPLIFIERS: Ashley CFT-1800 (each amp is bridged and drives one speaker)

RECORDERS: Alesis ADAT XT [3] with BRC; Marantz CDR620 CD recorder; Sony PCM2300 DAT, PCM2600 DAT, and MZ-R3 MiniDisc; TASCAM 302 cassette recorder

EFFECTS PROCESSORS: Eventide DSP4000; Lexicon PCM80, PCM90, LXP-15, and Vortex; Ensoniq DP/Pro and DP/4

OUTBOARD GEAR: Drawmer 1960 tube compressor/mic pre; Tube-Tech LCA-2B compressor/limiter; Amek System 9098 equalizers [2]; TC Electronic Finalizer; Barcus Berry BBE 862 Sonic Maximizer; LA Audio GX2 noise gate

MASTER CONTROLLERS: Kurzweil K2000; Alesis Quadrasynth; Roland JP8000; Yamaha CS; Lexicon MRC

SAMPLERS: E-mu Emulator EIV with 40 MB; Ensoniq ASR-10R

SOUND MODULES: Korg Mono/Poly and Wavestation SR; Roland Juno 1, JD990, and R8MkII; Yamaha TG-500, DX-100, and RM-50 drum module; E-mu Morpheus

MICS: AKG C414TL; Audio-Technica 4033; Shure SM58

STUDIO NOTES: Kenny Larkin states: I used to record at home until I purchased the Amek console, which ate up every foot of space available. So early in 1996 I decided to build a medium-size, high-quality studio to record (mainly) MIDI-based recordings — but quickly we began tracking vocals. Just recently we built a digital studio around a Yamaha 02R because of its compact size and bang for the buck. We're sticking with ADAT XT's in that room, as well as the same assortment of outboard gear, to ensure compatibility between the two rooms.

EQUIPMENT NOTES: Larkin continues: The last pieces I purchased were the Ensoniq DP/Pro and the TC Electronic Finalizer. The DP/Pro blew me away and sounds amazing for the price they're selling for. I can't wait to get my hands on the 24-bit converters. The Finalizer is also incredible. I just recently mastered a project that will be released on Sony/Japan and received compliments from the mastering engineer on how wonderful the project sounded. My Tube-Tech tube compressor is my favorite piece — it does great things to the bottom end without any ugly compression artifacts. **EQ**



Last year the VS-880
set the music world ablaze.

This year, we've added
fuel to the fire.



One year after
the hugely successful
introduction of the VS-880,
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Introducing the VS-880 V-Xpanded, a radical
enhancement of the hard disk recorder that sold an
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Revolutionary new features like **64 Virtual Tracks** which enables you to record
many takes on each track and then combine the best for the ultimate version.
And a **Random Access Recorder** with 999 levels of undo. Instantly copy the
song to try different versions. Plus, **two world-class stereo multi-effects
processors***, including COSM-based guitar pre-amps and every other effect
you'll ever need to record and mix your music.

Well, now we're upping the ante again with powerful new features like built-in
full **dynamic snapshot automation**. We've even added a COSM-based Mic
Simulator so you can plug in an inexpensive mic such as the Roland DR-20 and
model the sound quality of expensive, high-end mics. Best of all, existing
VS-880 owners can have all of this with just a simple, **super-affordable upgrade**.
So stop by your nearest Roland dealer or call (800) 386-7575, ext. 761 for a
free video and hard disk recording guide and check out the incredible VS-880
V-Xpanded Digital Studio Workstation. And get ready for another heatwave.

* with optional VS8F-1 Effects Expansion Board.



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with our pro-quality,
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and DR-20 dynamic
microphones, our
new COSM-based
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emulates the sonic
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to recreate the sound of the above pictured microphones. This was an independent
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either a business or consulting relationship or by way of license agreement.

CIRCLE 68 ON FREE INFO CARD



Microtech Gefell UMT 800

A new mic that
sounds different
from others of
its ilk

MICROPHONE NAME: Microtech Gefell UMT 800

PRICE: \$1995; Z option, which includes the EA 92 Elastic Suspension, \$150

TYPE OF MICROPHONE: Large format condenser

POLAR PATTERN: Omni, wide cardioid, cardioid, hyper cardioid, bidirectional
OPERATING PRINCIPLE: Pressure gradient transducer

FREQUENCY RANGE: 40 Hz to 18,000 Hz

SENSITIVITY: 13 millivolts/Pa (cardioid)

SIGNAL-TO-NOISE RATIO: 72 dB (CCIR weighted, re: 1 Pa @ 1 kHz)

MAX SPL FOR THD LESS THAN OR EQUAL TO 0.5%: 135 dB (cardioid)

RATED SOURCE IMPEDANCE: 150 ohms

EQUIVALENT LOUDNESS LEVEL DUE TO INHERENT NOISE: 14 dBA (IEC 651)

DIMENSIONS: 195 mm (length) x 70 mm (maximum diameter)

WEIGHT: 540 grams

MIC NOTES: Microtech Gefell's UMT 800 is built around the well-known M7 capsule, which is also used in Microtech Gefell's UM 92.1S. Obviously, the headgrille shape of the UMT 800 does not conform to the more typical cylinder- or wedge-shaped grilles and this is an important design consideration: Since most of the M7 capsule sits within the top half of the UMT 800's headgrille (i.e., above the name band), its tonal character is distinctly different from that of the UM 92.1S. Tech heads will notice that these differences are reflected in the measured frequency response of the UMT 800 and UM 92.1S.

USER TIPS: Because the UMT 800 utilizes the M7 transducer, it excels in a large variety of applications. It can be used close-up for solo vocal (including voiceover) or instrumental recording such as horns. It is also quite effective for more distant overall recording techniques such as might be used to record an entire orchestra.



PHOTO BY EDWARD COLVER

2 MILLION
THREE HUNDRED FIFTY THOUSAND
TRACKS LATER
OTARI REMAINS
THE LEADER
IN PROFESSIONAL
TAPE BASED RECORDING

Introducing the newest in this lineage, the **DTR-8S PRO-DAT Machine**. With features and specifications that could only come from a company that's been there, again and again.

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CIRCLE 53 ON FREE INFO CARD

Squirrel Nut Zippers "Hell"

A look into the unusual techniques used to record the Squirrel Nut Zippers' red-hot single with producer Mike Napolitano

BY ROBERT GRANGER

EQ: How did you record the track? It sounds extremely live.

Mike Napolitano: The only overdubs that we did on "Hell" was the piano — which I think is barely audible, and one of the horn parts. Other than that, the rest of the track was done completely live.

Was the entire album done like that?

Most of the album was done live except for, say, when an instrument needed to be played by somebody who was already playing another instrument. If Ken Mosher wanted to put an alto and a baritone sax on the track, he'd obviously have to overdub at least one of them. Jimbo Mathus played the piano part on "Hell" and he couldn't track with it without aborting his guitar part.

Whose idea was the "retro" sound of the album?

To me, and to everyone else, I don't think it was a "retro" sound for the sake of being "retro." The entire band wanted to track the album live for the feel, not for the sonics. The sound of the album is really derived from the sound of the house (Kingsway Studios). To track live, you have to set the whole band up in a room — it's a big band, it takes up a lot of space, and the mics that you set in front of one person pick up what the

others are doing. So the tracks have a very open, distant, sound due to the logistics of the situation. We tried to use as few mics as possible, not really for sonics, but for that open, live feel. It seemed like that was the best way to do it, and the sonics just followed.

How did you have the band set up?

It evolved slowly throughout the sessions, so it's really hard for me to say which songs were recorded what way. At one point it started off where, literally, everyone was in the same room. Slowly, the drums got sequestered by moving everyone else farther away. By the end of the sessions, it got to the point where the drums were in one room and everyone else was in another room. For the most part, most of the sound came from two mics on the drums and one mic for the rest of the band. I'd say 80 percent of the sound of everything else came from one mic.

What did you use in terms of microphones?

The one mic that was the vocal/everything mic was a Neumann U47 that we placed in the middle of the room, set to the omni position. Acoustically, things were premixed by "choreographing" the song where, for instance, if Tom Maxwell's acoustic guitar had to come up in the mix, he'd just walk up a little bit closer to the mic. Although there were a handful of individual close mics, they were barely used in the mix — maybe for a little bit of stereo to push the signal to one side or to fix some type of sonic anomaly that would pop up. They were our safety back-up.

What did you use for the individual mics?

We were constantly changing the close mic on the upright bass from a Shure 77, to a SM57, to a Neumann FET 47. Honestly, not much of the close mic is even used on the bass, it's mainly a little bit of direct low-end, while the punch and the air, or the finger noise, of the bass is mainly through the '47. We also used a Coles ribbon mic on the horns.

What did you use to mic the drums? The snare has such a nice open snap to it.

We used two Sony C37A's set up in an X/Y configuration about seven feet out in front of the kit. Chris has a giant col-



HOT NUTS: The single "Hell" from the Squirrel Nut Zippers debut release has propelled this band into the spotlight.

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lection of drums and he would dial in a drum sound that was appropriate for every song, but the miking set-up never changed.

There were other mics on the drums, but there weren't any other ones put into the mix of "Hell." There was a FET 47 on the kick, but only two or three songs have that mixed in, and it's pretty evident where it's mixed in. On some of the songs the upright is the "thump" of the groove and on some songs the kick drum goes below it—as the kick drum goes below it, that's the '47 in the mix. Any time there was an electric guitar there was a Neumann shoved right on it, but it really didn't get that much use.

How did you get the vocal sound?

I'm pretty sure Tom used a '57, because I know Jimbo did, through a Neve mic pre. The '47 wasn't kind to Tom. When Katharine Whalen sang, she just sang into the '47 that was up in the room. That's the reason why her voice is so bone dry in comparison to the volume of the other instruments, because she had to get right on the mic—no room sound for her.

How did you set up the background vocals?

They were done live. As each member played they would just yell the lyrics into the center of the room. The songs had to be choreographed—there were usually two or three takes before the final take, not for musical reasons, but for mix reasons. We'd run through the songs and figure out what wasn't loud enough and in the next take that player would walk up a little closer to the mic.

There's so much depth and "air" in the mix, was that achieved naturally?

Oh yes. Kingsway is a big old house. The piano, which runs in and out of the

track, probably has a lot to do with the depth of it because it's miked from about 40 feet away. Even though it's not a big part of the mix, I think it's a big part of the ambience.

How did you find it mixing the tracks?

Most songs, on average, were five tracks. "Hell" probably had a couple more than most because it had the extra horn

overdub and the piano overdub. I'm inclined to think that the main vocal was overdubbed as well, but I can't really remember. So "Hell" might have had as many as eight tracks. Sometimes we used a microphone just barely mixed in to push something off to the side, but, obviously, if you push up the '47 and the two Sony's that's most of the mix right there. There was no automating of the mix. We didn't use any effects, and I don't think we used an EQ either.

Did you use compression?


Everything went to tape with compression, half the tracks with LA2A's and half with UREI 1176's. We used analog tape and we mixed down through compressors to 2-track 1/2-inch so all the tracks got double compressed.

What's the story with the chandelier at the end of the tune?

That noise that you hear that sounds almost like wind chimes is Tom literally swinging from the chandelier and breaking it. We decided that it had a really cool,

spooky kind of sound that we really wanted to hear make it to tape, but I think he got a little carried away. Karen, the manager of the studio, was really upset with us. He was genuinely upset as well, and you can hear that when the track's over. He was extremely upset because they love that house and they do have a lot of respect for the house, but I guess he got a little caught up in the moment.

We tried to use as few mics as possible, not really for sonics, but for that open, live feel. It seemed like that was the best way to do it, and the sonics just followed.



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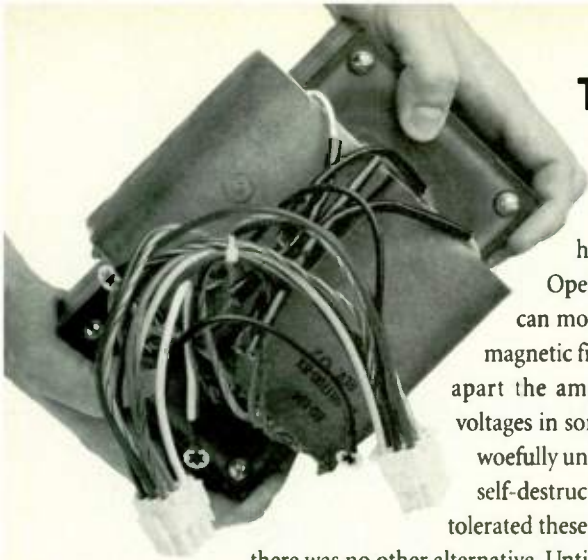


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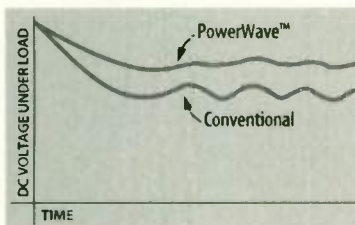


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QSC's PowerLight Project Team
(clockwise from left): Darrell Austin, Technical Services Manager; Pat Quilter, Chief Technical Officer; Robert Becker, Design Engineer; Greg McLagan, Market Manager (Live Sound); Doug Teulie, Industrial Designer



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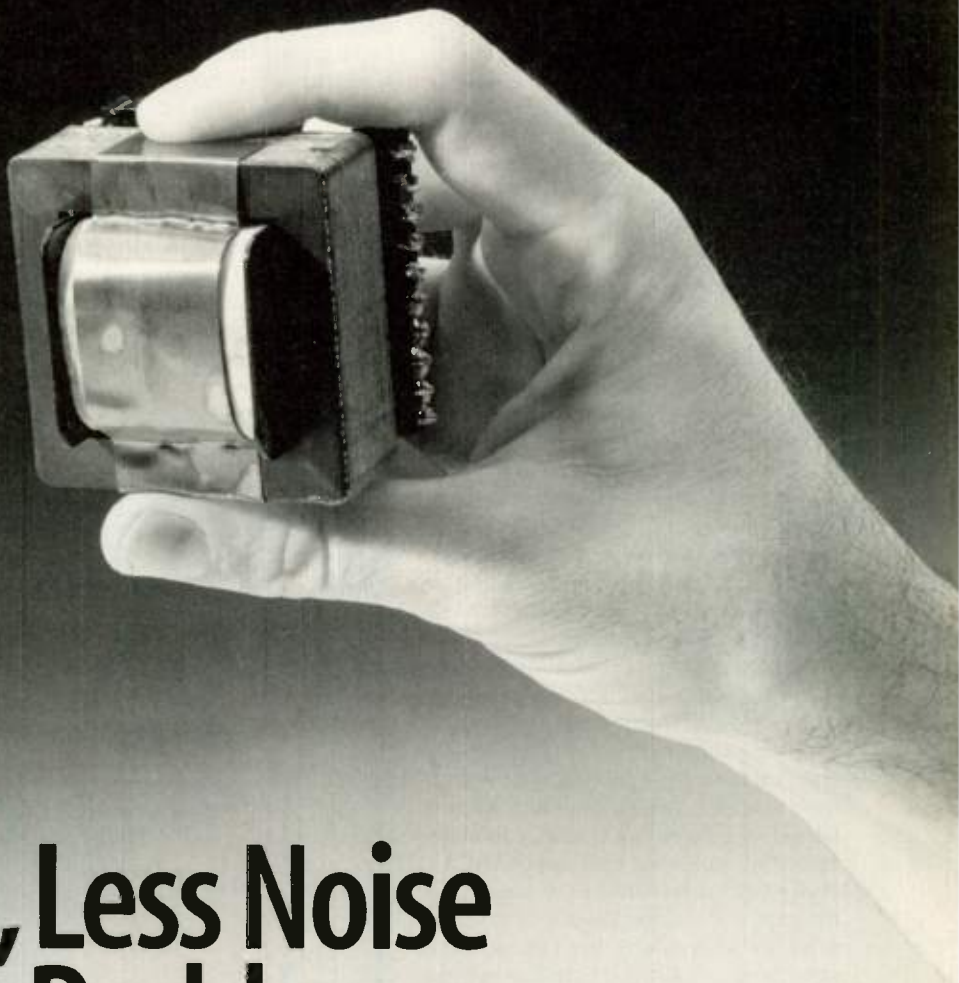
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Liquid Audio

These are two words you should know if you are interested in delivering audio over the Internet

BY STEVE LA CERRA

If you're exploring the possibility of using the Internet for delivery of audio, then you'll be very interested in three new programs from Liquid Audio — a software company that focuses specifically on delivery of audio via Internet. They have recently introduced Liquifier Pro, Liquid MusicServer and Liquid MusicPlayer, which (when combined) facilitate the up- and downloading of audio via the 'Net.

Unlike past methods of sampling music online, the Liquid Audio system claims to maintain sonic fidelity and protect copyright ownership, while still giving consumers the ability to preview and purchase CD-quality audio through their modems. After a listener has auditioned songs from a CD, they can make an online purchase and download the entire CD (or possibly a CD single). In the past, audio downloads would forever live on a hard drive, but Liquid Audio provides the ability for listeners to burn a CD from that download while protecting content providers from piracy.

It's important to realize, however, that music distribution to consumers on the 'Net is not the sole function of this software. It can also be used for "store and forward" purposes, i.e., to transfer audio files from one location to another without the need to physically transfer master tapes from studio to studio — thus opening new possibilities for remote overdubbing.

Of the three programs, Liquifier Pro is the nitty gritty end of Internet mastering, so let's take a look at that first. As of this writing, Liquifier Pro is the first professional audio mastering program for the Internet. Version 1.2 is currently available for Windows '95; Liquifier for Pro Tools is an AudioSuite plug-in for Pro Tools 4.0 or later and will be released shortly. Like other digital audio mastering programs, Liquifier Pro features waveform editing, format

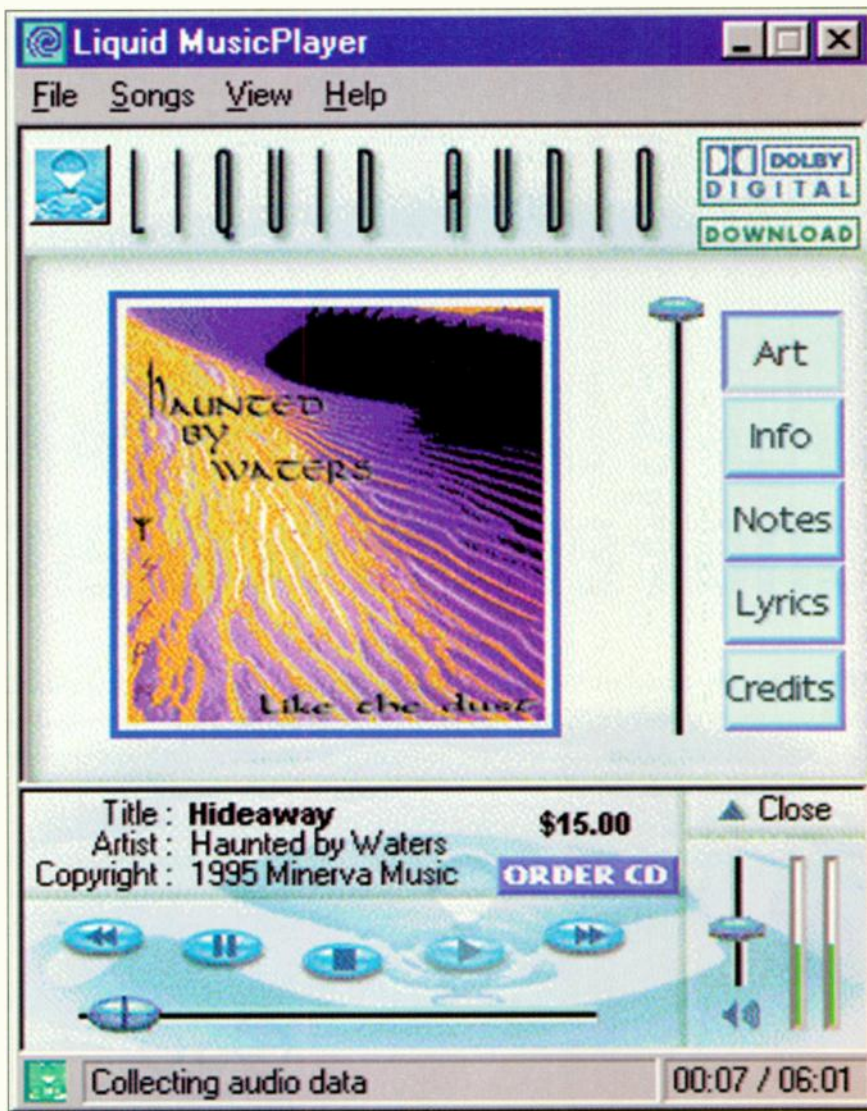
conversion, sample-rate conversion, 4-band parametric equalization, compression/limiting (with optional auto gain makeup), and expansion/gating. Crossfades may be created and previewed in real time, and independent fades can be applied for the demo clip of a song as well as the entire song itself. Audio can be recorded directly into Liquifier Pro (either analog or digital) or imported from CD-ROM at faster-than-real-time speeds. Liquifier Pro supports a variety of sound cards (including Audiomeia III, CardD and Sound Blaster, etc.) and provides a high-resolution plasma-style meter with peak hold function. So far it sounds like a "normal"

pro mastering program.

The real strength of Liquifier Pro is in preparing your music to be transferred via Internet. You may already be aware that the major signal processing problems with online audio transfer are (1) varying modem speeds and (2) it's no easy task to transfer CD-quality stereo audio at low bit rates such as 14.4 and 28.8 kbps. Liquifier Pro includes a library of encoding presets designed to optimize the conversion of audio for different data rates including 14.4 k, 28.8 k, 56.6 k, and 128 k.

If you're the tweaker type, you can write and save your own encoding presets.

continued on page 150



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The Real (Live) Thing

Avoiding the "Fake Factor" in MIDI solo acts



BY CRAIG ANDERTON

I travel frequently, so I stay in a lot of hotels. This means that in the last decade, I've seen 9562 musicians singing and playing to a drum machine and 3885 synth duos where a couple of musicians play along with a sequencer or sampler. I've even been in that position myself a few times.

Audiences have come to accept drum machines, but one person on stage being backed up by strings, horns, pianos, and ethereal choirs rings false, and the crowd knows it. Yet you don't want to lose the audience due to monotony. Unless you're a spellbinding performer, hearing the same voice and guitar or keyboard for an entire evening can wear out your welcome.

In the process of playing live, I've learned a bit about what does — and doesn't — work when doing a MIDI-based act. Hopefully some of the following ideas will apply to your situation too.

SEQUENCERS: NOT JUST NOTES

One way to avoid resorting to "fake" sounds is to maximize the "real" sounds you already have. As a guitar player, that

involves processing my guitar sound. Switching between a variety of timbres helps keep interest up without having to introduce new instruments.

This, however, creates a problem: using footswitches and pedals to change sounds diverts your attention from your playing, since you now have to worry about hitting the right button at the right time. For me, the solution is using a signal processor that can accept MIDI continuous controllers to change several parameters independently. This is where a sequencer really shines — in addition to driving instrument parts, it can generate MIDI messages that change your sound automatically, with no pedal-pushing required.

For example, on one of my tunes, the sequencer sends continuous controller data to a single Peavey ProFex program to vary delay feedback, delay mix, distortion drive, distortion output, and upper midrange EQ. As the song progresses, the various settings "morph" from one setting to another — rhythm guitar with no delay, low distortion drive, and flat EQ to lead guitar with delay, lots of distortion, and a slight upper midrange boost. Within the main guitar solo itself, the delay feedback increases until the solo's last note, at which point it goes to maximum so the echo "spills" over into the following rhythm part. Not only does this sound cool, it adds an interactive element. It's not human be-

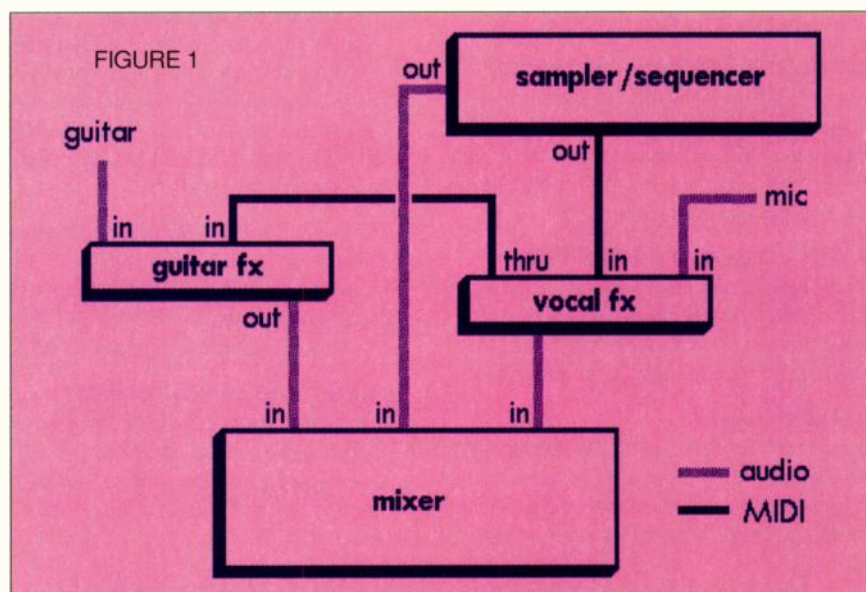
ings, but still, I can play off some changes. What's more, it doesn't seem fake to the audience because all the sounds have a direct correlation to what's being played.

Using a sequencer ties you to a set arrangement, with very few exceptions. However, although sections of the song are limited to a certain number of measures, you can play whatever you want within those measures, so solos can still be different each time you play them.

I really like DigiTech's Vocalist series of processors for live vocals. Being able to generate harmonies is cool enough, but there's a lot of MIDI power in some of these boxes, and you can do the same continuous controller tricks as those mentioned above for guitar. Once again, even though you're generating a big sound, it's all derived from your voice, so the audience can correlate what it hears to what's seen on stage.

THE SAMPLER CONNECTION

A decent sampler with a built-in MIDI sequencer is ideal as a live-music backup companion. It can hold any kind of drum sounds, hook up to something like an Iomega Zip drive for fast loading and saving of sounds and songs, and generate the continuous controller data needed to control signal processors with its sequencer. Fig. 1 shows how a sampler integrates into the rest of my setup.



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Samplers are also great because you can toss in some crowd-pleasing samples when the natives get restless. A few notes from a TV theme song, a politician making a fool of himself, a bit from a '50s movie — they're all fun. And to conserve memory you can usually get away with sampling them at a pretty low sampling frequency.

When sampling bass parts for live use, it's often best to avoid tones that draw a lot of attention to themselves, like a highly resonant synth bass or slap bass. A round, full line humming along in the background fills the space just fine.

When I switch over to playing a lead after playing rhythm guitar, it leaves a pretty big hole. To fill the space without resorting to sequencing other instruments, I sample some power chords and rhythm licks from my guitar and sequence them behind solos. This doesn't sound too fake because the audience has already heard these sounds, so they just blend right in. Furthermore, the background sounds don't have to be mixed very high. Adding just a bit creates a texture that fills out the sound nicely.

One of my favorite solo acts is a multi-instrumentalist in Vancouver named Tim Brecht who plays guitar, keyboards, drums, flute, and several percussion instruments during the course of his act (he also does some interesting things with hand puppets, but that's another story). So when the sequenced drums play, people can accept it because they know he can play drums. Similarly, on some songs I'll play a keyboard part instead of guitar. This not only provides a welcome break, but when I sequence the same keyboard sound as a background part later on, it's no big deal because the audience has already been exposed to it *and* seen me play it.

FOR BETTER DRUMS, USE A DRUMMER

Okay, maybe you can't convince your favorite drummer friend to come along to the gig. But if you can have a real drummer program your drum sequences, it really does make a difference.

I'm seeing more people using MIDI guitar live, but not in heavy-metal or techno bands: these are typically solo acts in places like restaurants. They use

MIDI guitar because, again, it reduces the fake factor. Even if you're playing other instrument sounds, people can see that what you're playing is creating the sound. Some changes can be more subtle, like triggering a sampler with a variety of different guitar samples so you can go from acoustic, to electric, to 12-string, just by calling up different patches. Being able to layer straight guitar and synthesized sounds is a real bonus, as it reinforces the fact that the synth sounds relate to the guitar.

IT'S THE MUSIC THAT MATTERS

All of these tips have one goal: to make it easier to play live, in spite of the technology, and to avoid sounding overly fake. People want to see you jumping around and having a good time, not loading sequences and fiddling with buttons. The less equipment you have to lug around, the better — both for reliability and minimal setup hassles.

When MIDI came out, it changed my performance habits forever. If nothing else, I haven't done a footswitch tap dance while balancing on a volume pedal in years — and I hope never to do one again! **EQ**

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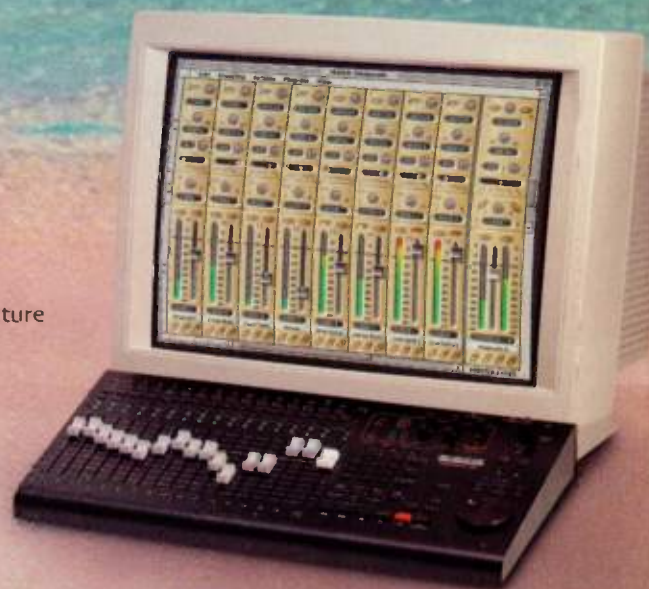
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Monitors I Have Known and Loved



PHOTO BY JIM HERRINGTON

How I learned to love stage monitors (or at the very least tolerate them)

BY AL KOOPER

To date myself right off the bat (someone's gotta!), when I started playing professionally, *there were no monitors!* At the big stage shows at the Brooklyn Paramount in the late '50s, *there were no monitors.* When you see the Fab Four at Shea Stadium, *there were no monitors.* If you think that performances suffered as a result, you obviously never saw Jackie Wilson, Buddy Holly, Larry Williams, Jerry Lee Lewis, or Little Richard live in their heyday.

Shortly thereafter, around 1966-67, monitors began to show up at concert bills I played on as a member of The Blues Project. We'd spend a couple of hours painstakingly working on them in the afternoon, only to have them squeal like pigs or sonically disappear later that evening at showtime.

Initially, I despised them and I also felt sorry for and grew to dislike

what I called the "monitor wimps," (i.e., those that continued in the face of adversity to bellow phrases at soundchecks like, "Can I get a bit more bass in the monitor?"). I was raised professionally to get out on *any* stage and play and sing my parts no matter *what!* I imparted this work ethic to all my bands and chastised any monitor wimps when they showed their true colors. Monitors might have become state-of-the-art, but many monitor engineers in clubs even today display the ears of someone recently upgraded from cleaning off tables after the gig. At least it appears that way to me.

As I grew older, I learned how to sing in the recording studio. It was simply a matter of getting enough of my voice in the headphone mix so that I could hear myself better and sing on pitch a lot more easily. This little kernel of information, along with some bad key choices, eluded me until the mid-'70s. Even *more* years later, I realized that if my voice was loud enough in the *live monitors*, I could actually sing on pitch at *live gigs* as well. I became a modified monitor wimp.

This is my current monitor modus operandi:

1. I tell the monitor guy that all I want to hear in my monitors are vocals.
2. I tell him to turn the vocals up as loud as they possibly can go, so that during the show if I ask him to make them louder, he can only shrug his shoulders and say, "They can't get any louder."
3. To a man, they NEVER do this, even if they say they have.
4. During a show, I motion for them

to raise the volume and, sure enough, they do. I HATE THAT. Nobody listens to me at soundchecks.

I am told that The Who and the late Eurythmics used to have the house mix coming out of all their monitors onstage. I have watched Leon Russell in recent years actually do the monitor mix *himself* from behind his keyboards right on stage. Some people prefer the "personal" models with personal gain controls. Everyone has a "method" that suits them to get the best out of those poor monitors. The bigger the act, the more complicated the monitor dance usually. Let's not even think about what the last Eagles tour spawned monitor-wise.

What's my point?

If you're a four-piece band, set up as close to each other as you can, no matter how large the stage area. (*I never understood the value of being as far apart as possible onstage unless you were the Gallagher brothers in Oasis.*) If the monitors are great, you'll be magnificent. If the monitors are awful, at least you'll be able to hear each other.

If you never expect anything, you'll never be disappointed. A good rule-of-thumb in the monitor wars: Don't depend on

'em — and if they're great, it's just icing on the cake.

Thanks for monitoring my column, and I'll see ya next month!

I was raised professionally to get out on any stage and play and sing my parts no matter what! I imparted this work ethic to all my bands and chastised any monitor wimps when they showed their true colors.

Al Kooper is the Andy Rooney of the pro audio community.



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Ray Manzarek



PHOTO BY ED FREEMAN

The Doors' keyboardist tells how he keeps his fire lit

BY MR. BONZAI

Mr. Bonzai: What are you working on now?

Ray Manzarek: I'm working on a project called "The Bamboo Jungle" here at my project studio with my son, Pablo. I'm also working on some keyboard ragas with tabla player Akal Singh, sitarist Shoujaat Khan, and violinist Kala Ramnath.

Any Doors news?

The big news is that The Doors box set will be out in October. It's got unreleased rarities, the first Doors demo with Rick and the Ravens (my brothers Rick

and Jim on guitar and harmonica), "Break On Through" from the Isle of Wight — the last recorded performance of The Doors, "Celebration of the Lizard" at Madison Square Garden, Hollywood Bowl "Light My Fire," a cool jazz version of "Queen Of The Highway" with Jim doing his Marlene Dietrich, a filthy version of "Gloria" — only now can we do it, back then we would really have been busted — and two new songs.

What about your film work?

I'm directing a Doors documentary — the *real* Doors as opposed to the Oliver Stone version. And I'm finally writing my book, to be published in the summer of 1998 by Putnam.

What do you have here in your project studio?

We just put it together and it's loaded with stuff. We're working with a Mac, we've got a couple of Akai samplers, the S-3200 and an old S-1100, and Proteus 1 and World sound modules. Opcode Studio 5 is controlling things. I just got a Roland JV-1080 with some nice keyboard sounds that I use for playing my Indian classical music. Other stuff includes the Kurzweil PC-88, KRK 7000B's, Digidesign 882, Lexicon PCM-

80, DigiTech, Alesis Miniverb and two of their compressors, Panasonic DAT, Mackie 24•8 board, and my old favorite, the best digital keyboard: the Roland RD-1000. It's such a big heavy mother. I also have an old Roland D-50 and various ethnic percussion instruments, and flutes. I've got a Saarang electronic Tambura that makes a four-note drone, and this tabla drum machine,

the Sur Sangat Professional, both made in India.

Where did you find Indian drum machines?

At the Ali Akbar College of Music in San Rafael, California. Call 415-454-0581 and ask for their catalog.

What is the major difference between recording in the '60s and now?

More tracks. Nothing has really changed in the creation of music since that first guy started beating on a log and that woman found a reed with holes and blew in it and got a whistling sound. The

art of making music has always been exactly the same. You immerse yourself in the energy of the universe and pluck your note. How you actually physically record it — who cares?

Why has the music of The Doors endured?

Suspect: Ray Manzarek

Occupation: Keyboardist, Filmmaker, Composer, Producer

Education: Classically trained pianist; UCLA Graduate School of Film

Spouse: Dorothy (Sansei, third generation Japanese-American)

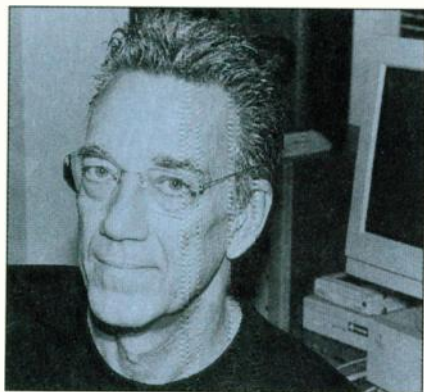
Credits: Founding member of The Doors; first solo project "The Golden Scarab" (with Tony Williams, Larry Carlton, and Jerry Scheff); "Carmina Burana" with Philip Glass; producer of "X," Echo and the Bunnymen

Residence: Los Angeles

Vehicle: Saab 900 turbo fastback

Diet: Thai, Chinese (Szechuan & Mandarin), Japanese, Polish, Italian & American

Odd Characteristic: Extemporaneous philosophical outbursts



PHOTOS BY MR. BONZAI

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The Doors represent a kind of freedom, an alternative to today's restricted world that we live in. After the explosion of consciousness in the '60s, in which we were able to bring our consciousness up and see things outside of ourselves, we're now locked up inside ourselves again as individuals and as a society. The Doors were free and The Doors hint that you can be free.

How have you retained your fiery, positive, passionate nature?

Once the doors of perception are cleansed, man will see things as they

truly are: Infinite. Once you've opened the doors of perception, they stay open. It's not a revolving door where you go outside for a little while, and say, "Hey, I'm the universe, I'm one with the universe," and then go back inside and become locked up like you were.

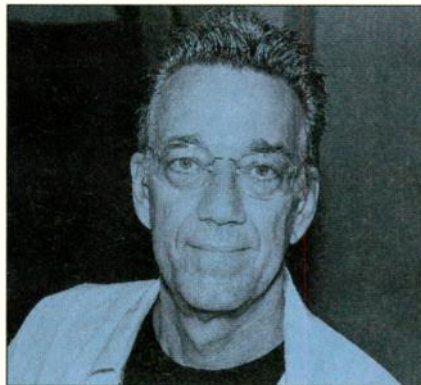
Can you recall the very first music that you heard?

No, but I can recall the first time I heard the blues. That's the important thing. I can recall the first time I saw Muddy Waters perform live in person, the first time I heard Howlin' Wolf on the radio. I grew

up on the South Side of Chicago, so hearing the blues was absolutely revelatory for me. I was ten or eleven years old.

If you could hear something that took place before recording came about, what would it be?

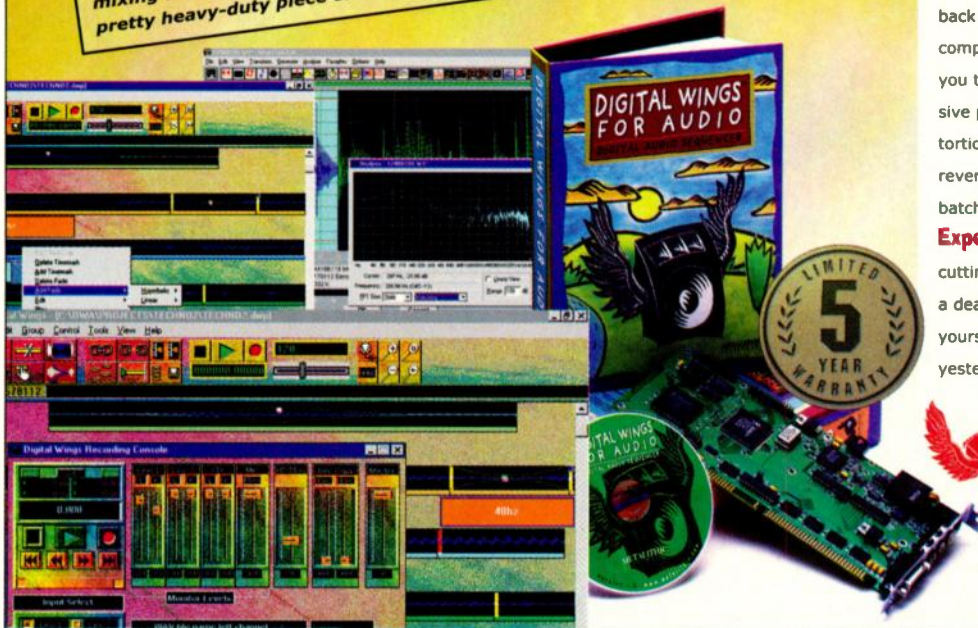
Isn't it a shame that we have no idea what the ancient civilizations' music sounded like? I'd immediately go to Egypt first. And Greek music — what were the Greek modes? What did Roman music sound like? Then Babylon, the Incas, and the Aztecs. That's why I need the Time Machine. Could somebody get



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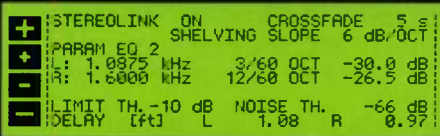
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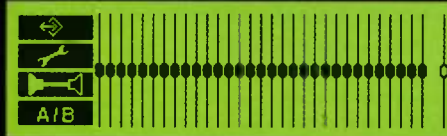
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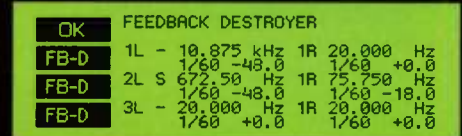
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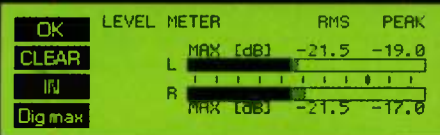
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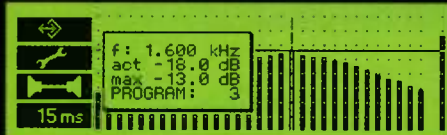
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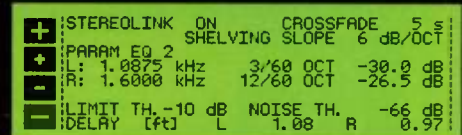
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on that, please? Can we have that in the next decade or so?

Who was your first teacher of music?
 Bruno Michaelotti. He was a dance-band leader and a hip young guy on the South Side. He taught me jump piano, stride piano, and helped me work on my boogie woogie. He was an all-around terrific teacher and a cool cat.

What's the most important thing you learned from Jim Morrison?
 Table manners. Not to lift up your slice of bread and butter it; leave your bread

on the bread plate. And don't use your coffee spoon to take the sugar out of the sugar bowl. That's why you have a separate spoon.

Anyone in the world you would like to work with?

Ravi Shankar.
What's your strangest characteristic as a human being?

I'm a sun worshipper.
Business advice?
 Business is very, very easy. Give everybody their fair share and don't drive

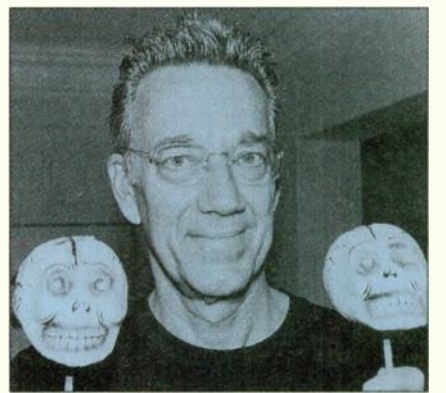
yourself crazy over nickel-and-dime stuff in your contracts. Get your percentage, get some front money, recording costs, and you're outta there. You could try to do what The Doors did. We made a four-way split. Morrison, God bless him, said, "There's only four guys in the band. We all do something but then we put it into The Doors' mind and out come Doors songs. Let's just make it a four-way split." And it's been easy ever since.

Do you believe in reincarnation?
 No, I don't. I believe we all go into the energy and come out of the energy into these individual forms that we occupy. But I don't think our consciousness goes from form to form. The Ray Manzarek or the Mr. Bonzai consciousness is here today and will not be back. But we are all one, we are all the "mind," and we have all been in all of existence up to this point.

Any old saying you like?
 Love thy neighbor as thyself.
Can you recall one ridiculous studio anecdote?

Well, it's not ridiculous, but Jim hosed down the studio after we recorded "Light My Fire." We were just smoking and burning, and afterwards he hadn't had enough. He came back to the studio and it was closed. I think he had ingested a certain hallucinogenic substance that was legal at the time, LSD. He climbed the fence and snuck into the studio. There wasn't a soul in the place, and a red work light was on. In Jim's hallucination, that red light made the place look like it was on fire. He saw flames and went right to the hose and hosed down the recording studio. He put the fire out, turned the water off, and left in peace. He had done his job.

Mr. Bonzai once sat next to Jim Morrison in the balcony of L.A.'s Troubadour club during a folk music concert. Talk about rowdy!



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TOM LORD-ALGE - Dual Grammy Award Winner for Best Engineer
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STEPHEN CROES - Producer, Arranger, Engineer - Stevie Wonder, Fleetwood Mac, Kenny Loggins, . . .
"The Indigo EQ2011 equalizer and C2021 Compressor are exceptional - both responsive and flexible. I can stomp or be subtle - hype a sound or just detail it. The EQs highs are especially sweet and the tube warmth translates to rich mids and lows. The compressor design is fast and friendly, great on drums, percussion and guitar. These are real tools for any level of music production."

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A: Oh, about a gazillion things.

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Okay. Got the picture? Obviously Layla isn't just another card, but a complete system. A system designed to help you make great-sounding music. Designed to grow as your needs grow. Designed to change the way you think about hard disk recording.

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PLAY IT Forget about having to premix output tracks—forever. Layla features ten independent balanced analog outputs, each one boasting a superior quality DAC, for true 20-bit audio performance. And our exclusive OmniBus™ audio assignment architecture lets you easily configure the outputs as aux sends, monitor mixes, discrete track outs—you decide. Plus you can play back on all ten output channels while you're recording on all eight input channels . . . that's not just full duplex—that's octadecaplex!

EXPAND IT Now for the really big news: You can synchronize multiple Layla systems—expansion is as simple as plugging in another card and connecting the word clock output of the master unit into the word clock input of the slave. (Daisy-chain as many Layla units as you have PCI slots in your computer.) When you build a larger system you not only get more hardware ins and outs (how does 24 inputs x 30 outputs grab ya?), you get more (lots more!) DSP horsepower.

MIDI IT(!) All right. We know MIDI in/out/thru probably isn't the earth-shattering feature you've expected (even if it is opto-isolated). But we know you'll appreciate the convenience of being able to create a simple, yet powerful audio/MIDI multitrack recording system without having to hook up a ton of additional gear (or worrying about your MIDI interface card

conflicting with the IRQ on your digital I/O card, which conflicts with your SCSI card, which conflicts

SYNC IT Layla offers synchronization capabilities that make it perfectly at home in a variety of professional environments. Synchronize to picture via SMPTE/MTC. Lock to external word clock. Generate sample-accurate sync from the master clock out. (Our word clock provides continuous single-sample resolution from 5kHz to 50kHz.)

DIG IT Create a 24-bit stereo master mix to send to the digital output. (Yes, Virginia, there's stereo 24-bit digital input as well.) Or maybe an all-digital effects loop is more to your liking? Whatever the application, your precious audio tracks are handled with 24-bit precision throughout Layla's internal audio path.

—you get the picture). Did we mention that Layla is a true Plug-and-Play™ system? That's right, no jumpers to set, no IRQs to configure (in fact, only one IRQ is used for both audio and MIDI functions and no DMA channels at all are used). Setup is as simple as plugging in the card and connecting the included multipin cable from the card to the audio I/O unit.

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PROCESS IT That big black square sitting in the middle of the Layla PCI interface is Motorola's latest generation DSP—the 56301, a 24-bit chip running at an astounding 80 million instructions per second. In addition to being a giant chunk of raw processing power, it's the PCI bus master, meaning that it handles all the routing of data in and around your system. That leaves your computer's CPU free to do things like drawing screens really fast. The 301 also handles audio timing information, so you get dead-on synchronization accuracy and—here's one for the engineers out there—zero-latency, sample-positioning (in other words, it always knows what audio is supposed to play when and where).

ECHO IT Why does it say ECHO on the card? Simple. Our strategic partners, ECHO Corporation, are the engineering team behind Layla. ECHO has been providing audio ASICs and DSP system software and drivers to the computer industry for the last 17 years, and their designs have been sold and licensed to such industry leaders as Analog Devices™, Motorola™, Rockwell™, Sony™, S3™, and VLSI™. Why should you care? Because it's your way of knowing that the Layla hardware and software driver (the key to making Layla compatible with so many of the great Windows 95 audio applications) were designed by people who really—we mean really—know computer-based digital audio.



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MSRP

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Spanish Intuition

Engineer/mixer Benny Faccone reveals his techniques for serving the Spanish-language music market

BY BOBBY OWSINSKI

In doing research for my upcoming book Mixdown — The Art of Mixing, I found I had collected a great number of interesting interviews with some of the top mixers in the world. Some are famous and some not exactly household words,

but all had a lot of studio tips to share. Here's the first in the series.

Engineer/mixer Benny Faccone is unique in that, while he's a Canadian from Montreal, 99 percent of his projects are for the Spanish-language market. From five Luis Miguel records, to the Latin rock band Mana, to the Spanish remixes for Boys II Men, Toni Braxton, and Sting, Benny's work is heard far and wide around the Spanish-speaking world.

EQ: Is there a difference in how one records and mixes for the English- and Spanish-speaking markets?

Benny Faccone: First of all, the way they sing in Spanish is totally different than English. The syllables don't fit in the same way. If you notice, with English music, it feels like the voice fits right into the music rhythmically. You can't do

that with Spanish because it has different accents with harder S's. You have to treat it a different way on the mixing side by building the rhythm track around the vocal. It's a different flavor with a different kind of emotion.

Are there other differences between doing an English-speaking record and a Spanish-speaking one?

What I try to do is treat a record project like an [North] American record. It may not be exactly what they want, but it's what I do. Even though the language may be Spanish, I try to treat it as I would an English [-speaking] record.

Do you do both Latin pop and traditional Salsa?

I do everything. The Latin field is not very specific like the American market where you do one type of thing and that's all you do. In Latin music, you just



LATIN LOVER: Canadian Benny Faccone reveals his proven production techniques for Spanish-language music.



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...all. I've done a couple of Mariachi records....

There were a few records where they wanted some traditional Salsa, and the only way to get it was to go to Puerto Rico and do it there. I had to get some ideas of how to do it from some engineers down there since they have very specific placement for a lot of the instruments. [For example,] they've got two or three different ways of doing it, but the things that stay the same are that the shaker and the bongos are always in the middle. Usually I do percussion as an overdub.

I don't deal with a lot of big orchestras; the biggest is about eight or nine people with a basic rhythm section and a couple of percussion players. What are the contrasts recording in other countries?

If you go to Mexico, some of the studios are pretty nice, but the maintenance is bad. I was recording a live concert once on two analog machines at 15 ips where you start one and before that machine runs out, you start the next one to overlap. When I brought the tapes back here to mix, I found out that the second

machine was running at a different speed than the first machine, so you really have to be careful.

In Spain, they like everything new. It's really hard to find an analog machine since everything is digital. Whatever is the latest is what they want, but you can't find a piece of vintage gear at all. In South America, it's whatever you can get that works. Even in Miami, you have to fly a lot of gear in from New York. Do you have an overall philosophy or approach to mixing?

The only approach is to try to figure out the direction of the song, develop a groove, and build it like a house. It's almost like a musician who picks up a guitar and tries to play. He may have the chart in front of him, but soon he has to go beyond the notes in order to get creative. Same thing with mixing. It's not just a thing of setting levels any more, but more about trying to get the energy of the song across. Anybody can make the bass or the drums even out.

How do you build your mix?

It really is like building a house. You've got to get the foundation of bass and drums

and then whatever the most important part of the song is, like the vocalist, and you've got to build around that. I put the bass up first, almost like the foundation part. Then the kick in combination with the bass to get the bottom [end]. That's because sometimes you can have a really thin kick by itself, but when you put the bass with it, there seems to be enough bottom because the bass has more bottom end. I build the drums on top of that. After I do the bass and drums, then I get the vocal up and then build everything from there. A lot of mixers just put the music up first, but as soon as you put the vocal up, the levels become totally different. After all the elements are in, I spend maybe a couple of hours just listening to the song like an average listener would and I keep making improvements.

Do you have a method for setting levels?

Yes, I have a starting point. I usually start with the bass at about -5 and the kick at about -5. The combination of the two, if it's right, should hit about -3 or so. By the time the whole song gets put together and I've used the computer to adjust levels, I've trimmed everything

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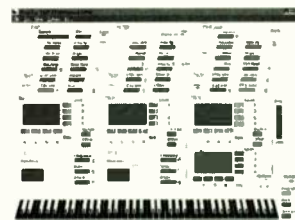
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back somewhat. The bass could be hitting -7 if I solo it after it's all done.

Do you put the snare at about the same level as the kick?

No. There, it's more a question of feel than level. Because there are so many transients with a snare drum, it could be reading -10 and still be too loud.

What's your approach to EQ? Do you have certain frequencies that you always come back to on certain instruments?

Yes, as a starting point. But I'll do whatever it takes, depending on how it was recorded. For bass I use a combination of a low frequency, usually about 50 Hz, with a limiter so it'll stay kind of tight but still give it the big bottom. Add a little 7 kHz if you want a bit of the string sound, and between 1.5 and 3 kHz to give it some snap.

For the kick, I like to have bottom on that, too. I'll add a little at 100 Hz, and take some off at 400 Hz, depending on the sound. Sometimes I even take all the 400 out, which makes it very wide. Then add some [focus] at 3 or 5 kHz. On the snare I give it some 10 kHz on the top end for some snap. I've been putting 125 Hz on the bottom of the snare to fill it out a little more. Usually 1.5 kHz gives guitars that present kind of sound. Pianos and keyboards vary so much that it all depends on how it feels in the track.

For vocals, it really depends on if it's male or female. If they sing really low, I don't add as much bottom end. Usually I always take some off at about 20 Hz to get rid of rumble. But anything on up, it really all depends on the singer. I might add a little bit in the 4-6 kHz range in there.

What's your approach to compression?

Limit the heck out of everything. [Laughs.] I like to compress everything just to keep it smooth and controlled, not to get rid of the dynamics. But I don't like a compressor across the stereo bus because then it sounds to me like the song's not breathing right. Even for hard rock, I don't like to do that. It's easier to do it individually.

I use around a 4:1 compression ratio on pretty much everything I do. Sometimes on guitars I go to 8:1. On the kick and the snare I try not to hit it too hard because the snare really darkens up. It's more for control, to keep it consistent. On the bass, I hit that a little harder, just to push it up front a little more. Everything else [is] for control more than for a sticking it right up in-

BENNY FACCONI DISCOGRAPHY

MANA: "Falta Amor"
Sting: "They Dance Alone" (Spanish version)
Xuxa
Nat King Cole Espanole
Barrio Boys: "Una Nacion"
Boyz II Men: "II" (Spanish Version)
Selena: "No Quiero Saber"
Jose Jose: "Soy Asi"
Toni Braxton: "No Volvere A Respirar"

your-face kind of a thing.

Is the use of effects different in the Latin market?

In the Latin market, because you're not just working on one genre like pop or rock, everybody's different. One day I could be working with a producer who loves echo and reverb and wants it real lush, and the next day I could be working with a rock band who doesn't even want to hear echo. One day you could be working with somebody who wants the vocals up front and loud and the next with somebody who wants the vocal as tucked in as possible. Rock has become very Americanized in the Latin market where they want it very dry, without effects.

Do you have any special effects tricks that you use? Any interesting things you like to use all the time?

I use a lot of the old Lexicon PCM42's on guitars for a very short slap delay. It's [a] mono [device], but it sounds really big. I use something like 4, 8, or 11 millisecond settings, so it doesn't sound like a delay. Sometimes I use as much as 28 ms on a power guitar. You stereo it out, it'll sound like two guitars on either side of the speakers.

Is there a certain listening level that you always listen at?

Yeah, pretty much I have my amps set at a certain level. It's a fairly modest level — not loud, not soft. When I start the mix, I crank it a little bit on the big speakers to kinda get hyped a little bit and check out the bottom end. Then I'll slowly start listening softer and softer. **How many versions do you do of a mix?** Usually one with the vocal up .8 dB and another with the vocal down .4 dB. And if there's backgrounds, the same thing. I do not want to come back to remix. **Once I'm done with a song I've heard it so much that I don't want to hear it again.**

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Postproduction on the Skids

How an award-winning commercial was produced using some inventive postproduction techniques

BY TED GANNON

Here at GLC Productions in New York City, we offer a variety of services to our clients, including sound design for film, music recording, and 3D animation and graphics. One of the more interesting projects we produced recently was a 30-second television commercial for Skids, a toe brake designed for in-line skates. The project had to be produced on a modest budget, and our role included picture editing, scoring, and

recording and mixing sound for the commercial. In addition to writing the score and editing the video, GLC president Daniel Kramer performed the music with another engineer, Sonny Calderon. Dan, Sonny, and I edited and mixed all the sound elements: VO, sound effects, foley, and music.

The commercial was shot on 16 mm film; dailies from the shoot were transferred to 3/4-inch video and then loaded into the Avid. All audio and video would then be done digitally within the Avid and Pro Tools systems. At this point, none of the music had been recorded, but Dan had a pretty good idea of what he wanted the score to sound like. He proceeded to edit the first video cut (keeping his score in mind) and ran that to 3/4-inch video tape with timecode.

Our Avid suite is separated from our sound design suite, so once the cut was on video tape we brought it into our live room where we began to record the score (we have video lock-up and mon-

itors in the live room for musicians to watch while they're playing). In playing around with the music, Dan found that the tempo didn't really fit well with the first video cut, so he took a rough of the first score back into the Avid suite and tried to recut the picture. He found this process too limiting, however, and came up with a new approach.

Because it was Dan composing the score and editing the video, we decided to bring the Avid into the live room and let Dan simultaneously edit the video while composing. He could do a video cut, experiment with the music (he was playing guitar and Sonny was playing drums), speed up or slow down the tempo, and A/B the results — all without having to get up out of his chair.

Normally, we are sticklers for timecode around here, but since we were producing the whole thing in-house, and because of our experience with both Pro Tools and Avid, we didn't need to lock Pro Tools to Avid using timecode because we knew it wouldn't drift with-



HEY, GLC: Ted Gannon (left) and Sonny Calderon kept within their budget by using Pro Tools in an innovative way.

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CIRCLE 2 ON FREE INFO CARD

in a 30-second spot. All of our machines here — the video decks, Avid, Pro Tools, TASCAM DA-60 DAT deck — receive black burst from a master generator, so they're running on the same digital clock anyway.

Basically, we'd run the commercial, use the two-pop [i.e., the count before the first frame of video — Ed.] as a sync reference, and Dan and Sonny would play along to the picture. After recording the final tempo that grooved with picture, we locked everything down with time-

code and finished the video edit.

At the time we were running Pro Tools (version 3) on a NuBus PowerMac 8100, but now we are running PCI-native version 4.0 on a PowerMac 9500. Pro Tools is hard-wired into our Harrison console, so we ran our audio inputs to the console and then routed them to a Digidesign 888 interface. Drums and bass went down live first, then Dan overdubbed rhythm and lead guitar later. We were looking for a raw, grungy sound throughout, so all the instruments were

recorded through our Nat Priest custom-built tube mic preamps. We could have altered the sounds in Pro Tools later on, but we spent time perfecting the sound before recording to get just the right mood we wanted. When we finished recording everything, we put all the tracks up at unity gain and (minus a few tweaks) that was the sound we were looking for. After the music was finished, we recorded the voice-over.

At this point, we were ready to do the last of the audio: sound design. We needed to record toe-brake sound effects, and Bobby Amore (the inventor of Skids) came down to help us out a bit and serve as our foley artist. We have a really big reverberant space in our basement with a concrete floor, so another engineer — Rob Montrone — went down there with Bobby (and his skates) to make some noise.

Conveniently, there is an unused elevator shaft here, so we ran a mic cable down the shaft into the basement and plugged in an AKG C414 to record the sound of Bobby whooshing, zipping by, and skidding around. Obviously, since he invented Skids, Bobby is an expert in making the ultimate skidding sounds. Rob handled the miking, and he'd let me know when to roll Pro Tools while Bobby skated around. Eventually we edited the sounds in Pro Tools and spotted them to picture. Since part of the commercial featured some amateur hockey play, we also used sound effects of body hits from our library to juice up the location sound of the hockey game.

Once the tracks were recorded, the mix was straightforward. We mixed the music in stereo, tweaked the effects, and compressed the VO to sit well in the track. We ran off an initial DAT of the full mix digitally, in order to get client approval. Once we got the green light, we mixed the audio with timecode to our TASCAM DA-60. At that point we took it to an on-line house where the Avid edit and the DAT were conformed onto a D2 master for broadcast [D2 is a broadcast-quality, digital video format — Ed.].

The entire project used a minimal approach, but the bottom line is that the Skids spot won a Clio Award in the Recreational Product category.

Ted Gannon can be reached at GLC Productions at 212-691-1038. Check out GLC's web site at <http://www.glc.com>.

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Poolside Punch-Ins

How Toad the Wet Sprocket used their Santa Barbara-based project studio to record their fifth album — and afford a few extra surprises

BY ALAN DI PERNA

The livin' sure seems easy in Santa Barbara, a sun-kissed California beach town an hour-and-a-half up the coast from L.A. There's been a recent influx of L.A. music biz folk in search of a more relaxed lifestyle. A handful of young, new Santa Barbara bands have been signed over the past year or so, but the four members of Toad the Wet Sprocket are neither young turks nor new arrivals. They have been Santa Barbarians all their lives. Glen Phillips, Todd Nichols, Dean Dinning, and Randy Guss met while still in school and have stuck together over the entire course of a ten-year/five-album career. Their thoughtful "adult pop" sound has garnered two platinum albums (*Fear* and *Dulcinea*) and seven hit singles. But it's only been with the making of their newest album, *Coil*, that they actually got around to recording in Santa Barbara, completing much of the record at the home of Todd Nichols, the band's lead guitarist.

"It was a really pleasant way to work," says Glen Phillips, Toad's lead singer, co-guitarist and principal songwriter. "In the past we'd always recorded at some faraway residential studio. This time, at the end of the day we could actually go home and see our families and have a life."

ADDING IT UP

The impetus to try project recording



came during the making of the band's last album, *Dulcinea*. "We did that record at the Site up in San Rafael [CA]," Phillips explains. "They had a beautiful 80-input vintage Neve, but, during overdubs, we realized that we were essentially paying \$2000 a day to use just one of those 80 channels. After that, I started collecting recording gear, thinking maybe next time we could use a big studio for the big studio parts of the project and then do overdubs in our own studio."

In amassing recording equipment, Phillips concentrated on pieces that would make for what he calls "a good front end": microphones, mic pres, a tape machine, and other gear essential to recording pristine tracks that could then be taken out to a commercial mixing facility. While Phillips was shopping for gear, Nichols and his wife bought a new home in an upscale San-

ta Barbara golf community. Out back, next to the swimming pool, there's a garage-sized building the band decided would make a perfect rehearsal/recording space. Nichols and Toad bassist Dean Dinning set about completing a "room within a room" soundproofing treatment of the structure, which includes an L-shaped, roughly 400-square-foot recording space and an approximately 12- x 14-foot control room. Both rooms have 8-foot ceilings.

"Todd's concern was really only soundproofing, not internal acoustics," says Phillips. "The control room has this really weird bass trap. But if you're recording one or two mics at a time, and if you monitor at a low level, it's okay. Doing drums in there would be a problem, though."

So the band began work on *Coil* by traveling down to Master Control studio in Burbank and cutting drum tracks with

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their long-time producer Gavin MacKillop. "They have a nice old SSL there," says Phillips, "and some really nice sidecars: a lot of Neve and API stuff. We recorded onto a Studer A827 analog 24-track. We did drums, bass, and mostly scratch guitars at Master Control, then we just came back here to Santa Barbara and finished everything else at Todd's house."

HOME SWEET HOME

Phillips set up his recording gear in the building out in Nichols's back yard. As

the centerpiece of his "good front end," he'd purchased a mid-'80s Stephens 24-track recorder that once belonged to Boz Skaggs. Phillips named his new acquisition Blanche DuBois, after the character in Tennessee Williams's *A Streetcar Named Desire*. "They're idiosyncratic machines, the Stephens," he laughs. "They have personalities and therefore have to be named. I first found out about them from a friend of mine, Susan Rogers, who recorded a few records for Geggy Tah on Stephens machines. Part of the reason for going with the

Stephens was that that's what I could afford. But anybody you talk to who has used them loves the way they sound. There's kind of a cult around the Stephens machine. I decided to become a cult member."

Phillips's setup for the sessions also included a 32•8 Mackie console that was used for playback only through either a pair of Genelec 1030A's or Audix 905's, the latter powered by a Crest FA-910.

Signals were sent to tape via a rack of outboard modules that Phillips amassed. "We never touched the Mackie going to tape," he explains. "Guitar amp and Leslie mics went through a bunch of Neve 33122 channel modules. Everything else was done through Manley mic pres or Neve 1064's. If we needed to EQ a track as it went to tape, we ran it through the 1064 EQ. I also have a couple of UREI 1176 compressor/limiters that I used a lot."

A Matchless DC 30 was the main amp used for electric guitar overdubs, with a Fender Vibro King and Matchless Lightning 15 providing a few other tones. "There's maybe one song where Todd used a fuzz box," says Phillips. "All the other distortion was just done by overdriving a Matchless amp." Since the guitar amps were close-miked, room acoustics weren't much of an issue on electric guitar overdubs.

"Most of the time, we just used my Stephen Paul-modified Neumann U87, right up on the amp," says Phillips. "Sometimes that was combined with a Shure SM57: one mic on each speaker. In many cases, though, we didn't even need the second mic. With the Stephen

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TECHNIQUES RECORDING

Paul mod, the '87 has got a ton of presence. So a lot of the electric guitar overdubs were just that."

Acoustic guitar overdubs, Phillips continues, "were generally recorded using AKG C12A's through the 1064's, usually with the 1176 also in the chain. We didn't stray much from that. The acoustic guitars we used were a Taylor 710 and a Lakewood M32. If we wanted a bigger, strummier sound, we'd go with the Taylor. For the woodier stuff, it would be the Lakewood."

Phillips also added keyboard overdubs, playing a Hammond XB2 "MIDI organ" through a Model 122 Leslie cabinet. "For that I used a couple of Microtech Geffells that I bought and had modified by Mikeworks in the Midwest. Those mics usually have a real presence peak, which is a lot of their sound, but when I got them back from Mikeworks they were much flatter. They're quieter and they sound better, but they also don't have the same character that people are used to hearing. They worked really well on the Leslie."

Some of the bass tracks cut at Master Control made it onto the album, but others had to be replaced at the band's project studio. "In a few cases we ended up changing the bass parts," says Phillips; "And in a few others we found out the bass was out tune when we did cut the basics. So we just miked Dean's cabinet up and combined that with a Demeter DI. There was no problem in the big room — which is still really a small room — as long as we put the cabinet in the correct corner."

SIDESTEPPING THE TAHITI SYNDROME

Along with audio issues, the band met the psycho-social challenges of domestic studio work. "I think we avoided the typical 'record at home' syndrome, where you spend twice as long and never make your mind up about anything," Phillips laughs. "Record companies really get nervous when they hear you're going to record at home because they don't know how to monitor you there. They're afraid you'll just be dropping acid and doing experimental trance tracks. But we're pretty much a live four-piece pop band. We're not the kind of band that writes a lot in the studio. We rehearse; we know our parts. And we're fairly goal-oriented. We don't like to go into the studio, start something, and not be able to finish it the same day. Aside from going home at night and taking

weekends off, we didn't regard the situation as a leisurely one. When we went in there, we kept a mindset that we were supposed to be working. We didn't go home if things weren't perfect."

Even though the studio was right in the guitarist's backyard, the band made it a practice never to go in and record without their producer present. "Gavin really helps keep us on track," says Phillips. "He lets us know what's a good take and what's a lousy take without beating us down. Left to our own devices, we might end up talking an idea into the ground. Gavin helps us break out of that and get back to work."

Phillips estimates that 70 to 80 percent of the overdubs, including vocals, were completed in about three weeks early last winter. Because of MacKillop's schedule, the remaining tracks were completed piecemeal over the following few months: "Whenever Gavin could manage it, he'd just drive up for the weekend and we'd do some work. So it ended up taking four months to complete. But it was probably just six weeks worth of actual work."

FIRST CLASS FINISH

At the end of the process, Phillips found that his hunch had been correct: the band had saved a tidy sum by recording at home. "Todd got reimbursed for getting the place done and I got reimbursed for the use of the gear," he explains. "But we still had enough budget for a few luxuries. So we got Van Dyke Parks in to do string arrangements on two songs, which we got to cut with a 19-piece string section at Capitol Studios in Hollywood. We were also able to do things like mix in Miami with Tom Lord Alge, which we wouldn't have been able to afford if we'd recorded in a conventional studio."

INTELLIGENT, MOBILE UNITS

Pleased with the way *Coil* turned out, Phillips is currently having a project studio all his own designed and built by Santa Barbara-based acousticist Chris Pelonis, who has recently designed studios in the area for David Kershenbaum and Christopher Cross, among others. In this 600-square-foot space, Phillips will be able to record drums, if the whim strikes him: "It'll have a small control room with some bass trapping in it. The great thing about Chris is he's very project sensitive. He's very concerned about saving you money and not doing things

that aren't really necessary. So this space will just have some double-wall soundproofing and some intelligent trapping for some good diffusion — just so there's a nice sweet spot that's totally neutral. I don't have much use for giant soffit monitors. I'll just be using my Genelec 1030A's and Audix 905's: strictly nearfield monitoring. So I don't really need a huge room that's built to withstand crushing bass at really high levels."

Even though he's getting his own space, Phillips remains committed to the idea of portability and modularity in a recording rig. His outboard gear all fits into three rollaround racks. In addition to the pieces already mentioned, there's a BSS DN504 Quad Compressor, Oram HDEQ, Roland SDE-330 and 880, Ensoniq DP/4, a Panasonic DAT, and Sony Super Bit Mapping DAT, all integrated via three patchbays. "There's a series of multipin connectors on the back of each rack," Phillips explains, "and I have a set of 16 snakes that plug directly into the back of the racks. So I can take my whole studio apart, move it across town and set it back up again all in one day. Another good thing about the Stephens tape machine is you can take off the top, take out the meter-bridge, take the casing and power supply, and put it all in a car. Every single part can be carried by a single person. Whereas, if you had a Studer or 3M machine, you'd have 800 pounds to lug around. I'm also planning to replace my Mackie 32•8 board, probably with a Yamaha 02R. I usually mix to DAT anyway, so the signal will just enter the digital domain a little sooner, when it hits the console. The 02R is very portable, too, so everything I have will be movable by a single person. And I can track a whole band with this setup. This is the fourth location it's been in."

The way things are shaping up in Santa Barbara, it's a good thing Phillips is ready for action. "A lot of bands from here are getting signed," he says with discernible civic pride. There's been Dishwalla, who've done very well. Also, Summercamp, Nerfherder, Stegosaurus, and Snot have all been signed out of here. For a town this size, it's pretty amazing. None of these bands sound a bit like one another either. So between all the artists here and the fact that a lot of people want to get out of L.A., I think the recording scene in Santa Barbara should really pick up. I think this is a real artist-friendly place to work." **EQ**

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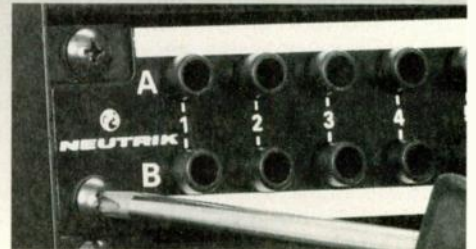
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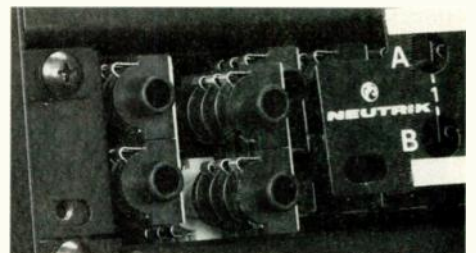
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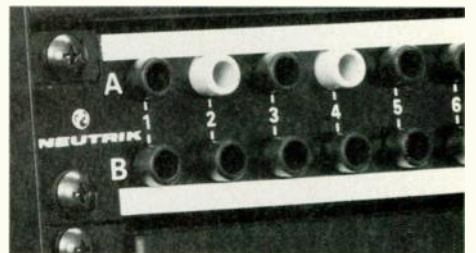
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The Postproduction Project Studio

Learn how to gain business by tapping a new area of business — video postproduction

BY TIM TULLY

Building a project studio is costly, and the projects that bring a return on this investment can come to life slowly. But some new tools are opening up a potentially profitable area: the video postproduction project studio.

Most project studios are oriented around music production, as these studios are generally built by musicians who want a place to compose and produce music. But if cash flow is tough, consider expanding your studio's functionality into digital video postproduction, specifically for QuickTime movies.

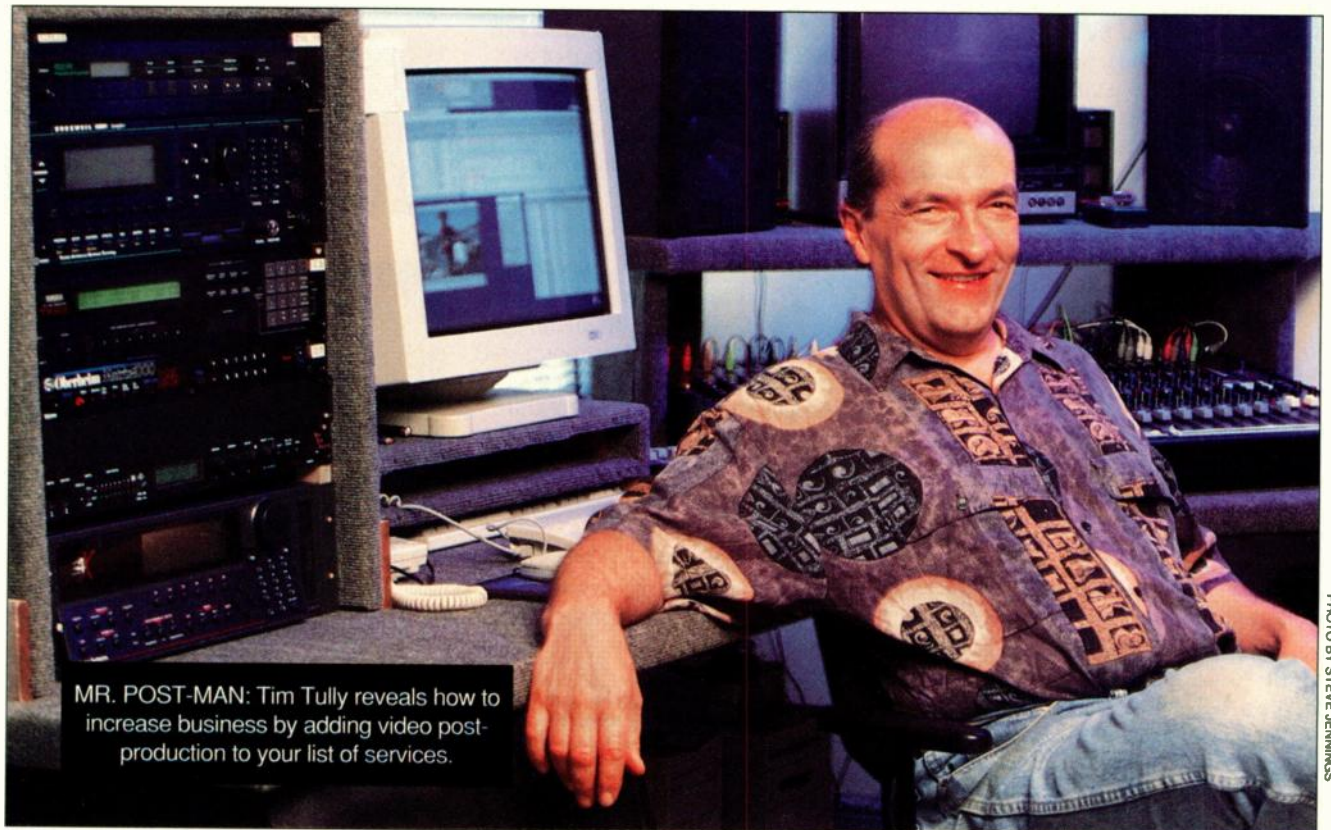
VIDEO À LA QUICKTIME

QuickTime is Apple Computer's technology [<http://quicktime.apple.com/dev/>] for doing video on a desktop computer. (Though developed on and for the Macintosh, QuickTime for Windows is available too.) Making a QuickTime movie has a lot of parallels to producing digital audio. Someone needs to shoot the video, then digitize it into the computer using an add-in video capture card or (for less than professional quality) the hardware built into some Macs. This digitized raw footage needs to be edited using a video-editing application like Adobe Premiere [<http://www.adobe.com/>]. The video editor tosses the bad footage, keeps the good, creates all the scene-to-scene transitions and visual effects, and does basic sound editing.

For the final step, the edited video (the edit master) has to undergo data compression via one of a variety of "codecs" [abbreviation for *compress/decompress*; a device used to compress or decompress digital data]. This process

makes the video file small enough to play back on a computer with no special video accelerator hardware and usually reduces the video's image quality. If the final deliverable will be on video tape, the editor can use a gentle codec that does little or no damage to the video. This will render a video file that must play back on a video-accelerated computer, but since the file's only computer playback will occur when it's played out to tape by the editor, that doesn't matter.

In the major leagues, when a video (or film) reaches this point, it goes to audio postproduction, the stage where highly paid but overworked audio types do everything from adding sound effects, Foley, and music, to dialog replacement. (In Hollywood movies, the actors come to the studio and record dialog to replace any on-camera dialog that's unacceptable due to ambient noise, distance from the camera, or other reasons — like an impassioned "Forget you!!" to replace the original two-syllable line for the TV version.)



MR. POST-MAN: Tim Tully reveals how to increase business by adding video postproduction to your list of services.

PHOTO BY STEVE JENNINGS

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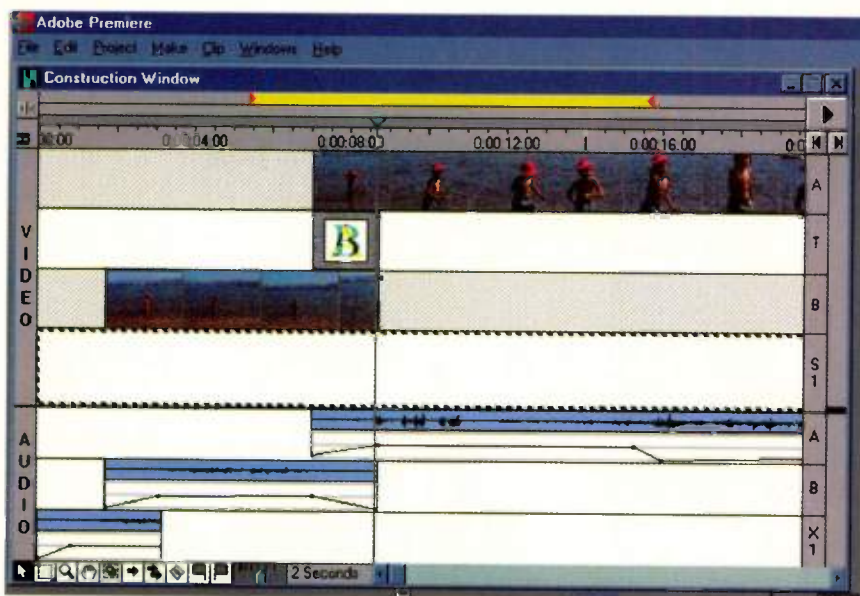


FIGURE 1: Adobe Premiere typifies desktop video editors: good video editing features and crude audio capabilities. Notice there are only three audio tracks.



FIGURE 2: Once the audio and MIDI tracks of a QuickTime movie are imported into Studio Vision 3.5, you can create a sophisticated, professional sound track.

Until now, the audio post session has been largely absent from QuickTime or any desktop video production, due at least partially to a dearth of tools. But this is about to change.

THE AUDIO CONNECTION

When I said Premiere offered "basic" audio editing before, I wasn't kidding. Like others in its field, Premiere has only three mono audio tracks that automatically load with whatever sound was captured by the video camera (fig. 1). Its audio editing functions consist of little more than crudely resolved trim, volume, and cut and paste. Premiere can export the on-camera sound as

AIFF or WAV files, and an audio studio can enhance and edit them, but finding the right operating environment for posting QuickTime is not easy. Upgrading a Digidesign Pro Tools III system to Post View, for example, will display and sync to a video, but this requires an added expense (though the upcoming version of Pro Tools is said to incorporate Post View features). Further, Pro Tools will only let you play — not create or edit — MIDI files, and both separating audio tracks from and reuniting them with a QuickTime movie requires a video-editing application like Premiere.

The software upgrade that's chang-

ing this landscape is the just-released version 3.5 of Opcode's Studio Vision [<http://www.opcode.com/>]. The new Studio Vision goes farther toward opening up QuickTime movies for audio enhancement than any application I've seen. It's Power Mac native, which speeds up its redraws and DSP functions, and on a 200 MHz Mac it can play up to 20 mono tracks with no additional hardware. It still supports Digidesign's TDM, however, offering custom software consoles that can have up to four aux sends per channel and 16 stereo busses. With a Digidesign Audiomedia III card it plays eight tracks and with Pro Tools III hardware, 48 tracks.

More to the point, Studio Vision 3.5 can import both the audio and "MIDI" tracks from any QuickTime movie into a sequence, where they're editable by Studio Vision's professional level functions. The MIDI side of this is especially laudable. In QuickTime 2.5, Apple fully implemented the "QuickTime Music Architecture." This feature made it possible for a user to import a standard MIDI file into a QuickTime movie, convert it to a similar, albeit proprietary, format, and have it play any synthesizer, including the QuickTime Musical Instruments in the Mac system file. This is a particularly attractive bandwidth-saver for movies intended for the Internet. Unfortunately, editing the MIDI tracks in any way was nearly impossible; there were some crude cut-and-paste functions, a hard-to-use program change device, and little more.

Studio Vision 3.5 solves this problem. After importing tracks from a

continued on page 151

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RUSH'S LIVE MIDI SECRETS REVEALED

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SOUND LIKE
MUCH MORE

**By Jack
Secret**

Rush has always had the reputation of being a band that sounded like a lot more than three people. When I joined them as guitar and keyboard tech (back around 1977), they were already using Moog Taurus pedals to augment the bass, drums, and guitar. Their whole technique was to accomplish a very full sound and yet still have enough freedom to maximize their performance of the song — all within the guidelines of reproducing live what they had created in the studio.

Over the years, our keyboard set-up has evolved to reflect that philosophy and has gone through many revisions from the pre-MIDI days up to the current system. One of the most important considerations in our MIDI system is the reliability factor, and I believe that we have refined it to a point where, night after night, we know it is going to work without any



IN THE LIMELIGHT: Geddy Lee (left) and Alex Lifeson, two-thirds of Rush, manage to get the sound of a larger band through use of a sophisticated MIDI system.

problems. And I have built in quite a bit of redundancy just in case a MIDI device should fail.

SYNTHS VS. SAMPLERS

We actually use two dedicated MIDI systems, which share some of the

routing equipment, but have separate MIDI controllers and slaves. One is a more traditional synth-type system with a Roland D50 as the master controller, a Roland JD800, two Prophet VS's, and a Roland JV1080 synth module. Geddy [Lee, bassist/keyboardist/vocalist] talks to these synths using the D50's MIDI out to call up the various programs he needs for different songs in the show. This system is routed via a passive MIDI switching matrix and two JLCopper 1620's (more on this in a minute).

In past years, we used sequencers for the sequenced parts in songs like "New World Man" or "Spirit of Radio." When we started using the Roland S770 samplers, we discovered that we could record and loop sequences and trigger them in real time. Or — if it was a sequence that required a changing passage — there was enough memory in the S770 to record the entire passage. All of the sequences then became samples. Right now there are no sequences being played, just real-time triggering done in two ways: either as one-shot (you hit a key once and the sample plays through its length), or you have to hold down a key (or keys) in order to play the sample.

Using the second MIDI system (which is basically a sample playback system), the band uses samples to augment their performances. These samples are triggered by the band members in real time. It's not like there is a sequencer going with a click, events happen and the band has to follow them. Take, for example, a synth part that needs to come in at the chorus of a song: the band is responsible for making that sample happen at the correct time. It's a matter of learning the part like any other musical part in a song — something that has to be done with either the hands or feet.

While you might think this sounds pretty easy, remember that if the sample is played late or early, it sounds (for its duration) out of time with the band. Some of these samples last for entire sections of a song, and if they come in at the wrong time, it could be a train wreck. So it really is critical for the band to trigger those samples *exactly* when they're supposed to start. If a part is played half a beat late or early, you will hear it. If it is right

on, then it will musically fit into what the band is doing.

All of the samples that we use are taken from parts the band has played on the multitrack studio masters. The samples are in time relative to the recording so it's Neil's job to make sure that the songs are played at the correct tempo — and he does an amazing job at that using only his musical abilities. When playing live, they are not going to be playing a song faster or slower than what you heard on the album. Songs have to be played pretty much exact to the

tempo of the record because the samples themselves are not time-expanded or time-compressed to meet any criteria. If there is any shifting that needs to be done, having done



RUSH HAS GOT A SECRET: Jack Secret keeps track of the massive MIDI rig, and even keeps a spare ready — just in case.

it for so long, they can pretty well handle it (they do that very well, and Neil is amazing when it comes to locking in).

MISSION: CONTROL

For this tour, there are a total of six controllers for the sample playback system. Ged has four of these controllers: a Yamaha DX-7, a Prophet VS, and two sets of Korg KMP-1 MIDI pedals; one at the keyboard position and one at his up-front mic position. (As an interesting side note, the MIDI cable run from Ged's controller to me is 105 feet. I was told in the early days that for a MIDI run longer than about 50 feet you'd

need to buffer it or you'd have all kinds of problems, but I have not experienced any problems.)

Alex [Lifeson, guitarist] has two controllers, though for this tour he is actually using only one (a set of Korg KMP-1's). Depending on the song, he'll either trigger sampled parts or play sampled sounds from the keyboard. Additionally, Alex has a set of Moog Taurus analog synth pedals, which he uses as a separate instrument to play synth sounds. Neil has a percussion controller that he uses to trigger samples from this system as well as samples from his own AKAI S900. He might play a part that makes sense for him to play (such as

a percussion part) or it might just be easier for him to trigger a part than for Geddy or Alex, such as a synth part or horn samples that he plays during his solo.

I use a second Prophet VS (actually the seventh controller) to test the system when I put it up early in the day. I can trigger sounds if need be, reset MIDI patches, and also make sure that everything is functioning during the short time between our set changes. [*Rush's latest tour is "An Evening With..." —Ed.*]

MAXI MIDI

To avoid any MIDI mishaps, I have designed the MIDI routing to be completely redundant — if any one device goes down, I can easily reroute the MIDI signals to a backup device without repatching.

Routing from the controllers to the synths and samplers is done via JL Cooper 1620 MIDI patchbays, which allow me to make up as many patches and flow-throughs to any of the synths and samplers as I need. Past experiences showed us the necessity for a backup system, so Geddy, Jim Burgess (owner of Saved By Technology, Toronto) and I started dealing with the idea of, "What if the program switching goes down during the show? How can we have two of these online at the same time, and if one goes down, be able to switch and have full capability without me jumping up and pulling wires out of the rack and repatching?" So we came up with a way to simultaneously connect two 1620's. We also needed to merge the MIDI flow from the seven controllers before sending it to the samplers, so we are using two Anatek Studio Merge 8x1 MIDI mergers (again, one is a backup).

EASY AS A/B

Our solution was to have a multi-port MIDI thru box with an A/B switch. All of the controllers physically patch into a rack-mount MIDI thru box built by Hi-Tech Musical Services [a former division of JL-Cooper —Ed.]. This Hi-Tech box is amazing. It is a passive device with 108 chassis-mount MIDI connectors. Three sections make up the rear panel of this unit — top, middle, and bottom — each of which is identical to the rear panel of one JL-Cooper 1620 (one 1620 has 16 MIDI in and 20 MIDI out ports). The middle section of the Hi-Tech box is the



KEYS TO SUCCESS: Geddy has four MIDI controllers at his disposal: a Yamaha DX-7, a Prophet VS, and two Korg KMP-1 MIDI pedals.

“master,” where all of my MIDI controllers and slaves physically interface with the system.

This master section does NOT handle patching of the controllers to the slaves — that is handled by the 1620's. The top and bottom sections of the Hi-Tech box are identical to the master section and each port from the middle section is internally paralleled (via switch) to its respective port in the top and middle sections (see fig. 1). From the top parallel MIDI ports, cables are run to the inputs of Anatek Studio Merge “A.” Likewise for the bottom parallel MIDI ports and Studio Merge “B.” Note that for clarity fig. 1 shows MIDI flow for only two MIDI controllers — there are actually five more controllers connecting to the master section of the Hi-Tech box and thru to the Anatek units. We now have identical MIDI connections going to two separate Studio Merges.

Once the controller signals are merged, the single output of the “A” Anatek merger is connected to a MIDI in on the “A” JLCoooper 1620. This is also done with the “B” boxes. Geddy's D50 controller is the exception: this unit connects to the master section of the Hi-Tech box and then is “thru'd” directly to the 1620's. It does not get merged with the other controllers because it is not used in the sample playback system, only the synth system.

Patching from controllers to slaves is handled in the 1620's. The merged input (from the controllers) is software-patched to four separate 1620 MIDI outputs that are destined for the four Roland samplers. Also, the D50 is routed to the four different outputs. These are destined for the four synths. But, remember, we are doing all of these patches times two.

Outputs from the “A” 1620 are connected back to Thru “A” on the Hi-Tech box and the same for 1620 “B” and Thru “B” on the Hi-tech box (see fig. 2). By using the A/B switch

on the front of the Hi-Tech box, I can instantly switch the entire MIDI rig over to either 1620/Studio Merge “A” or 1620/Studio Merge “B.” If a unit fails, I can bring the

backup online without repatching a single cable and I don't have to worry about the A/B box losing power because it's passive. [Note that fig. 2 omits the D50 and the slave synths for clarity.] I can actually switch be-

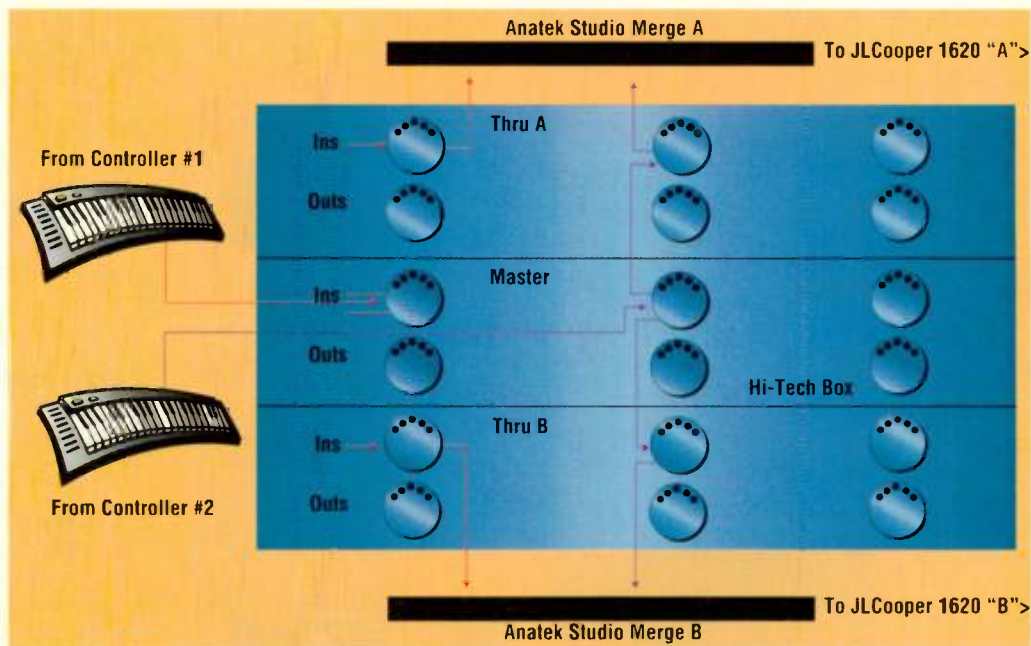


FIGURE 1: A MIDI signal from a stage controller arrives at Master MIDI In #1. The signal is internally paralleled to Thru A MIDI In #1 and Thru B MIDI In #1.

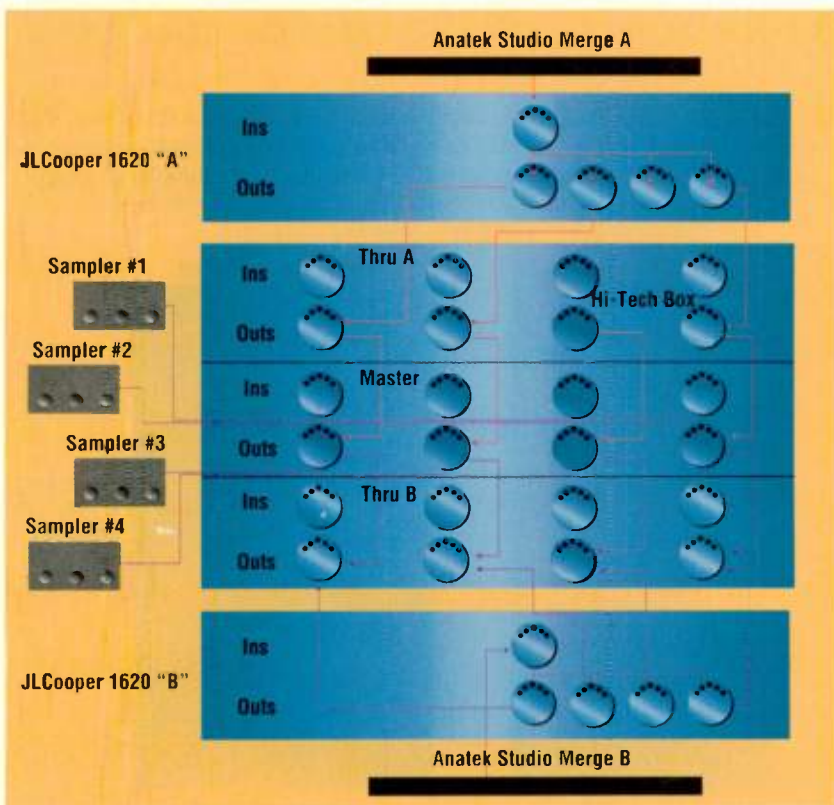


FIGURE 2: A single MIDI output from each Anatek Studio Merge is connected to a MIDI In on each JLCoooper 1620. A software patch in the 1620's splits that MIDI signal to four MIDI outs. Those outs connect to the Hi-Tech thru box and ultimately (via switch) to four Roland samplers.

tween these two units while playing something and not get any MIDI hang ups like you would expect to if you were unplugging a MIDI cable from the back of a unit while someone was playing. Theoretically, it could be switched during the show

without missing a note, but I'd have to hear something go out before I could actually do anything about it.

On to the samplers: We use four Roland S770 samplers, each with a rack-mount 1 GB Dynatek hard drive.

I also have another 450 MB Dynatek dual drive which I use for offline sample editing. All four S770's are active, but two do the show. They are paired, with two serving as dedicated backups. I have it set up so that I use two machines for the performance and work one song ahead. The first song is in the #1 sampler and its backup. During the first song, the second song is loading in the #2 sampler and its backup. If anything goes wrong with the #1 sampler, I hit a switch and backup #1 (which is already receiving MIDI from the controllers and functioning as if it were sounding) is put online to the house console. The same is true for a problem with sampler #2 and backup #2.

AUDIO OCTOPUS

There are eight outputs from each sampler (L, R, and 1 through 6), and the programs are arranged like this: The first channel goes to Neil and carries anything that is rhythmically based so he can get it in the monitors, hear that it's been played, and lock into it. This signal does not go to the house console. Next would be the right channel output, dedicated to mono, bass-type samples. Anything low-end, single-bass-note-type samples will go out that channel to the house console. At the house console, the channel EQ will be set up specifically for bass samples so that the channel doesn't have to be re-EQ'd for every sample that comes down the line. If you have a stereo send of a keyboard submix, then the engineer has to find a compromise EQ to get the best sound for all of the keyboards and you could wind up with some very bizarre EQ.

The next outputs, 1 and 2, are a left and right pair of "music channels." They carry any samples that are organ, keyboard pad, or piano-type sounds. Outputs 3 and 4 would be for vocals, either backup or unison for Geddy. Outputs 5 and 6 are dedicated to any guitar samples and sound effects, making for a total of seven sample channels to house (and monitor). Also running to the house console would be the stereo output of Ged's D50 onstage, stereo out from the JD800, stereo out from the two VS's, and a single channel for the miniMoog. It's a lot, but it's not totally out of control. Remember that of the nine synth channels, two (the second Prophet) are backup synth and

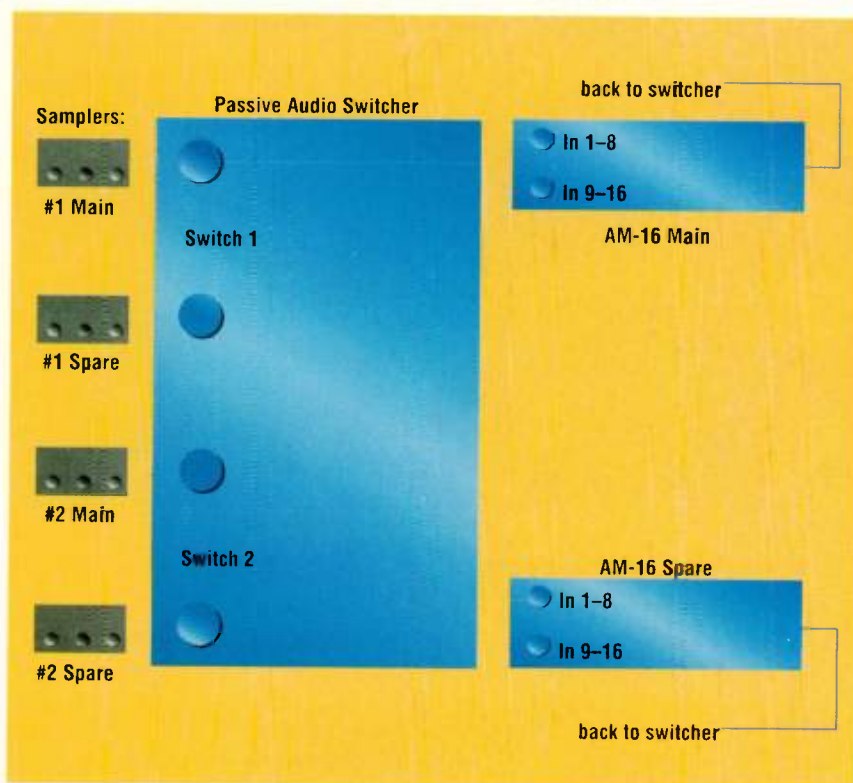


FIGURE 3: The passive audio switcher accepts eight audio outputs from each sampler. Switch 1 connects either sampler #1 main or sampler #1 spare to the switcher's outputs. Ditto for sampler #2. The output from sampler #1 is split and connected to both AM-16's. Ditto for the sampler #2 output.

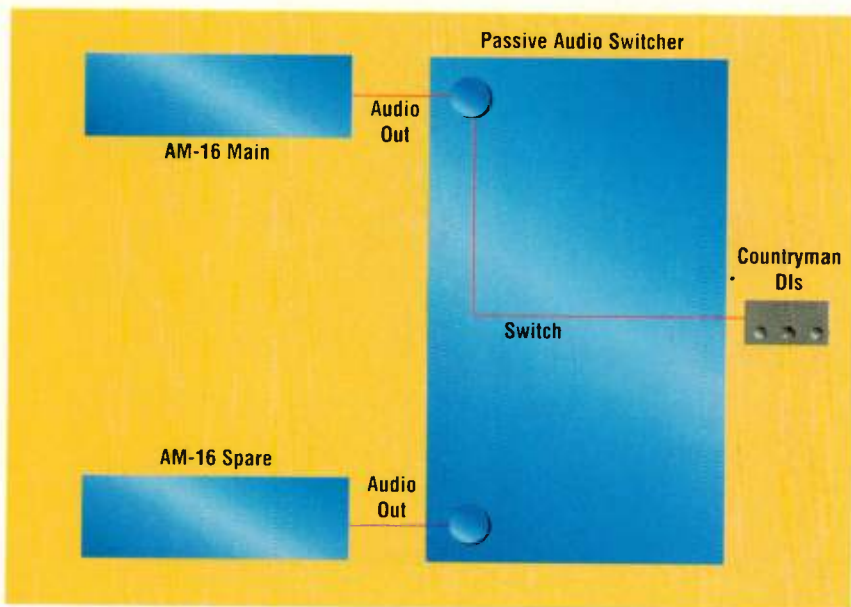


FIGURE 4: Eight audio outputs from each AM-16 are routed back into the passive audio switcher. A switch selects output from either the main or spare AM-16 and connects that output to the Countryman DIs.

Will a wet woolen blanket placed over my PA system enhance or degrade sound quality?

The answer is: The blanket will degrade sound quality.

The so called **BOSS** effect (Blanket Over Sound System) can also be achieved without the blanket, but is nevertheless an *undesirable* effect. Often, when the blanket isn't present and the PA still sounds bad, the culprit is none other than the system's graphic EQ!

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The graphs to the right were made with all faders at maximum boost, not a typical setting, but a test that can immediately pinpoint an equalizer's problems. The ripple from the well known brand X is not hard to hear! The Symetrix graphics not only look better on paper, they sound significantly better!

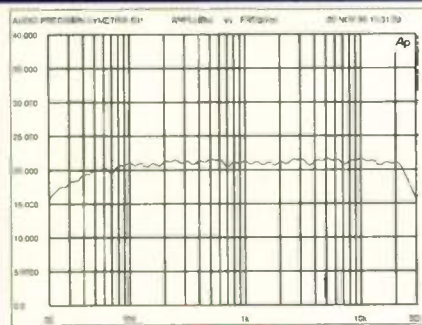
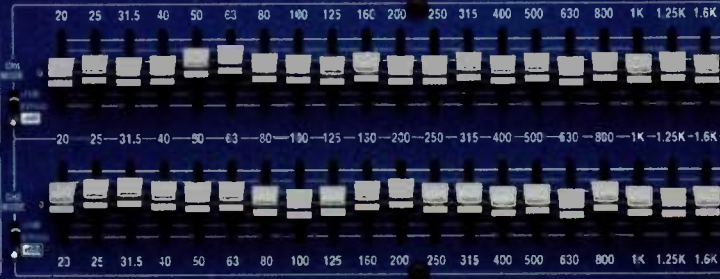
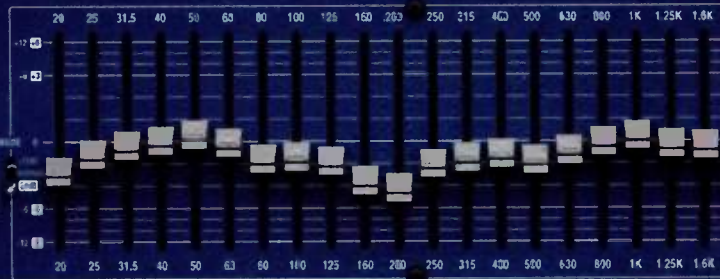
➔ **THD+Noise (1kHz at +4dBu, eq in, all bands flat) is <0.002%**. A very important spec in any EQ, it can only be achieved with meticulous design and exacting craftsmanship.

➔ **Precision grounded center detent metal shaft faders.** Two important concepts: 1) The center detent means that when a fader is in the center (grounded) position its filter contributes zero noise. 2) Metal shaft faders operate more smoothly and reliably over time. They cost a lot more than plastic ones found in competing units, but we believe that without them you don't have a professional EQ.

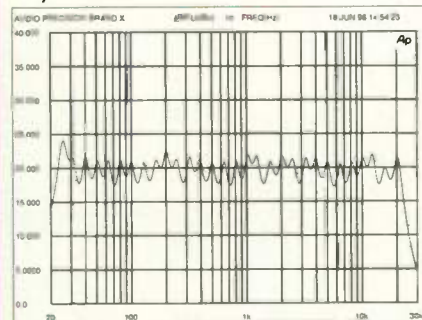
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➔ The two position **range control** switches the 31 graphic faders between a standard +/-12dB range and a high resolution +/-6dB range.

➔ **Large high contrast knobs and crisp graphics.** A feature we know you'll appreciate late at night when you're really tired. (Many EQ's don't even have fader knobs!)

➔ **Servo controlled output stages** eliminate large electrolytic caps from the output. The result is zero DC output offset, a low -3db rolloff point (6Hz), and the elimination of output loading effects.

➔ **LED input level ladder.** An EQ's dynamic range spec can only be achieved when the incoming signal is properly adjusted. With the 531E and 532E input signals are set precisely where they need to be. Dynamic range of over 112dB is assured.

➔ **We've got more features:** internal power supply, failsafe relay bypass, CE compliance, XLR and 1/4" connectors, high tolerance multi dielectric film capacitors (resulting in low sensitivity to temperature changes), and many more. We can't go further here, but if you call us we'd love to.

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would only be unmuted in case of failure.

Depending on the song and situation, I could be using any one of the four samplers. It would be crazy to feed all those outputs up to the house console, so I need to control switching from the stage. I have a passive audio switching matrix that accepts all 32 outputs from the samplers and has two sets of eight outputs. Each set of eight outputs is split to feed two 360 Systems Audio Matrix 16 Crosspoint Switchers (also known as the AM-16, this unit is an active audio switcher that can route any of its 16 inputs to any of its 16 outputs). On the front panel of the passive matrix there are switches that toggle between sampler #1 main/spare and sampler #2 main/spare (there's a third switch I'll get to in a minute). This connects either the main or spare samplers to the audio outs on the rear panel (see fig. 3).

Now both samplers are connected to both AM-16's, which have two basic programs. Program 1 would be for song 1 and odd-numbered songs. It sends sampler #1 to the outputs of the AM-16, while simultaneously muting sampler #2. Program 2 would be for song #2 and even-numbered songs. It routes sampler #2 to the outputs of the AM-16 and mutes sampler #1. This same program switching happens on the second AM-16 for

backup...just in case.

The outputs from the two AM-16's are returned back into the passive switch box and sent to the third toggle switch (fig. 4). This toggles between the two AM-16's and the output feeds a set of eight Countryman DIs, which then feeds the house and monitor consoles. I take a tap from here and run the eight outputs to a Roland line mixer that I monitor with headphones during the show.

You might ask (and rightfully so), "Why not just use one switch to toggle between the four samplers and feed the house and monitor consoles?" The answer is, "Yes, that could be done." But then every time I used the switch, there would be a nasty *pop* in the PA system, which is unacceptable. Using the AM-16 allows me to mute the audio outs of the samplers while switching, eliminating switching noises. The passive matrix allows me to switch to a backup AM-16 in case one fails.

RACK IT UP

This entire sample playback system is housed in two racks. One is a MIDI rack, containing the two Anatek Studio Merges, two JLCoooper 1620's, and the Hi-Tech systems box.

In the audio rack there's four Roland S770 samplers, a Roland line

mixer, the audio switching matrix, a Dynatek RM450 (rack mount) dual hard drive, and a power conditioner. A third small rack holds the four rack-mount Dynatek 1 GB drives. We also carry an additional spare drive that rides elsewhere, usually with production cases so that if anything were to happen, I would still have a copy of the show. And I have a CD-ROM backup of all of my samples — one stays with me and the other stays back in Toronto.

KEEPING AN EYE ON IT ALL

One of the really nice features of the S770 is that they have a video output, allowing me to use a monitor while I am working, as opposed to looking at a little LCD screen. This makes my life easier. I use two monitors: one for each main sampler so I can see what's loading in one sampler, while watching what is being triggered on the other. I have a video switcher that allows me to switch either one of the monitors between any of the four samplers — in case one of the monitors goes down, or if I need to do something on a backup machine. If I want to look at the load list on another unit, I don't have to leave the play screen currently active.

For what it does, the system is actually quite simple — especially compared to the days when there were 21 synths on stage or when we had five Emulator II's and 67

show disks! Although some of the components in the system are getting on to be about 10 years old, they have been incredibly reliable. Reliability is the most important thing, and we have refined our hardware to the point where it is very easy to follow the flow of the system.

In addition to working as a keyboard technician with Rush, Jack Secret has also worked with Blue Öyster Cult, Riot, and Bob Seger. He can be reached online at JSecret1@aol.com.



MONSTERS OF ROCK: Alex gets a little help from some friends on his pedal MIDI controllers.

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- 6 Tap Feature allows you to set the delay interval using a footswitch.
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LIVE DANCE MIX TIPS

DJ TURNED REMIXER

JUNIOR VASQUEZ

TAKES HIS DANCE MUSIC

TECHNIQUES

FROM THE

CLUB TO THE STUDIO

AND BACK AGAIN

By Liana
Jonas

The art of the club DJ has revolutionized the studio scene, with the emergence of a number of studio remix celebrities. Junior Vasquez's live mixing techniques have emerged on many of the most popular recordings of our time. However, true to his roots, Vasquez, remains a live sound mix master, taking his musical cues from the club circuit to the project studio and back again.

It takes a lot more than two Technics MK1200 turntables to call yourself a DJ, especially if you plan on spinning for today's discerning club goers. Most noted for his stints at New York City's Sound Factory and the Tunnel, Vasquez can now be heard spinning his magic on Saturday nights at New York City's Arena on 14th street. But make sure to nap before you go; he doesn't go on until one in the morning and he stops at three or four the following Sunday afternoon. Here, *EQ* caught up with the master of mix to discuss the art of DJ'ing, the secrets to his success, and how the hell he stays up so late.

EQ: How did you break through in the closed-circle world of club DJ'ing and how do you maintain success?

Vasquez: I have a very competitive nature. To me, it's definitely all about playing records, trying new things, and staying fresh with your skills. I'm known to put a lot of drama into what I do — the way I play music and feature drag queens and club kids. My playing definitely reflects on how I'm feeling. For instance, if I feel angry, I'll shut the music off for 20 minutes. I'm very controlling and manipulative with my crowd — and they seem to like that.

Where do you shop for your records?

A place called Eight Ball Records on ninth street and fourth avenue in New York City.

How do you maintain your record collection?

Believe it or not, I don't really. The life of a record is only about four to six months. If a record skips, it skips, the kids scream anyway. I'll replace the good records once they've had it.

Do you mix CDs?

No. I only play them as filler or to support acts.

How do you match your records?

I don't know or use BPMs (beats per minute). I don't know how to figure that out and I don't mark my records. I go strictly by ear. I tried it once and it makes it too rigid for me.

Do you use samples when you spin?

Yes I do. I have a Casio CZ101 keyboard with vocal samples lined up in them that I trigger periodically throughout the night. I also use an Akai 3000 sampler. There are some delay effects that I use, but I don't choose to give their names because other DJs may pick them up! But I do use digital effects. Everyone knows that I use a Lexicon JamMan, which is like a looping delay that I either use for effects or to help me get from one record to another.

How are the components in your rig connected?

All of my effects processors, samplers, turntables, CD player, DAT, and tape machine are hooked up to my UREI mixer. The UREI has three turntable inputs, two auxes, and a mic input. But each of these inputs has another five auxes to them, so you can switch and go to anything. Unfortunately, UREI discontinued this mixer, so if you can find one it's good to buy it. My UREI is the original unit that I used at the Sound Factory over eight years ago. It's been modified with a crossfader. It's also got a cutoff switch that allows me to cue up the records in the booth without using headphones — and no one on the floor can hear me cueing. I use this switch when I want to hear the record a little larger than what I hear in the headphones.

What do you think about all of the Technics 1200 turntable clones?

You can't beat the 1200's. I mean, Vestax makes some good turntables now. They have one that plays backwards, one of which I have in my console at the club. I don't use it for actual spinning, but it's good for effects.

What kind of cartridges do you use?

I use the Stanton 500's; the white ones. They're designed for back cueing. I tried the Ortofon cartridges and found them to be too brittle and harsh-sounding for my taste.

How often do you change your needles?

About every month to two months.

Can we expect any Junior Vasquez DJ equipment anytime in the future?

I'm trying to invent a joystick-type device that allows you to pan the sound from center to left to right to right to left, and so on. I want the sound to move around. It's more involved than having just a center channel. It would almost be like switching in between a main system into a small sidefill-type system. Then you can slam back on the big system. It's still just an idea.



Tell me about some of the funky things you do.

I'll do crazy stuff like turning up a turntable pot while putting its tone arm against the teeth of the platter. I'll do that to make noises. I also use my mic to create feedback. I'll take the mic and put it in front of my huge monitors in the booth so it feeds back, then I'll crank up the mic delay to delay the feedback. I'm always doing stuff like that. I used to play a record and tap the label part of it with a pencil to make different beats come out through the needle. Or, for instance, I can be playing turntable one and then turn up turntable two and play it like a percussive instrument by tapping it with a pencil. Or I'll simply tap the record that is actually playing to make beats. If you tap the records right, they won't skip.

How do you deal with sampling rights and their accompanying red tape?

You don't really have to deal with that in a live club situation, you deal with that more in the studios. However, what happens is the club owners are supposed to be paying into ASCAP and BMI by the year. Once

they do that, they can use whatever they want as long as it's not for sale.

You mentioned earlier that your mixer was modified, how about your turntables?

Well, a lot of DJs use the pitch control to control the speed of the record. I don't. I place my finger on the side of the platter to play the turntable like an instrument; I'm slowing down and speeding up with my finger. And that's how I can ride my mixes for a long time. I do use the pitch control, but only for adjustments. Anyhow, I couldn't do this if my turntables weren't modified. There's a little circuit in the 1200 that I had cut to bypass the Quartz Lock. Once the Quartz Lock is off, I can manually control the speed of the record. Without this mod, the turntables drag because they want to click back into Quartz Lock.

Do you travel with sound technicians?

Yes. George Santos and Shawn Brophy. They adjust everything for me so I can just come in and pilot the plane.

What other gear is used for tweaking?

I have crossovers — an Overture

Long three-way crossover and a custom-made Steve Dash, Dash three-way crossover. These get tweaked when I get too loud.

Tell me about the monitoring system in your booth.

I have two EAWs each loaded with two 12's. I put a separate JBL tweeter on each of them.

How do you deal with delay when you're mixing?

The room is time-aligned with an analyzer. I have about a 15-second delay in my booth because it's such a huge room. But honestly, I'm just used to it.

Do you do anything to protect your ears?

Early in the night, I sometimes use earplugs, but I can't do it for very long afterwards.

So how's your hearing?

It's probably screwed up. I usual-

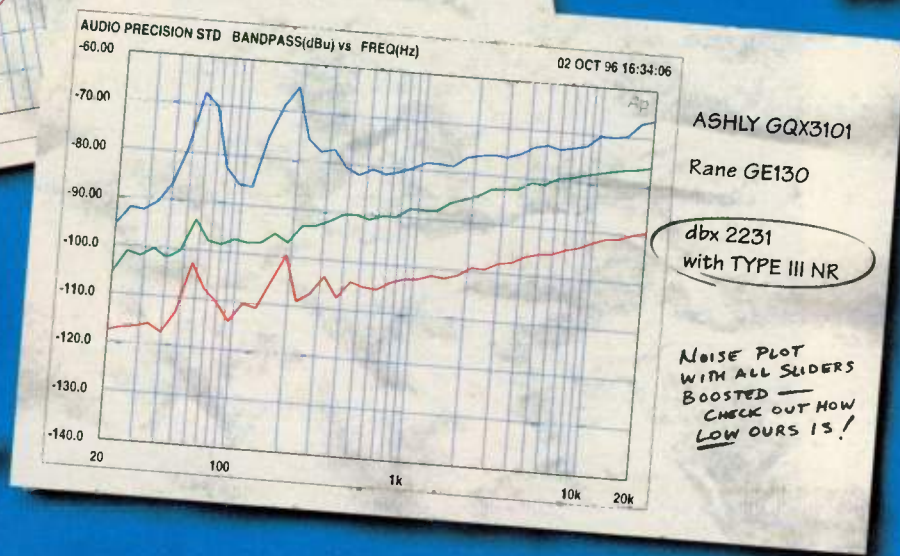
I'll take the mic
and put it in
front of my huge
monitors in the
booth so it feeds
back, then I'll
crank up the mic
delay to delay
the feedback.
I'm always
doing stuff
like that.



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CIRCLE 18 ON FREE INFO CARD

ly have a dullness in my right ear. My headphone is on my left ear, so my right ear is getting hammered from my monitors, which I have cranked up. Your eardrums just get fatigued.

What kind of headphones do you use?

I use the Fostex T10 or T20's. I cut the right side off and then modified them so that I don't get leakage, and then I just get a mono signal to the left side. The neckpiece stays on because I keep my headphones around my neck all the time. Fostex seemed to be the best that I've used.

I think there will always be a market for a hardcore, underground club. Not a digital place, just all analog, because records are analog.

I can crank them and they don't burn out.

What do you think about all the short-lived trends

on the club DJ scene?

There are a lot of movements out there; a lot of kids doing jungle, drum and bass, and so on. Personally, I think that the less trendy something is the more steady and consistent it will be. I play records if they're good and I don't follow the genre that's "in" at the time. I didn't jump on the techno bandwagon when everyone else did. I just don't operate like that.

Do you think that club DJ'ing will be the same, say, five years from now?

Things are changing so drastically technically. I think it's going to be difficult if vinyl is done away with. But I think there will always be a market for a hardcore, underground club. Not a digital place, just all ana-

log, because records are analog. I think that in the midst of all this digital technology, there will always be a desire for a warm, analog sound. **What are some obstacles the club DJ must face?**

Climate control. As the crowd gets bigger, the level of humidity increases a great deal. The humidity dulls the sound out because it is slowing the frequencies down. When this happens we have to adjust our master Behringer EQ in my booth.

How do you stay up so late?

Well, this is my one-and-only gig at Arena. Aside from working in my studio, I have the rest of the week off.

I hear you have an album out now.

Yep. I have my live CD recorded from the club. It's a cross-section of 12 hours of what I do. It's called *Junior Vasquez Live on Pagoda Records*.

EQ

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CLUB PROFILE: ARENA

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ENHANCED SYSTEM
THAT CAN HANDLE
DJS AS WELL AS
LIVE BANDS

By Steve
La Cerra

It's no secret that most clubs employ one PA system for their live stage sound and a second, separate system for the DJ. But with an eclectic variety of activities from all-ages dance nights to live bands to lead-singer-with-DAT-backup, the Arena Cafe (located in Hollywood, CA) really has unique PA requirements. Rather than go the route of separate systems, the club's engineer decided to install one sound system to handle both the "canned" music and the live stage sound.

Arena's rectangular-shaped room centers around a dance floor with dimensions of roughly 40 feet wide by 78 feet long. At one end of the dance floor is the stage that is approximately 15 x 16 feet. Arena Cafe house engineer Chuck Schoon tells us that the club frequently hosts live bands that specialize in Mexican Quebradita. "This music started about 150 years ago in northern Mexico," Schoon explains. "German immigrants assimilated their music into that culture and that's why it sounds very much like polka music."

Schoon has been involved with Arena for the past four years, and he's



ARENA TOUR:
Top: The Arena's DJ booth; Right: The club's dance floor is surround by Electro-Voice's DeltaMax speakers.

been wanting to upgrade the system for the last two. "I really wanted to put in a system that matched the caliber of the club. The previous system was never installed correctly and had many problems. It was not powerful enough, was running on 2-ohm loads, and was so problematic that it had to be changed." That was when Chuck had the chance to make his audio vision a reality.

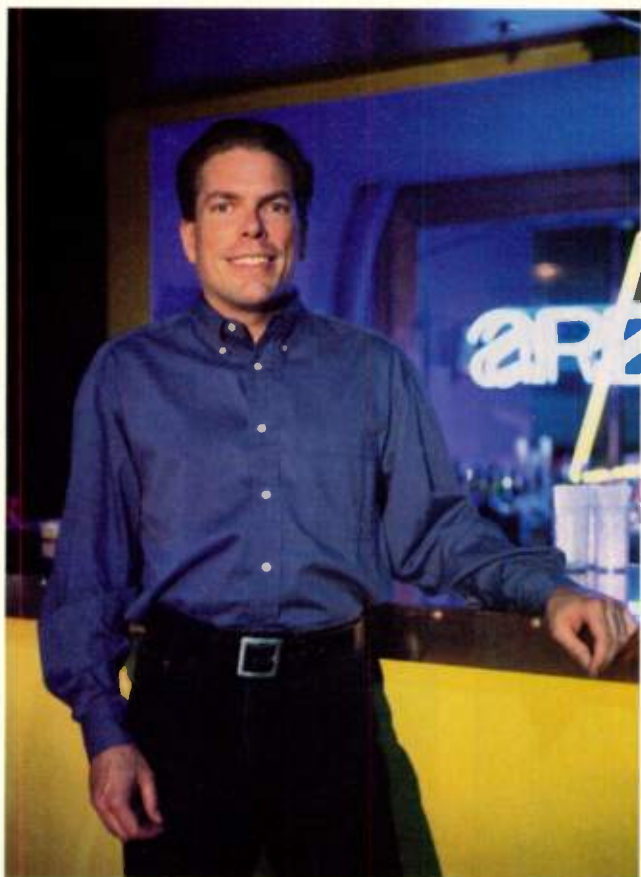
"Everything had already been de-

signed on paper," Chuck reports. "For the past year, I had this E-V system drawn out with the DMS-1183 DeltaMax system and the MTL-2B subs. It was completely set to go. So — fortunately for me — when the owner said he wanted this done in three weeks, it was doable." Since downtime would have to be at a minimum, it was up to Chuck to install the new system quickly and efficiently. "We ordered our gear from E-V on



a Friday afternoon and had it in four days. While we were waiting for the cabinets to arrive, we had our welder come in and build all the speaker brackets. We also had a carpenter come to do the wood-working. Once we started, we had the old system out and the new system up and running in three days." All work was done with in-house personnel except for the welder and carpenter.

Chuck did the install in stages so that if there were any difficulties, at least part of the system would be working. "Before the gear was ordered, all of the cables, con-



CUSTOM FIT: House engineer Chuck Schoon customized all his gear to his exact situation.

nectors, and amp racks were prewired so that when the amps were delivered, it was just a matter of sliding them into the racks, bolting them in, and hooking it up. The existing racks were sitting there ready to go — even the Speakon connectors for the E-Vs were ready. Everything had been worked out for impedance and, in this system, no amp sees a load lower than four ohms. Also, every MTL-2B cabinet has a dedicated amplifier channel,

totaling 16,000 watts."

Schoon obviously took his system design very seriously. While he was waiting for the cabinets to be delivered, he spent time at his bench making all audio interconnects by hand. "Nothing was bought off the shelf. All of it is custom to the situation, using Neutrik connectors and either Canare or Mogami cable." From the 36-channel stage box (with eight returns), audio is routed via snake up to the mixing booth into a Mackie 1604 console. Monitor mixes are currently run from the auxes on the Mackie back to the stage area, through

Crest amps and EAW 258 wedges, though Schoon expects larger bands to bring monitor consoles. The Mackie mixer and the DJ mixer are fed into a Rane SM26 splitter/mixer, which routes the "online" signal to an Aphex Studio Dominator and then an Electro-Voice Dx34 processor for crossover. An additional output from the Rane unit feeds a set of Dorrrough Model 40-A loudness meters. From the output of the Dx34, audio goes to the amp racks.

There's currently no EQ in the system, and — though he's considering a Klark Teknik DN4000 — Chuck "really hasn't found the need for it. The Dx34's

are extremely versatile in their adjustments. We stayed with factory parameters but tweaked the gain structure a bit. We raised the low end output to the subs by 3 dB and dropped the low-mid output by 2 dB — which really helped balance out the system." The entire signal path from mixer to power amps is balanced; the run from the Dx34 in the booth to the amp racks is about three feet, but the run to the two subwoofer amps is about 60 feet.

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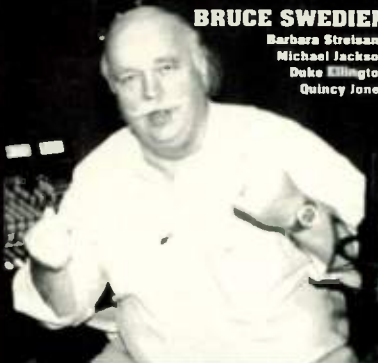
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CIRCLE 11 ON FREE INFO CARD



Bottom end for the system is handled by 14 E-V MTL-2B subs, powered by seven Crest CA-12's. A total of twelve E-V DeltaMax DMS-1183's cover the rest of the frequency range in this four-way system. Three more CA-12's power the '1183 woofers, while three Crest 7001's power the midrange and three Crest 4601's take care of the highs — serious muscle for a club that has a capacity of 1230.

Not content to use the more traditional heavy-gauge speaker cable, Schoon devised a sort of "power distro" for the amp/speaker connections. Running alongside the length of the dance floor is a conduit run that breaks out for every pair of speakers. Inside the conduit, Chuck installed 8-gauge lines for the amplifier outputs. There are terminal blocks set in positions along the conduit run that tie the 8-gauge line with 10-gauge line that connects directly to the cabinets (the longest 10-gauge run

being about 10 feet). Similarly, the amp racks tie with 10-gauge line into terminal blocks that again interface with the main 8-gauge runs. Schoon placed the subwoofer amps in an old storage area to keep them close to the MTL-2B's — the longest run from an amp to an MTL-2B is 25 feet.

Chuck explains the arrangement of the cabinets in relation to the stage and dance floor: "The entire PA system is pointing inwards to the dance floor, throwing sound into the middle of the room. If you stand on the floor at the front of the stage, you have a cabinet on your left and on your right pointing inwards. I planned the wiring so that, if necessary, I could shut down the cabinets closest to the stage to avoid any potential feedback. It turns out that we don't have to do that. If the room is empty we have to be careful about feedback, but once the room fills up, it's not a problem."



POWER MONGERS: The Arena amp racks relies on Crest CA-12's and 4601's to power the sound.



Chuck admits that the mix position is tough: "The mixing booth overlooks the dance floor from a back corner of the room. For a DJ, it's fine — they have a great view, they're out of the way, and it's not a problem. For a live mixing position, however, it's a problem. To help a bit we have



EAW FR-183 monitors and 600 watts per channel in the booth as a monitoring system. I have an A/B switch to monitor either the DJ mixer or the house


mixer. If I am doing the mix, it's usually not a problem because I know the room. For larger bands we use Industrial Sound (El Segundo, CA). They bring in stage monitor and house mixing consoles, and feed our system."

In addition to full live bands, Arena also hosts vocal artists that sing to a backup tape (Chuck notes that he has even seen a recording artist come in and lip-sync). "We have a TASCAM DA-30, and we'll do shows where a singer brings an instrumental DAT and sings over it, or maybe comes in with a few backup singers and a DAT." Chuck uses Shure SM58's for just about everything.

As for the reliability of the system, Chuck says, "This system has bullet-proof protection and where the Aphex unit starts to limit, I'd estimate that the system is only at 70



TWO-WAY SYSTEM: The E-V DeltaMax DMS-1183 speakers surrounding the rectangular dance floor provide solid sounds for DJs and bands.

percent of what it can really do. There's very minimal distortion and loads of headroom. At 2-ohm loads, amps can run very hot — and we all know that heat is the enemy of electronics. This system is run very conservatively with no load below four ohms, so the amps should last 10 or 15 years." 

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GEAR FOR YOUR NEXT GIG

GET A Q

Sabine's POWER Q ADF-4000 has been designed to handle many tasks that would normally take several different units. The ADF-4000 includes the FBX Feedback Exterminator, Parametric EQ, Graphic EQ, RTA,



Sabine ADF-4000

Compressor/Limiter, Noise Gate and Delay all in one package. It also offers 24-bit digital processing, automatic room equalizing to match your specified curve in less than four minutes per channel, and ClipGuard adaptive clip level control that expands dynamic range to greater than 110 dB. For more information, contact Sabine, 13301 Highway 441, Alachua, FL 32615-8544. Tel: 904-418-2000. Circle EQ free lit. #117.

EASE ON DOWN THE ROAD

The first product offering from Allen & Heath's new MixWizard Series, the WZ16:2 mixing console, offers 16 balanced mic/line inputs complete with inserts, XLR and TRS jack connectors, and 100 mm faders. The WZ16:2's 4-



A&H MixWizard

band British EQ has two wide-ranging sweepable mids, and 80 Hz low-cut filters can be found on every channel. Each of the console's two stereo returns features balanced inputs and monitor sends, while its six auxes feature the ability to allow mono or stereo monitoring. The

WZ16:2 is also the company's first mixer to feature their quick change connector (QCC) system, which allows the board to go from a rack to a desk, and back, without unplugging cables or removing panels. The board can be configured to fit in a standard 10U space, 19-inch rack. For further information, contact Allen & Heath U.S., 8760 South Sandy Parkway, Sandy, UT 84070. Tel: 801-568-7660. Circle EQ free lit. #118.

MONITOR, MONITOR!

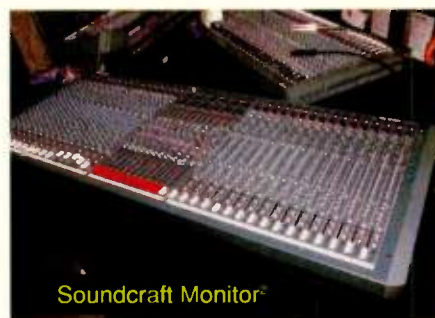
Available in 24-, 32-, and 48-channel frame sizes, Spirit by Soundcraft's Monitor² offers a total of 12 monitor sends (8 mono and 2 stereo), each with 100 mm faders and 12-segment tri-color LED meters for precise level adjustments. The console also boasts a built-in splitter, ten sub-

groups, individual PCBs throughout, and facilities for stereo engineer wedges. By routing all monitors to master strip

11/12 and using its two faders as Mix Left and Right, the Monitor² can also be used as a front-of-house console. All mono channels employ Spirit's UltraMic+ preamp, while each strip features four bands of British EQ with two sweepable mids; individual-channel phantom power; a phase reverse switch; hi-pass filter; EQ bypass; 12 monitor/aux sends; PFL; Mute; 60 mm faders; and LEDs for signal and peak. The Monitor² also offers two effects returns via balanced jack socket inputs. A "House to FX" return switch allows the house mics to feed any monitor output, while separate "FX to Monitor" level controls enable effects to be patched to the monitor outputs. The Monitor² will be available at the following suggested retail pricing: 24-channel — \$4699.95; 32-channel — \$5999.95; 40-channel — \$7999.95. For further details, contact Spirit by Soundcraft, Inc., 11820 Kemper Road, Auburn, CA 95603. Tel: 916-888-0488. Circle EQ free lit. #119.

JOIN THE CLUB

Yamaha's new Club Series speaker line features a 15-inch two-way speaker with a high-efficiency cast frame woofer and a 2-inch titanium high-frequency driver, also available in a floor



Soundcraft Monitor²

monitor-style cabinet. The line also includes a 12-inch two-way speaker with a redesigned woofer for enhanced low-end response. A newly designed 90x40 constant directivity horn offers extremely smooth coverage and an optional 60x40 horn is available. The top-of-the-line models in the series come equipped with ATM flyware pre-installed, while sockets for pole mounting are provided on all models. Two input jacks allow for loop-through connections. All the models also feature a redesigned crossover network for improved power handling and smooth frequency response. Suggested



Yamaha Club

retail price ranges from \$199 to \$529. For more information, contact Yamaha Corporation of America, Professional Audio Products Department, P.O. Box 6600, Buena Park, CA 90622-6600. Tel: 714-522-9011. Web: www.yamaha.co.jp/product/proaudio/homeenglish/index.html. Circle EQ free lit. #120.



AXSENT MS-100

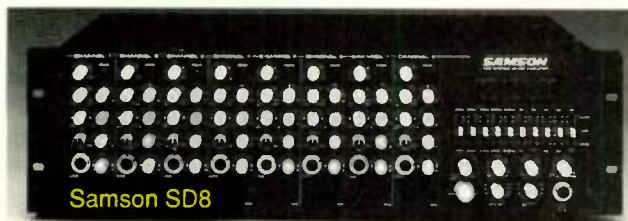
ONE SMOKIN' IDEA

The MS-100 single-channel Intercom Master Station from AXSENT has several tricks up its sleeve. In addition to a large signal light that provides high visibility, the MS-100 offers a 12-volt cigarette lighter along with a cigarette pack holder and two BNC rack-light fittings. For those nonsmokers out there, the lighter can be used as a 12-volt power-out to power a cellular phone, and the pack holder can be used to store the phone. The MS-100 provides single-channel intercommunications, is housed in a 1U 19-inch rack case, and can supply power to a maximum of 15 portable intercommunications belt packs. For more details, contact AXSENT, div. of Pro-Audio Marketing GmbH, Buchrainstrasse 34, 60599 Frankfurt, Germany. Tel: 01149-69-658011. Circle EQ free lit. #121.

I WANNA BE SD8ED

Samson's new SD8 stereo mixer amplifier features Zoom digital signal pro-

cessing from the acclaimed 1202 Studio Reverb to provide quality time-based effects. In all, the built-in Zoom digital processing offers up to 256 variations of room and hall reverbs, delays, etc. The SD8 offers 8 balanced mic/line inputs and 250 watts of power per side into 4 ohms. Samson has provided 3-band graphic EQs on each channel as well as a 10-band Master Graphic EQ. The SD8 also boasts mic input trim controls on each channel; two aux sends per channel; two stereo effects returns with front-panel level controls; global 48 V phantom powering; protection relay circuitry to prevent "thumps" when powering on and off; master monitor and DSP effect level controls; a built-in headphone amp with 1/4-inch stereo connector and individual level control; and a front-panel output signal level meter. The suggested retail price for the SD8 is \$999. For more details, contact Samson Technologies Corp., P.O. Box 9031, Syosset, NY, 11791-9031. Tel: 516-364-2244. Circle EQ free lit. #122.



Samson SD8

BREAKING THE MOLD

D.A.S. Audio/USA has introduced a new line of light-weight and efficient loudspeakers that are both durable and attractive — the Dynamics Series. Made up of three models — DS-8, DS-12, DS-15 — the system was designed entirely with the aid of advanced computer modeling programs. D.A.S.

utilized high-pressure injection molding techniques to form the high-density, mineral-loaded polypropylene enclosures. The DS-8 and DS-12 are full range systems that use 150 W, 8-inch and 300 W, 12-inch low frequency transducers with voice coil diameters of 1.5-inches and 3-inches, respectively. Each model also utilizes the M-3 1-inch exit compression driver with 2-inch titanium diaphragm



DAS Dynamic Series

and a specially designed diaphragm and driver assembly to provide high power, low distortion, maximum sensitivity, and long-term reliability. Both enclosures also have their own proprietary crossover network and CD horn as well. The DS 15 offers a 300 W, 15-inch low-frequency transducer with a 3-inch voice coil and incorporates an M-5 compres-

sion driver and a new CD horn assembly. For more information, contact D.A.S. Audio/USA, 6 Vista Drive, P.O. Box 987, Old Lyme, CT 06371. Tel: 860-434-9190. Circle EQ free lit. #123.

ROOM TO MOVE

Incorporating 50 mW of RF output power, a frequency response of 80–20,000 Hz, a frequency range of 450–960 MHz, and a maximum



Sennheiser SKM3072

switching bandwidth of 24 MHz, the SKM3072-U UHF handheld transmitter from Sennheiser utilizes phase-locked loop (PLL) technology to provide 32 switchable transmission frequencies. Sennheiser's patented Hi-Dyn plus® noise reduction system helps deliver a signal-to-noise ratio of 120 dB. The SKM3072-U features an integrated antenna as well as a battery compartment underneath the microphone head to provide an unobtrusive appearance. An LC display for frequencies and a low-battery indicator are included. A 9-volt battery supplies eight hours of continuous operation. The SKM3072-U can be used in conjunction with a variety of Sennheiser multichannel UHF receivers, including EM1031, EM3031, EM3032, EK4015, and EM1046. For further details, contact Sennheiser, 6 Vista Drive, P.O. Box 987, Old Lyme, CT 06371. Tel: 860-434-9190. Web: www.sennheiserusa.com. Circle EQ free lit. #124.

AVOIDING ROAD KILL

HOW TO
SWERVE AND
HOPEFULLY
MISS THOSE TOUR-
STOPPING POTHOLES
THROUGH BETTER
GEAR
MAINTENANCE

By Eddie
Ciletti

Life on the road is an art form, an attitude, and an equal-opportunity abuser. Survival is the name of the game, and what better way to do so than to follow the old Scout's motto: "Be Prepared." Here are some road survival tips:

WARPED SENSATION

In the studio — where equipment racks usually stay put or, at most, roll around a little bit — using just the bottom pair of rack screws will do the trick. Road racks, by contrast, are more likely to get flipped upside down as part of some road warrior's daily aerobic routine. "Forgetting" to install the top pair of rack screws will not only cause the front panels to warp, but also damage components and connections between the front panel and the main chassis. Always use all four rack screws and, if necessary, provide rear support for gear that is deeper than it is wide.

(Note: Newer versions of digital multitracks are more roadworthy than

their predecessors. The Alesis ADAT XT, for example, has a cast-metal chassis while the TASCAM DA-38 uses a switching-mode power supply that reduces weight and height by a rack space.)

VENTILATION

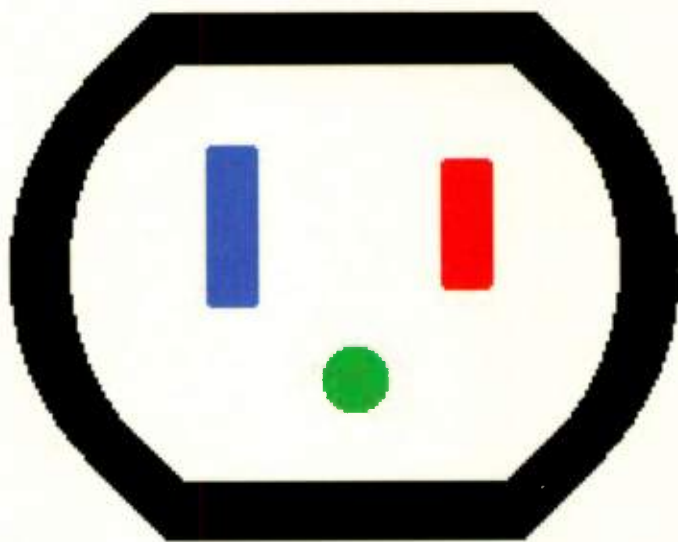
Built-in fans are a plus. If filters are provided, check and clean regularly. Without filters, your gear will fill with smoke and dust. Find the fan, determine its direction (reverse if necessary) and install a filter. (Standard fan filters are available at 800-Digi-Key.) This is especially true of the TASCAM DA-88, which draws air through the tape insertion hole. See my Web site at <http://www.tangible-technology.com> for details.

WIRING TIPS

Spare cables can save the day. Prefab cables cost more, but you can save money by making bulk purchases or by building cables yourself. If the latter, don't compromise on connectors. This is one area where only name-brand parts will do. (Don't use Radio Shack 1/4-inch plugs!) Neutrik (908-901-9488/e-mail: neutrikusa@aol.com), for example, has a line of quality hardware that provides an easy-to-use strain relief and screw-driver-less XLR connectors. When ordering, request extra strain-relief parts because they are made of plastic and can be broken.

Switchcraft (312-792-2700/Web: <http://www.raytheon.com/re/swc.html>) hardware, while reliable, has

Neutral Hot



Ground

FIGURE 1

The Incredible Impulse™ 200



Hear them at some familiar places.



The Impulse 200 can be wall-mounted from the bottom or wall-ceiling mounted from the top with the Peavey Versamount™ 70 bracket. The speaker can be used free-standing with the S-1 tripod stand.

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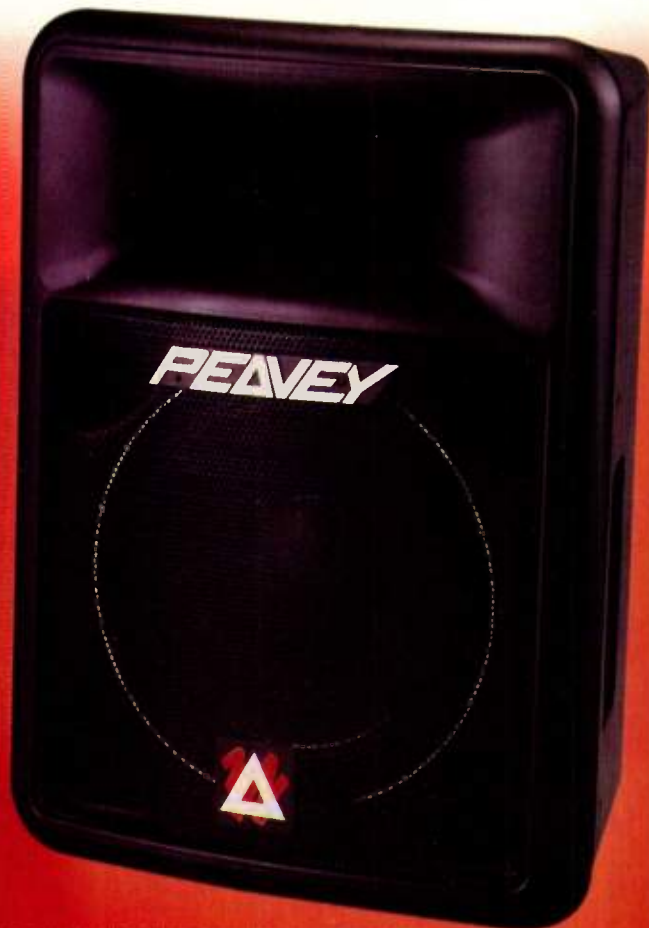
All these features, plus carefully matched audio and crossover components, conspire to produce the crystal-clear, high-fidelity response that one has come to expect from the Impulse Series.

The Impulse 200... looks great, sounds even better.



Peavey exclusive Sound Guard™ high-frequency driver protection circuit utilizes a much more audibly pleasing and transparent safeguarding method.

Specially coated cone and dust cap help make the Peavey made Black Widow™ woofer even more durable. Field-replaceable baskets reduce down time should the speaker become damaged.



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CIRCLE 66 ON FREE INFO CARD



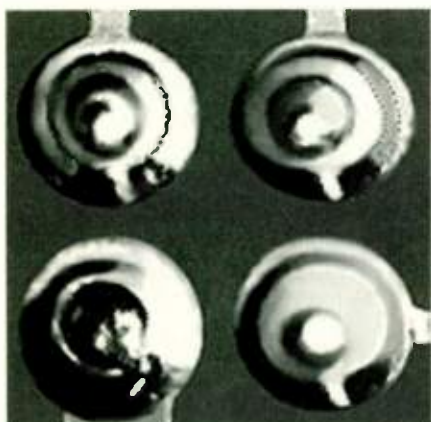


FIGURE 2

not changed its design in 30 years and could stand a bit of streamlining. Their 1/4-inch plugs waste wiring real estate and have a strain relief that does not facilitate connector recycling. Their type 3502 RCA phono plugs are particularly annoying, but there is an improved version available.

SOLDERING TIPS

Refined wiring skills come with experience. Use heat-shrinkable tubing and observe strain-relief techniques to help make connections last. Once you get the hang of stripping cable insulation (without nicking wires) follow these suggestions:

- Always keep the soldering iron tip clean by dabbing it into a moist cellulose sponge.
- Immediately add fresh solder both to protect the tip and to conduct heat to the work.
- Add solder to the work, *not* the iron.
- Avoid movement until the solder cools.
- A good connection is shiny, not dull.

INNER MITTENS

Intermittent connections are aggravated by road abuse. Twisted front panels are an obvious invitation for inspection, but if blasting level or a smack of the hand provides temporary relief, it's time to look at solder connections. What is often referred to as a "short" is actually an "open" connection caused by a "cold" solder joint.

For example, a switch that is me-

chanically supported by only solder is doomed. Close inspection with a magnifying glass or jeweler's "loupe" will reveal a cracked or crystalline connection. This is clearly visible in the image provided (fig. 1). From the bottom right, moving counterclockwise, a printed circuit connection gradually deteriorates until the connection is broken. Reheat with a soldering iron adding fresh solder.

POWER FACTORS

Before plugging in any gear, measure the voltage and check polarity. Radio Shack's AC-outlet analyzer (22-101) sells for \$5.99 and can save a life. Fig. 2 shows where the connections *should* be. Using a voltmeter, there should be minimal, if any, juice between Ground and Neutral. From either of these to Hot should be 120-ish volts.

Gear with "switched-mode" power supplies will be light weight and can run on anything from 90 volts to 200 volts. This is a plus, for sure, but switching supplies are not easily repaired. Spares are highly recommended. Traditional linear power supplies are less efficient, much heavier, and more susceptible to overheating if the juice exceeds 125 volts for a significant time.

Inspect all of your extension cables. Frayed, mangled connections should be remade. "Tinning" stranded power cables with solder will minimize fraying and help the wire stay in place as it is screwed down. Be sure to leave a little slack before tightening the strain relief. Power spikes from intermittent connections do the most damage. Heat is always the enemy.

EAR CONDOMS

Protect your ears. Wear plugs whenever possible. Try to convince loud bands to use smaller amplifiers and personal monitors. This will make it easier for everyone to hear, to sing, and to keep hearing. Own a sound-level meter.

DON'T CROSS YOUR THREADS

Abused tools do more damage than good. Using the right screwdriver size, for example, minimizes wear on the tool and the screw head. Know your threads. A "trained" eye can spot the

major differences among the variety of machine, sheet metal, and wood screws you are likely to encounter.

Road abuse strips and loosens screws. Spare kits are available from MCM (800-543-4330). A wider assortment of hardware is available through McMaster-Carr (908-329-3200). Machine screw threads will be spaced according to either ISO metric (Asian and Euro-products), SAE (American), or Imperial (old British gear) standards. They cannot be mixed. Do not use force.

SPRAYING YOUR TERRITORY

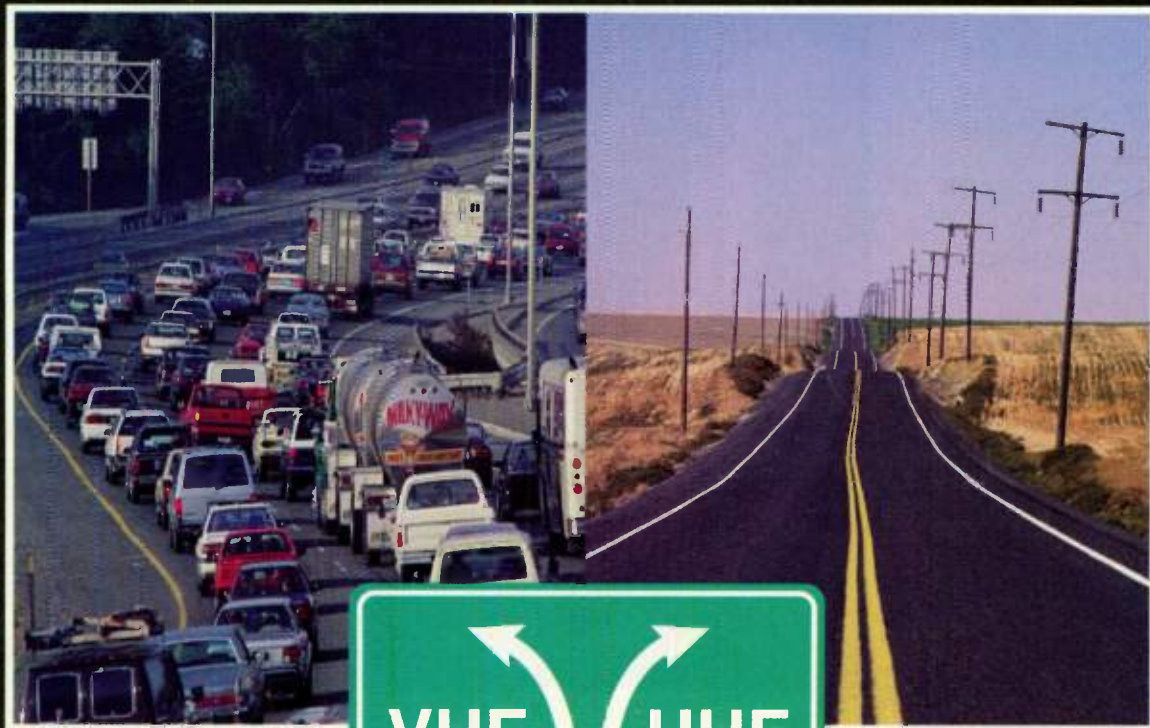
Cleaning pots and faders is not as easy as it used to be. Don't just spray anywhere and hope for the cleaner to migrate! The resistive elements in pots and faders can be of two types: carbon and conductive plastic. The more affordable carbon-type are OEM'd by companies such as Alps and Noble who do not sell direct. Penny & Giles, Inc. (310-393-0014), Bourns, and Clarostat make the more expensive conductive plastic and ceramic rotary controls that are more likely to be sealed from the environment. P&G requests that faders be cleaned with water and/or water-based cleaners (for stubborn schmutz). Silicone is the recommended lubricant.

Follow directions when using CAIG Labs products such as "Cramolin" and DeOxit. Lubricants attract dirt, so remove any excess with a cotton swab or cloth. Do not use pencil erasers to clean circuit board edge connectors. Wipe clean with denatured or anhydrous (low-moisture) isopropyl alcohol. Apply a gold treatment such as PRO GOLD, available as wipes or in a felt-tipped pen. Exercise the connection, then remove the excess.

SPARES KIT

Of course, fuses, connectors, and cables are the most obvious candidates for your spares kit. But, since pots, switches, and faders are also prone to failure, it's good to have a few on hand in a spill-proof parts "organizer." Own service manuals for all your gear. Create a database of parts, suppliers, and authorized service centers. And don't forget to write!

Drive the Wide Open Road with Telex® UHF Wireless



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STAR**
by Telex®

If you've used a wireless recently you already know that the VHF landscape is pretty crowded. What with TV, radio, walkie-talkies, and other wireless users, it's hard to get a note in edgewise.

Not so with Telex ProStar® UHF systems. There are more available frequencies, less traffic and a cleaner signal in the UHF band. Until now, the problem for most wireless users has been the high cost of UHF systems.

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MELLENCAMP AND MONITORS

AN OLD DOG
REVEALS MONITOR
WORLD TRICKS
FOR JOHN
MELLENCAMP

By Gregory A.
DeTogne



ROCKY'S ROAD: Kevin "Rocky" Holman made a name for himself by taking chances.

The process of gathering monitor engineer Kevin "Rocky" Holman's wisdom for this article was facilitated by the Rosemont Theatre, a 4000-seat venue designed for multi-use presentations. Holman was in town as part of a U.S. theater tour undertaken by John Mellencamp during March and April of this year, which parked at the Rosemont for multiple nights.

Outlined by the multi-hued glow of a bank of Klark Teknik DN3600 EQs and the LEDs of his own custom-fitted Midas XL-348 console, Holman leads the way out of Monitor World over a cable maze backstage.

Once ensconced in the quiet of a dressing room upstairs, Holman begins revealing the secrets of his dual-identity as Mellencamp's monitor engineer and production manager. Along with a wellspring of audio erudition comes a seemingly endless, metaphor-rich stream of wild anecdotal lessons gathered from over 20 years in the business with the likes of Bon Jovi, Billy Squier, Journey, Bob Dylan, and other headliners.

"John Mellencamp likes this big point source sound," he relates. "I'm sure that has a lot to do with how he grew up in the early '70s. Just like

me, he went to see Humble Pie, the Stones, or whoever he dug in concert, and was greeted with a towering PA stacked left and right. It was always a wall of sound coming at you back then. Today he's still looking for that same traditional rock energy. If sight lines weren't an issue, I firmly believe that this band would have more PA than God on either side of the stage."

Providing sound reinforcement for the Mellencamp theater tour was Colorado Springs-based Audio Analysts. With AA crew members John Muldowney and Monte Carlo orchestrating events, 32 proprietary AALTO boxes comprised the FOH rig along with eight subwoofer systems. Within Monitor World, two mid/hi and two low frequency AALTO enclosures provided sidefill, while a dozen more AALTO single-12 wedges, five AA NDF dual-12 wedges, four AA HP dual-15 wedges, and a pair of AA HP dual-15 subwoofer systems completed the sonic picture.

TO YOUR STEALTH

In keeping with the usual Mellencamp production scheme, everything was stealthily hidden. Even the monitor system's loudspeaker enclosures, which resided behind curtains, rigged to lighting trusses, and in a number of other undetectable airborne places as well as a few earthly positions below. Onstage, only the risers, drum kit, percussion section, keys, and vocal mics were visible, creating a clean, Spartan image.

Holman's professional association with Mellencamp began as a trial by fire back in the mid-'80s. Thrown in front of a console without notice at a Farm Aid benefit concert, he quickly assembled what he calls a "generic rock mix," and it struck an instant chord with the band. Based on this performance, he was asked to stick around, and ultimately became as permanent a fixture at the monitor desk as the song "Little Pink Houses" is within the set list. Over the years, Holman has gained a reputation as a



professional risk-taker and innovator of the offbeat.

"You're never going to change the laws of physics, so fuck with them," he tells me earnestly. "When I started in this business, there were really no monitor engineers who were taking chances. One of my first breaks with convention was when I put a 2482 driver in a Par lighting can and used it as one of the mainstay enclosures within my system. I mean it was just a big sloppy bung-hole of upper midrange ice-pick-in-your-ear-stuff, but it certainly worked for loud bands. It sounded terrible, like a fog horn. But it cut through all the shit, and the artists were happy, done deal. That's important, because my critics don't write for the newspaper, they sign checks, and I talk with them personally every night."

A common Holman technique for the loud bands he works for — Mellencamp included — is to tune his monitors until they optimally sound good, and then thin them out until they're a bit brash. "Then, once the big house PA gets turned on, more fat lady than you'll ever need is

right there singing for you: All that 200 Hz, 160 Hz, and buck-and-a-quarter stuff. When I'm in these small pocket-type environments like on this theater tour, things can get unreasonably thin. But once the house is on, it's great."

While the days of Holman blowing smoke rings onstage with a driver-loaded lighting can may have to remain relegated to fond memory, some things never change. Most notably is his high regard for keeping things straightforward and easy to control. To that end, the 16 different mixes he employed on the Mellencamp tour received a bulk of their processing via two insert racks housing ten 1/3 octave DN3600 stereo EQs and four DN410 parametric EQs from Klark Teknik. Strongly eschewing the use of "jive-ass effects" in any way, shape, or form, Holman maintains lonely real estate in his effects rack with the minimalist presence of only a trio of Yamaha SPX-900 units used just for opening acts. To help fill the empty space, a KT DN6000 real-time analyzer calls the rack home as well. Capable of direct

interface with the DN3600's, the spectrum analyzing capabilities of the latter provides sum and difference display options, and can be used to capture RT60 (reverberation times), Leq (equivalent SPL), and Let (equivalent dose) measurements.

Holman puts the DN3600's to good use on all outputs as well as on inserts for John Mellencamp's vocals. And since he despises gating with a passion equal to that of the hated jive-ass effects, the DN410 parametrics see regular duty as precision drum EQ and as problem-solvers for loud acoustic guitars.

"I was never a big fan of anything other than old-dog conventional EQ," Holman unabashedly states for the record. "Before the DN3600 existed, I did some tours with automated EQ, and found myself wishing I had my old stuff back. The DN3600's combine the best of both worlds. Now I obtain features like notch filters and stereo linking, all in a package that's easy to operate. There is a DN3600 remote, but I didn't use it on this tour. I have a human remote in the form of Audio Analysis' Monte Carlo instead. He

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MIC STORY

Gathering input for Holman's Midas XL-348 was an assortment of microphones led by E-V N/D457B vocal mics. Other than serving as John Mellencamp's wireless capsule and backup, the hypercardioid dynamic units numbered four onstage in total, and were stand-mounted in hardwired configurations for backing vocals at downstage left and right, as well as on the keyboard and percussion risers.

The big-diaphragm EV RE38N/D microphones were found on guitar and bass. Keyboards are DI, with a pair of Sennheisers serving Leslie top left and right, and an Audix D2 on Leslie bottom.

At the drum kit, totally hidden Shure SM98A's are used as overhead cymbal mics à la a fashion popularized by Metallica's FOH engineer "Big Mick" Hughes. Snare top is an Audix D2, snare bottom an AKG 414, and toms AKG 419's. Brake drum (yes, brake drum) relies on an Audix D2 as well. Mellencamp's song, "Rain On The Scarecrow," was recorded with the percussive sound of a real brake drum. Sampled brake drum pings were once attempted for live performances, but fell flat. So a standard five-lug pat-

tern steel unit was purloined from a '69 Mustang, ground down to provide the proper sound,

mounted to a snare stand, and miked.

For kick drum, E-V's new N/D868 microphone was incorporated into the scheme. Holman talks about it: "This is one of the only heli-fied kick drum mics on the market. During all my years in the business, this is the first time I've miked a kick drum without a D12 from AKG. Since they quit making them [D12 microphones], it's gotten to the point where it's almost impossible to find a good one. This mic has the same sound — big bottom end and a large capsule, all in a compact design. It fits well in the drum. As a matter of fact, there's two in there — main kick and a prewired spare. The factory-fitted shock mount is effective as well."

Crown power fuels Holman's efforts within Monitor World in the form of four racks stuffed to the max with Audio Analysts-supplied 36 x 12VZ's (Holman owns 16 Crest 10004's and swears by them, but Crown is no stranger to his personal rack space either). In keeping with Rocky's philosophy that less gear is the best gear, all crossover functions are managed from within the 36 x 12VZ's via Crown PIP cards modified expressly for the job.

THE MIDAS TOUCH

Holman did supply the pair of Midas XL-348's which saw action in Monitor World and at FOH on the Mellencamp tour, at the request of Audio Analysis. "It became apparent that since I stand behind one of these goddamn things every night, I should own one," Rocky tells me with the conviction of someone real-



BEST OF BOTH WORLDS:
Top: Mellencamp's FOH set up, featuring a Midas XL-348 console; Left: Monitor World's Midas console; Above: FOH engineer John Robbins (left) and Rocky Holman.

izing they should've realized something sooner.

Rather than buy something off-the-rack, however, Holman, while killing idle hours in the U.K. one day, walked in off the street and struck up a conversation with Midas's Bob Doyle at Midas headquarters in Kidderminster, Worcestershire. He explained what he wanted in a console. Doyle listened, and delivered Holman's first pair of personally owned XL-348's. Outfitted with gain-controllable direct outputs and dual concentric pots in place of the stock stereo input sends, the desks were also fitted with a jumper that facilitates pre- or post-EQ. Holman finds the latter useful in situations where he's confronted with simultaneously sending a mix to the stage as well as to some kind of recording medium. Now he can do both, and have 48 channels of gain-controlled flat signal being recorded.

"Midas also has a thing called the XL-42," Rocky mentions. "I didn't have a need for it on this tour, but I've used it in the past. An all-around utility device, it basically gives you two extra inputs, or an outboard EQ, in a single rack space. It also has the same 4-band parametric EQ, mic/line amp, and 48 V phantom power you'll find on an XL-4. So bottom line, with the XL-42, I can acquire extra inputs or EQ without going to an extra console."

A Rocky-defined "Midas dude" himself, John Robbins at FOH puts up the faders each night behind a XL-348 equipped with an extender used for opening acts. A natural foil to Holman's unavoidable ice-pick-in-you-ear antics, Robbins is the straight man of the duo who looks and speaks the part.

Robbins' mixing philosophy at FOH complements Holman's, and indeed, the two work together tightly when the house goes dark to cooperatively deliver the best for the band. Shunning the use of effects except for ambience, and keeping his gating to a bare minimum, Robbins rides point over a herd of Crown MA-

continued on page 151

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STAGE MONITOR PSYCHOLOGY

HOW TO HELP
PLAYERS KEEP
MONITOR LEVELS
UNDER CONTROL

By Mike
Sokol

Stage monitor mixing can often be more complex than FOH mixing. And while loud instrument and vocal monitors on stage make you feel more powerful and add to the libido of the players, in reality, loud monitors can cause extra sound reflections in the microphones that can then produce undesirable coloration and feedback. Plus, the FOH speakers must be made loud enough to cover up the monitor spill from the stage into the audience. All of which can cause uncomfortable listening levels for everyone.

BE ON THE "E" TEAM

Trouble often begins when the artists and sound crew group themselves into different teams. This "us against them" mind set causes a lot of trouble. If the musicians lack respect for the sound crew, then every suggestion the crew makes will be met with resistance. Conversely, if the sound crew doesn't respect the musicians, then a condescending attitude towards the talent crops up — with bad results. What to do?

I like to think of a performance as being put on by the "Entertainment Team." Everyone who plays a part in the success of the show is on it, from security, to the lighting grips, to the sound crew and talent. We all need to work together to give the audience members what they're paying for — a good show.



You need to get into the spirit of teamwork. Be sure to introduce yourself to every member of the band. If the guitarist needs a battery for his or her tuner, pull one out of your gig bag and offer it to them. (Never accept money for a gift in the heat of battle.) Remember, you're on the same team, and team members willingly share their batteries. This seemingly simple act of *esprit de corps* will pay big dividends when you need a favor or have to ask someone in the band to turn down.

HOW TO TURN DOWN THE STAGE VOLUME

Outdoor gigs usually aren't a problem, but small clubs can be a nightmare. Let's say the guitar player just got a new Marshall amp. The first thing he does to show off is "crank it up." And it does sound great, but it's hitting 120 dB SPL in front. Few audience members will tolerate this sonic abuse and will quickly vacate.

But asking an electric musician to turn down his amp can be a tricky proposition. Remember, their musical personality is often intertwined with it. And there's a certain attitude that a big amp equates to big playing. If you simply say, "Turn down that thing," what practically every guitar player hears you say is, "You don't like my playing." This usually results in an upset artist, who may retaliate by turning it up even more. And then the monitor mixer has no choice but to turn up the vocals and instruments in the monitors even more.

Enlist the musician's help in solving the problem. A conversation might go like this: "Hey that's a really great Raptor amp, but it's got so much power that I'm having problems mixing it down for the front rows. Could you come off stage and listen to it in front for a minute?" Then offer a 50-ft cable that will allow the musician to sit a few rows back. (If the guitar

player doesn't use active pickups, you'll want to add a preamp to prevent high-frequency roll-off.) Now sit the guitarist down in the front row and have him play. Turn the FOH sound up to demonstrate the microphone on the guitar amp is actually turned on and that the amp can be heard out front. Spending a few extra minutes during sound-check will often get them on the "E" Team. Be sure to follow up after the first set and ask if the stage levels feel all right. But don't be condescending, or you're off the team.

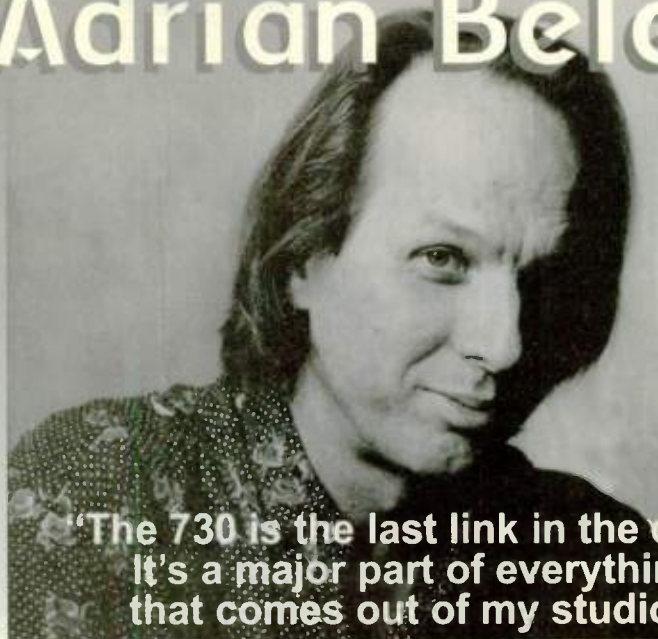
Once the stage instrument levels are under control, you can work with the vocal monitors. One technique you can employ is to set up the monitor mix with the FOH system turned on but with levels down about 10 decibels rather than completely off. This returns some of the bass reinforcement that probably won't be present in the monitor speakers due to cabinet limitations. If you try to do the soundcheck without any bass bleed from the FOH system, the inclination is to turn up the monitor levels to add the impression of more bass (remember the Fletcher-Munsen curves). I sometimes cheat a little and boost the 60 to 100 Hz bands a few dB rather than just turning up the vocals in the mix.

And think about compressors in the monitors. If you have the luxury of a separate monitor mixer in addition to the FOH console, be sure to patch in a compressor for the vocals on the monitor board. Compressors can thicken up a thin vocal, and if it's needed in the house mix, then it's probably needed in the monitors as well.

Stage monitors can set the tone of the whole event. When the musicians get a good monitor mix at a reasonable level, then everything else falls in place. If not, then it's an uphill battle all the way.

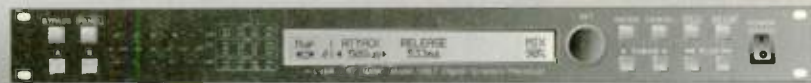
Mike Sokol is a musician, audio engineer, and communications integrator. His book, The Acoustic Musician's Guide to Sound Reinforcement and Live recording, will be published by Prentice-Hall this fall. You can reach Mr. Sokol at jmsokol@intrepid.net or www.soundav.com. He can also be faxed at 301-791-8146.

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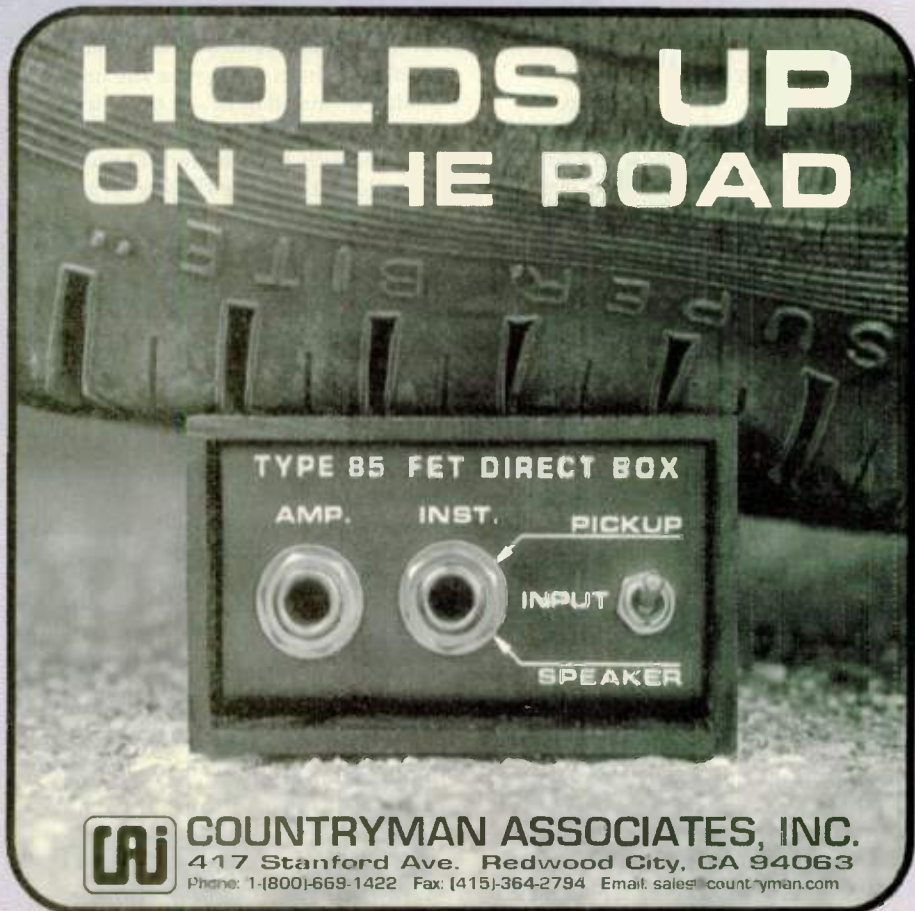


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WEDGES: A SLICE OF HELL

HOW TO PLEASE
THE ARTISTS AND
EVEN MAKE THE
FOH ENGINEER
LOVE YOU
(WOULD'YA BELIEVE
"LIKE A LOT"?)

**By Wade
McGregor**



Monitor loudspeakers may cause more problems than they solve. For example, they cause feedback, create awful-sounding leakage into mics, and consume too much time getting adjusted during soundcheck. In a perfect world, we wouldn't use them. Those with gigs in a perfect venue on that perfect world can stop reading now. For the rest of us, let's consider how these troublesome loudspeakers can be adjusted to do minimal damage to the FOH sound while still creating a comfortable listening environment for the performers.

There are three primary considerations when placing monitor loudspeakers, or simply, "monitors," on stage:

1. Coverage of the loudspeaker
2. Interaction between loudspeakers
3. Interaction between loudspeakers and microphones

To optimize onstage monitors, you will want to: (1) use the fewest possible loudspeakers; (2) use loudspeakers that have very controlled dispersion, sending sound only where it is needed; (3) carefully equalize the

monitor system to transfer the best quality of sound between the mics and loudspeakers; (4) use devices that are extremely rugged; and (5) use devices that fit into the staging for the event.

Let's start with the behavior of the individual monitor loudspeaker. Monitors can be found in many different configurations, and are a very personal choice for most performers. (The loudspeaker, though, is usually chosen from what is available that most closely suits the application.) The applications can range from: loud drummer wishes to meet same (himself) at SPLs above the pain threshold, to lounge-music duo wishes to interact with restaurant audience unencumbered by gear-laden stage (corner of restaurant).

The drummer may require a large horn-loaded HF unit with double 15-inch LF drivers, while the duo only needs a tiny nearfield unit that can be mounted on a mic stand. In both cases, the loudspeakers must be capable of providing the following requirements: adequate sound pressure level, adequate bandwidth, and ade-

quate directivity control. They must also be suitable in terms of cost, size, and format (wedge, stand-mount, mini-PA, etc.). The cost, size, and format of the unit may be last in this list, but they are often the first criteria used to select a device. Will it interfere with the audience sightlines, leave any room on stage for performers, last to the end of the tour, or impress the performer? You may have to answer these requirements before you can discuss the acoustical performance of the monitor.

The need to keep the size of the monitor as small as possible has often driven these loudspeakers to be little more than a box of magnets. There is rarely room to use a large-format horn to control the dispersion of the sound. If, however, you can control the splash of sound from the monitors, then you can improve the gain-before-feedback of the monitor system and reduce the messy leakage that results from mics on stage picking up the monitor mix. A monitor that is too directional, though, can cover some performance areas poorly, thus requiring additional monitors (more on this later).



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Smaller monitors have the advantage of being placed closer to the performer. This reduces the output level (inverse square law — double the distance to the listener and lose 6 dB in level) required from that monitor, which, in turn, reduces the overall stage volume. Small loudspeakers cannot achieve significant directivity at low frequencies, and therefore the spill from these devices in the low midrange and bass ranges is a problem for the person mixing the FOH sound and for the audience in the front rows.

Most stage monitors use separate devices for each frequency range in either a two-way or three-way configuration. This usually means there are lobes in the dispersion pattern produced by these devices caused by interaction (physical offset) between the drivers. This lobing is worsened in monitors that have dual LF drivers, common to some high-output designs. These lobes can become a severe feedback problem, as the frequency response of the direct sound from the monitor will change radically as the performer (with mic in hand) moves around the stage. This means that the carefully rung-out monitor rig will now ring during the show. Therefore, you must always walk through all the potential performing locations to check for feedback and reduce the surprises during the show.

Just as the individual drivers cause cancellations (comb filters) within ear-shot of the monitor, two monitor loudspeakers with the same signal (not necessarily the same mix, just the same signals in that mix) will interact and create a sound field on stage that has significant peaks and nulls (comb-filter frequency aberrations) where the levels between the two monitors are within 10 dB. If you visualize these cancellations based on the wavelengths of the frequencies you hear changing as you move, you will be able to see potential problems before you even turn the system on.

Orientation of the monitors can diminish these interaction effects at high frequencies, when possible, but rarely can this help matters at lower frequencies. Run some pink noise through your monitor system at your next gig. You will find that,

with all the monitors on, the frequency response and overall level changes dramatically as you move about the stage. Use the inverse square law (distance between monitors) to reduce these effects whenever possible.

A front line that insists on having pairs of monitor wedges in front of each vocal mic may be good for the rental company's invoice, but it is bad for the quality of sound onstage. Listen to the sound from these pairs of monitors as you move around the area of the mic. There will be large changes in frequency response near the center point between the monitors, but they will sound best at exactly dead center. Often the performers ask for this arrangement because of the sense of envelopment it creates and are willing to live with the changes in quality as they move in and out of the "zone." Some people have tried flipping the polarity between the two monitors to create a null where the mic is. Unfortunately, this is also very near where the performers' ears are. If the mic is moved just a little, the benefit is gone, but the comb-filter effects are worsened and you begin to hear this really loud howling noise.

Not only do the loudspeakers interact, so too do the mics. The mics will pick up the sound not only from the nearest instrument, but also from every other sound source onstage, including the other instruments and the monitors. This leakage is mixed in with the instrument's sound and causes similar comb-filter effects in the response of sound when combined in the mixers. This is why it is so important to minimize the leakage from the monitors into the mics. (It isn't just because the FOH mixer is complaining that you are mixing the show from the monitor desk.)

Selecting mics that have a very tight polar (pickup) pattern will help to reduce the level of the floor monitor. Equally important is that the off-axis response of the mic is smooth and doesn't accentuate some frequencies over others. Without a smooth polar response, the mic will force you to equalize the monitors for the polar response as it relates to those specific monitor po-

sitions. When the mic is moved, this response changes and your feedback EQ is no longer effective.

If you already have good mics that don't plague you with these problems, then it is simply a matter of placing the mic and monitor in a relationship that makes the best use of the mic's pickup pattern. A cardioid mic should have the connector (at the back of a vocal mic) pointed at the floor wedge, while a hypercardioid is typically least sensitive when the connector points just above or below the monitor. These relationships are often less problematic to maintain with instrument mics than vocal mics. Don't forget that an instrument or a vocalist's face can act as an acoustic reflector, bouncing the sound from the monitor back into the front of the mic. The inverse square law is especially important to consider when placing mics on stage. The closer the mic is to the sound source, the higher the level from the source and the lower the level from the monitors (yes, this seems obvious, but ...).

The most chaotic part of a sound-reinforcement system is the stage-monitoring system. By applying your best efforts and understanding, the show can go on. At the end of the night, you may even be thanked by the person mixing FOH.

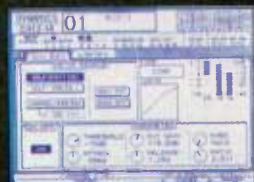
Wade McGregor is a senior consultant for Barron Kennedy Lyzun & Associates, an acoustical consulting firm based in Vancouver, BC. For more info visit their home page at www.bkla.com.

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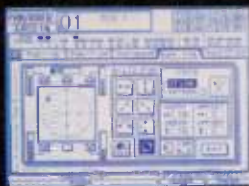


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CIRCLE 81 ON FREE INFO CARD



EAW LA212 STAGE MONITOR



EAW's LA212 — part of the company's Linear Activation Series of loudspeakers — is an interesting sound-reinforcement speaker. Combining a 12-inch woofer and a 2-inch exit compression driver on a Wave Guide Plate, the LA212's size and shape suggest that it would be suited for use as a stage monitor, as indeed it is. The LA212 can, however, also be used alone for mains where extended low-frequency response is not essential (more on that later). If additional low end is required, EAW offers the LA215, which carries a 15-inch woofer.

The LA212 is housed in a very

solid, Baltic birch plywood cabinet with an integral handle and a black polyurethane finish. Rubber feet are positioned for using the cabinet either as a wedge or as a stand-up main. A socket set into the cabinet's bottom allows the LA212 to be mounted on a stand. While the cabinet is compact, its weight (52 pounds) is no

ROAD **TEST**

MANUFACTURER: Eastern Acoustic Works, One Main Street, Whitinville, MA 01588. Tel: 800-992-5013/508-234-6158. E-mail: info@eaw.com. Web: <http://www.eaw.com>

APPLICATION: Full-range sound-reinforcement cabinet.

SUMMARY: High-quality, compact, multipurpose wedge for stage and mains use.

STRENGTHS: High intelligibility for vocals; solid construction; versatile.

WEAKNESSES: Heavy; limited LF response if used for mains.

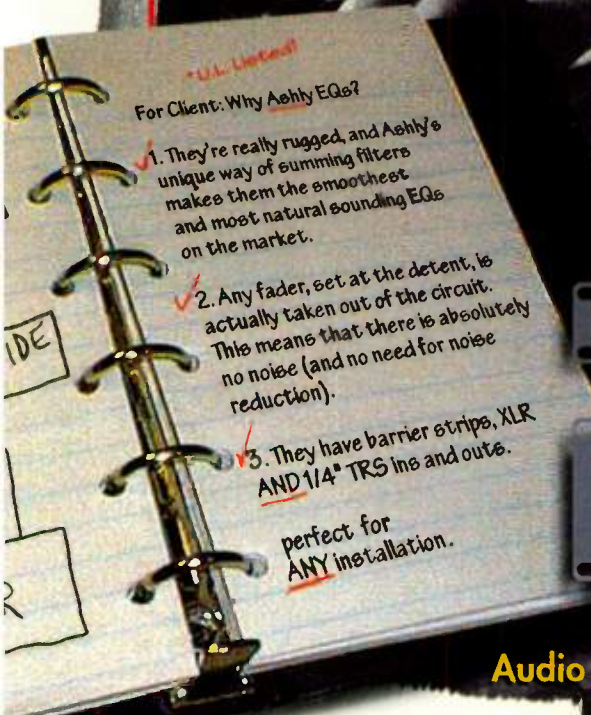
PRICE: \$1395

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CIRCLE 05 ON FREE INFO CARD

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"The ProGold works great. I used it on some old tube equipment and it eliminated a hum that I thought was something more serious. ProGold also got rid of the recurring contact noise in a rotary control that usually returned after using other sprays. Even works on seeping oxidation from metal panels and knobs." News/Studio Sessions Editor, RADIO WORLD

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joke, though it can be moved by a single healthy person. An attractive black perforated steel grille protects the drivers from harm. Input to the system is via Neutrik NL4 connectors, with one acting as a parallel output.

Our first task for the LA212 was as a "main on a stick" for piano and vocal. When used with a Shure SM58, vocal reproduction through this box was smooth, clear, and effortless, and required no low-frequency rolloff to the mic. Most of the piano's range sounded natural, but some LF cut was needed to keep the LA212 from straining while trying to reproduce the bottom octave. This is not surprising for a cabinet of this size. Our single LA212 had no problem putting out the SPL we needed, providing we powered it appropriately.

We then used the LA212 as a stage monitor for a synth rig where the tone was a bit edgy on some sounds (such as strings) but not harsh like we have come to expect from the standard "woofer-with-a-horn-tweeter" wedge. To assimilate sounds coming from the two drivers, a minimum distance of about four feet from the listener is required. Any closer than that and you can hear the drivers doing their jobs separately. B3 organ patches had a decent amount of bottom end, but not enough to rock your world.

Interestingly, this cabinet seems to "know" its low-end limitations: instead of trying to reproduce the lowest fundamentals and producing mud, it gracefully rolls

them off, maintaining clarity. As an experiment, we tried the LA212 as a drum fill where it sounded great reproducing most of the range of the kit, but there wasn't enough usable low end to shake your pants leg on the kick-drum hits. Of course, we'd be quite surprised if any single 12-inch monitor could overcome this kind of abuse.

As a floor wedge for vocals, the LA212 excelled. Vocals clearly cut through on-stage din without making your fillings rattle, and the vocal midrange was warm and full with an absolute minimum of EQ'ing. Again, SPL capability was more a function of how much your power amps can cleanly provide.

An important consideration in evaluating the LA212 is that you're unlikely to outgrow it. A small PA could start with a pair of these alone. Later on, a pair of EAW's LA118 subwoofers could be added to augment the low end. If more powerful mains were required, the LA212's could then be placed into service as floor wedges. Combined with another LA118, the '212 could become part of a full-range, side-fill, or drum-fill system. There's even built-in fly points for using the LA212 as a center fill in larger rooms.

Let's face it, the LA212 ain't cheap. But in return you get road-worthy construction, excellent sound (particularly vocal intelligibility), and the versatility to use this cabinet in myriad configurations. Those qualities combine to make the LA212 an attractive purchase for touring bands and PA companies.

Interestingly, this cabinet seems to "know" its low-end limitations: instead of trying to reproduce the lowest fundamentals and producing mud, it gracefully rolls them off, maintaining clarity.

MANUFACTURER'S SPECIFICATIONS

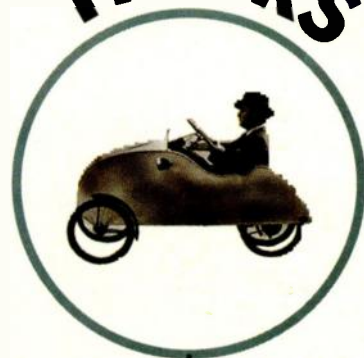
Frequency Response: 60 Hz to 18 kHz, ±3 dB
Impedance: 8 ohms
Maximum Output (@ 1 meter): 130 dB SPL peak, 124 dB SPL long term
Power Handling: 500 watts (AES standard)
Dimensions: 24 inches H x 14.74 inches W x 14.74 inches D
Floor Angle: 50 degrees

CIRCLE 12 ON FREE INFO CARD

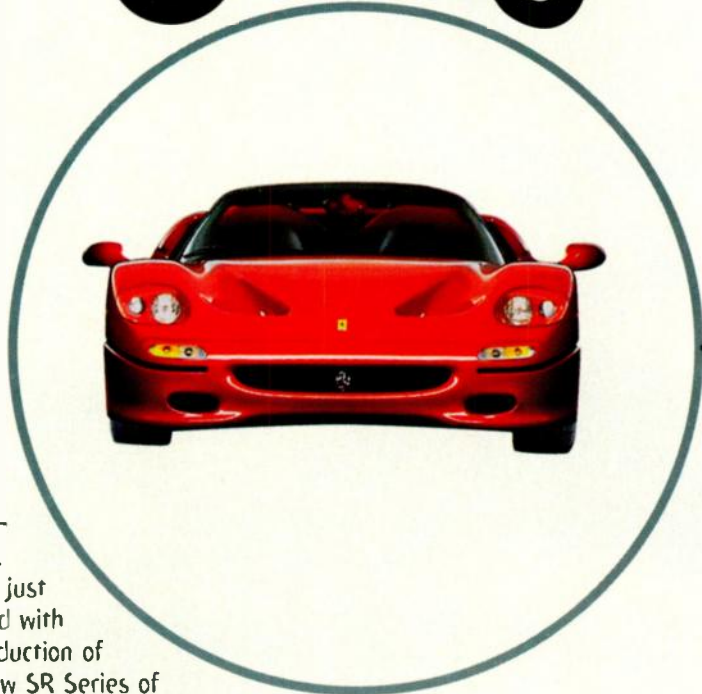
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	Peavey 231	Mojo MQ302	Rane ME60	DOD SR231GX
Configuration	Dual 31 Band	Stereo 31 Band	Dual 31 Band	Dual 31 Band
Balanced In/Out	In only	Yes	Yes	Yes
Low Cut Filter	Yes	No	Yes	Yes
FET Switching	No	No	No	Yes
Response	20Hz - 20kHz	20Hz - 20kHz	25Hz - 20kHz	20Hz - 20kHz
Signal to Noise	95 dB	96 dB	112 dB	106 dB
THD	.003%	.009%	.008%	.004%
Independently controlled channels	Yes	No	Yes	Yes
Priced under \$ 375	Yes	No	No	Yes

CIRCLE 21 ON FREE INFO CARD

PEAVEY MEDIA MATRIX



What if someone offered you a magic box that could process your audio anyway you could imagine? What if you could change your mind about the processing configuration, including all the wiring between processors, whenever you wanted? What if any imaginable audio process used between the mic pre-amp and the power amplifier were included? Peavey has the magic — and it's called MediaMatrix.

Powerful DSP-based sound systems offer many sound-reinforcement users the flexibility and control that suits this fast-paced industry. The ability to configure a sound system to suit an afternoon corporate rental and then immediately reconfigure it to handle an all-night rave that same evening can ensure that the equipment is out for rent, all the time. The small club

that has invested in a good loud-speaker system can now reconfigure the signal processing to suit the headlining-band's FOH mixing expert without losing those carefully crafted settings the house tech uses on the local talent. Peavey produces a wide range of DSP-based processors that can suit these applications, and the MediaMatrix system is all of that and more.

When Media-

ROAD TEST

MANUFACTURER: Peavey Electronics Corp., 711 A Street, Meridian, MS 39301. Tel: 601-483-5365. Web: www.peavey.com.

APPLICATIONS: Sound-reinforcement system design and processing.

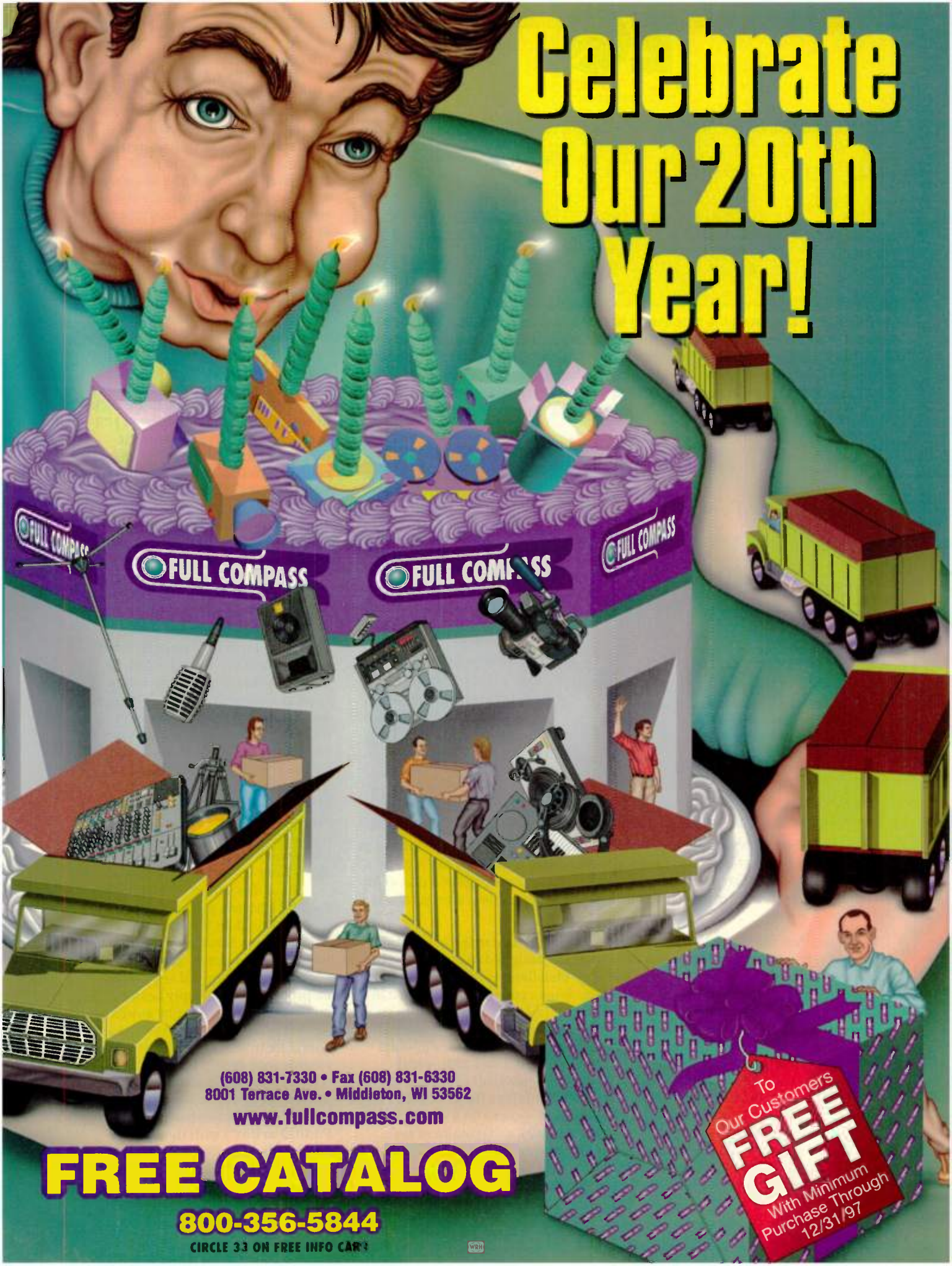
SUMMARY: A lot of power and flexibility in a compact system.

PRICE: Due to the variable components within each system, readers should contact Peavey directly for accurate pricing information. The MediaMatrix system is sold only to Peavey-authorized sound contractors. Components include: Miniframe 208 (VGA monitor, keyboard and mouse extra); MM-8840 eight-channel line-level I/O and remote control interface (expandable to four 8840); and the 8-channel mic preamp A/A-8P [see June '97 EQ for review].

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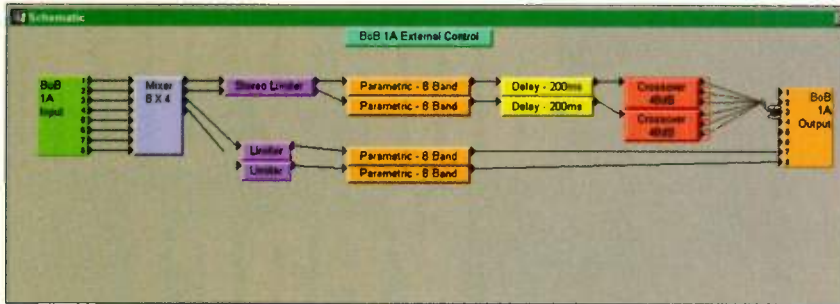


FIGURE 1: Designing the processing for a MediaMatrix system is straightforward. After selecting the appropriate processing (mixer, limiter, EQ, signal delay, and crossover) from the drop-down menu, a wiring tool is used to connect the audio signal path. Multiple outputs can be logically connected to multiple inputs to speed the wiring process. The result looks much like a system schematic diagram but, once compiled, actually functions like real wire connections.

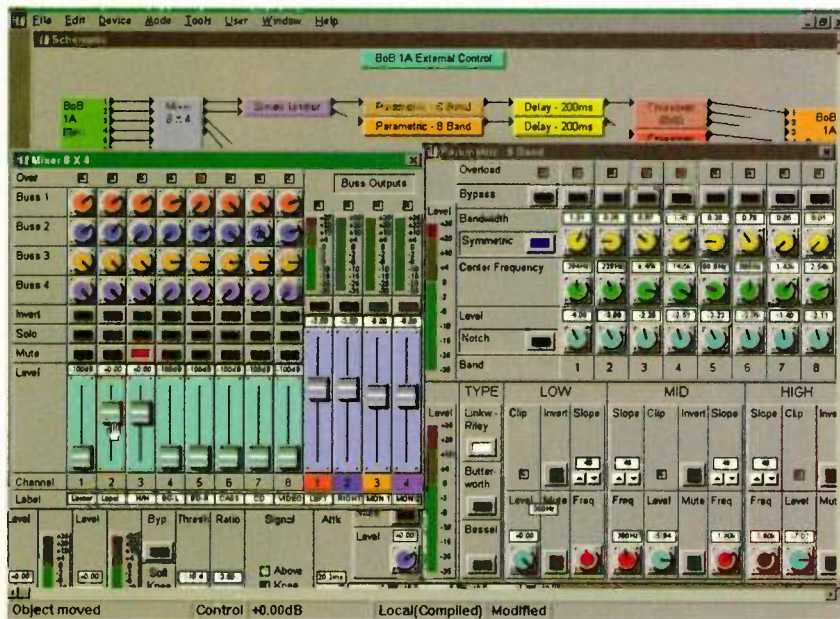


FIGURE 2: Each of the devices in the schematic/wiring view can be opened to reveal all of the user controls. Each of the hundreds of devices can include a full complement of controls. Each control setting can be stored in a preset for remote or local recall of all settings or even complete system configurations.

Matrix was first introduced a few years ago, many people realized that Peavey had developed a working system that could change the way we create and use sound systems. Comprehensive control of the audio using the full range of signal processing units we normally have in a sound system is now stuffed into a few small boxes that house: the CPU (primarily the interface for configuring and operating the processing); the DSP (the engine that performs the processing); and the input/output interface for the audio and control signals.

The MediaMatrix high-end systems are designed to accommodate large installations (including the U.S. Senate sound system) and can have up to 256 inputs and outputs. This review deals with the more affordable Miniframe series of units (Miniframe 108 and 208), which uses a less powerful processor for the user interface (Intel 486DX2-66 based and soon to be a 486DX4-100) and supports a maximum of four BoBs [Peavey-speak for the MM-8840 Break-out-Box] units (a mere 32 inputs and 32 outputs) and one

(108) or two (208) DSP cards.

Each DSP card has four Motorola 56002 digital signal processors and includes a proprietary connection between cards to allow efficient sharing of DSP resources over the internal 256-channel, 24-bit digital audio bus. The Miniframe CPU includes: interfaces for the internal hard drive; standard Windows keyboard and mouse; a video card; and serial and parallel ports and a 3-1/2-inch floppy disk drive behind the lockable front panel, all typical computer ports. There are also four special ports for connection to the external BoB interfaces. Audio and control wiring to the BoB is handled by a series of Phoenix-type removable screw-terminal blocks.

MediaMatrix places entire racks of signal processing in a box of DSP cards, and it also minimizes the wiring and analog/digital/analog conversions that can be one of the weakest links in the signal chain. The computer is an industrial-strength rack-mounted unit (Miniframe 208) that will take up only four of the dozens of rack-spaces of gear it will supplant. The 8-channel interface (MM-8840) will require another two spaces. If you need to handle mic inputs directly (because you're throwing out that outdated mixer), then the A/A-8P eight-channel mic preamp will occupy one more rack space. The Miniframe 208 can handle up to 32 inputs and 32 outputs simply by connecting three more Break-out-Boxes. The BoB is available in three (factory set) sampling rates of 32 kHz, 44.1 kHz, and 48 kHz. All in, the system will fill a small thigh-high equipment rack and be capable of the same processing power as many floor-to-ceiling racks. Wow...

All of this would be academic if the MediaMatrix processing were less capable than its stand-alone counterparts. However, the processing sounds extremely good and the capabilities go beyond any dedicated processor, not simply because any control setting can be stored for instant recall, but because you can configure interaction between processing that simply isn't practical with free-standing processors. The processing is also extremely comprehensive (see sidebar: "All These Fit In One Box") with the only exceptions being effects, such as reverb, flanging, regenerating delays and echoes, etc. Such effects are so

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CIRCLE 35 ON FREE INFO CARD



flavor oriented that it would be foolish to compete with the plethora of dedicated units on the market, however, users could build their own devices with these capabilities. After all, with up to 32 outputs, it shouldn't be too difficult to spare an effects-send output!

Although we have become used to DSP-based devices replacing their analog counterparts, until MediaMatrix there was no simple way to integrate all of the processing into a single comprehensive package. This integration depends on the user interface when configuring the system and when it is in operation. Configuring a MediaMatrix system is so simple that the complexity of the processing can be greatly expanded (if required) as you can wire up a working signal path in minutes. The devices

ALL THESE FIT IN ONE BOX

- Crossovers
- Delay
- Compressor
- Limiter
- Ducker
- AGC Automatic Gain Control
- Gate
- Expander
- Parametric EQ
- Graphic EQ
- High-Shelving Filter
- Low-Shelving Filter
- High-Pass Filter
- Low-Pass Filter
- Band-Pass Filter
- All Pass Filter
- BoB Input
- BoB External Control
- Peak Meter
- RMS Meter
- Pan
- Mixer
- Automatic Mixer
- Routers
- Routers under External Control
- Sine Generator
- White Noise Generator
- Pink Noise Generator
- DC Generator

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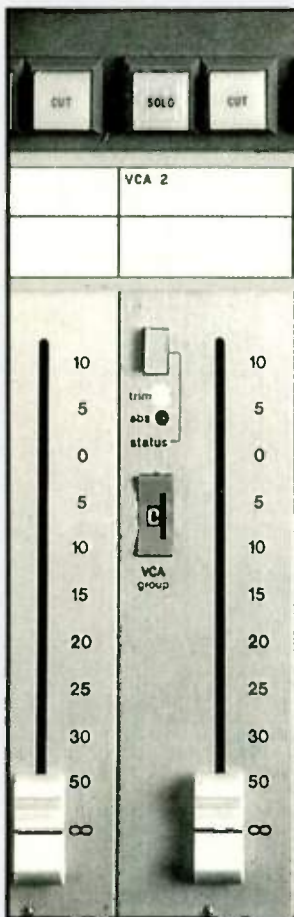
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CIRCLE 32 ON FREE INFO CARD



(such as mixers, compressors, equalizers, etc.) are available from a drop-down menu and are simply laid out on the screen and then the computer mouse simply drags a little patch cord between units to make the signal connections. Once you have everything wired up, you select Compile from the menu, and in a few seconds (minutes in more complex systems) the Miniframe is ready to pass audio. All of the processors include an interface for on-screen or remote control of parameters. The system is so flexible that the same hardware can be used in an indoor sports arena or a church. Loading a preset file can configure the same hardware to be a 32-input automatic mic mixer or eight four-way crossovers or both. *Yikes.*

The software for the Miniframe is specific to the hardware serial numbers and will not run on another system. However, this software can be run on another computer when designing the configuration of the system, stored on a floppy disk, and loaded into the Miniframe when complete. You can even preset levels, equalization, or any other parameter without needing the Miniframe at hand. The software only controls real audio when loaded on the appropriate Miniframe.

With the enormous range of processing devices and connectivity that MediaMatrix offers, the creative designer can build audio processors that have never been heard before. Perhaps you would like the equalization, signal delay, and compression to be different on every input, but would like to control the relative threshold of all the channels from a single rotary control. It can be done, and the control can be a simple 10 kohm pot that is located wherever you find convenient. No MIDI or other control protocols are necessary, because the MediaMatrix uses tried-and-true DC control that is very inexpensive to implement and uses anything from telephone bell wire to mic cables to connect to the Miniframe BoB. Changes in value caused by long cable runs are easily compensated for during setup. Changes between processing con-

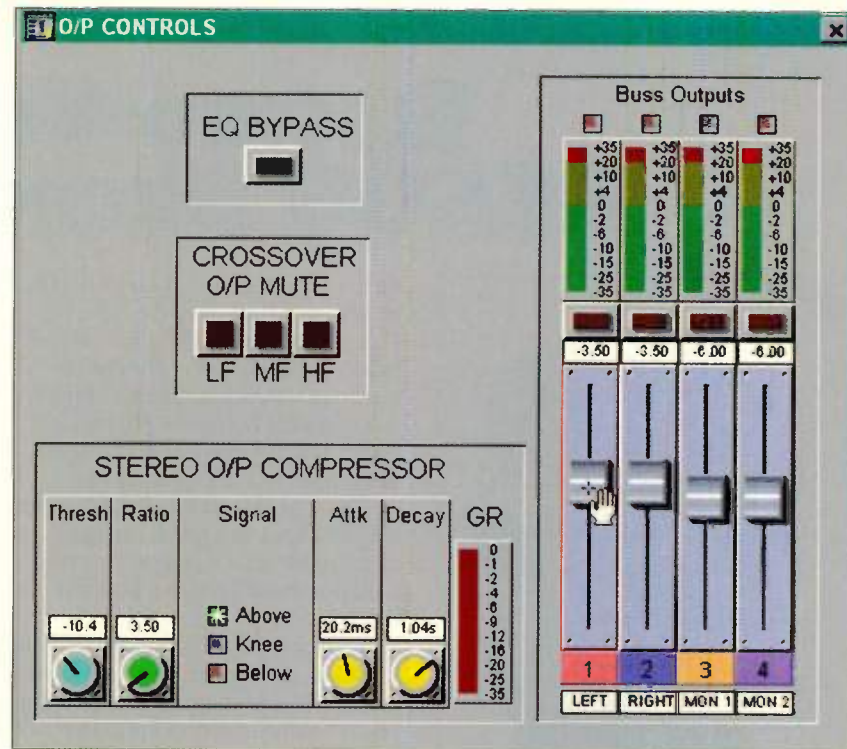


FIGURE 3: A custom user interface can be built simply by copying controls and indicators from each processor. The function of the copied control will be maintained (e.g., the above Master fader #1 will control the output level of Master #1 on the mixer shown in fig. 2). By selecting only the necessary controls, the interface can be simplified even when the overall processing is very complex. This interface was built in just two minutes based on the system in figs. 1 and 2. For those (like me) that dislike controlling knobs with a mouse, a fader can replace the knob or the numeric box (above the knob) can be highlighted and the new value entered directly from a keyboard.

figurations can be selected at the press of a button (wire one to your shirt, if you like) and the audio change-over is seamless. The system uses an optional serial-control software package, called PASHA, to suit complex remote control functions.

Digital signal processing is now the norm for many applications. The last area to be addressed is sound reinforcement, and now that DSP is taking hold in this technologically conservative community, expect to see most common tasks fall to the all-powerful DSP device. Peavey's MediaMatrix is an excellent example of a comprehensive DSP solution for sound reinforcement that includes enough variables to allow creative designers and users to realize new sound system configurations. For imaginative users, DSP now offers uncharted territory in combining signal

processing and control interfaces that can be very personalized, while stretching the reach of the tools. Your mixers/processors — your way.

Peavey MediaMatrix is the best thing that has happened to signal processing in a very long time. The latest addition to the MediaMatrix fold of hardware platforms is the X-Frame, which promises to bring the cost of this versatile system to within reach of even small sound systems. If the inflexibility of your sound system is limiting your abilities, maybe it's time to throw out your old drive rack and get into a Miniframe.

Wade McGregor is a senior consultant for Barron Kennedy Lyzn & Associates, an acoustical consulting firm based in Vancouver, BC. For more info visit their web page at www.bkla.com.

ELECTRO-VOICE RE500 MICROPHONE



The Electro-Voice RE500 is a handheld condenser microphone designed primarily for on-stage vocal use (E-V notes that it can also be used for broadcast and certain recording purposes). Based on the design of E-V's

RE2000, the RE500 uses an externally biased, true condenser transducer. This element is biased by an internal DC-to-DC converter, which helps maintain stability regardless of the voltage delivered by the phantom power supply (a very important consideration for a microphone that would be used with a variety of sound-reinforcement consoles). Shipped with the RE500 is a zippered storage pouch and an E-V 323S mic stand holder.

It's evident at first glance that the RE500 is not another "me-too" microphone. Surrounding the handle of the mic is a rubbery sort of finish that E-V calls Warmgrip™, and indeed, this material does help the mic maintain a warm feeling. But Warmgrip's real purpose is to reduce handling noise, not frostbite. Also intended to reduce handling noise is the internal shock-mount cradle, which supports the element within the mic body. A three-stage wind/pop filter is employed to minimize breath and wind noise. A low-frequency rolloff kicks in at 80 Hz (-12 dB per octave) to minimize rumble-type noises.

We tried the RE500 on a male lead vocal in a live situation where it was connected to a small PA system including a Mackie CR1604, Crown power amp, and JBL MR-Series cabinets. In this application, the RE500 offered a well-balanced sound. Top end was audibly extended and smooth, without the shrillness sometimes heard from some other mics. While the built-in low-fre-

quency rolloff does help reduce handling noise, the console's low-frequency EQ was needed to keep popping "P's" and "B's" from launching woofers.

Once a vocalist gets in close on this mic (within, say, 1.5 inches), there's plenty of bottom — maybe a bit too much for some situations. But this low-frequency characteristic [proximity effect] can make thin male vocals sound a bit fatter (in a flattering sense). Compared to the other mics that were being used in this system (mostly Shure SM58's), the RE500 provided a more articulate sound and required minimal EQ to cut through the mix — granted, the RE500 is considerably more expensive. One minor gripe we have about the RE500 is its XLR connector, which was so secure that we had some difficulty disconnecting cables — particularly those with Neutrik connectors. [E-V's intent was honorable in that they made the XLR connector very secure so there would be little chance of the phantom power popping in and out.]

ROAD TEST

MANUFACTURER: Electro-Voice, 600 Cecil Street, Buchanan, MI 49107. Tel: 616-695-6831.

APPLICATION: Handheld vocal mic for on-stage use.

SUMMARY: A strong performer in an already crowded field.

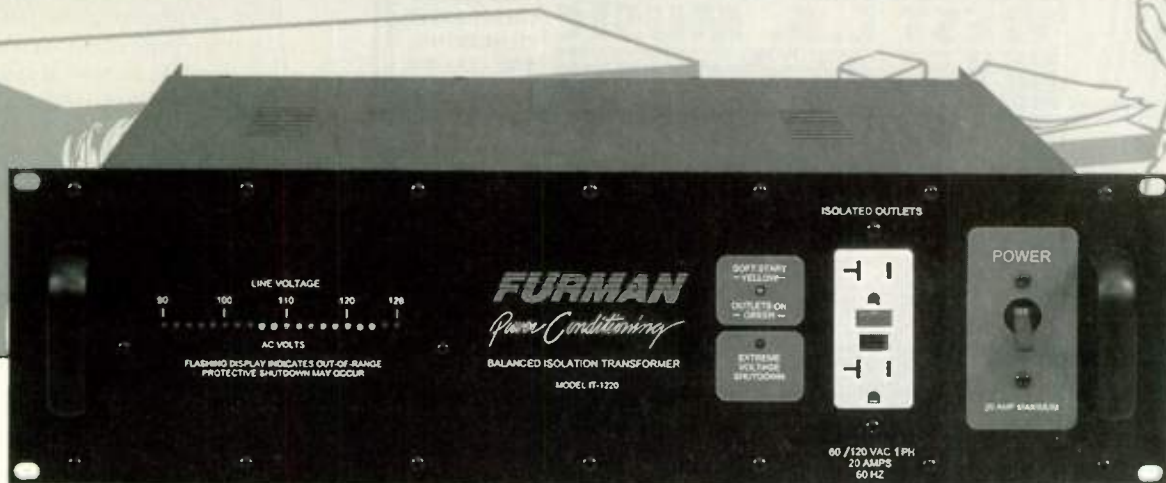
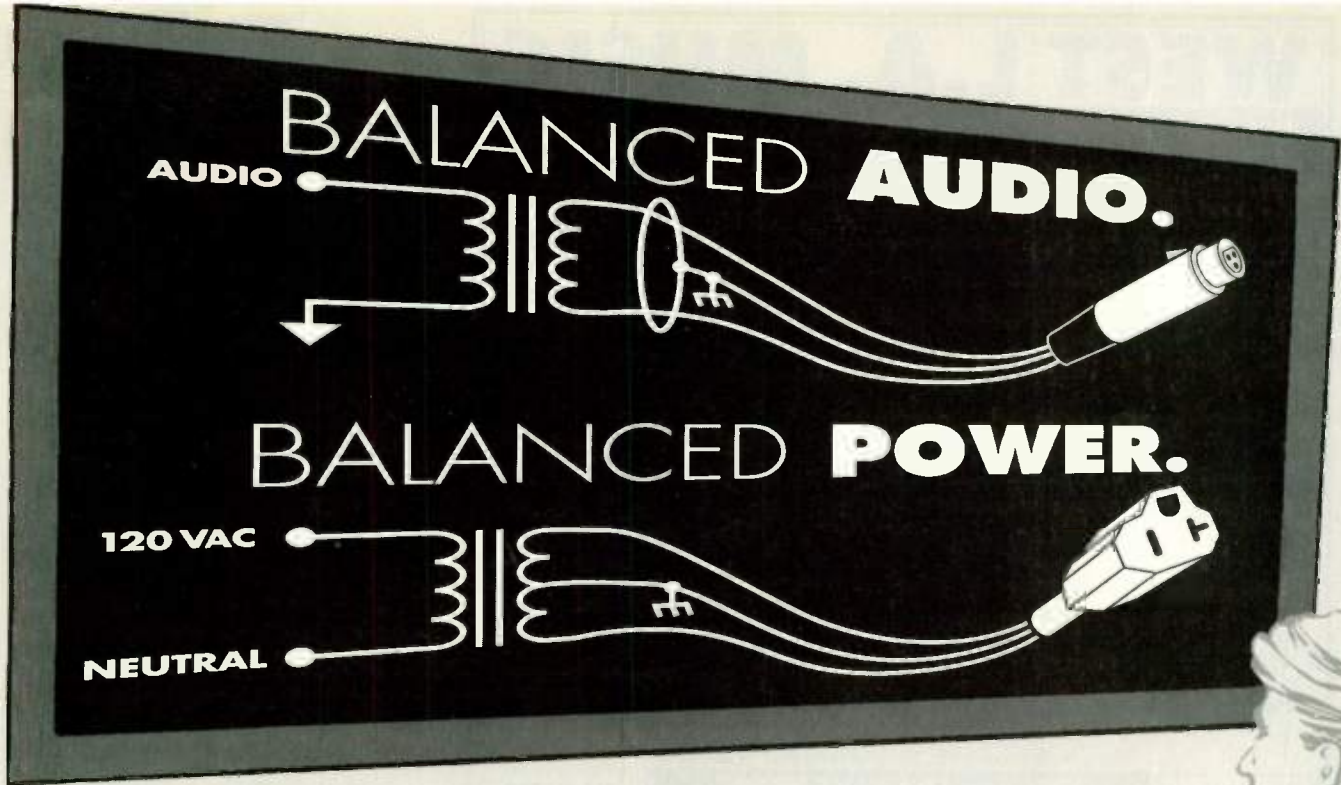
STRENGTHS: Handles high SPL; high output; tightly controlled pickup pattern.

WEAKNESSES: Hot output can overload mic preamps with low headroom; XLR receptacle can be difficult to disconnect from certain mic connectors.

PRICE: \$375

EQ FREE LIT. #: 127

BY STEVE LA CERRA



Balanced Power is ideal for the most critical, ultra-low-noise installations.

In much the same way that balanced audio lines can reduce the pickup of hum and other types of electromagnetic interference, the use of balanced AC power lines in sensitive audio, video, or computer installations can make an enormous difference in residual system noise. The Furman IT-1220 Balanced Power Isolation Transformer can supply your facility with 20 amps of 120/60V single-phase balanced AC power, using the well-known common-mode cancellation effect to drastically reduce hum and buzz caused both by ground currents from power supply filtering and by radiation from AC supply cables. In turn, this can reduce the need to adopt cumbersome and expensive star-ground systems or use massive bus bars or heavy ground rods. There is no need to "lift grounds" or compromise the integrity of safety ground wires to achieve hum reduction. Furthermore, balanced power for technical power applications is now recognized in the US National Electrical Code (Article 530).

The IT-1220's heart is a specially wound and shielded toroidal isolation transformer with a center-tapped secondary, allowing the AC power to be balanced at its source. The current-carrying wires are no longer "hot" and "neutral" (0V), but two 60V lines of opposite polarity (referenced to the safety ground connected to the center tap), whose difference is 120V.

The IT-1220 provides 14 balanced outlets (two front and 12 rear) and includes an accurate, self-checking "smart" AC voltmeter, an Extreme Voltage Shutdown circuit, and a "Soft Start" circuit to prevent large inrush surge currents.

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In an outdoor miking situation (also on male vocal), the RE500's wind filter worked well and gave us a good "signal-to-wind ratio." In this particular system (a concert PA system), the RE500's hot output was a double-edged sword. On the one hand it gave us a great signal-to-noise ratio and required minimal console gain. On the other hand, the mic occasionally overloaded the front end of the mic pre on the house console. Make sure, therefore, that your board can handle this kind of level. In this system we used the console's high-pass filter set to about 150 Hz, which kept the low end from building up.

As you would expect from a mic with a cardioid pickup pattern, rejection at 180 degrees was excellent. But its rejection to monitors placed in the 210- and 150-degree off-axis area was also very good. In fact, we'd say that the cardioid characteristic was quite well-controlled. In a less-polite vocal application, the RE500 easily handled high-SPL screaming without a trace of effort. As result, isolation from the surrounding stage cacophony was very good (we estimate about 30 dB rejection at five feet from the monitor). Handling noise was minimal, but since the Warmgrip is not removable, it was difficult to ascertain how much of an effect it provided.

Minor caveats aside, the RE500 is a strong contender in the handheld vocal mic field. It does cost more than the typical handheld dynamic, but the performance definitely justifies the extra expense.

EQ

MANUFACTURER'S SPECIFICATIONS

Frequency Response:

80-18,000 Hz

Polar Pattern: Cardioid

Output Impedance: 200 ohms

Power Requirements: 12 to 52 volts DC

Current Consumption: 3.5 milliamps

Polarity: Pin 2 hot



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optional. So if you're torn between a new recorder for the field, or a new DAT for the "B" suite, think no more.

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SURPRISE!

CIRCLE 84 ON FREE INFO CARD

Pioneer D-9601 96 kHz DAT Recorder

Double your pleasure
(and sample rate) with
Pioneer's latest DAT
recorder

BY EDDIE CILETTI

or 96 kHz recordings, two D-9601's will make digital copies of standard sample-rate recordings at double speed. In addition, internal shielding is so extensive that there is a remarkable lack of digital noise *and* related artifacts all the way into the noise floor. For this reason alone, I believe the effort required to build a machine capable of doubled sample-rate recording yields better-than-average sonics at the standard sample rates.

Smooth Operator: Built into the transport control logic are momentary pauses that make the machine seem slow to respond. (If this results in less mangled tapes, I'll take it!) Combined with the near silence of the mechanism, one's first impression is that nothing is happening. *Au contraire*, the Table of Contents (TOC) feature stores Start ID locations at the head of the tape. This accelerates search speeds because the internal computer



Since the dawn of digital time, everyone has begged for more bandwidth. Now it's here and affordable. But when HHB first asked me to review the Pioneer 96 kHz DAT deck, I turned them down. Was I crazy? Temporarily, perhaps.

In addition to being a standard DAT machine with professional inputs and outputs, the D-9601 also records at double the standard sample rates. Since Pioneer is the only company to offer 88.2 kHz and 96 kHz sample rates on DAT tape, they are nice enough to do the down-conversion so that, to the outside world, the D-9601 is just another digital source.

Before diving into the listening tests, let me make these points:
Good Value and Sound Quality: Even if you have no intention of making 88.1 kHz

EQ LAB REPORT

MANUFACTURER: Pioneer, distributed in the U.S. by HHB Communications USA, 626 Santa Monica Blvd., Suite 110, Santa Monica, CA 90401. Tel. 310-319-1111. Web: <http://www.hhb.co.uk>

APPLICATION: Stereo DAT recorder.

SUMMARY: A fair price for an unusual DAT machine that, at minimum, delivers some peace of mind for digiphobes.

STRENGTHS: Four sample rates: 44.1, 48, 88.2, and 96 kHz, plus the ability to make double speed copies of standard (44.1/48 kHz) tapes; 60-character Start-ID labels; RS-422 interface; Error Rate Display.

WEAKNESSES: No Shuttle knob.

PRICE: \$1795

EQ FREE LIT. #: 128

knows *where* to expect each ID.

In addition, Start IDs can be labeled with up to 60 characters. A wireless remote was not included with the D-9601, but the identical remote from the Otari DTR-8S (also reviewed in this issue) has an alphanumeric keypad.

There is also a pair of DB-9 connectors that provide an RS-422 interface supporting both Sony 9-pin and Pioneer's "ES" bus protocols. RS-422 is a bidirectional control interface. Sony 9-pin support implies that the unit can be used in conjunction with a similarly equipped video machine or edit controller. ES is Pioneer's way of controlling multiple machines. There are DIP switches on the rear of the machine for setting ID numbers.

I had the good fortune to test the Pioneer D-9601 side-by-side with the Otari DTR-8S (also made by Pioneer). (See my June '97 column for an overview of Original Equipment Manufacturers — OEMs — and high sample rates.)

Using an oscillator and a voltmeter, the record levels of each machine were calibrated to be within .1 dB. Two *mono* test recordings were made, both with an AKG SE300B condenser body with a CK91 cardioid capsule. For each test, two different preamps were used — the Altec 1566 (see *EQ*, January '97) and the Aphex Tubessence.

A passive switch routed the output of either machine to a consumer power amplifier made from discrete transistors. Monitoring was via speakers and Sony V6 headphones. The DTR-8S and the D-9601 had their sample rates set to 48 kHz and 96 kHz, respectively.

The recordings consisted of kalimba, acoustic guitar, and voice. Playback of the two machines was staggered by five seconds so that direct comparisons of identical passages could be made. As you will soon see, it can not be overstated that regardless of one's subjective or projective opinions, real scientific testing requires that all variables be minimized.

Based on observations made during bench testing, I really expected to be clobbered over the head with an obvious-sounding difference. Both recordings sounded good and, at times, maybe a *slight* difference was observed, but "maybe" is both too subjective and unfair to readers and Pioneer.

Recording at the higher sample rates makes an obvious difference on the test bench. For example, a 10 kHz square wave is sampled eight times rather than four, revealing two octaves of harmonics above

the fundamental rather than none. (Pictures are included in my June '97 column.)

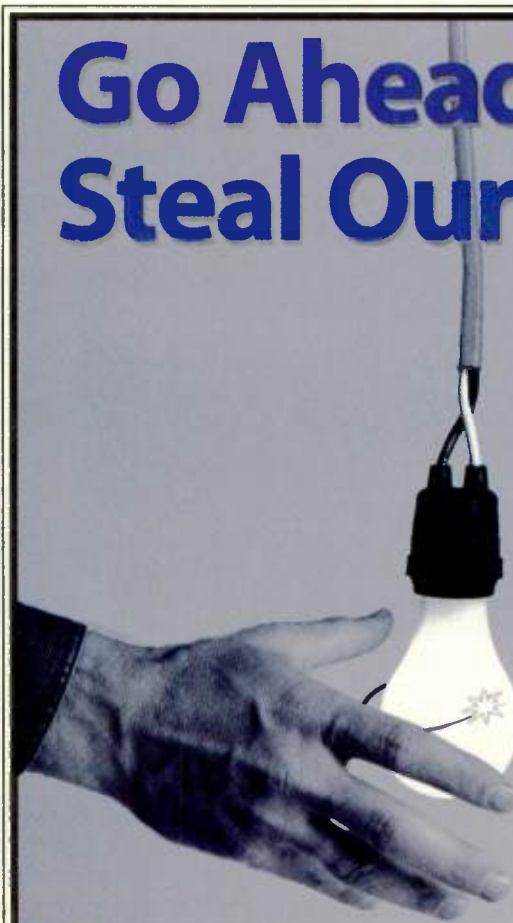
That the two machines sounded the same makes me question the accuracy of statements concerning the "vast" difference some listeners observe between digital audio and *linear* analog. (Linear analog is the undistorted output from preamps and mixers before being committed to any kind of storage.)

It is also possible that neither my ears nor the peripheral gear used for this test are capable of revealing such microscop-

ic sonic details. Any and all manufacturers are invited to provide me (a Gear Slut second only to Roger Nichols) with tools capable of such acoustic finery....

If there is a price to pay for doubling the sample rates, it is that twice as much storage space is required. But there is also a plus, since more tape is used, errors are less likely to be a problem. That, the ability to make double-speed digital copies, and label start IDs makes one's audio life-on-earth a little sweeter. Spread the word on the Pioneer D-9601. **EQ**

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CIRCLE 76 ON FREE INFO CARD

Otari DTR-8S *DAT Recorder*

Innovative features separate this DAT recorder from the pack

BY EDDIE CILETTI

I/O is transformer balanced, while the S/PDIF I/O is not [as per, Otari states, the S/PDIF standard]. (For the record, TASCAM and Panasonic machines have a balanced S/PDIF output and unbalanced input.)

The DTR-8S allows users to monitor the input even when no tape is in the machine by simply pressing the Record button. (Why it took so long for

of Contents" feature that writes a summary of the newly renumbered IDs at the head. A TOC greatly reduces the time it takes to find known Start IDs. Pressing an ID number and Play is all it takes to get there.

REFERENCE (YOURS AND THEIRS)

There is likely to be some confusion concerning the level at which one is



Looking for a DAT deck? There is a considerable amount of competition right now. For example, there are at least three other machines in the same price ballpark as the Otari unit reviewed here. Here's what I learned about the Otari DTR-8S.

FEATURES

The most important feature in a DAT machine is the error rate display. No machine makes this parameter as easy to access as the Otari DTR-8S. Simply press the Error button while in Play mode. This deck also keeps track of total head drum time.

Digital I/O on some machines is a pain in the butt. Fortunately, the DTR-8S simultaneously outputs AES and S/PDIF at all times. A front-panel rotary input switch selects either of these as well as the analog input. For those who need to know, the manual even includes real, down-and-dirty digital interface particulars. The AES

any manufacturer to incorporate this feature is beyond me.) Users can also label each start ID with up to 60 characters via the wireless remote. ID renumbering is augmented by a "Table

supposed to record a reference tone. This really is a subjective decision based on the program material and the amount of dynamic compression being used. On the DTR-8S, 12 dB down

EQ LAB REPORT

MANUFACTURER: Otari, 378 Vintage Park Drive, Foster City, CA 94404. Tel. 415-341-5900. Web: <http://www.otari.com>

APPLICATION: Stereo DAT recorder with 48 kHz, 44.1 kHz, and 32 kHz (long play) sample rates.

SUMMARY: Extremely quiet mechanism with pro I/O.

STRENGTHS: Finally, a DAT recorder with an "Input Monitor" feature. Plus, "Character Pack" (up to 60 characters can be written at each start ID), TOC speeds up ID searches and no SCMS!

WEAKNESSES: How 'bout a 96 kHz version?

PRICE: \$1395

EQ FREE LIT. #: 129

from full scale (fs) produces +4 dBu (balanced) at the output connectors. (Other manufacturers have chosen -18 dBfs or -14 dBfs.) There is a rear-panel select switch for +4/-10 operation. There are no RCA connectors — only XLR connectors, with the exception of the S/PDIF ports — but the concept of balanced inputs at “minus ten” appeals to me.

THE MECHANICAL CHOICE

Every time an ID is searched, all machines overshoot slightly and enter Reverse Play mode to find the precise location. This is hard on the tape, especially if the mechanism is sloppy and/or imprecise. Of the options in this price range, I prefer the Otari/Pioneer transport to the Alps transport used in other machines because Alps, for some reason, eliminates the adjustment of a mechanically critical guide. Otari/Pioneer provide the guide and in their service manual show technicians how to get the adjustment right.

SHUTTLE: THEN AND NOW

Not so long ago, completed reviews — hard-copy or a floppy disk — were snail-mailed to the magazine's editor. For the past several years, e-mail and faxes have made the reviewer's life curds-and-whey easier. For example, under “Weaknesses,” I had originally listed “No Shuttle knob.” But as I “abused” the DTR-8S on a daily basis, I discovered that pressing Fast-Forward or Rewind during Play yielded different speeds depending on whether either button is held or only momentarily pressed.

Then I get this fax from Otari via my editor:

“...One thing that has been left out of the Otari DTR-8S operator's manual is that the machine has all the same functionality — and then some — of the Panasonic 3700 class DATs (which, it's true, set the standard for the product class with the knob), but uses a different method for the user to do jog and shuttle.

The system offers 3X and 5X shuttle in both directions as well as half-speed jog mode. Here's how it works....”

I've tried it; it works. It's just a different technique. This is what you do:

3X forward or reverse play: Press and *release* FFWD or RWD during Play.

5X forward or reverse play: Press and *hold* FFWD or RWD during Play.

1/2x forward or reverse play: Press and *hold* FFWD or RWD during Pause.

SOUND

I received a surprise when I compared the Otari DTR-8S to the Pioneer D-9601 DAT. The Otari is made by Pioneer and the Pioneer D-9601 records at double the standard sample rates (88.2 kHz and 96 kHz). I expected the two machines to reveal the mysteries of digital audio to me. What they did instead is sound so similar as to be too close to call. This

means either that they both sound really good or that I can't hear the improvement that 96 kHz should bring. Even the noise floor was identical and remarkable. I also liked what I *didn't* hear from the Otari DTR-8S — it's both mechanically and electronically quiet. This is a DAT recorder that, compared to its competition, hasn't received much promotion and attention. Nonetheless, its features prove that anyone looking for a DAT machine will be very happy if they find the Otari DTR-8S. **EQ**

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CIRCLE 19 ON FREE INFO CARD

Red Roaster CD-Burner

Turn your PC into a CD duplication house (sort of) with Red Roaster's easy-to-use system

BY CRAIG ANDERTON

Making your own CDs is great, whether you use them as one-offs for clients or as references for listening to mixes over various systems. The recent price reductions for CD-Rs make them attractive for the project studio, but you need the right control software — something that can line up your tunes in the right order, insert index and subindex markers, and allow for tricks like crossfading and level changes.

The Red Roaster 16-bit package (RR for short) consists of Samplitude CD (S-CD) for assembling your mas-

EQ LAB REPORT

MANUFACTURER: Hohner MIDIA, Box 5497, Santa Rosa, CA 95402. Tel. 707-578-2023.

APPLICATION: Create one-off Red Book CDs.

SUMMARY: Flexible and tolerant, this program makes creating CDs a breeze.

STRENGTHS: With sufficient system memory, works with most hard drives; quick assembly and editing; useful, if basic, DSP; records as well as imports; easy crossfading.

WEAKNESSES: Confusing manual makes the program seem more complex than it is; limited editing options for hard-disk projects.

SYSTEM REQUIREMENTS: 486/66 or higher processor, Windows 3.1/95, 8 MB RAM/16 MB with Windows 95, SCSI controller, CD-R that supports Disc-At-Once mode (see sidebar).

PRICE: \$695 **EQ FREE LIT. #:** 130

terpiece and PoINT CD for the actual CD-R control (a higher-level version, Red Roaster 24-bit, is also available; see sidebar). Burning CDs pushes a computer system to the limit, and requires stellar hard drive and bus

throughput — anything less will cause errors, trashing your CD-R media. Because of computer issues (not problems with RR), getting the system up and running was a frustrating and tedious experience. But once it was working, it worked fabulously.

GETTING STARTED

S-CD is a variation of the Samplitude hard-disk recording program, previ-

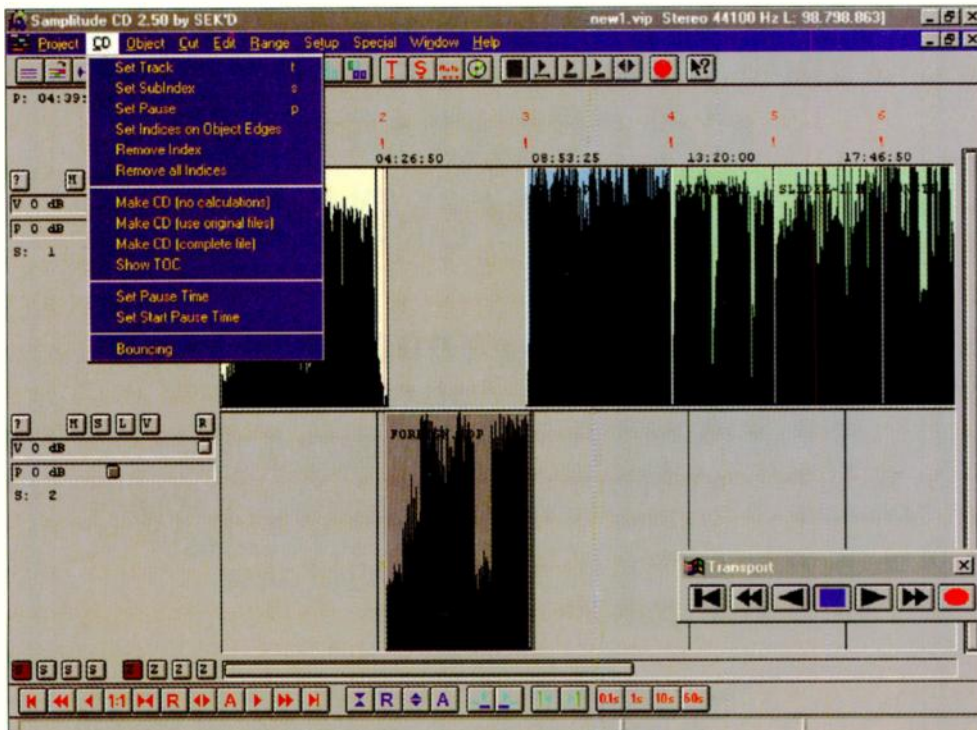


FIGURE 1: (Top) An assembled VIP project in the main Samplitude window, with the CD menu pulled down.

RED ROASTER 24-BIT

This package (\$995) is based around Samplitude Master, a true 32-bit application that runs only under Windows 95 and NT. It combines mastering with CD assembly and burning. Storing data in a 32-bit floating-point format doubles storage requirements (20 MB/minute of stereo) but provides a huge dynamic range, no internal distortion, and 24-bit precision, allowing future use with 24-bit converters. The signal processing is also impressive: there's declipping (which actually "undistorts" signals by interpolating valid data), parametric equalization, dynamics processing (compressor, limiter, expander, gate), and noise reduction.

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CIRCLE 47 ON FREE INFO CARD

WEB

ously reviewed in *EQ*. Each of S-CD's two tracks accepts stereo WAV files (called HDPs, for hard disk projects), which you either record into a track or import.

Once imported, these turn into "VIPs," or virtual projects (fig. 1). In more standard terminology, this is a "playlist" that determines the order of the various files, and provides basic, non-destructive editing options.

If you just import WAV files, you can set the CD index markers (or have S-CD do it automatically) and burn away. This requires only enough hard disk space to hold the files themselves. However, to do crossfade files on different tracks and other fancy tricks, you may need to turn the playlist into a complete, new file before indexing. This doubles the amount of storage space compared to simply importing WAV files, but has the advantage of being easy to back up as a single entity.

If there's not enough space to write a complete version of the processed file, there's still hope: bounce only the modified areas within the VIP to another track, thus saving just the changes to hard disk. This avoids creating a whole new file.

When you bring in a new file, it snaps to the end of the old one, adding the industry-standard 2-second pause. Files can snap to a grid or be placed freely. You can even bring over a long WAV file and drop in markers anywhere you want; you're not limited to transferring songs one at a time from something like DAT.

Navigation is simple, with the usual transport buttons, zoom in/zoom out, various keyboard shortcuts, and a "range manager" for defining several recallable ranges — great for going from a tight zoom in on a particular crossfade to a zoomed-out overview. A timeline tracks overall position in samples, milliseconds, SMPTE frames (24/25/30), bar/beats, or CD MSF (75 parts per second). You can also color files to differentiate them — nice.

The main editing options are mute, fade in/out with customizable curves, crossfade, normalize, create level envelopes ("rubber band" type or free-hand), draw waveform, and resample to 44.1 kHz. As long as you're working in the VIP mode, editing is nondestructive; however, editing an HDP alters it permanently — there's no undo.

Setting up index and subindex markers for the CD is easy; they can in-

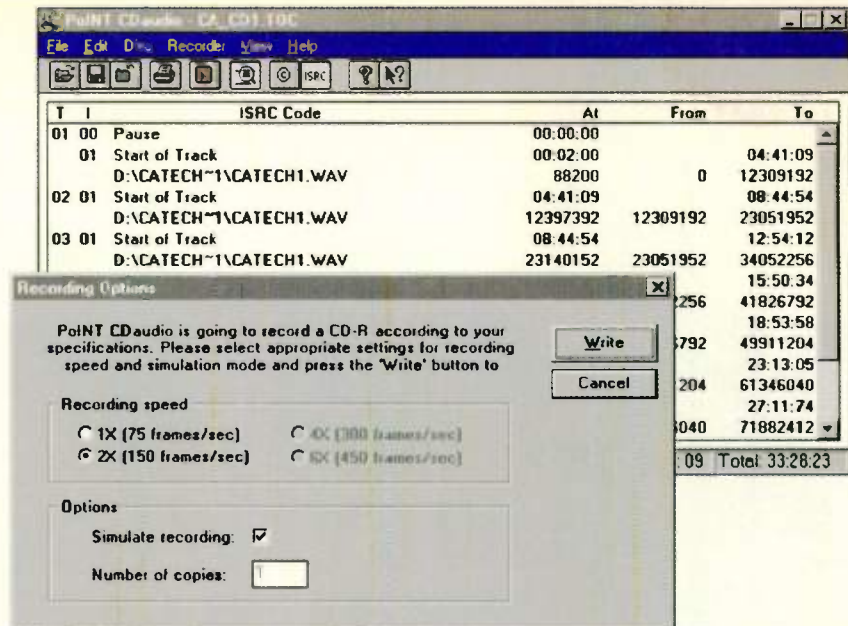


FIGURE 2: PoINT CD, with the TOC in the background and Recording Options dialog box up front.

sert manually or automatically, and when you change order or delete/add markers, the others renumber themselves.

After creating the TOC (table of contents file), you close S-CD and open up

PoINT CD. This simple program fixes any TOC errors (e.g., trying to start a CD at zero time instead of starting with a 2-second pause), lets you print out the TOC (useful for sending to mastering

continued on page 168

BURNED OUT ON BURNING

It took months before I finally got the entire system to work. The problem was not in the software, but getting the computer to play ball with the rest of the system.

Short files worked fine, but burning anything longer than about 15 minutes gave a write error. To see if it was RR or not, I tried backing up data to the CD-R using Adaptec's CD writing program. Each time, the test procedure (which didn't actually write to disk) said everything was great, but would always fail during the real writing process. Obviously, the problem was not RR, but everything seemed okay: AV drive, Pentium machine, 32 MB of RAM, etc.

To make a long story short, after asking for advice, trying different software and disk drives, and altering weirdass system parameter settings, I hit upon the right combination of system parameters and boosted the RR buffers to 10 MB of RAM so the system could cover a 30-second interruption in data from the hard drive (there's a description of how to change buffer size in the PoINT CD "Read Me" file). The system has worked flawlessly ever since.

SUPPORTED CD-R DRIVES

Grundig CDR100IPW; HighTech CD-R1002; HP 4020I/C4324/C4325/CD-Writer/6020i/SureStore; JVC XR-W1001 (not DAO)/2001 (firmware revision 2.xx for DAO)/2010/2020/2022; Kodak PCD200 (not DAO)/225 (firmware revision 1.07 or higher for DAO); Matsushita CW-7501; MBi Playwrite 2000/2040/4000; Olympus CDS615E; Optima CD-R650; Panasonic CW-7501; Philips CDD521 (not DAO)/522 (firmware revision 1.07 or higher for DAO)/2000/2600; Pinnacle RCD-1000 (firmware revision 2.xx for DAO)/5040/RCD-4X4; Plasmon RF4000 (not DAO)/4100 (not DAO)/102 (not DAO)/220/CDR4220/4240/4400; Ricoh MP6200/RO-1420; SAF CD-R2004/2006 (not DAO)/4006; Sony CDU920/921/924/926 (not DAO); TEAC CD-R50; Yamaha CDR100 (firmware revision 1.04 or higher for DAO)/100-II/102/400 (firmware revision 1.0b or higher for multiple devices on SCSI chain).

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CIRCLE 28 ON FREE INFO CARD

Westlake Audio *Lc8.1 Speakers*

Westlake introduces new nearfields that fall within the budgets of many project studios

BY STEVE LA CERRA

Westlake Audio is a name that has traditionally been associated with high-end and custom-installed studio monitors, usually at prices for studios with hefty bank accounts. For those of more modest means, there now is the Lc8.1, which retails for \$1299 per pair (and also its little bro', the Lc6.75, which retails for \$999 per pair). At 18 inches high, the Lc8.1 is a console-top, close-field monitor that stands a little taller (and heavier) than most monitors with a similar driver complement; an 8-inch polypropylene woofer handles the low end while a 1-inch dome tweeter puts out the highs. Available in a painted black cabinet, the front panel of the Lc8.1 is staggered to time-align the acoustic center of the tweeter with that of the woofer. Westlake suggests using the speakers placed vertically, although they can be placed on their sides (with some reduction in output at the crossover frequency when listening off-axis).

A very useful instruction manual, which offers tips on placement, amplifier selection, cable selection, and dampening materials, as well as room treatment and reduction of ambient

noise in the listening environment, accompanies the Lc8.1. Input to the Lc8.1 is on the rear panel via gold-plated, five-way binding posts. Removable grilles accompany the 8.1's and (as suggested by Westlake) we listened with the grilles removed.

We set up the Westlake Lc8.1's in our studio and connected them to a Bryston 3B power amplifier using Westlake's W1 7-gauge speaker cable. The speakers were set upon the console top about 5 feet apart and turned slightly inwards to create the usual equilateral-triangle-type arrangement. Since these monitors are taller than typical console-top monitors, you might have to elevate your listening

position by a few inches to stay precisely on-axis. As recommended in the manual, the speakers were toed in by 45 degrees.

Our initial session with the Lc8.1's



MANUFACTURER'S SPECIFICATIONS

- Frequency Response:** 55 to 18,000 Hz
- Impedance:** 7 ohms nominal, 5 ohms min., 25 ohms max.
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involved recording bass-synth tracks. One of the first things we noticed was the 8.1's low-frequency proficiency: as we were listening to them from behind the console, a low-end synth blast played through and we felt a puff of cool air in the face. This was not our HVAC system — it was the Lc8.1's ports working hard to translate the lower regions of that synth sound. Of course, once we discovered this, we cranked up the volume to see just how much bottom (and air) we could get out of the cabinet. While it won't shake the rafters, it did rattle some loose items placed nearby and created minor turbulence.

The Westlakes put out about as much bottom as you could reasonably expect to get from a cabinet this size (maybe even a bit more than you might expect). Kick drums were powerful and tight with great chest factor and plenty of impact, but still gave the feeling that the low-frequency response was under control.

Fortunately, this bottom end is complemented by a smooth, accurate high-frequency response. Cymbals and percussion instruments never sizzled, and when miking such instruments with omnidirectional mics, room tone was clearly audible. The Lc8.1's possess a good amount of what I call "the ruthlessness factor" — the ability to be uncolored enough to let you know what's really going to tape — without being fatiguing. Vocals were a touch accentuated in the lower midrange (which may be more a characteristic of the room), but overall, sounded natural.

When it came time to mix, we found that we could turn the volume down and mix in the 70 to 80 dB SPL range without feeling like we were missing anything. Our mixes translated well on other systems, without any surprises, and the sweet spot was plenty wide to move around in while listening. If you're in the market for a pair of \$1300 speakers, check out the Westlake Lc8.1's. If you're not, check them out anyway.

PRICE: \$1299
MANUFACTURER: Westlake Audio Manufacturing Group, 2696 Lavery Court, Unit 18, Newbury Park, CA 91320. Tel. 805-499-3686. Web: www.westlakeaudio.com. Circle EQ free lit. #131.

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Ambiance Acoustics *California Cube*

A hi-fi fave enters the world of professional monitoring

BY STEVE LA CERRA

inating a traditional internal (passive) crossover. Our California Cubes came finished in a slick-looking granite mica covering, but Cubes can also be ordered with a variety of veneer or laminated finishes.

Installing the California Cubes requires placing the EQC-1 inline with a console's monitor outputs. Monitor out from our console was connected to "line

other equipment. Our audition confirmed this: put the EQC-1 too close to another studio unit with a rude transformer and you'll have an increase in noise. Inserting the EQC-1 into the monitor chain raised the noise floor ever-so-slightly. (Towards the end of our review, Ambiance Acoustics sent us a revised version of the EQC-1 that provided a subtle change in



Ambiance Acoustics is a new name to many studio mavens. The subject of this audition, the California Cube, is their first monitor intended for studio use (though the company has already established itself in hi-fi circles). The California Cube defies conventional studio-monitor design in several manners, probably the most obvious being that all of the drivers are identical (there are no "woofers" and "tweeters") and that the enclosure is actually cube-shaped. All four of the drivers used in the California Cube are 4.5-inch full-range with treated paper cones and rubber surrounds. Designer Robert Salvi used one type of driver to minimize phase shift due to driver time-misalignment.

Provided with the loudspeakers is an active equalization box, the EQC-1, which allowed Salvi to lower distortion by elim-

inating a traditional internal (passive) crossover. Our California Cubes came finished in a slick-looking granite mica covering, but Cubes can also be ordered with a variety of veneer or laminated finishes. Installing the California Cubes requires placing the EQC-1 inline with a console's monitor outputs. Monitor out from our console was connected to "line

input" on the EQC-1, and the EQC-1's line out was connected to the power amp input. The EQC-1's front panel has several buttons, including, bypass, a subsonic filter (18 dB per octave slope at 53 Hz), and a tape monitor loop (the latter a remnant from the system's hi-fi heritage, no doubt). Parts and construction of the EQC-1 were first-rate (toroidal transformer, 1 percent metal film resistors, premium ICs), but the input connectors were of the gold-plated RCA variety, and we are inherently suspicious of such connectors. Perhaps Ambiance Acoustics should give us balanced 1/4-inch I/O connectors. Literature accompanying this system cautions against use of the EQC-1 with other loudspeakers, and suggests locating the processor at least 12 inches away from any

MANUFACTURER'S SPECIFICATIONS

Frequency Response: 42 Hz to 15.5 kHz, ± 3 dB

Sensitivity: 91 dB/1 watt @ one meter

Nominal Impedance: 8 ohms

Suggested Amplifier Power: 10 to 250 watts per channel

Dimensions: 13 5/8 inches cubed

Weight: 27 pounds

the high-frequency response and the noise floor — this updated version seemed to be a bit smoother in the high frequencies and a touch more quiet.)

Connection to the speakers is via gold-plated, five-way binding posts. Cabinet construction was clean and tight, with

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the four drivers flush-mounted on the baffle with a removable grille, which we removed for listening tests.

We used the California Cubes in a variety of mixing and tracking situations. The Cubes easily handled a wide variety of sound sources, including kick drums played way too loud and overzealous bass synths, and there's no question that these speakers are ballsy. Frequency response of the Cubes was extended at both ends, and they easily played loud and clean enough for our uncommon sense. At the other end of the extreme, these speakers were adept at reproducing more subtle sounds from percussion instruments such as shakers and triangle.

When it came to mixing, we discovered what we felt was the California Cube's main weakness: the sweet spot is very narrow. If you are listening off-axis, you could easily misjudge hi-hat and cymbal levels by several dB. Ambiance Acoustics' literature says you should be directly on-axis to the center of the front baffle — and they mean it. This may or may not be a problem depending on your studio application and habits. Rooms where three or four people need to simultaneously be in the sweet spot will find a problem with the California Cube's dispersion, but where only one or maybe two people need to hear the mix on-axis (as is the case in most project rooms), they can squeeze into the window.

If you tend to move around the control room a lot while working, this is an important consideration. Move your head around while mixing on the California Cubes, and you'll notice this immediately. You can hear when you have arrived into "The Spot" — all of a sudden, the top end will dramatically open up. Of course, this factor can also be a strength in certain control rooms, particularly those where acoustic planning was nil — the directionality of the California Cube can help reduce the adverse effects of an acoustically untuned room.

California Cubes aren't the answer to every listening situation, but in smaller rooms where controlled dispersion, wide dynamic range, and a full frequency response range is desired, the California Cubes are worth an audition.

PRICE: \$1995

MANUFACTURER: Ambiance Acoustics, P.O. Box 27115, San Diego, CA 92198. Tel: 619-485-7514 (phone and fax) or 888-CAL-CUBE. Web: www.calcube.com. Circle EQ free lit. #132.



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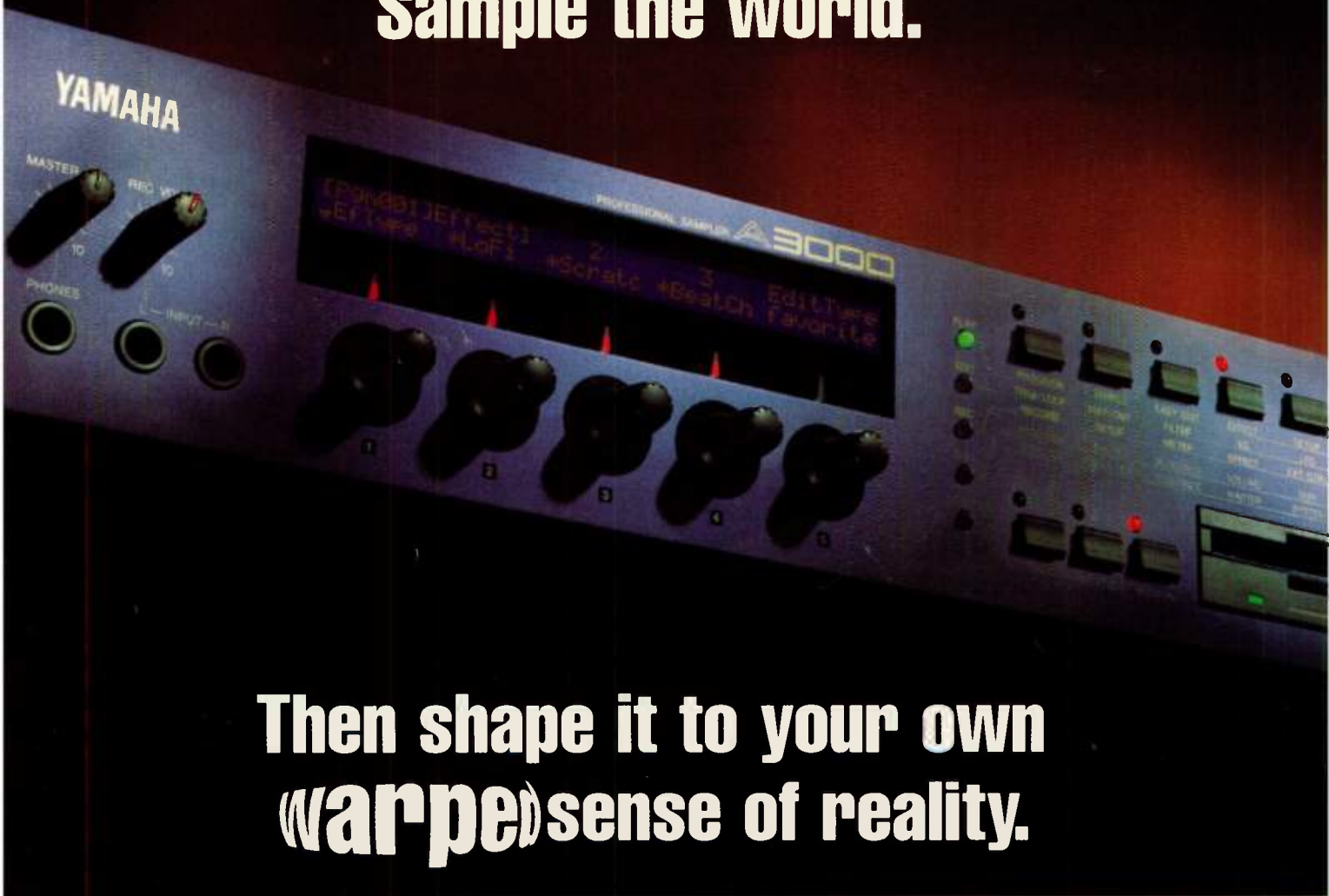
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WRB

BPM CR-95/TB-95 *Microphones*

EQ examines two new condenser mics imported from Germany

BY STEVE LA CERRA

BPM Studio Technik is a German microphone manufacturer relatively new to the United States. The company's focus is on studio condenser mics and two of these — the CR-95 and the TB-95 — use the same capsule with either a tube amp (TB-95) or a solid-state amp (CR-95). Both models have switchable polar patterns (cardioid, omnidirectional, or figure-eight) and a three-way pad/rolloff with positions for flat response, -10 dB pad, and low-frequency rolloff (6 dB/octave @ 150 Hz). Well-padded aluminum cases come with the mics to store the mic and included accessories: a shock mount, cable and power supply for the TB-95 and shock mount, cable and wind screen for the CR-95.

The supplied shock mount, which is the same for both models, is quite solid and versatile. It uses a very simple clamping method whereby you pinch a large clip and a padded clamp opens to accept the mic. This made rotating the mic very easy when placing it in different positions (like in a kick drum). Internal inspection of the TB-95's power supply showed that all components were well-secured (the unit passes Europe's strict CE code). [This power supply, incidentally, also works with older Neumann mics.] The supply's indicator lamp, which is built into the On/Off switch, though, was intermittent, and the box could perhaps have been more solidly built.

When we first powered up the TB-95, we heard a low-level crackle-type sound that disappeared and never returned once the mic warmed up. (It has been our experience that moisture in the capsule of a tube mic due to ambient humidity may cause this effect.)

In our first BPM session we used the TB-95 on drums for a room sound and were able to get a nice retro-drum



sound was lean and tight with an open top and just the right amount of percussiveness. This was true both in cardioid and in omni; the omni pattern offering a bit more way up in the high frequencies (and, of course, the room tone). On the same instrument, the TB-95 was a bit forward in the lower mid/upper bass area — about what I would have anticipated from a tube mic. (As can be expected from all tube mics, it was also a taste noisier than its solid-state brother. But that's generally the trade-off when working tube vs. solid state.)

Interestingly, on male lead



sound, but the mic (though set to "flat") was a bit thin in the bottom octave. Cymbals sounded good, but overall the kit sounded too polite. Then we tried the TB-95 over the rack toms where it sounded really good — a nice balance between the attack and the roundness of the toms. At the same time, we put the CR-95 on the kick drum, inside the front head. With the -10 dB pad on, the CR-95 took all the SPL from the kick we could dish out.

On our next session, we used these mics both in the cardioid and omnidirectional patterns for acoustic guitar and vocal. The CR-95 provided a great sense of intimacy on acoustic guitar. The

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vocal, this situation was reversed. Much to our surprise, the CR-95 was more flatter and brought out the chest factor in the male vocal. Occasionally the CR-95 was a bit sibilant, and, in cardioid, proximity effect for both mics was about typical for large-diaphragm condenser mics.

Unlike some mics, both '95's maintained a uniform high-frequency response at the front and rear when set to the figure-eight pattern. Thus making them especially suitable for miking a pair of background vocalists facing each other with the mic in between. We thought we might have heard a bit more proximity effect at the rear, but it was at most very subtle.

While recording electric guitar, we used the TB-95 set to omni, placed about 1.5 feet from the front of an open-back 2 x 12 amplifier. Here, the TB-95 rounded out the lower mids a touch, but generally was neutral while providing a nice sense of ambience. This was also true of the CR-95, which sounded similar, but had a flatter lower midrange.

Finally, we used the two mics on an assortment of percussion toys. Using the CR-95 on tambourine definitely retained the transients of the instrument. On wind chimes, both mics sounded equally transparent. For triangle, the TB-95 offered a slightly softened attack that took some of the harshness out of that sound.

An interesting thing happened when we miked a cabasa: with both mics placed head to head (one upside down) facing the instrument, we switched back and forth from the TB-95 to the CR-95 and noticed a minuscule change in pitch — the CR-95 having a slightly higher pitch. Tone of the cabasa was accurate without the heaviness that some mics can impart to this instrument.

With the TB-95 and CR-95, BPM Studio Technik has come up with two good-sounding microphones in a fiercely competitive field. The only way to determine if these German-built microphones are right for your recording situations is to make a point to go and listen to them.

MANUFACTURER: BPM Studio Technik, 7091 N.W. 51st Street, Miami, FL 33166. Tel. 305-5311-BPM. E-mail: bpmusa@south-fla.net. **PRICE:** CR-95, \$1199.95; TB-95, \$1849.99. Circle EQ free lit. #133.

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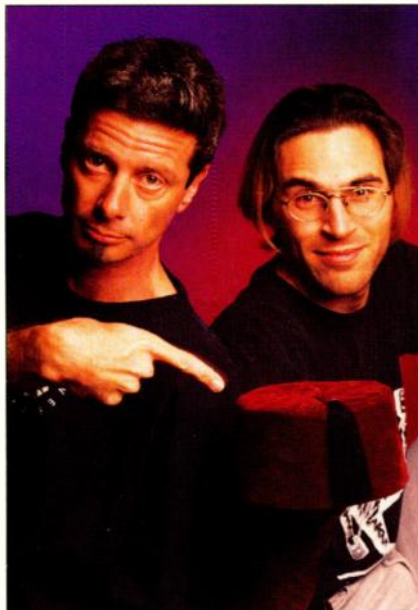


PHOTO BY STEVE JENNINGS

Going live from your computer to the world

BY JON LUINI & ALLEN WHITMAN

Let's take a moment to talk real-world fun. If you have a modem and a computer, then you have access to a global audience. Whether you are opening for God at the Grand Canyon at dawn or jamming with your younger brother in your room, your performance can be sent to that portion of the human race that is connected to the Internet. For our experiment we opted for something approaching the latter example.

We sent out mono audio only (no video) onto the Web and monitored feedback through a real-time chat system — we used one called Internet Citizens Band (ICB). The FezGuys made musical fools out of themselves and their long-suffering friends by jamming for two hours. Live, on the Internet. Here's how you can do it, too (send live, streaming, audio onto the Net, that is). The creative part is up to you.

First, here's a quick rundown of the equipment and software we used for our live broadcast. You may find it useful to refer back to this information as you read on. We had a variety of instrument inputs (guitar, bass, electronic drumkit, miked saxophone) into our Mackie mixing board (you

can use a direct input as well). An output from our mixing board went into a Pentium computer running Win95 with the RealAudio live-encoding software. We used this computer to send a live 28.8 kbps RealAudio 3.0 stream over our PPP dialup connection. At the other end was the MediaCast RealAudio server located offsite on gobs of Internet connectivity (bandwidth).

The server software you'll use probably sits on a server computer. Think of the server as a distribution hub, and your desktop as one of the spokes on that hub. Your desktop computer will be sending out a signal to the server (as the hub), which will then stream out your signal to any computer that connects and requests it. You must gain access to the server software (or find someone who already has it and beg, borrow, or steal from them) and cause your audio signal to get from your computer to the server (see sidebar on "Getting Access to a Streaming Audio Server").

OK, so now you have a RealAudio server to distribute your performance. Next, let's make sure you've got the computer and software to encode that performance and send it to the server for redistribution. You'll need a computer with a sound card (we've found that RealAudio works best on a Pentium running Windows 95/NT) and the live encoder software (which comes as part of the RealAudio server software). As always, the more RAM you can get your hands on the happier your computer will be. Try to have at least 32MB. Your modem should be a 28.8 minimum.

Still with us? Remind yourself this is the new era of the broadcast medium. Take a coffee or smoke break if you need one. Remember, this may be the first time you've tried using this crazy new technology — the more often you do it, the easier it becomes.

Ready? OK, identify your audio source and plug it into your encoding computer's sound input. Whether you are using one mic into a preamp or a stereo feed from your mixing board, that signal gets tossed directly into your sound card where it is converted into a digital file by your software application.

On your desktop you will start your live encoding app and name your file. The FezGuys suggest: <yourname.ra>. Please refer to the February '97 FezGuys column about naming audio files. This file name is what to tell your potential audience so that they can find your performance. It makes sense to place this file on your home page. It also makes sense to save a copy of your performance. If possible, configure the server to save a copy as it streams out the audio in real time. That way you can edit the more embarrassing moments and archive them on your site. Consult the documentation that comes with your RealAudio server software. You must also tell your encoder the address of your server. You will already know this so it will be a snap. Now your computer can find the server and send your signal there.

Of course, you still have to tell everyone about it. In this case we sent out messages to users in the various ICB

THINGS THAT ARE COOL AND NEW

Cool: Mt. Everest Expedition. Both Xing Technologies and Progressive Networks were involved with daily and live broadcasts of the first Malaysian climb to the summit of Mt. Everest.

- Live Xing Broadcast Info:

<http://www.internetnetwork.com/geonav/geonav.htm>

- Daily RealAudio reports:

<http://www.everest.mountainzone.com/dispatches.stm>

New: MPEG Encoder. Boasting the fastest software MPEG encoder out there, Xing has released a revised version of its popular MPEG encoder. A demo version is available for 30 days to encode only up to 30 seconds, with a full version purchasable online at \$89. <http://www.xingtech.com/>

By the Way: Another free version of Progressive Networks RealPlayer (beta) is out. <http://www.real.com/products/player/>



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chat groups and a couple of them designed to listen in. The comments they sent us on the mix were useful to us in cleaning and balancing the signal. "Turn up the saxophone," one wrote. Another requested a musical style we hadn't heard called "Art-Deco." The amusing results can be heard (in an abridged form) along with this column at <http://www.fezguys.com/>. It's important when jamming to switch instruments often. It won't help the listeners, but it'll keep the performers fresh!

Naturally, if we were providing a live stereo and video stream of a U2 concert over T3 lines to an expectant audience that had been bombarded by advertising and promotion for weeks, we would have potentially had an audience in the tens of thousands. We had two or three people listening in to our live Webcast in glorious mono audio. You gotta start somewhere. Forty years ago the first space exploration

was a tiny ball of metal. Now, who knows what's going on up there?

NINE-UP: A CASE STUDY

So you've seen how the FezGuys applied a little of this new technology to send out a live audio feed of an unrehearsed jam to a small group of friends. No doubt you've also heard a bit in the news about those online super-concerts with big-name bands. Feel like something is missing? Enter Nine-Up, filling the middle ground of live music Webcasts.

In a rehearsal studio in south San Francisco, a couple of guys in a band have chipped in to get an ISDN line installed in their rented room. Pulling from their own Internet-industry jobs, and a relationship with MediaCast and ISP Networks, they produce the biweekly spectacle known as "Nine-Up." Every other Saturday from about 4 PM to 8 PM (Pacific), the rehearsal space is opened up to local Bay Area mu-

sicians who have been invited in to play live on the Net, giving the world a glimpse at the rising underground music scene in the area.

Each event includes a live audio and video Netcast of the 2-3 bands scheduled to perform live for that afternoon, plus band interviews after each set. The performances are typically pretty raw, but that's what the Nine-Up folks are looking for. "There's something about playing in a rehearsal studio that captures an intimacy and goes beyond the normal venue. We find that people play a lot better in a rehearsal studio. It's a completely different feel — more comfortable," says Ben Montesano, one of the masterminds behind Nine-Up.

The video is jerky, but that's OK for now. Things don't always run strictly on schedule. The fact is they're doing it. This is how it starts. For information on upcoming bands, an archive of past performances, or the answers to why Nine-Up loves Pabst Blue Ribbon, check out <http://www.nineup.com>.

GETTING ACCESS TO A STREAMING AUDIO SERVER

In order to reach people with your live broadcast, technologies such as RealAudio, Xing, and VDOLive all require you to have their server software installed on a server computer located on gobs of Internet connectivity.

For our purposes this month we are using a RealAudio server so we'll focus on that, though other technologies typically follow similar guidelines.

If you break out in hives when considering the notion of installing software on a computer that isn't within arm's reach, you'll want to find someone else's server to use. This is why companies such as MediaCast (www.mediacast.com) and AudioNet (www.audionet.com) exist — to help you out of this persnickety predicament. They take care of the tough stuff and give you the information you need to connect to their servers, as well as the information you need to tell your audience how to tune in. An increasing number of ISPs are adding RealAudio to the services they provide, so be sure to ask them! Also, never forget to work that network of techie-friends that you may have — they may have a server you can use for free, or at least at a more affordable rate.

If you do feel up to installing your own server, Progressive Networks offers a free "easy start server" that includes 10 streams for a period of 30 days (but 60 streams will run you a cool grand). You can download this from the RealAudio site at <http://www.real.com/products/server/>.

We would be remiss if we didn't briefly mention how licenses in this type of software work. Whether you are running your own server or "leasing" someone else's, a license is required for as many streams as you have listeners in your audience. In real-world terms this means how many individual computers you expect to be receiving a copy of the live signal you will be sending. Each individual stream goes to each individual computer. The Xing Streamworks server uses the total amount of bandwidth required for their licensing, rather than the number of users. For a 28.8 kbps modem speed, you can expect to need a T1 (1.54 MB) for serving an audience of about 100 users.

Regardless of whether the server you use is your own or someone else's, you should make sure you know the password required to send a live audio stream into the server.

LETTERS TO THE FEZGUYS

Hello from Paris, France. Great column in *EQ* magazine. And now I can read it on your Web site before I get *EQ* by mail (it takes about a month). Keep on fezguying good. I'll e-talk to you soon. —Eric

Dear Eric: Thanks for your note. And thanks for our first ever use of the word "fezguy" as a verb. It's wonderful to get feedback and perspective from other countries and cultures in such an immediate fashion. (To the Thoughtful Reader: Have we made our point yet?) —The FezGuys

May the Fez be with you!

Jon Luini is a working technophile, a musician (bass player/singer) with full-blown facility and extensive experience on the Web and no free time. He is a co-founder of IUMA and currently is a partner/founder of MediaCast and Executive Vice President of Addicted To Noise. [jon@fezguys.com]

Allen Whitman is a writer and working musician (bass player/singer) with rudimentary technical knowledge and a keen, real-world interest in the practical use of the Web. He currently plays in the San Francisco-based band The Mermen. [allen@fezguys.com]

EQ&A

continued from page 16

"loading" used with reference to "Y" splitting signals as appear in your March '97 EQ column and also in the Feb. '97 EQ "First Look" [see pg. 34] on the Whirlwind AC2 Mic Splitter.

My understanding was that due to low impedances offered by balanced mics and the balanced output of DI boxes, a passive "Y" split would not affect a signal that could be sent to both the FOH console and the stage monitor board. Could you please clarify this?

David Distler
Campinas, SP
Brazil

A You are mostly correct in assuming that a mic or direct box is low impedance and that a passive "Y" split "should" work. Assuming no ground anomalies and no strange destination impedances, minimal problems should arise. Otherwise, use a proper "splitter" transformer that has separate windings to isolate all of the parties concerned.

Microphones are almost the last of a breed of analog audio devices that, because of their output transformer (most, but not all, have these), want to "see" a "load" impedance. Most audio gear, such as tape decks and outboard gear, are transformerless low-impedance sources that are fairly insensitive to cable and destination impedances.

Modern line inputs are high impedance (10,000 ohms as opposed to the 600-ohm inputs of old tube and transistorized gear) and therefore will not load anything except a passive guitar or bass, which want to see a 250,000 ohm to 1 MEGohm destination (input) impedance.

Digital audio, video, SCSI devices, and computer networks are not as easily satisfied — you've got to use special cable and be properly "terminated" (another word for "load"). The cable is referred to as a transmission line, because it actually becomes an integral part of the circuit.

Think of a transmission line as a water hose. This is not a perfect analogy, but attaching a nozzle is similar to the destination impedance in that it creates "back pressure." Also, the nozzle allows the water to be focused into either a mist or a very directional stream that translates into "reflections" and fre-

quency response variations that can blur video and make data unreadable.

Eddie Ciletti
Contributing Editor
EQ magazine

SYNC OR SWING

Q I have a couple of questions. First, I'm purchasing an ADAT XT to be the master with my original formula ADAT. Will the system use the XT's faster sync software or be as slow in slaving as the old one is?

Next: I have a Fostex 504-16 channel mixer (old school!) and I'm running an Alesis MicroVerb III through aux 1. I keep getting this annoying feedback ring when I turn up the aux. I can only saturate the track a little bit (not enough, I might add) before it starts the feedback loop. It never did this before with my Mackie 1202. I'm at a loss here.

Steve Manko
Mentor, OH

A There are some great advantages to using an ADAT-XT as the master over an ADAT classic [known to EQ readers as the ADAT OF, for "Original Formula"]. You get almost all of the XT's features for the entire 16-track system. So things like Tape Offset (for copy and paste editing), digital track routing, 10 location points, Auto Punch, Auto Loop, and Rehearsal Mode all become functions of both machines. However, the two machines are independent in their transport locating and lock functions. So the ADAT classic is four times slower than the XT in locating. As far as locking together from a parked position, it should take an average of about 3 seconds for the two machines to lock. If they are locking slower than that you might need to clean the heads and/or change the idler wheel (idler wheels are about \$10.00).

Regarding the "feedback ring" you describe, I'm not exactly sure what this is, but the word "ring" makes me wonder if it is comb filtering. Comb filtering occurs when the original signal that is going to the L/R bus is met by another copy of itself (say, passing through an effect). The way you get rid of this is by setting the effect so that it is 100 percent wet, thus none of the original signal passes through it — so all you get is effect. To do this on the MicroVerb III, you simply turn the Mix knob all the way to the right. See if this helps.

Kent Ormiston
Marketing Communications Manager
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CIRCLE 41 ON FREE INFO CARD

FIRST LOOK

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An audio file is processed into the data rate(s) you prefer and saved as a single file for each rate. So if you're sending a mix to someone, you can choose a process rate that suits their modem speed. You can audition different processing presets before encoding the entire file and preview the result before it reaches the other end. According to Liquid Audio, real-time streaming using a T1 connection will produce CD-quality transmission; with ISDN it's near CD-quality, and with a 28.8 kbps modem, it's "FM stereo" quality. Audio downloads are CD-quality regardless of modem speed. In addition to the actual audio data, a Liquifier Pro file also includes 40 data fields where you can enter production notes, text, lyrics, artwork, copyright information, and performing rights tracking info.

In light of the fact that high-quality audio files can be of considerable size, Liquifier Pro includes Liquid Audio's exclusive version of Dolby Digital data-compression technology to minimize file size while maximizing audio quality. Perhaps most importantly, the encoding process includes extensive copyright

protection in the form of multilevel encryption and digital watermarking technology. Watermarking involves embedding an inaudible digital code into the music data that can later be extracted in order to provide an electronic audit trail to combat attempts at piracy. Liquifier Pro also embeds the artist/publisher information into the sound file, and a content provider actually has control over how many CD-Rs may be burned by someone that downloads a file.

Once an audio file has been encoded, it can be electronically published to the server, which acts as a container or organizer of music files. Liquid MusicServer software uses standard protocols to deliver Liquifier Pro files over Internet provider networks. The Liquid MusicServer can currently support any number of simultaneous audio streams from UNIX and SGI platforms; future versions will support Intel and Windows NT platforms.

Audio files are retrieved through the use of Liquid MusicPlayer, a free, downloadable program for PCs and Macs that allows users to listen to and download audio. It's sort of like a software CD player, but also lets the user view artwork, lyrics, and production notes while listening to music. Songs can be previewed and auditioned in real time at CD

quality and can also be downloaded. In cases where music is being sold via Internet, Liquid MusicPlayer can direct the listener to ordering information — all while maintaining copyright security.

Liquid Audio will be a useful tool for engineers, producers, and recording studios. For example, you could have a mix of a song and send it via the 'Net to a remote location for overdubbing. At the remote location, a musician performs their overdub and then the studio sends a mix back with the OD on the left channel and the rough mix on the right. Since the program supports timecode, the OD can then be flown onto the master without having to wait for tapes to travel. Or a producer can "Liquify" a mix and send it to a musician at their home for approval, without the musician being at the session (oh joy!).

Liquifier for Pro Tools (available from Digidesign) and Liquid MusicServer pricing varies with server requirements. Liquid MusicPlayer can be download free of charge from Liquid Audio's web site, <http://www.liquidaudio.com>. For more information contact Liquid Audio at 415-562-0880. Circle EQ free lit. #134.

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
POSTPRODUCTION

continued from page 74

QuickTime movie, you can open the movie itself in Studio Vision. Since it's part of the open sequence, the movie is perfectly synchronized to the MIDI and audio tracks. The movie not only follows the sequence as it plays, but locating to any point in the sequence or in the movie, in any way (clicking, scrubbing, etc.), will locate the other medium to the same point. I've been testing the software on a Mac 9500, and the autolocate function is virtually instantaneous.

Once the movie's sound track is available in Studio Vision, you can perform real audio postproduction operations. Depending on the nature of the original audio, and the enhancements you'd like to make, you can record a voice over, add sound effects or music, and position them easily and accurately anywhere in the movie (fig. 2). Since Studio Vision also includes the list of the QuickTime Musical Instruments (a General MIDI set), you can compose to them for music and effects. These are not the best sounds you've ever heard, but they and Apple's software synthesizer are available on any Mac with QuickTime 2.5, and to whatever degree you can use MIDI instead of audio, there's that much smaller a data stream to hamper the movie's video.

When you're ready, Studio Vision can save your audio and MIDI tracks as a QuickTime movie, either by themselves or along with the original video. You can either replace or just add to the original on-camera audio, so you have the choice of leaving it pristine or enhancing it in whatever way is necessary — add EQ, dynamic compression, noise reduction, or whatever processing your studio has to enhance the quality. Studio Vision even has an improved pitch- and formant-shifting feature with which you can change the timbre of a voice without the distortion traditionally associated with simple pitch-shifting.

A lot of video is being produced with modest budgets on desktop computers. The people who do this are not typically used to having a good sound track, but they all know the difference between what they've been producing and what comes out of Hollywood. If you can show them the impact of a well-posted video, you may carve out a business niche that will pay your bills until your music projects hit the big time. 

ROCKY HOLMAN

continued from page 105


3600VZ/1200's with IQ System control. KT graphics, an Aphex Dominator II stereo limiter, and a pair of Omnidrive system controllers from BSS provide a bulk of the processing, while inserts include a KT DN360 dual 1/3 octave EQ, a pair of Summit DCL-200 compressor/limiters, and four Behringer Composers.

"Rocky and I sort out our problems pleasantly," Robbins notes amiably. "There is no sonic warfare. We have the same objectives. For example, John Mellencamp's voice needs low frequency, which makes him uncomfortable if he hears it on-stage. If you listen to his vocal mic without the house on, he sounds thin. So I supply those frequencies and Rocky doesn't. John works off the volume of the house, and he likes that. It all meets together full range."

Holman leans back in his chair and says, "The real deal with this show is the emotion; the vibe," he says thoughtfully. "I felt it the first time I ever saw John Mellencamp, and it hasn't changed since. That was back in the early '80s, at the Checkerdome Arena in St. Louis. He was John Cougar then. I was there talking business with the headlining act, Heart. The last thing on my mind was taking in the opening act. But at 8:00 PM, when the house lights went down, this big 2/4 drum sound began to swell, followed by larger than life guitars. John walked out wearing sunglasses with a cigarette dangling from his mouth and lit into "Thirty Days In The Hole" with all the coolness of James Dean, dancing like James Brown, singing like Steve Marriott. It riveted me on the spot. I mean I was speechless. I was undeniably experiencing a Great American Rock Show; rolling thunder, a train hurtling from the stage. The guy had balls."

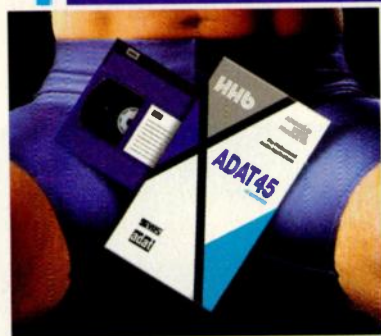
He leans forward and shows me his sleeveless arm. "Look, goose bumps. I still get 'em just thinking about it. That's why you get into this business in the first place."

Tonight, showtime is 9:22 PM. The hour draws close. Soon John Mellencamp will take the stage with the same conviction that knocked Holman senseless nearly two decades ago. With his band, he'll paint us a vivid portrait of small towns, wild nights, the nature of authority, and hurts that feel good. It will be loud, yet clear. Sparse gating, effects just for ambience. One last question before you gotta go, Rocky... Have you ever thought about mixing the house?

"Naaah," he drawls while standing just inside the dressing room's door on his way out. "Hell, why would I want to walk that far just to get to work?" 

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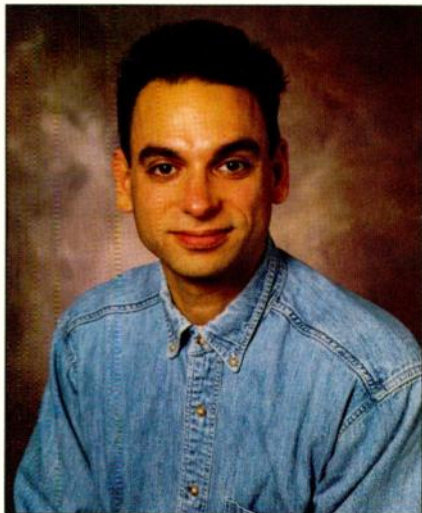
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CIRCLE 41 ON FREE INFO CARD

Fear of Frying

Here's a do-it-yourself project that'll help allay any fears of doing light electrical work



BY EDDIE CILETTI

The terms "High-Voltage" and "Phantom Power" may sound scary, but don't be afraid. A little caution, a dash of re-

spect, and a do-it-yourself project will put you at ease. (*Boo!*)

PHANTOM POWER

In a vacuum-tube mic or dynamic mic, balanced audio appears on pin 2 and pin 3 of an XLR connector. The signal is transformer isolated from ground (pin 1). Vacuum-tube mics use special, multi-conductor cables to deliver plate and filament voltages from a dedicated power supply. Audio is handled in the same harness, but on a separate pair of wires.

"Phantom" is a method of getting power to transistorized microphones using standard, three-conductor cable. Phantom power applies 48 volts DC (direct current) — by a pair of 6.8 kohms resistors — to both pin 2 and pin 3. The audio signal is now riding "piggyback" 48 volts above ground.

THE WORK OF OTT

The one and only graphic for this column (fig. 1) is a highly tweaked photo that is both schematic and component layout. Readable schematics are hard to come by, so this circuit was built as it might be drawn to help make the technology a bit more tangible. It includes oscilloscope inserts.

THE CONVERSION PROCESS

All audio circuits require DC power before amplification can occur. Like an au-

dio signal, the power that flows from a wall socket is also AC, specifically, a 120-volt RMS sine wave. (Line voltage varies with location and demand. RMS is the "effective" or equivalent power a sinusoid can deliver when compared to its DC counterpart. Actual peak-to-peak voltage is 343 volts.)

FROM LEFT TO RIGHT

The power cable is attached to a switch and a fuse. The transformer converts 120 VAC to 25 VAC. Notice that there is no physical connection between "primary" and "secondary" windings. The "connection" is made by induction: the flow of current in a wire radiates a magnetic field into the iron core (the vertical lines). (Guitar pickups "gather" noise — hum from power transformers and buzz from light dimmers — also by induction.) The ratio of turns between primary and secondary — in this case, 4.8 to 1 — will determine the voltage.

RECTUM FRIED

The conversion from AC to DC is called rectification. Logic would dictate that 48 volts AC makes 48 volts DC. This is almost correct. I chose a 25-volt transformer because you can buy one at Ray's Shack. A little sleight-of-hand will squeeze out the necessary juice...

The oscilloscope insert to the right of the transformer displays a slightly

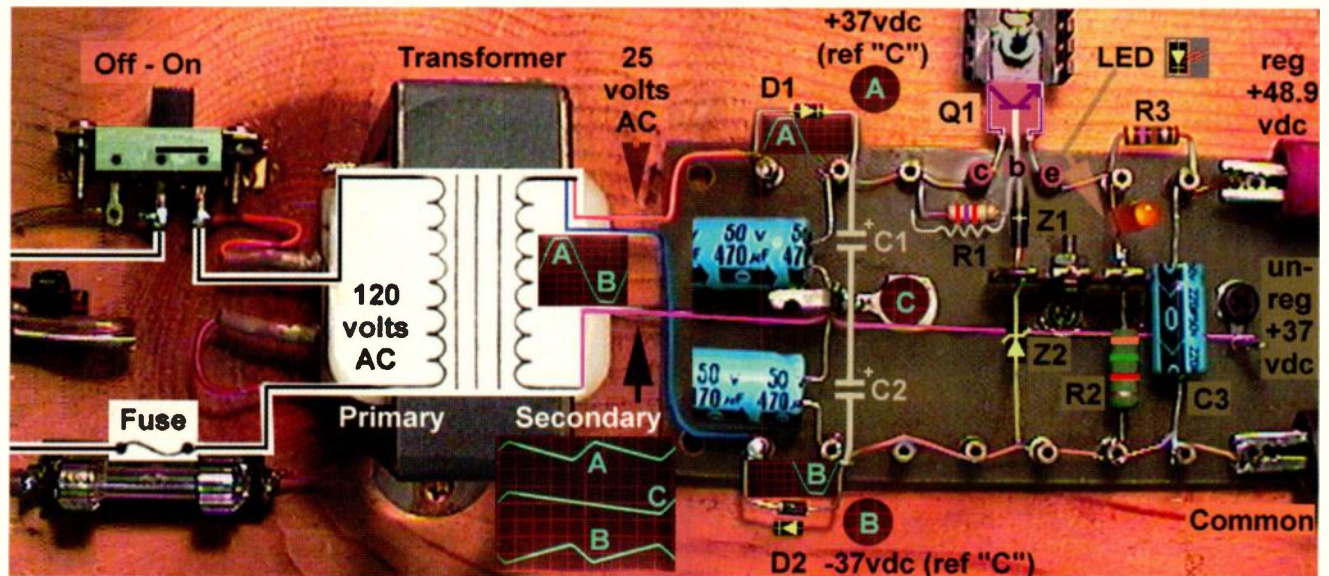


FIGURE 1

PARTS LIST

PARTS LIST	DEVICE	TYPE	NOTES
S1	switch	SPDT	
F1	fuse	.5 amp, fast	
T1	transformer	25 volt 1 amp	
D1, D2	diode	1N4007	
C1, C2	capacitor	470 μ F, 50 volt	
C3	capacitor	220 μ F, 63 volt	
C4	capacitor	.1 μ F, 100	
L1	LED		
R1	resistor	2.7 kohms, 1/2 watt	red-violet-red
R2	resistor	1.5 kohms, 1 watt	brown-green-red
Q1	NPN transistor	2N6551, 52 or 53	ECG or NTE 210
Z1, Z2	zener diode	1N5252, 1/2 watt	ECG or NTE 5031A
Fuse holder			
Terminal board			
Wire clamp			
Wood			

clipped sine wave of about 75 Vp-p. Diode D1 passes only the positive portion of wave "A." Notice that diode D2 is reversed so that it passes only the negative portion of wave "B." This circuit configuration is known as a "voltage doubler."

Filter capacitors C1 and C2 smooth out the "ripple" that results from rectification. (See the 'scope insert to the lower right of the xfmr.) Traces "A" and "B" were measured by first placing the ground lead at test point "B," measuring "A." Then, leads were reversed so that ground is at "A," measuring "B." Notice that the frequency of the "A" and "B" traces is double that of the "C" trace. This is full wave rectification. Unfiltered, it yields a 120 Hz hum.

IT'S ALL RELATIVE

With the 'scope's ground lead at test point "C," the wave form observed at test point "A" will yield trace "C." (The polarity will be reversed when observing test point "B.") This is what half-wave rectification looks like. If the circuit did not continue beyond capacitors C1 and C2, the power supply would yield ± 35 volts referenced to "C," or 70 volts when measured from "B" to "A."

The relationship of 35 volts DC to 25 volts AC has to do with the fact that a sine wave is involved. Dividing 25 volts RMS by ".707" (35.36) and then multiplying by 2 (70.72) yields the peak to peak value of the sine wave. (The square root of 2 — 1.414 — divided by 2 yields .707, hence R-M-S or root-mean-squared.)


HIGH-FIBER REGULATION

Z1 and Z2 are 24-volt zener diodes. When reversed biased (as shown), a zener diode acts as a DC voltage limiter. Placing two in series creates the 48-volt reference. R1 (2.7 kohms) sets the "knee" so that the circuit will maintain regulation even if the line voltage drops to 92 volts. Increasing R1 will raise the knee and decrease regulation. Decreasing R1 will overheat the zeners. A side-effect of regulation is that it further reduces the ripple to almost a straight line.

PASS TRANSISTOR

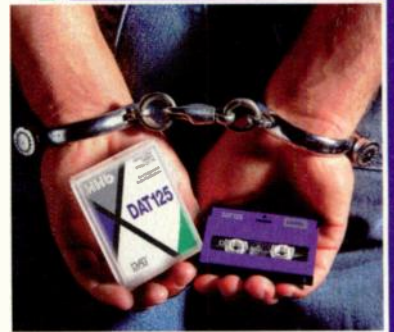
Q1 is an NPN transistor in the "common base" configuration. It is a general replacement type, either NTE or ECG 210. Its American counterpart is a 2N6551. Raw 75 volts is fed to the collector (c), which serves as the input. The reference voltage is connected to the base (b) and the output appears at the emitter (e) six-tenths of a volt lower than the reference. This drop is typical of a silicon-junction device.

REALITY CHECK

When the power line delivered 122 volts, 28.2 VAC appeared at the secondary. This became 75 VDC, rectified. The reference, 49.5 volts, was a bit higher than expected and yielded 48.9 volts (at the emitter) with no load. R3 serves as a current limiter (protection), but without it, the circuit can easily drive a 1 kohm load without budging. For more information, visit: <http://www.tangible-technology.com>. 

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With Pro Tools Project you get 8 tracks of digital audio &, on some Power Mac systems, up to 16 tracks of playback & 64 virtual tracks! The Pro Tools Project system includes an audio card as well as award winning Pro Tools software. You choose either an 888 or an 882 I/O to complete the package. Project also features MIDI recording and playback as well as Quickpunch™ punch-on-the-fly & when your ready to upgrade, it's ready too.

REQUIRES-

- Qualified NuBus or PCI Macintosh CPU
- 24MB RAM minimum
- Hard Drive, system software 7.1 or greater
- 14" monitor (17" recommended)

ProTools 4.0 Software Digital Audio Software for Macintosh

Pro Tools version 4.0 software provides the next step in the evolution of Digidesign's award-winning digital audio production software for the Mac. Fully Power Mac native, 4.0 features noticeable improvements in every major area. ProControl™ support, improved automation features, reactive fader groupings & group nesting, plug-in MIDI personality files, multiple edit play lists, Sound Designer II™ functionality, Finder-style searching & sorting, and I'm out of breath.



JUST IN

MAC

STUDIO DAT RECORDERS

SONY PCM-R500 NEW PRODUCT



Incorporating Sony's legendary high-reliability 4D.D. Mechanism, the PCM-R500 sets a new standard for professional DAT recorders. The Jog/Shuttle wheel offers outstanding operational ease while extensive interface options and multiple menu modes meet a wide range of application needs.

FEATURES-

- Set-up menu for preference selection. Use this menu for setting ID6, level sync threshold, date & more. Also selects error indicator.
- Includes 8-pin parallel & wireless remote controls
- SBM recording for improved S/N (Sounds like 20bit)
- Independent L/R recording levels
- Equipped with auto head cleaning for improved sound quality.

TASCAM DA-20/DA-30mkII



- Multiple sampling rates (48, 44.1, and 32kHz).
- Extended (4-hour) play at 32kHz.
- S/PDIF Digital I/O, RCA Unbalanced In/Out.
- SCMS-free recording. Full function wireless remote.

DA-30mkII Additional Features-

- Variable speed shuttle wheel.
- Digital I/O featuring both AES/EBU and S/PDIF
- XLR balanced and RCA unbalanced connections
- SCMS-free recording with selectable ID.
- Parallel port for control I/O from external equipment.

Panasonic SV-3800/SV-4100



The SV-3800 & SV-4100 feature highly accurate and reliable transport mechanisms with search speeds of up to 400X normal. Both use 20-bit D/A converters to satisfy even the highest professional expectations. The SV-4100 adds features such as instant start, program & cue assignment, enhanced system diagnostics, multiple digital interfaces and more.

Fostex D-15



The new Fostex D-15 is the least expensive timecode DAT on the market. It has a host of new features aimed at audio post production and recording studio environments.

FEATURES-

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

WINDOWS

Session 8™ Digital Audio Workstation for Windows



Session 8 is a professional quality digital audio recording, editing, & mixing system created specifically for personal and project recording studios. Designed to operate with Windows 95 or Windows 3.1, Session 8 offers professional recording features, powerful random access editing, automated digital mixing, & unparalleled integration with most popular MIDI sequencers.

FEATURES-

- 8-channel direct to disk digital recording
- Random access, non-destructive editing
- Automated, intuitive digital mixing environment
- Built-in volume & pan automation
- Complete SMPTE frame rate support
- Frame accurate sync with built-in .AVI video playback window
- Digital parametric EQ
- Support for multiple hard drive partitions
- Auto sample rate convert to 44.1 or 48 kHz mono .WAV file format
- Choice of audio interface option.

SOUNDSCAPE DIGITAL TECHNOLOGY LTD.



A professional Multitrack Digital Audio Workstation, the SSHRD1 combines the highest quality processing hardware with easy-to-use Windows-based software. The most complete and affordable solution for high quality digital audio on the PC, the SSHRD1 has over 50 powerful editing tools and is expandable from 8 to 128 tracks, with up to 32 inputs and 64 outputs. Ideal for a wide range of applications ranging from project studios, to multi-unit 32, 48 and 64 track systems for major TV and film studios needing audio post production linked to video.

SSAC-1 Accelerator Card

The new SSAC-1 is a DSP card that can be added to any existing SSHRD-1 system for faster processing as well as an additional 8 channels of I/O in the form of a TDIF port. This card is needed by anyone who wants to upgrade an existing system to V2.0.

SS810-1 8 Channel I/O

This rack mount unit connects to the SSAC-1 card via the expansion port to give you 8 XLR ins & outs with superb A/D-D/A conversion. It also features an ADAT Optical interface. The SS810-D comes with the analog converters for connecting an ADAT without additional channels.

SSHRD-1 Hard Disk Recorder/Editor

Version
2.0



CD & CASSETTE DUPLICATION

marantz CDR615 / CDR620 Compact Disc Recorder



Both next-generation standalone write-once CD recorders, the CDR615 & 620 offer built-in sample rate conversion, CD/DAT/MD/DCC sub-code conversion, and adjustable dB level sensing. Additional features include adjustable fade in/fade out, record mute time, & analog level automatic track incrementing. A 9-pin parallel (GPI) port and headphone output with level control are also included.

CDR620 Additional Features-

- SCSI-II Port • XLR (AES/EBU) Digital In/Out and Digital cascading
- 2x speed recording • Index Recording and playing
- Defeatable copy prohibit and emphasis • 34 key, 2-way wired remote (RC620)
- Available on CDR615 w/optional Wired Remote (RC620)

Telex ACC2000/ACC4000 Cassette Duplicators

Designed for high performance & high production, Telex duplicators offer easy maintenance and operation. The ACC2000 is a 2-channel mono duplicator while the ACC4000 is stereo. Each produces 3 copies from a cassette master at 16x normal speed & by linking additional copy modules, you can duplicate up to 27 copies of a 60 minute original in under two minutes.



ACC2000XL/ ACC4000XL

The XL Series feature "Extended Life" cassette heads for increased performance and wear characteristics. They also offer improvements in wow and flutter, frequency response, S/N ratio & bias.

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E-300 Studio Condenser Microphone

A multi-patterned side address mic that combines vintage capsule design with advanced head-amp electronics, the E-300 has an unusually wide frequency response of 10Hz to 20kHz, and an exceptional dynamic range of 137 dB. It also features extremely low self noise of 11dB. Ideal for even the most critical studio applications.

Shown with optional ZM-1 Shockmount

Unique powering of all Equitek Series microphones is accomplished with a pair of rechargeable nicad 9-volt batteries in combination with 48V phantom power. This ever comes inherent current limiting associated with most phantom power supplies & can supply 10x the current.



audio-technica **AT4050/CM5**

Cardioid Capacitor Microphone

The AT4050 multi-pattern condenser expands upon the AT4033 to set the standard for studio performance mics.

- 2 capacitor elements
- Cardioid, Omnidirectional, & Figure 8 polar pattern settings
- Vapor-deposits of pure gold on specially-contoured large diaphragms are aged through 5 steps to ensure optimum characteristics over years of use.
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AZDEN **UHF Performance Series**

Breaking new ground, Azden's new UHF receiver and microphone transmitters offer superb performance and features at prices far below anything you've ever seen.

411UDR UHF Receiver

- Crystal-controlled, PLL synthesized UHF receiver with 63 user-selectable channels in the 794-806 MHz band. Up to 9 systems may be used simultaneously. Features both 1/4-inch and XLR output jacks, volume adjustment and can be rack mounted.

41HT Handheld Microphone Transmitter

- Newly designed handheld with supercardioid uni-directional mic element and 63 user-selectable channels. Uses 2 AA alkaline batteries or Azden ni-cads with the AMC-2A Charging Station.

41BT Bodypack Transmitter

- 63 user-selectable channels, input level control, standby switch, locking mini-plug connector and retractable lead for use with lavalier and headset microphones or as an instrument transmitter.

AMC Ni-cad Battery Charging Station

- Turns the 41HT into the only rechargeable UHF microphone available. (Uses Azden AN-1A nicad batteries only). Fully charged, the 41HT will run for 4 hours. Charging time is approximately 12 hours.



SENNHEISER **ME66/K6P**

Short Shotgun Microphone

This read ready mic system is perfect for camera mount and other short gun applications. It's professional sound quality and affordable price combined with the flexibility of a modular setup make it a hard choice to beat.



MIXING BOARDS

MACKIE **SR24x4 • SR32x4**

Sound Reinforcement Consoles

These consoles do for live sound what the acclaimed 8-bus series has done for studio recording. Both professional grade mixing consoles, the SR32-4 and SR24-4 were built to deliver the same kind of useful features found on 'bigger boards' while standing up to 24-hr-a-day use.

- Fast, accurate, easy level setting via "solo".
- 4 submix buses.
- 3 band EQ w/ sweepable mids.
- 6 Aux sends.
- Globally switchable AFL/PFL.
- Mackies "VLZ" technology for low noise.
- Tape return to main mix, mono out w/level control.



The new MS-1202, 1402, 1604 & SR Series all include VLZ (Very Low Impedance) circuitry at critical signal path points. Developed for Mackie's acclaimed 8-Bus console series, VLZ effectively reduces thermal noise and minimizes crosstalk by raising current and decreasing resistance.

TASCAM M-1600

16 & 24 Channel 8-bus Consoles

Great for modular Digital Multitrack setups and hard disk recording, the M-1600 is part of Tascam's next generation series of recording consoles. It features multiple options for inputs and outputs and uses the same, easy to install D-sub connectors as Tascam's more expensive consoles, all in a compact design.

- XLR Mic inputs w/phantom power on 8 channels.
- Signal present/overload indicators on each channel.
- Balanced & Unbalanced tape returns & Balanced Group/Direct outputs using D-sub connectors.
- TRS Balanced Line Inputs on all channels.
- 3-band EQ with sweepable mids.
- 5 Aux sends (1 stereo)
- 4 assignable aux returns.
- Perfect for use with DA-88 and ADAT setups.



MINIDISC MULTITRACKS

TASCAM 564 Digital Portastudio

The Tascam 564 Digital Portastudio combines the flexibility and superior sound quality of digital recording with the simplicity and versatility of a portable multitrack. Using MiniDisc technology, the 564 has many powerful recording and editing features never before found in a portable 4-track machine.

FEATURES-

- Self-contained digital recorder/mixer.
- Uses low-cost, removable MiniDiscs.
- 2 AUX sends / 2 Stereo returns.
- 4 XLR mic inputs.
- Channel inserts on inputs 1 & 2.
- 5 takes per track, 20 patterns, 20 indexes per song.
- Random access and instant locate.
- Non-destructive editing features with undo capability include: bounce forward, cut, copy, move.
- Full-range EQ with mid-range sweep.
- S/PDIF digital output for archiving.
- MIDI clock and MTC.



SONY MDM-X4 MD Multi-Track Recorder

MD recorders are here! Offering up to 37 minutes of high-quality 4-track digital recording, the MDM-X4 is truly the next generation of personal multi-tracks. With a built-in mixer, exclusive Track Edit system, and a Jog/Shuttle wheel for sophisticated editing with ease, the MDM-X4 will encourage you to flex your creativity.

FEATURES-

- Records on high quality, removable MD data discs
- 3.5-gen. ATRAC LSI for wide dynamic range.
- 10 Input / 4Bus mixer.
- 2 AUX sends, 3-band EQ • 11-point locator.
- Random access memory for quick playback and record from anywhere on the disk.
- Editing features include Undo, Redo, & Section/Song editing for flying material between different tracks.



STUDIO MONITORS

ALESIS **Point Seven**

DESIGNED FOR MULTI-MEDIA!

- Shielded reference monitor.
- Front ported venting system for great bass response.
- 50 watts RMS-100 watts peak @ 4Q.
- 85Hz-27kHz, ±3dB.
- 2kHz crossover for accurate phase and a wide "sweet spot" for mixing.
- Accurate flat sound reproduction.
- Great for studio and multi-media applications.



TANNOY PBM 6.5II

Studio Reference Monitors

The PBM 6.5 II is the industry standard for studio reference monitors. They provide true dynamic capability and real world accuracy.

- 6.5" lowfrequency driver and 3/4" tweeter
- Fully radused and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.



SONY SMS-1P

Powered Studio Reference Monitors

The new SMS-1P monitors are perfect for post production environments. They feature 2 types of inputs with independent volume adjustment, 15 watts of power, bass/treble control and shielding for use near computer monitors.



JBL 4206 & 4208

Studio Reference Monitors

The 4206 & 4208 studio reference monitors are 6" and 8" respectively. Both offer exceptional sonic performance, setting the standard for today's multi-purpose studio environments.

- Multi-Radial baffle ABS baffle virtually eliminates baffle distortion.
- Superb imaging & reduced phase distortion.
- Pure titanium diaphragm high frequency transducer provides smooth, extended response.
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PRO CASSETTE DECKS

TASCAM 202 mkIII / 302



These decks provide high-fidelity sound reproduction and a wide frequency response, as well as a host of editing & play back features.

- Dual Auto Reverse, Normal and high-speed dubbing.
- Dolby HX Pro* extends high frequency performance and minimizes distortion.
- Auto sensing for Normal, Metal & CrO2 tape.
- Intro Check, Computerized Program Search, Blank Scan and One Program quickly find the beginning of tracks.

302 Advanced Features-

The 302 is 2 independent decks, each with their own set of RCA connectors, transport control keys, auto-reverse, and noise reducing functions. Cascade and Control I/O let you link up to 10 additional machines for multiple dubbing or long rec & playback.

112mkII/112RmkII

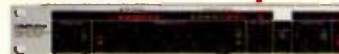


A classic "no frills" production workhorse, the 112mkII is a 2-head, cost effective deck for musicians and production studios. It features a parallel port for external control and an optional balanced connector kit for integration into any production studio. The 112RmkII features a 3-head transport with separate high performance record and playback heads as well as precision FG servo direct drive capstan motors.

SIGNAL PROCESSING

BEHRINGER

MDX 2100 Composer



- Integrated Auto/Manual Compressor, Expander & Peak Limiter.
- Interactive Gain Control (IGC) combines a clipper and peak limiter for distortion-free limitation on signal peaks.
- Servo-balanced inputs & outputs are switchable between +4dB & -10dB. **NEW LOW PRICE!**

APHEX

107 Tubessence 2 Channel Mic Preamp



The 107 delivers outstanding sonic performance, as well as a great degree of presence, detail, & image.

- Up to 64dB of gain available
- 20dB pad with red LED indicator, 2 LED input meter
- Full 48V phantom power with red LED indicator
- Low cut filter at 80Hz, 12dB/octave
- Polarity inversion switch with LED indicator
- Switchable +4dB/-10dB output, 1/4" Balanced.

109 Tubessence Parametric EQ



The Aphex 109 is an extremely versatile, high performance parametric vacuum tube EQ with professional flexibility and sound quality.

Great for "warming up" digital signals.

EFFECTS PROCESSING



Lexicon

PCM-80 & PCM-90 Digital Signal Processors



A great combination for any studio owner with an ear for the best. The PCM-80 delivers high quality multi-effects based on the legendary PCM 70, maintaining Lexicon's high standards for sonic clarity and extraordinary processing power. The PCM 90 is a digital reverb with its roots stemming from the studio standard 480L and 300L effects systems. Reverbs from telephone booths to the grand canyon, the PCM 90 is incredibly realistic. Together, they make an excellent addition to any rack mount arsenal.

Buy a PCM-80 and receive a **FREE Pitch FX Card** offer valid thru 7-31-97

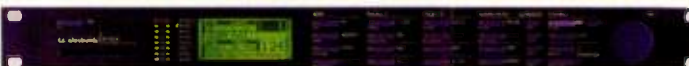
Lexicon MPX-1 Multi-Effects Processor



Lexicon's latest addition to their Digital effects family, the MPX-1 features top-quality effects in an easy to use, 1 rack space unit. With 56 Pitch, Chorus, EQ, Modulation, Delay, and world-class reverb effects accessible from the front panel, as well as TRS and XLR balanced I/O and complete MIDI implementation, the MPX-1 creates a new standard for cost and quality in a multi-effects device.

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Wizard M2000 Studio Effects Processor



The M2000 features a "Dual Engine" architecture that permits multiple effects and 6 different routing modes making it a great choice for high-end studio effects processing.

FEATURES-

- 250 factory programs including reverb, pitch delay, chorus, flange, phase, EQ, de-essing, compression, limiting, expansion, gating and stereo enhancement
- 20-bit A/D conversion AES/EBU and S/PDIF digital I/O.
- "Wizard" help menus, 16-bit dithering tools,
- Tap and MIDI tempo modes.
- Single page parameter editing, 1 rack space.

SONY

DPS-V77 2 Ch. Master Effects Processor



Sony's latest effects processor, the DPS-V77 yields excellent sonic quality combined with realtime control, a digital I/O and many more features that will put a smile on the face of any discerning studio engineer.

FEATURES-

- 198 preset & 198 user-definable programs.
- Control up to 6 parameters in realtime via MIDI information and an optional foot pedal
- Use the AES/EBU & SPDIF digital I/O to link multiple V-77s together & when working with digital mixers
- 10-key pad input
- Shuttle-ring equipped rotary encoder allows for quick patch changing.
- A noise gate circuit is provided ahead of the input for guitar players and other instrumentalists who want top quality effects without sacrificing tone.

ALESIS

QuadraVerb 2 2 Ch. Master Effects Processor



Alesis' most powerful signal processor, the Q2 offers amazing audio fidelity in a versatile multi-effects unit. Great for professional & project studio owners, its large backlit display making parameter editing intuitive and quick.

FEATURES-

- 100 preset & 200 user-editable programs.
- Octal Processing allows use of up to 8 effects simultaneously in any order.
- Choose between over 50 different effects types for each block, including reverb, delay, chorus, flange, rotary speaker, pitch shift, graphic and parametric EQ, overdriver and more.
- 5 seconds sampling, triggered pan, and surround sound encoding are built in.
- Selectable -10 dB and +4dB levels, servo-balanced TRS inputs and outputs.
- ADAT Digital Interface allows you to work entirely in the digital between the Q2 and an ADAT XT.

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- Circumaural pads for long sessions.
- Steel cable, self-adjusting headband.
- 15Hz-20kHz, 600Ω

SONY MDR 7506

The Sony 7506's have been proven in the most trying studio situations. Their rugged, closed-ear design makes them great for keyboard players and home studio owners.



- Folding construction
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- 1/4" & 1/8" Gold connectors
- Soft carrying case
- Plug directly into keyboards

beyerdynamic)))

DT 770 Pro

These comfortable closed headphones are designed for professionals who require full bass response to compliment accurate high and mid-range reproduction.



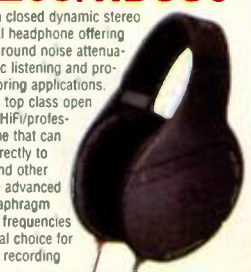
- Wide frequency response
- Durable lightweight construction
- Equalized to meet diffused field requirements
- Padded headband ensures long term comfort

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HD 265/HD580

The HD-265 is a closed dynamic stereo HiFi/professional headphone offering high level background noise attenuation for domestic listening and professional monitoring applications.

The HD 580 is a top class open dynamic stereo HiFi/professional headphone that can be connected directly to DAT, DCC, CD and other pro players. The advanced design of the diaphragm avoids resonant frequencies making it an ideal choice for the professional recording engineer.



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- Built in MIC limiter and 20dB pad.
- TRS jack w/ level control for monitoring.
- Includes shoulder belt, AC adapter, & battery.



PDR1000/PDR1000TC



- 4 head Direct Drive transport
 - XLR mic & line analog ins. 2 RCA line outs. Digital I/O includes S/PDIF (RCA) and AES/EBU (XLR).
 - L/R channel mic input attenuation selector (0dB/-30dB)
 - 48V phantom power, limiter & internal speaker.
 - Illuminated LCD display shows clock and counter peak level metering, margin display, battery status, ID number, tape source status and machine status.
 - Nickel Metal Hydride battery powers the PDR1000 for 2 hours. AC Adapter/charger included.
- PDR1000TC Additional Features—**
- All standard SMPTE/EBU time codes are supported, including 24, 25, 29.97, 29.97DF, & 30 fps.
 - External sync to video, field sync and word sync.

- **HS1000 Master Sync module** ensures drift will be no more than 1 frame in 10 hrs.
- **HM1000 Headphone Matrix** provides a rotary switch for selection of Stereo, Mono Left, Mono Sum, & M/S (mid-side) Stereo modes.

SONY TCD-D8

This is the least expensive portable DAT machine available. It features 48kHz, 16-bit sampling, automatic and manual recording level, a long play mode for 4 hours of recording on a 120 minute tape, & an anti-shock mechanism. It includes a carrying case, a DT-10CLA cleaning cassette and an AC-E60HG AC adaptor.



PORTABLE HARD DISK RECORDING

Roland VS-880 V2

This new version of the popular VS880 incorporates powerful additional software functions that allow you to get the most out of this baby's incredible creative potential.

- FEATURES—**
- Auto Mixing Function records and plays back your mix in real time
 - Easy recording with an inserted effect in "INPUT-TRACK" mode.
 - Process the master output with a specific inserted effect such as total compression.
 - Scene change by MIDI program change message.
 - Simultaneous playback of 6 tracks in MASTER MODE recording
 - Digital output with copy protection.
 - 10 additional effect algorithms (30 total) including Voice Transformer, Mic Simulator, 19-band Vocodex, Hum Canceller, Lo-Fi Sound Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ, and Vocal Canceller.



- 100 additional preset effects patches.
- Use MIDI program & control change messages to edit and change effects.
- In total, over 20 powerful and convenient features in editing/scene sections have been added. Some require the optional effects expansion board.

Fostex DMT-8 VL

The latest in the Fostex HD recording family, the DMT-8 VL truly brings the familiarity of the personal multi-track to the digital domain.

- FEATURES—**
- 18 bit A/D, 20 bit D/A conversion.
 - Built in 8 channel mixer. Ch 1 & 2 feature mic & line level.
 - 2 band EQ and 2 AUX sends per channel.
 - Cut/Copy/Move/Paste within single or multiple tracks.
 - Built-in MIDI Sync, 6 memory locations.
 - Dual function Jog/Shuttle wheel provides digital "scrub" from tape or buffer without pitch change. 1/2X to 16X.
 - Divide the drive into 5 separate "virtual reels", each with it's own timing information.
 - **NO COMPRESSION!**



KEYBOARDS & SOUND MODULES

Roland A-90EX Master Keyboard Controller



The A-90EX is an 88-note, weighted master controller with one of the best keyboard actions currently on the market. It offers incredibly realistic piano sounds, powerful controller capabilities and 'virtual' programmable buttons which can be configured to operate your software and other devices. The A-90EX combines the majestic sound of a concert grand, the expressive action of a fine acoustic keyboard and the comprehensive MIDI functions of a master controller—all in a portable stage unit.

Roland JV-2080 64-Voice Synthesizer Module



FEATURES—

- 64-Voice polyphony / 16-part multitimbral capability.
- 8 slots for SR-JV80 series expansion boards.
- 3 independent effects sets plus independent reverb/delay and chorus.

- Roland resets the standard with the incredibly expandable JV-2080 64-Voice Synthesizer Module. This amazingly powerful package offers unprecedented expandability, digital signal processing, and remarkable operational ease, all housed in a 2-unit rack-mount design.
- 6 outputs, Main Stereo and 4 assignable.
- **NEW** patch finder and Phrase Preview functions for easy access to the huge selection of patches.
- Large backlit graphic display
- Compatible with the JV-1080, XP-50, and XP-80.

Roland JP-8000 Analog Modeling Synthesizer

Analogy is back—FOR REAL! This synth delivers a killer array of real-time control, Roland's revolutionary new analog modeling technology, and FAT, FAT SOUNDS! The assignable ribbon controller, 4 octave keyboard, built in arpeggiator w/ external sync capability, and RPS function will make this little gem a must have for DJs and re-mixers as well as that funk musician looking for some new inspiration.



FEATURES—

- 8 note polyphonic, 49-key velocity sensitive keyboard.
- Newly developed DSP oscillator
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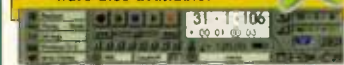
Studio 5 LX Macintosh MIDI Interface



The Studio 5 LX is arguably the most advanced MIDI interface on the market today. It incorporates a MIDI patchbay, MIDI processor, and SMPTE synchronizer with its interface functions, all in a 2 rack space unit.

- 15 Independent MIDI ins and outs.
- SMPTE reads and writes all formats—24, 25/29.97/29.97DF/and 30.
- Network multiple units, 240 MIDI channels each.
- 128 patches, unlimited instrument controls.
- 2 assignable footswitch inputs, 1 controller input.
- 8X speed when used with OMS.
- Internal power supply.

Studio 3 & 4 MIDI Interfaces, and Vision 3.5 sequencing software also available.



Mark of the Unicorn MIDI Time Piece AV 8x8 Mac/PC MIDI Interface



The MTP AV takes the world renowned MTP II and Genlock, ADAT sync, and word clock sync, even Digidesign superclock!

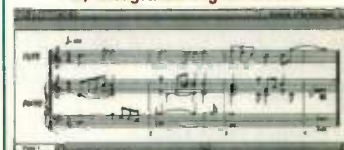
- Same unit works on both Mac & PC platforms.
- 8x8 MIDI merge matrix, 128 MIDI channels.
- Fully programmable from the front panel.
- 128 scene, battery-backed memory.
- Fast 1x mode for high-speed MIDI data transfer.

Pocket Express Mac/PC MIDI Interface



With the pocket express you get a 2 in, 4 out, 32 channel interface that supports both Mac and PC. It also features a computer bypass button that allows you to use it **EVEN WHEN THE COMPUTER IS TURNED OFF.**

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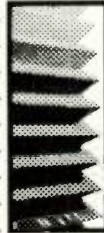
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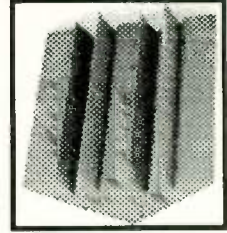
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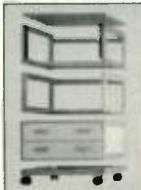
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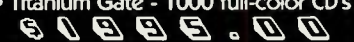
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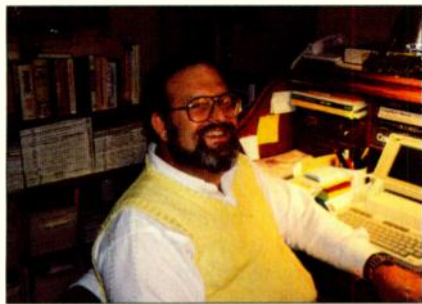
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BY MARTIN POLON



The moment of truth for most project studio owners is the way in which their business flourishes. What seems to inevitably happen for most studios that are deemed a success by their owners/investors/creators, is that the use of the studio increases. Unfortunately, it seems to be a rule of such commerce that the more a studio succeeds, the more likely it is to run afoul of the law in some way or another.

That this situation occurs so frequently to project studios may likely reflect the reality that smaller studios lack the business and/or legal components found in larger operations, and the staff operates with the "ignorance is bliss" school of management.

One area that has by now become so patently over impacted for small studios is the issue of those project studio operators who work from within residential settings and neighborhoods. The issue of "location legality" is still a critical one for many project studios. It is still a fact that many large-scale recording studios bear a significant concern about project studios that operate from residential settings (and neighborhoods vis-a-vis local zoning violations) with residential property taxes, trash pickup, police and fire services, electrical rates, telephone rates, and insurance rates, and the lack of mandat-

ed inventory taxes and business levies.

The point of the larger studios is that small studios run as businesses in residential areas have an unfair and probably illegal competitive edge. There is also a resentment by some in the large studio business with tax deductions for equipment purchases "by the little guys" and the solicitation of recording customers in a residential setting and/or of serving artist groups who would otherwise record in a larger facility but for the fact that they use a project studio.

Not to belabor the point, but for those who do have their project studios in a residential setting, do it by the book. Insulate your acoustical and monitoring spaces so that the neighbors will not file police noise complaints, keep the number of cars parked down to the minimum, and avoid noisy after-session raps on the front lawn at 2 AM. If you are charging for your studio's usage from within a residential neighborhood, check (anonymously if necessary) with your local planning department and see if it is legal. It may be. If not, you may want to rethink what you are doing since a zoning violation could carry significant financial penalties.

Wherever your studio is located, make sure that all of the changes made to your structure are done correctly by approved vendors and contractors. Be absolutely accurate in adhering to the latest electrical code. If not, then a chance visit by the localities building inspection and electrical inspection departments could cause the temporary or permanent shutdown of your recording facility — not to mention onerous fines.

Other issues besides building codes and localities zoning also can cause unfortunate contact with the law. When you buy equipment, buy it from an authorized dealer. Most people in the audio industry do not realize the number of project facilities that have been closed down for good because the police have stepped in to recover stolen property. Think of it this way: why would some one sell a brand-new multichannel mixing console off the back of a large lift-gated truck at an unbelievable price unless there was something "hinky" about the deal. Same concept

for flea market pro-audio booths. Used gear can also be sold in this way and sometimes is legitimate and sometimes is not — do you want to gamble? It is probably safer to take your equipment money to Las Vegas or to Atlantic City and throw the dice or spin the wheel or flick the cards.

Never let anyone in your studio who is using drugs. Now I know this sounds rather pompous and ridiculous, considering the way those making music sometimes behave, but consider this: Frequently, at seminars on how to manage recording studios, there are employees of the U.S. Drug Enforcement Administration (DEA) or of the U.S. General Services Administration trying to learn how to best manage the audio recording studios that the government has seized as assets because of illegal drug usage. On the other hand, if the studio is small enough, the government will simply sell the assets at a sale. These sales occur regularly and nationally, and are advertised in both your local papers and in the pages of *The New York Times*. Probably a good reason to avoid losing your facility over someone's careless mistake.

There are other ways to get in trouble with the law. Not paying your income or real estate taxes is high on the list, but nothing will get you closed down faster than not turning your employee's state and federal wage withholding taxes in to the appropriate agency at the appropriate time. It is sort of like taking a swim in shark infested waters with fresh hamburger strapped to your body. You may survive the experience but you really won't want to repeat it soon!

[Editor's Note: EQ does not encourage the use of project/residential recording facilities as commercial sites unless those facilities adhere to all the tax and legal regulations commercial studios do. (Which, of course, then makes your studio a legal commercial studio, not a project studio....) The basis of the project studio is that it is used as a personal recording environment by an individual or group to archive and promote its own music or audio creations, not to rent its facilities for use by outside clients. Clients would come to you or you would approach them based on your specific talents, not based on your facility. —HGL] **EQ**

ACROSS THE BOARD

continued from page 170

smooth and warm, then it is easy to do. If you want it to sound raw and edgy, then that is just as easy. If you like using analog outboard gear, then you can do that too. There are plenty of high-quality converters to get the analog audio in and out.

I realized from the Capricorn sessions that digital mixes shine when pumping 48 tracks of rocking bass, stabbing horns, and mellow 40-piece string sections through all of the bit crunching, but what about minimal acoustic tracks? The Oxford mixes were recorded on the Sony 3348 48-track digital machine, but sometimes I used only two tracks for acoustic guitar and vocal. I never used more than 18 tracks. The results of even the guitar/vocal mixes were head and shoulders above the analog console mixes I did before we got to Nashville.

NEXT MONTH

So now I have mixed albums on the AT&T DISQ digital console, the AMS/Neve Capricorn, and the Sony Oxford. For next month, I am mixing an entire album on the Yamaha 02R fed by ADATs and Pro Tools. Stay tuned. **EQ**

RED ROASTER

continued from page 132

houses), and allows entering data on SCMS, preemphasis, and ISRC codes.

The final steps are to click on Write, specify the write speed (2X worked with the test machine, a Microboards' PlayWrite 2000 CD-R drive with Sony CDU920S mechanism), and, if you're cautious, do a simulated write to make sure the system is actually up to the task. If it is, burn away.

A major reliability boost is that Samplitude can buffer as much audio as you want, within the limits of system memory, meaning that it will work with just about any drive — fast IDE, SCSI, even those that do thermal recalibration (just set a buffer time long enough to cover for the recalibration time-out). I set the buffers for 30 seconds of audio, and could probably burn a CD from a floppy (just kidding, but you get the point).

TRIAL BY MANUAL

S-CD is not too difficult to figure out through trial-and-error, which is a good thing since the manual unnecessarily obfuscates the subject through a com-

ination of propriety jargon (why not just say "playlist" instead of VIP?), confusing translation from German, and poor organization. The interface has a few quirks as well, but for 90 percent of all the CDs you'll burn, you won't have to get into the program too deeply. It's set up to do most of what you need fairly painlessly.

THE BURNING QUESTION

S-CD is a wonderful program that has been far more reliable cutting audio CDs than the CD backup programs I've used to cut data CDs. The price is right, and if you need more juice, there's the 24-bit edition. Samplitude has always been underrated as a hard-disk recorder, but with this particular variation, Hohner MIDIA has a winner on their hands.

Acknowledgments: Thanks to Charles Alcon at Microboards (www.microboards.com) for supplying the Sony CD-R drive (as well as advice and sympathy), and also to Art Munson at Cassette House, suppliers of DAT tapes, CD-Rs, and other media, for donating enough CDs so that I could really run the system through its paces (anyone need some coasters?). You can contact Cassette House at 800-321-5738 or via their Web site at www.tape.com. **EQ**

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They *LAUGHED* when I said they could have **Perfect Pitch**

...until I showed them the secret!

► The **TRUE STORY** by David L. Burge

It all started in ninth grade as a sort of teenage rivalry.

I'd slave at the piano for five hours daily. Linda practiced far less. But somehow she always had an edge that made her the star performer of our school. It was frustrating. *What does she have that I don't?* I'd wonder.

Linda's best friend Sheryl sensed my competition. One day she bragged on and on about Linda, adding more fuel to my fire.

"You could never be as good as Linda," she taunted me. "Linda's got Perfect Pitch."

"What's Perfect Pitch?" I asked.

Sheryl gloated over a few of Linda's uncanny abilities: how she could name any tone or chord—*just by ear*; how she could sing any pitch she wanted—*from mere memory*; how she could play songs after only *listening* to them on the radio!

My heart sank. *Her fantastic EAR is the key to her success* I thought. How could I ever hope to compete with her?

But later I doubted Sheryl's story. How could anyone possibly know F# or Bb just by listening? An ear like that would give one a *mastery of the entire musical language!*

It bothered me. Did she *really* have Perfect Pitch? I got up the nerve, approached Linda, and asked her point-blank if it were true.

"Yes," she nodded to me aloofly.

But Perfect Pitch was too good to believe. I rarely pressed. "Can I test you sometime?"

"OK," she replied cheerfully.

Now I'd make her eat her words...

My plan was ingeniously simple: I picked a moment when Linda least suspected. Then I boldly challenged her to name tones *by ear*.

I made sure she had not been playing any music. I made her stand so she could not see the piano keyboard. I made certain that other classmates could not help her. I set everything up perfectly so I could expose her Perfect Pitch claims as a ridiculous joke.

Nervously, I plotted my testing strategy. Linda appeared serene. Then, with silent apprehension, I selected a tone to play. (She'll never guess F#!)

I had barely touched the key, "F#", she said. I was astonished. I played another tone. She didn't even stop to think. *Instantly* she announced the correct pitch. Frantically I played more tones, skipping here and there all over the keyboard. But somehow she knew the pitch each time. She was *SO amazing*. She knew tones like colors!

"Sing an Eb," I demanded, determined to mess her up. She sang a tone. I checked her on the keyboard. She was right on! Now I was starting to boil. I called out more tones for her to sing, trying hard to make them increasingly difficult. Still she sang each note perfectly on pitch.

I was totally boggled. "How in the world do you do it?" I blurted.

"I don't know," she sighed. And to my dismay, that was all I could get out of her!

The dazzle of Perfect Pitch hit me like a ton of bricks. My head was dizzy with disbelief. Yet from that moment on I knew *Perfect Pitch is real*.

I couldn't figure it out...

"How does she DO it?" I kept asking myself. On the other hand, why can't everyone recognize tones by ear? It dawned on me that most musicians can't tell a simple C from a C#, or the key of A major from F major! I thought about that. A musician who cannot tell tones by ear?! That's like a painter who can't recognize the rainbow of colors on his palette! It seemed odd and contradictory.

I found myself more mystified than ever. Humiliated and puzzled, I went home to work on this problem. At age 14, this was a hard nut to crack.

You can be sure I tried it myself. I would sweet-talk my three brothers and two sisters into playing tones for me, which I would then try to identify by ear. My attempts were dismal failures, a mere guessing game.

So I tried playing the tones over and over in order to memorize them. I tried to feel the "highness" or "lowness" of each pitch. I tried day after day to learn and absorb those elusive tones. But nothing worked. After weeks of struggle, I still couldn't do it. So I finally gave up. Sure, Linda had an extraordinary gift—the ultimate ear for music, the master key to many talents. I wished I had an ear like that. But it was out of my reach.

Then it happened...

It was like a miracle. A twist of fate. Like finding the lost Holy Grail. Once I had stopped *straining* my ear, I started to listen *NATURALLY*. Then the incredible secret to Perfect Pitch jumped right into my lap.

I began to notice faint "colors" within the tones. *Not visual* colors, but colors of *pitch*, colors of *sound*. They had always been there. But this was the first time I had ever "let go"—and *listened*—to discover these subtle differences within the musical tones.

Soon—to my own disbelief—I *too* could recognize the tones *by ear!* It was simple. I could hear how F# sounds one way, while Bb has a *different sound*—a sort of like "hearing" red and blue. The realization struck me: THIS IS PERFECT PITCH! This is how Bach, Beethoven and Mozart could envision their masterpieces—and know tones, chords and keys all by ear—*by tuning in to these subtle "pitch colors" within the tones*.

It was almost childish—I felt sure that *anyone* could unlock their own Perfect Pitch



with this simple secret of "color hearing."

Bursting with excitement, I went and told my best friend Ann (a flutist) that she too could have Perfect Pitch. She *laughed* at me.

"You have to be *born* with Perfect Pitch," she asserted. "You can't develop it."

"You don't understand what Perfect Pitch is or how it works," I countered. "I couldn't recognize one note before. Now it's *easy*."

I showed her how to listen. Timidly, she confessed that she too could hear the pitch colors. With this jump start, it wasn't long before Ann had *also* acquired Perfect Pitch.

At school we became instant celebrities. Classmates would test our ears, endlessly fascinated with our "supernatural" powers. Yet to us, our hearing was nothing "super"—just natural.

Way back then I never dreamed I would later cause a stir among college music professors. But when I got a little older, I eventually started to explain my discovery to the academic world.

They *laughed* at me. Many told me: "You must be *born* with Perfect Pitch; you can't develop it." I'd listen politely. Then I'd reveal the simple secret—*so they could hear for themselves*. You'd be surprised how fast they would change their tune!

As I continued with my own college studies, my "perfect ear" allowed me to progress far faster than I ever thought possible. I even *skipped* over two required courses. Perfect Pitch made *everything* easier—performing, composing, arranging, sight-reading, transposing, improvising—and it skyrocketed my *enjoyment* of music as well. I learned that music is definitely a HEARING art.

And as for Linda?

Oh yes—I'll backtrack. Time found me at the end of my senior year of high school. I was nearly 18. In these three and a half years with Perfect Pitch, my piano teacher insisted I had made ten years of progress. But I was not fully satisfied. I still needed to beat Linda. Now was my *final chance*.

Our local university sponsored a music festival each spring, complete with judges and awards. To my horror, they scheduled me as the last person to play—the *grand finale* of the entire event.

Linda gave her usual sterling performance. I knew she would be tough to match, let alone surpass. My turn came, and I went for it. Slinking to the stage, I sat down and played my heart out.

Guess what? I scored an A+ in the most advanced performance category. Linda only got an A. *Sweet victory was music to my ears—mine at last!*

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For 16 years now, thousands around the world have proved that my Perfect Pitch method works, including research at two leading universities. Now I'd like to show YOU how to experience *your own* Perfect Pitch! You only need a few basic instructions. I've put everything I know into my **Perfect Pitch® SuperCourse**.

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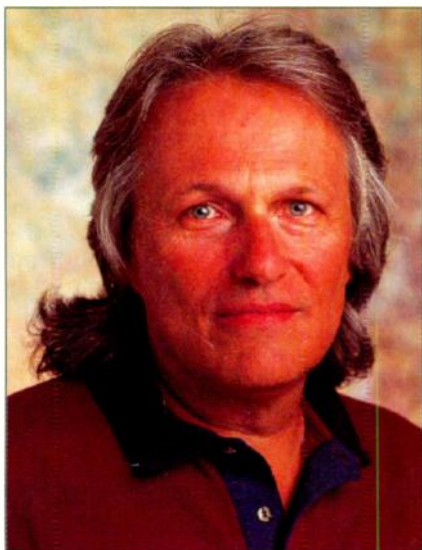
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Sticking with Zeros and Ones

The real reasons why I love digital

BY ROGER NICHOLS



There is no reason to continue living. I have seen the enemy, and it is me. I can never go back to mixing on an analog console ever again. Last month I mixed an entire album on the AMS/Neve Capricorn digital console at Chung King Studios in New York. This month I got to mix an entire album on the Sony Oxford digital console. I already tossed my analog console over the cliff by my house. If it wasn't for my Yamaha 02R and 03D, I would have forgotten to let go and gone over with it. Working with digital consoles is like flying IFR. Once you get over the initial learning curve and check ride, life is so much better.

WHEREFORE ART THY OXFORD?

The Sony Oxford console I used is located at the new Ocean Way Nashville studios. Owner Alan Sides decided to attack the studio scene in Nashville in a big way. The site was an old church that has been a Nashville landmark for many years, first as a Presbyterian church, then as Tony Alamo's Nashville headquarters.

The studio complex consists of

three rooms. Studio A sports the largest discrete Neve console in the world in a 25- x 32-foot control room. It is basically two Neve 8078 consoles glued together to get 80 inputs. The studio supplies the client with walkie-talkies and binoculars so you can communicate with the producer at the other end of the console. The recording room is 50 x 75 x 30 (h) feet with four 15- x 18- x 20- (h) foot iso booths.

Studio B is the Oxford room. A 30- x 34-foot control room with a 30- x 40-foot recording room. The Oxford as fitted at Ocean Way is 120 inputs.

The Sony Oxford console consists of two identical control surfaces with a center master control section sandwiched between them. On the left and right console sections, you can call up any group of 24 channels to view and modify. There can be up to five groups totaling 120 inputs. You can display 1-24 on the left side and 25-48 on the right side, or the same group of channels can be displayed on both sides at the same time. Two producers can actually ride the same vocal at the same time. One guy can be boosting the level while the other guy is lowering the level. The automation mathematically adds the two moves together and the results get stored as the resultant move. You may laugh, but I could have used that feature many times in the past 30 years.

There are seven color LCD screens for menus, waveform displays, and parameter selection. It works like a Mac with multiple monitors. Just scroll the mouse pointer to the one you want and click. Any monitor can display any parameter screen, so you can have all of them looking at the same EQ curve.

Most of the knobs and switches on the console had LEDs next to them for software configuration. Each knobs' function depends on the mode you are

in. The knobs provided 1000 steps per revolution with the LED pointer in the moving part of the knob. It looked and felt like you were actually doing something when you just barely turned the knob.

The linear faders are not the P&G faders that everyone has come to expect with moving faders. These are custom made for the Oxford console and utilize a direct coupled linear motor instead of a rotary motor and string to position the fader. They are fast and accurate without overshoot. You can be 20 dB below the unity gain point and still make moves of a tenth of a dB if you want to.

Of course, you could connect digital outboard gear directly. I used the Lexicon 480 provided by the studio, but I also brought along a Lexicon MPX-1, a Roland 880 reverb, a TC Electronic M-5000 with two engines, a TC Electronic Finalizer, and a Valley Audio Dynamap 730 digital limiter. It was easier than plugging in analog gear because there was no balanced audio or ground loop hums to deal with, and I knew that the outboard gear I brought would be the same level and sound exactly the same as they did when plugged into any digital console.

DIGITAL VS. ANALOG, STILL

I love digital. I like the way digital recordings sound. I like the way digital consoles do nothing of their own to the sound; only what I want them to do. The instruments sound so open and nice that it is almost beyond belief. The attacks of a piano, the mouth-watering highs of a shaker or tambourine, the sweet overtones of an acoustic guitar, and the vocal that sounds like it is right there in the room with you. That is what I like about digital recording and mixing.

If you want an instrument to sound

continued on page 168

I like the way digital consoles do nothing of their own to the sound; only what I want them to do.

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