

# Windows SoundCard Shootout

# EQ

PROFESSIONAL  
PROJECT  
RECORDING  
& SOUND

SEPTEMBER • 1998

*Bela Fleck Records  
'Left of Cool' With...*

# No Strings Attached

## Reviews:

Yamaha 01V  
Digital Mixer

Sonic Foundry ACID

beyerdynamic  
Digital Mic

Furman  
Headphone Mixer

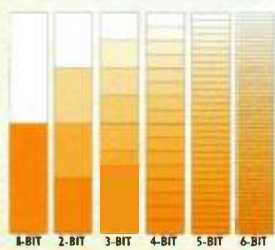
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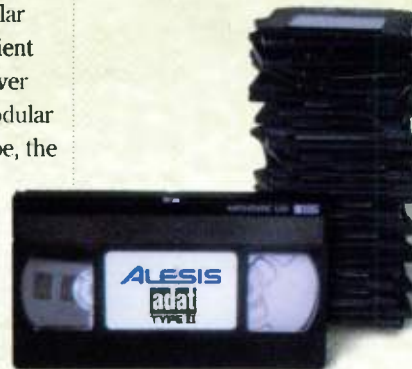
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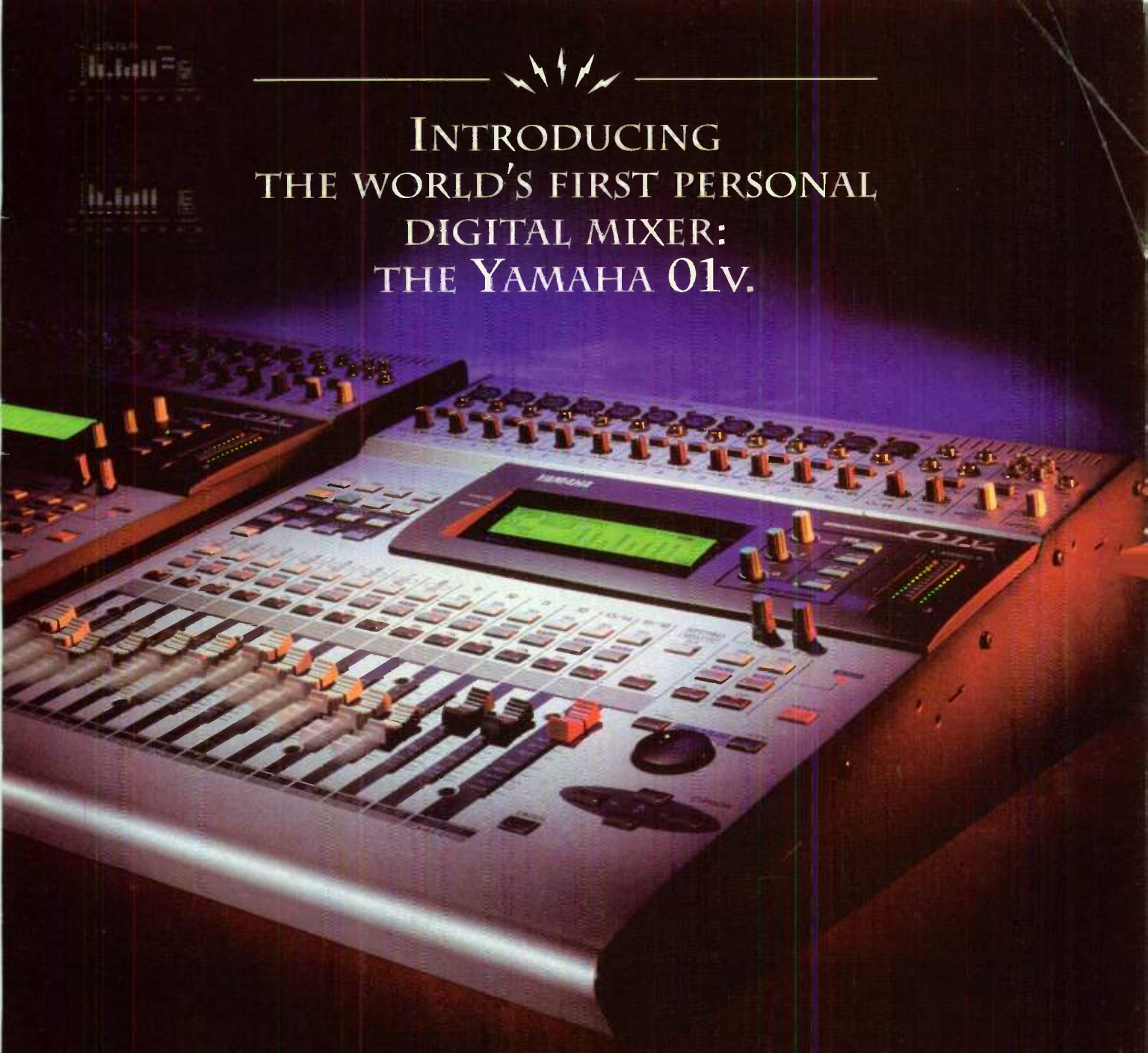
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CIRCLE 69 ON FREE INFO CARD  
World Radio History

# Advanced Digital Mixer

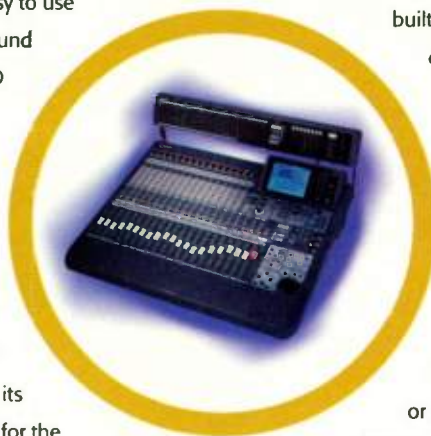
Panasonic is taking digital further today with the DA7 digital mixer, an entirely new standard in quality, flexibility, affordability, ease-of-use and value. 24-bit converters, 32 inputs, 8 buses, 32-bit processing, moving faders, instantaneous recall of all settings, surround sound mixing...nothing this fully featured has been this easy to use or affordable... and it's available NOW! Incredible sound quality, Internal 32-bit processing and 24-bit A/D and D/A converters give this mixer sound worthy of consoles costing several times its price.

**Easy-to-use.** The DA7 is one powerful mixer. If you know how to run a traditional mixer, you already know how to run a DA7, since it has a smart, user-friendly design. To access any of the 32 channels, just press its select button and all parameters for the channel-EQ settings, bus and aux assign-



ments, and dynamics and delay settings come up on the large backlit LCD screen. To access individual parameters, just touch the appropriate knob in the console's master section. This automatically calls up the sub-menu on the LCD screen and zooms in on the appropriate function. No more digging through menus or getting lost in functions; just adjust EQ, Pan/Assign, Dynamics/Delay, or Aux... and you're there.

**The power to control.** The EQ section offers 4 true overlapping parametric bands active on every channel (with the top and bottom bands switchable to low or high peak/shelving, or low pass, or high pass filters). Each Aux return also provides two bands of fully parametric EQ. The dynamics section offers variable attack/release times and levels for threshold and ratio on each channel, and delay is adjustable up to a maximum of 300ms. 50 Memories each are provided for EQ, Dynamics and individual channel settings. In addition to full dynamic moving fader automation of 32,000 events, there are 50 "snapshot" or "scene" memories. Plus, a Macintosh and



windows software package (that greatly expands the capabilities of the DA7), will soon be available.

**Surround sound at your command.** You'll be mixing surround soon.

The DA7 is equipped to mix 5.1 channel today. The DA7 has 3 built-in panning modes, and all modes provide full dynamic control of panning, and can be copied, stored, and transferred to any other channel. An optional MIDI joystick gives you yet a fourth method of surround control.

**MIDI and more.** The DA7 features 4 up/down/left/right cursor keys that can be switched to output MIDI Machine Control commands to MDMs, sequencers, or workstations.

Data entry is done through the large parameter dial or an alphanumeric keypad. There's also an undo/redo button, a solo-mode set, and a built-in Talkback mic.

**Take on the world.** The rear panel sports 16 analog mic/line inputs (8 XLR with individual software-switched phantom power, and 8 with TRS); 16 channel inserts (pre-A/D); and 6 auxiliary send/return jacks (1,2 use S/PDIF; the rest use +4dB 1/4inch connectors). Along with the 2 digital and 4 analog Aux returns, the DA7 has 38 total inputs. Digital I/O, provided via XLR connectors switchable between AES/EBU and S/PDIF, offer the master out signals and they can be assigned to inputs 15 and 16.



The DA7 rear panel also offers MIDI In and Out, word clock I/Os, both a 9-pin RS-422/485 serial port and PC port for Mac or Windows with software support for both, a 1/4 inch footswitch jack for controlling Talkback on/off or automatic punch in/out, and a D-15 subconnector for the optional meter bridge. So, take your digital mixing further

today by going to the nearest Panasonic dealer and auditioning the DA7 for yourself!



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Surround Sound

Full Automation

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Taking Digital Further

**Panasonic**  
Broadcast & Digital Systems Company

# EQ

PROFESSIONAL PROJECT  
RECORDING & SOUND  
VOLUME 9, ISSUE 9  
SEPTEMBER 1998



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*Bela Fleck with his cat, Animal, in his project studio (Bela's studio, that is, not the cat's). Photo by Beth Gwinn.*

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# A Good Man(ual) Is Hard To Find

I seem to have struck a nerve with some manufacturers over the sorry state of their user manuals. If you've read my equipment reviews lately, you'll find that a number of otherwise excellent products have earned my displeasure due to their poorly written, inaccurate, or nonexistent manuals. Manufacturers are certainly reading *EQ*, because I'm getting phone calls, e-mails, and even FedEx documents with the "correct" manuals — just in time for me to review the equipment.

This doesn't bother me a bit. In fact, it assures me that they (like *EQ* readers) take the reviews in this publication seriously. Here's where I'm coming from on this issue.

1. I read all owner/operator manuals. I really do. And not just the ones for the equipment that's sent to me for review. [I used to make a living setting up packaging machines and building laser-trimmed military-grade resistors. If you didn't read and follow the SOPs (Standard Operating Procedures) and calibration manuals, it was "Goodbye Mr. Chips."]

2. Poorly written manuals cost you time and money. Crazy translations of foreign languages into English may at first seem funny, but when you're trying to determine the switch settings for a new microprocessor or memory chip it can get expensive both in lost time and blown semiconductors. A manual's text should be edited by a person whose primary language is native to the country for which the manual is intended. This is not foreign-phobia on my part. If I can't understand what the manual's saying, the more casual reader is really going to be in trouble.

3. I know a good manual when I see one. It has the quick start-up information up front, detailed info in the middle, and technical appendices in the back. Plus, a full set of technical-support phone numbers prominently displayed. And Web site listings, FTP sites, fax numbers, and anything else to help get users the correct information. I like to see schematics included too, because even if you can't read them, hopefully the guy trying to fix your latest whiz-bang device can.

4. Send in the clowns. Put in some humor; humor helps to explain complex ideas. Even someone like me often won't read all the way through "dry" manuals. Check Mackie's manuals for what can be done with a little humor.

5. Include a complete technical manual, too. A full-blown technical manual should be included with any complicated or expensive gear. If I've just spent 5 grand on something, I want a tech manual included. If it's too expensive to print and ship a thick book, manufacturers could include a PDF file on a CD-ROM (and put it on their Web site). I've heard it hundreds of times that it's some special design that they don't want copied, but give me a break. Any competitor that wants to copy a design will simply put it on the bench for a week and reverse engineer it.

6. I don't forgive sins of omission. In recent columns, Eddie Ciletti has detailed undocumented fixes and error detection procedures for certain digital tape recorders. Way to go Eddie. Shame, though, on the manufacturers for not making it available in the first place. Web sites make up-to-the-minute information inexpensive to distribute. (Always check the FAQ area at the manufacturer's site for any late-breaking information.)

7. It's important. It's very important to have all of the pertinent information at your fingertips. When you've got a one-of-a-kind gig, and your latest mixer/compressor/recorder/processor takes a nosedive and resets itself to factory defaults an hour between soundcheck and the broadcast.... Take your manuals with you. My system rack has a drawer with copies of all the important stuff for emergencies. Many times I've bailed myself out of a bad situation by simply "looking it up." Instead of looking like a dork, suddenly I'm a hero because I could produce the information immediately.

8. Read your manuals. Question: "What do you call someone who reads the manual from cover to cover?" Answer: "A Power User." Devices today are way too complicated to just bash on them and hope for the best. If you want to get the most out of your equipment, read the manuals. And if it doesn't make sense, complain (nicely) to the manufacturer. After all, it's in their best interest to have you as educated about their equipment as possible.

—Mike Sokol, Contributing Editor



# CREATIVITY

# DPS12



The concept seems so obvious.

Combine a digital disk recorder and a digital mixer in one convenient box. Eliminate complex interfacing and keep everything in the digital domain. Add optional internal effects. Creative heaven. But up until now, buying anything that you could afford meant settling for almost enough tracks to record your music. Or a compressed data format that sounded almost as good as CD quality. Or a user interface that you could almost make sense of.

Now, finally, the concept of integrated digital recording and mixing lives up to its promise with Akai's **DPS12** Digital Personal Studio. Designed for those unwilling to compromise their creative vision, the DPS12 combines a 12-track random-access digital recorder (with professional-quality uncompressed 16-bit sound and powerful non-linear editing) and a 20-channel MIDI-automatable digital mixer in one compact, incredibly easy-to-use package. All at a price that is nothing short of spectacular!

It's creativity without compromise.

# WITHOUT COMPROMISE

Since its founding in 1984, Akai Professional has consistently pushed the boundaries of affordable recording technology. From the original MG1212 12-track recorder/mixer, to the breakthrough A-DAM digital multitrack, to the DR4/8/16 professional disk recorders and the DD family of audio post-production tools, each Akai recording product has established new levels of performance and value.

Now, with the DPS12, Akai builds on this experience to bring professional-quality digital recording and mixing to the personal and project studio at a price that's truly unexpected. (Not to prolong the suspense, it's \$1499 msrp.)

## More Is Better

At the heart of the DPS12 is a powerful random-access disk recorder capable of simultaneously playing 12 (that's twelve) tracks of uncompressed 16-bit linear audio from optional removable JAZ cartridges or SCSI hard disks. More tracks for more recording flexibility. More control of individual parts. Less need for track bouncing.



And speaking of more tracks, the DPS12 also lets you record a whopping 256 virtual tracks. At mixdown, you can assign any virtual track to any of the twelve physical tracks for playback. This gives you the freedom to compare multiple takes, experiment with alternative arrangements, even combine parts of different virtual tracks on a single track.



At the front end, the DPS12 lets you record on up to 8 tracks simultaneously through six high-quality balanced analog inputs and a S/PDIF stereo digital input at sampling rates of 48kHz, 44.1kHz or 32kHz.

## The Wait Is Over

Since the DPS12 is a random-access recorder, waiting for tape to wind is a thing of the past. The DPS12's locating functions let you move instantly to any of

12 quick-locate points and 100 stack memory points. The stack points can even be named, so you can identify locations by the part of the song (FIRST VERSE, CHORUS, etc.) or even by specific lyrics.

## Easy Editing

Ever wonder how people managed to write anything before word processors? Well, after experiencing non-linear editing on the DPS12, you'll wonder the same thing about audio. Insert, Delete, Erase, Copy or Move sections of single- or multi-track audio from anywhere to anywhere within your project. This is stuff you just can't do with tape.

The DPS12's high-quality jogging and graphic waveform display let you zero in on your precise edit points.



Then call up an edit screen (complete with a graphic representation of your selected operation) and Do It.



Next, use the special Play To and Play From keys to confirm that seamless edit. Changed your mind? 256 levels of Undo are only a button press away.

## Mix Master

The DPS12's digital mixer is a model of flexibility. During mixdown, for example, the inputs can be used as an additional 8-channel Thru Mix, perfect for adding tracks from sequenced MIDI modules to the 12 recorded tracks for a true 20-channel mixdown. Two AUX sends and digital EQ are also included.



Found the perfect mix? Mix setups can be saved as snapshots and recalled at any time. And since all of the DPS12's faders and panpots generate MIDI controller data, you can record your mix moves into an external MIDI sequencer (like our MPC2000, for example) and play them back in sync with the DPS12.

## Effects Inside

If you want the added convenience of integrated internal effects (not to mention keeping your mix entirely in the digital domain), add the EB2M multi-effect processor board. The EB2M gives you two independent studio-quality effects processors with a wide variety of programmable effect types.

## It Wants To Be Your Friend

It's one thing to give you all the tools you need to do the job, but it's another thing entirely to make them useable. It is, quite simply, really easy to use. At the heart of its friendliness is its informative graphic display. Backlit and easy to read, it always gives you a clear picture of what's going on with your DPS12. Frankly, it's all so simple that most of you may never have to take the manual out of the box.

## Check It Out

There's a lot more to the DPS12 than we could fit in this ad, so head down to your local Akai Professional dealer for some quality hands-on time with a DPS12. And don't forget, that's

# \$1499<sup>-</sup> msrp.



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## POWER PLAY

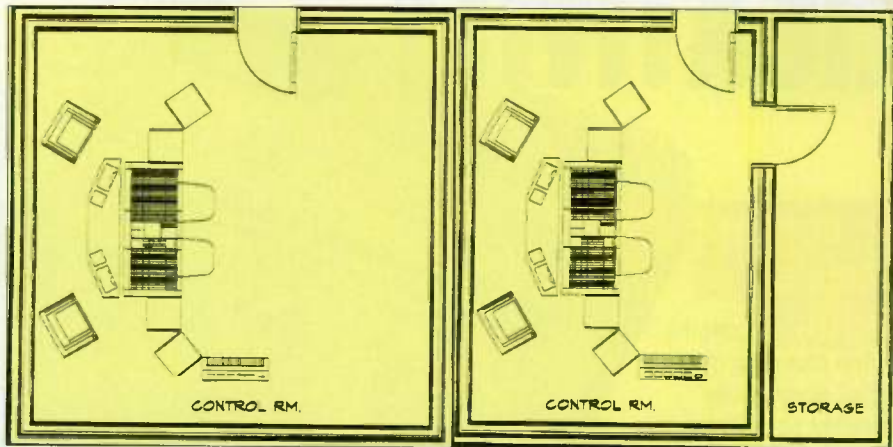
In reference to David and Crystal's question about their SPX90 power supply ("Power to the People," EQ&A, August '98): First of all, over the last couple of years, we've received a number of SPX90's with blown or malfunctioning power supplies. Is this an inherent problem? Well, no...and yes. The design of the supply is very rugged. There was a problem (by no means unique to Yamaha) with the compound used to lock components down to the board in order to minimize vibration damage and intermittents. During the period that these were manufactured, Yamaha, and many other off-shore manufacturers of electronic equipment, used an organic compound that tends to carbonize with age (this is easy to see, as the mass, which was originally tan, turns dark-brown).

This normally would not pose a problem, except that the compound was applied not only to the bodies of the components, but to the leads (and PCB proper) as well. As the unit ages, this mass of compound becomes one *huge* resistor; you can actually read resistance across it with any voltmeter! The net result is that unintentional current paths are formed and either: [a] the output voltages of the supply are thrown totally out of tolerance, or [b] the supply overheats and self-destructs. In the first case, simply scraping away the offending mung and replacing it with a vinyl-based hot glue will alleviate the problem. In the second case, damaged components must be replaced.

Speaking of components: most of the discrete parts, as well as the power supply assembly for the SPX90 are no longer available from Yamaha, however, ECG replacements are available and work fine. In agreement with Eddie Ciletti's comments, *do not work on switch-mode power supplies if you are not familiar with them!* There are high voltages and critical component tolerances at work here, so if you are not familiar with the trials and tribulations of this power supply design (and there are entire volumes written on this subject), bring it to someone who is.

Finally, if you have an SPX90, please don't go calling Yamaha whining about this. They are by no means liable since they had no way of predicting how the compound would age over a 10+ year period. By now, these units, while they are still cool, have lived past their normal intended life expectancy. Get with it and go 20-bit!

John R. Frondelli  
Tech Services Director  
dBm Pro Audio/Music Services



DESIGN DEBATE: Fig. 2 from John Storyk's article.

## DESIGN DEBATE

I enjoyed John Storyk's article on Acoustic Treatments for studios in the June '98 issue. It benefits everyone concerned when more light is shed on the need for sound control, as this is all too often the forgotten stepchild in facility design and outfitting.

My main reason for writing is that I want to clarify for EQ readers what I believe John was intending when he wrote about eliminating room ratio problems. While room ratios can at times dictate horrific amounts of low-frequency abnormalities, I don't want readers to be misled into thinking that using the so-called "golden" room ratios touted in library and textbooks is a panacea and will negate the need for additional low-frequency control.

The largest problems I commonly witness in control rooms are poor placement of the mix position with regard to the rooms' front-to-back room geometry and a gross insufficiency of low-frequency absorption in general and at rear-of-room in particular. If I understand his writings correctly, I believe that studio designer Tom Hidley feels control rooms today are universally severely under-trapped at their rear ends and allow far too much low-frequency information to return to the mix position.

I want to warn those readers who might have an urge to decrease the size of their rooms as suggested in fig. 2 of John's article that, without careful planning, they might be subjecting their mix positions to worse low-end problems than they are currently experiencing. It is a widely accepted opinion that rooms with higher internal cubic volumes inherently sound better than those with lower ones, so I'd hate to see readers hacking into their spaces without a thorough understanding of the ramifications of their actions.

Of course, it is advantageous to start off with a properly shaped room, but, given as there is no "perfect" set of room ratios, it's safe to say that all rooms require low-fre-

quency absorptive help — and to a far greater degree than most people realize.

Rather than performing structural modifications, I feel strongly that a far safer way to correct a room's low-frequency problems — especially an apparent lack of low frequencies at the mix position — is to introduce low-frequency absorption to the rear of the room at the tri- and dihedral corners, as well as on the rear wall itself. I tend to shy away from resonators and membrane absorbers as low-frequency control devices because of the possible side effects inherently associated with them if they're improperly designated or implemented. Passive devices like acoustic foam bass traps are free of these potential problems and are far "safer" for most users to implement on their own.

Articles like John's help broaden the public's understanding of acoustics as a whole and thus improve their enjoyment of creating sound in their own facilities. I appreciate your letting me put my two cents' worth.

Eric Smith  
Founder and President  
Auralux Acoustics, Inc.  
Indianapolis, IN

## UP AND COMING

I appreciate Roger Nichols's candid article on "The Good, The Bad, The Ugly," June '98, however, I was disturbed when I read that I was on his ugly list simply by categorical association. Maybe he needs to know that, while I charge less than Crescent Moon and the others for 24-track analog, I don't offer massages or haircuts either (unless they want to go to Supercuts...well, I can't stop that).

The beautifully appointed big budget studio is a dream for many, and a reality for some who have "made it." Others are on their way up and really try to make an effort.

Wayne Ricker  
Hollywood Recording Studios Inc.  
Pembroke Park, FL

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## APPETITE FOR DESTRUCTION

**Q** *I have a black face Alesis ADAT with 289 hours on it, which just recently starting eating tapes when the Stop button is hit. It operates fine during play. I took it apart and cleaned the head and rollers, but that didn't do the trick. Any suggestions?*

*John Malvey  
via Internet*

**A** If you haven't already changed the idler tire (between the two reel tables), I highly recommend "listening" to the mode switch as described in my *EQ* article "Crunch a la Mode" [November '97]. While there is an alignment procedure associated with this part, you will at least be able to determine its condition. If scratchy, have it replaced!

Eddie Ciletti  
Contributing Editor  
*EQ* magazine

## BAKING TIPS

**Q** *I have a serious problem: Ampex stopped selling 457 tape, which I use on my Fostex R8 recorder. If I switch to 456, will I need to recalibrate my machine? Would you mind explaining what all the adjustments are for? I have a tone generator that can provide 100 Hz, 1 kHz, and 10 kHz.*

*Jon Edwards  
via Internet*

**Q** *I have two questions regarding your recent *EQ* article ["A Recipe for Tape Restoration," July '98]. How long are the baked tapes playable after baking? What is and where does one buy a photographic thermometer? I just ordered my very own Snack Master [dehydrator]!*

*Mick F. Cantarella  
via Internet*

**A** I am writing a "global reply" to the above two questions because the subject matter is so similar.

Future *EQ* articles on analog tape machine maintenance are planned. An article about (not) aligning narrow format machines appeared in the April '97 issue of *EQ* and is presently on my Web site. Ampex 457 is just a 1-mil version of 456 (1.5 mil yields 1200 feet on a 7-inch reel; 1 mil yields 1800 feet). Thinner tape yields better tape-to-head contact for narrow format machines. You might try contacting Maxell. Maxell is on my list of "companies to contact" because they make a wide variety of both digital and analog tape.

The reason I recommend *not* attempting an alignment yourself is that there is no Repro head. The single-head design does double duty, making the machine really hard to align. The best "alignment" for a narrow format machine is to have the heads resurfaced.

It is apparent that more people are having difficulty getting parts and even tape for their machines. On occasions,

when I have discussed keeping analog machines alive, a list of companies specializing in third-party support has always been published (see the list below). I can not emphasize enough the importance of supporting them by buying wear-item parts now rather than waiting until the last minute.

Perhaps it's time to create an "Analog Tape Group for User Support" (AT-GUS?). A database of users would be helpful so suppliers could anticipate user needs. In the jukebox world, *Always Jukin'* is a monthly newspaper that lists suppliers and provides useful tips. Maybe *EQ* could start a new section called "Get the Flux," specifically to address analog tape issues.

Concerning tape baking, tapes remain playable for perhaps a few months. I have considered placing silica gel packs in the boxes to see if, by absorbing moisture, the usable time can be extended. Tapes can be rebaked several times. Either a "photo" or "candy" thermometer can be used because they include the range of temps we are concerned about (95-150 degrees Fahrenheit). They are available wherever photo and baking supplies are sold.

Here's a list of third-party parts suppliers:

- Athan Corporation (Ampex, Otari, Sony/MCI, Studer, 3M); tel: 415-589-5206
- ATR Service (Ampex); tel: 415-574-1165
- MDI Precision Motor Works (Otari); tel: 508-562-4420
- JRF Magnetic Sciences (heads and restoration); tel: 973-579-5773

Sincere thanks to all who read and support my column. It is so helpful to get such diverse feedback! I am trying to write a book about tape machine maintenance, but with so many machines to repair, progress is slow!

Eddie Ciletti  
Manhattan Sound  
Technicians, Inc.  
NYC, NY



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## HEAD GAMES

**Q** *A studio with an Otari MTR 100 had been having difficulty reading SMPTE. They traced the problem down to a very worn head, which they ordered. The new head arrived 4-1/2 months later, and I came in to do the install only to discover that the connectors didn't fit. Oops! It was a Record head, not the required Reprro head!*

*Otari says that the studio ordered the wrong head and is charging a restocking charge of 15 percent. At about \$4000 for a single head, that's a chunk of change. Worse yet is that it will take an estimated 2-1/2 months more to receive the correct head.*

*Imagine having an unusable machine for months? I highly suggest that everyone check his or her heads for wear and order them way in advance. Neither JRF nor Sprague stocks the Otari heads because they're so expensive.*

*Michael Gore  
via Internet*

**A** Regarding your recent e-mail to EQ regarding the troubles your customer experienced with the incorrectly ordered Otari MTR-100 head, there are a few issues that I would like to clarify for you and your intended recipients.

I agree with you that a 2-inch, 24-track replacement head for an MTR-100 is an expensive item. This is a precision part that is manufactured wholly by Otari, not a third-party vendor. The \$4000 per head stack correlates to about \$165 per track, which doesn't sound so bad when you think of it that way. In any event, they are expensive, and, as you know, should be cared for properly to maintain their peak performance and long life.

Although it appears that we did make a mistake in ordering the wrong head for the MTR-100, we in fact waived the restocking fee for this customer, since it appeared to be our fault. Also, lead times for replacement heads are extremely long, and we understand the strain that this puts on our customers. In this particular case, we contacted Japan and have arranged to have the proper head sent via overnight international courier at our expense, the moment one is available.

These efforts and concessions by Otari are by no means extraordinary. When we make a mistake, we do our best to make the customer satisfied and the situation right. This is part of our continuing effort to maintain Total Quality Assurance. I certainly hope that you will clarify these

issues with the intended recipients of your e-mail message.

Thank you for your input, and I appreciate the opportunity to improve our customer support efforts. If there is anything I can do to help you in the future, please do not hesitate to contact me personally.

*Mike Babbitt  
National Technical Services  
Manager  
Otari Corporation*

## CLONE ALONE

**Q** *I bought two Fostex CX-8 "XT clones" in January '97. I thought it was a good deal. How'd I know they'd be discontinued and disinherited? I love 'em just the same, but support is lacking.*

*Unit 1 went to Fostex service early this year for "init" problems and came back with version 1.06 software. Unit 2 still has version 1.04 and came up with the dreaded "CAL PG" syndrome. After spending an hour and a half at the Alesis Web site with no luck (or even a clue), I checked out Eddie Ciletti's site after reading "Taming the Hot Rod." Bless your heart! I had it fixed in 15 minutes!*

*Unit 2 is also showing 9999 head hours even though both units are really at about 235 hours. I don't know when or why the "9999" popped up. If you can give me a clue, I would really appreciate it.*

*Jim Perry  
via Internet*

**A** Your "Fostex" machine is really an Alesis XT. Congrats on the deal. I too had the 9999 problem. Your head hours merely need to be reset. This requires a special chip from Alesis, which they won't even sell to me. Take your machine into a service center and have them give the machine a once over.

*Eddie Ciletti  
Contributing Editor  
EQ magazine*

## ASK US

Send your questions to:  
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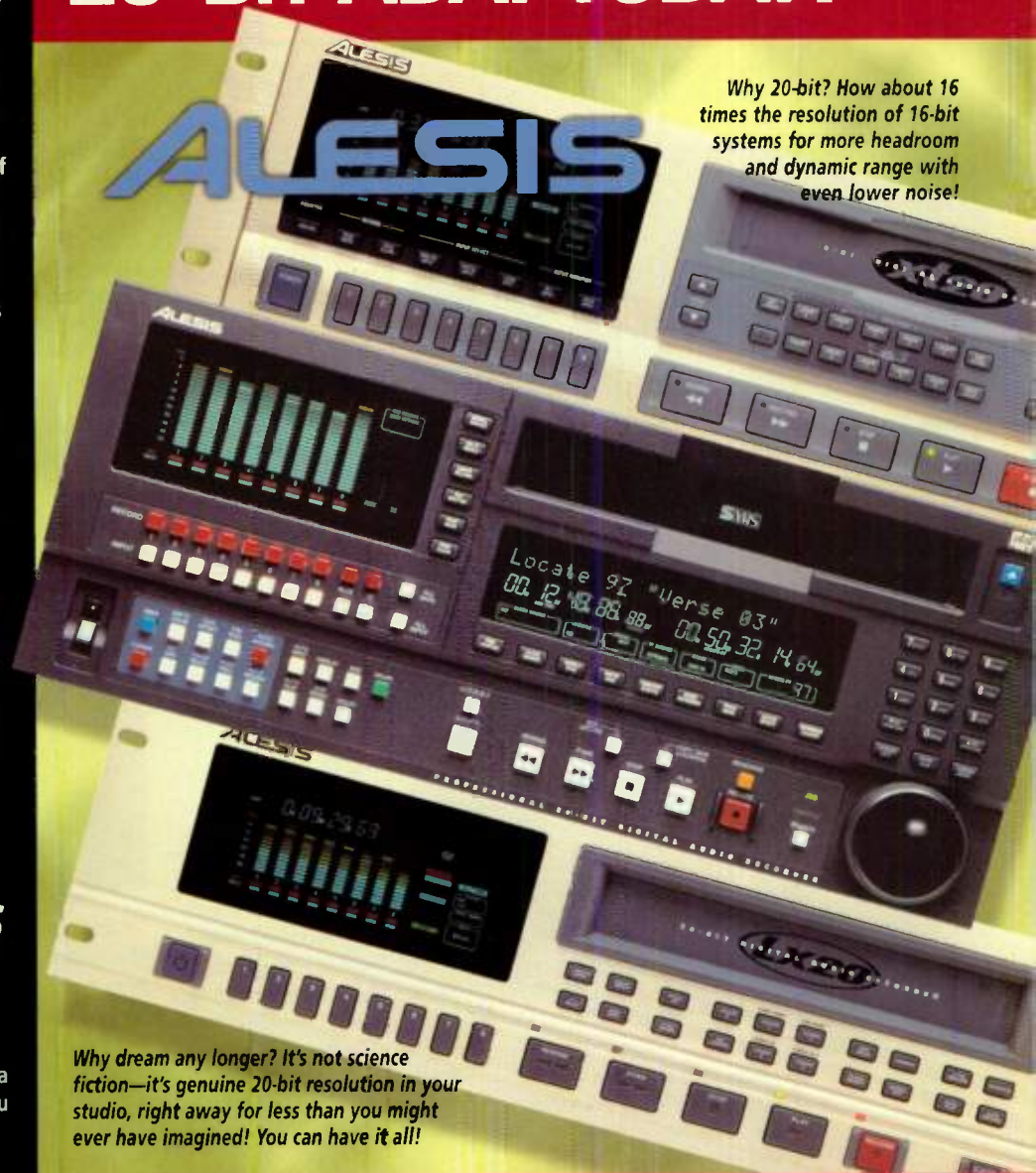
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HR824

According to *Mix* magazine's recent field test of the HR824...

**"Frequency response was the flattest we have measured so far... there can be no question... they speak the truth."**

**"The HR824s performed admirably, allowing us to distinguish very fine shades of tonal color and to establish subtle timbral and harmonic relationships between sounds. When the mixes were played on other monitors, including some that cost more than twice as much, they translated very well. The overall imaging was extraordinarily clear and detailed."**

Because the HR824 is active, we can precisely match each transducer's actual output. During final assembly, each HR824 is carefully hand-trimmed to  $\pm 1.5$  dB, 39 Hz 20kHz. As proof, each monitor comes with its own serialized, guaranteed frequency response printout.

## ■ EXTREMELY WIDE SWEET SPOT.

Instead of a traditional, narrow "sweet spot" directly between the monitors, you'll discover that the HR824s have a wide, "sweet zone." They maintain a wide, coherent, stereo panorama that lets you move from side to side — and share what you hear with others.

Again, *Mix* magazine... **"[HR824s] also have a wide off-axis listening range, due to the high-frequency dispersion of the waveguide...the mids and highs were tightly focused, and the stereo image well defined."**

## ■ EXTENDED LOW FREQUENCY RESPONSE

(sub woofer is built in\*). The HR824 has the lowest frequency response of any 8-inch near-field

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\*A large honeycomb composite piston mounted on the back of the cabinet couples with the front woofer, acting as a subwoofer.



AC power and input connectors (1/4" & XLR) extend directly from the bottom of the amplifier down, allowing the cabinet to fit flush against any surface.

overhang, distortion or "tubbiness."

**Mix** further states...

**"The HR824s handled the ultra-low bass remarkably well... Mackie asserts that the HR824s are smooth from 39 to 20k Hz ( $\pm 1.5$  dB), and our tests corroborated the claim. This is no mean feat for monitors this size, and at this price."**

## ■ BRING ON THE HR824s. HOLD THE ICEBERGS.

Simon Franglen and his cohorts worked on the blockbuster hit *Titanic* at Castle Oaks Studio in Calabasas, CA. The studio was equipped with expensive studio monitors (one each for left, center and right) and a matched sub

woofer. When Simon received three Mackie HR824s, he immediately did a series of rigorous listening tests against the old monitors. The unanimous decision: replace the studio's previous near field monitors with the HR824s.

**"The difference was extremely pronounced,"** explains Simon. **"Three HR824s gave us better bass response than the larger monitors with a sub woofer. The HR824s were louder, had more dynamic response, and the imaging throughout the room [was incredible]."** Simon says the HR824's sweet spot is much larger, which made listening to things easier, "when you were off to the side of the room." "Apart from

very expensive speakers," says Simon, "I've not come across any other speakers that sound as good. They absolutely tell me what I'm putting on tape."



■ One person who's taken Mackie to heart is British-born synth player/producer **SIMON FRANGLEN**. You may not know his name, but you most certainly know his work. Simon Franglen's curriculum vitae includes work with Grammy winners Eric Clapton, Madonna, and Celine Dion (including the single from the blockbuster movie *Titanic*), rockers Yes and Crash Test Dummies, and legendary performers such as Michael Jackson and Barbra Streisand. Simon's done work in the movies, too, including *Titanic*, *The Client*, *Dances With Wolves*, *Mission Impossible*, *Seven*, and *Contact*. He's won seven Clio

Awards for his work in television commercials—his clients have included Nike and Lee Jeans. His talents as a session synth player and programmer, as well as producer, are well-known throughout the entertainment world. With such credits, you'd think the guy was using incredibly esoteric, expensive gear. How else could he get such award-winning results? Well, Simon will be the first to say: you don't have to spend wads of money to get tough, quality sound gear. Not with Mackie.



# MONITOR—WELL WORTH DISCOVERING.

## ■ How much is unflinching accuracy worth to you?

As we talk to more and more professional engineers who have converted to Mackie HR824s, one

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Department — because our monitors can uncover miniscule audio flaws that were undiscovered during the tracking and mixdown process on “big studio monitors.” When you value the quality of your creative product, HR824s should be in your studio, too.

## ■ HUMBERTO GATICA, TRIPLE GRAMMY AWARD-WINNING ENGINEER/PRODUCER

Being at least nominally humble we thought it would take years for mixing/producing legends like Humberto Gatica to publicly admit — much less proudly proclaim — to prefer our HR824 near field monitors.

We're delighted the esteemed Mr. Gatica proved us wrong. After being turned on to HR824s by Simon Franglen, Humberto now uses them at his private facility and has carrying cases for a second pair so he can get the same accuracy in studios that haven't yet become HR824 converts. Talk about a traveling ad!

Humberto's stellar ear for mixing has served him well as a producer: Grammy awards and nominations for engineering (Chicago, Michael Jackson, Streisand) led the way to a Grammy for producing Celine Dion's "Falling Into You" and mixing/producing her 18X platinum album "Let's Talk About Love."

Mix Magazine quotes from Mix Magazine Field Test by Barry Cleveland, April 1998. Reprinted by permission. And this isn't the only glowing review we've gotten. Check out the February 1998 issue of Recording Magazine, beginning on page 30; the April issue of Pro Audio Review, page 16; and the October 1997 issue of Audio Media, page 46.

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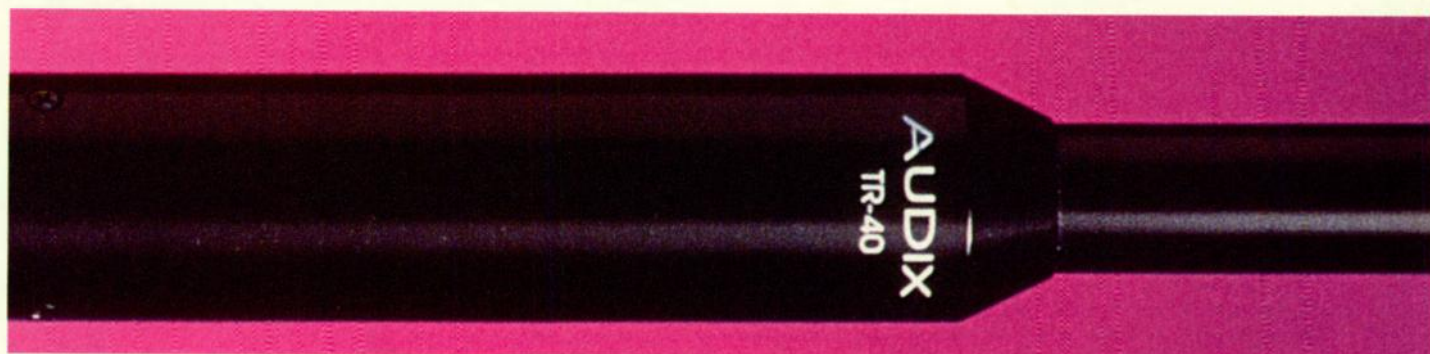


### EX-PANDED HARD DISK RECORDER

**R**oland has introduced a new addition to its line of VS hard disk recording systems, the VS-880EX Digital Studio Workstation. The new unit provides 8-track simultaneous record capability plus a built-in effects processor. The display is now backlit and the operating system incorporates Roland's EZ Routing setups for signal management as found on more recent VS-Series models. The new model provides TRS (Tip-Ring-Sleeve), balanced inputs, and both optical and coaxial S/PDIF digital outputs. Audio CD recording and data backup is available via an optional CD-R drive. For more information, contact Roland Corp. US, 7200 Dominion Circle, Los Angeles, CA 90040. Tel: 213-685-5141. Web: [www.rolandus.com](http://www.rolandus.com). Circle EQ free lit. #102.

### SAMPLE THIS!

**N**ew from Akai is the S5000 digital sampler. This unit uses the DOS FAT 32 (File Allocation Table) disk format and WAV files as the native sample format. The S5000 features 64-voice polyphony and can be upgraded to support 128 voices. Programming options allow for up to 128 multi-programs to be loaded into RAM at any one time, a "Quickload" function to load programs directly into parts, and Akai's Assignable Program Modulation. For additional information, contact Akai Musical Instrument Corporation, 4710 Mercantile Drive, Fort Worth, TX 76102. Tel: 817-831-9203. Web: [www.akai.com](http://www.akai.com). Circle EQ free lit. #103.



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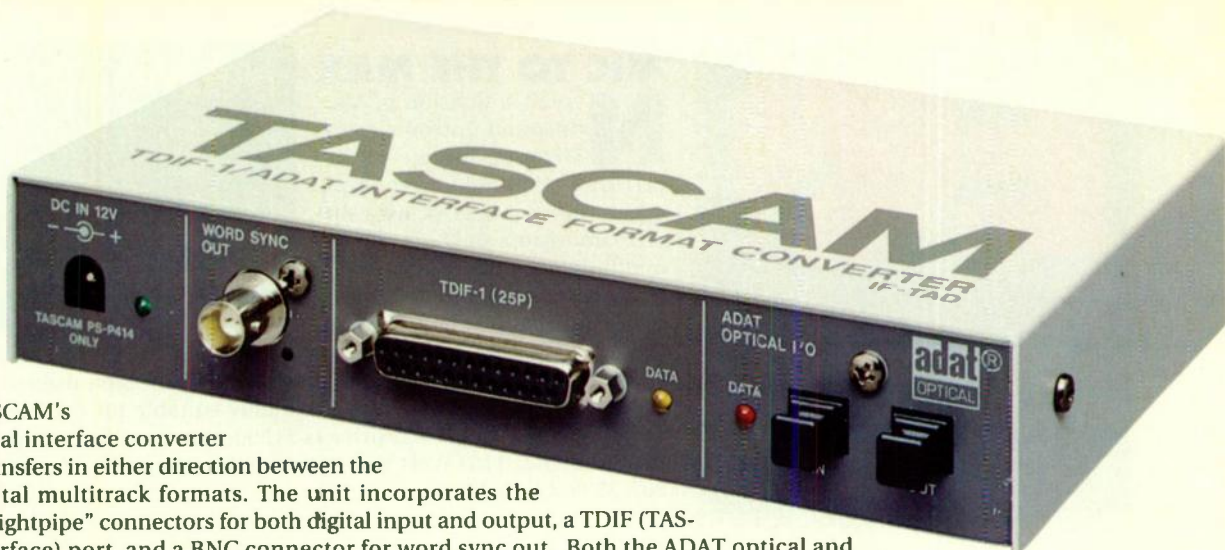
CAM Digital Interface) port, and a BNC connector for word sync out. Both the ADAT optical and

the TDIF ports have associated LEDs to indicate data activity for either format. The IF-TAD is designed for those

facilities in need of a convenient means of either receiving from or delivering material to clients in either format. For ad-

ditional information, contact TASCAM, 7733 Telegraph Road, Montebello, CA 90640. Tel: 213-726-0303. Web: www.tascam.com.

Circle EQ free lit. #104.



## WHERE IT'S A-T

**A**udio-Technica has introduced the AT4060 cardioid vacuum tube capacitor microphone. The microphone features a 2-micron-thick, vapor-deposited gold diaphragm that is designed to provide accurate reproduction of subtle sounds, especially high-frequency signals not easily reproduced by conventional large-diaphragm condenser transducers. Each 6922 tube is hand-selected by Audio-Technica engineers and is then individually aged and tested to ensure the microphone maintains optimum performance characteristics. The AT4060 operates in conjunction with the AT8560 power supply, which is included. For more details, contact Audio-Technica U.S., Inc., 1221 Commerce Drive, Stow, OH 44224. 330-686-2600. Web: www.audio-technica.com. Circle EQ free lit. #105.

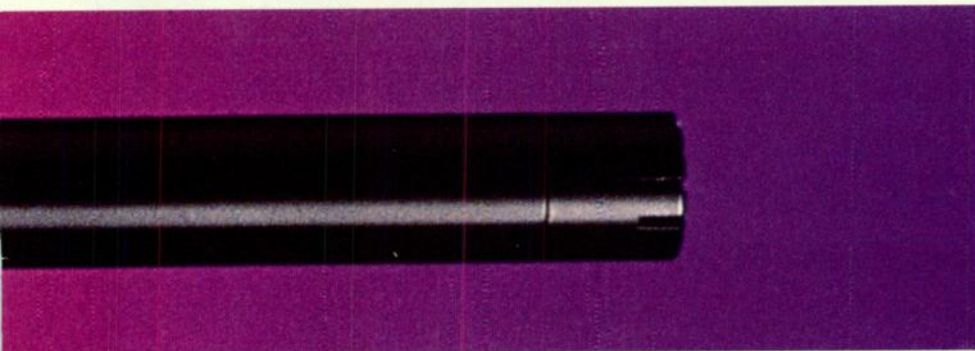
## LISTEN UP

**Y**amaha Corporation has announced the addition of the MSP5 powered monitor speakers to their line of nearfield monitors. The speakers feature a biamped design delivering 40 watts of power to each speaker's 5-inch woofer, while a separate amplifier provides 27 watts to the 1-inch titanium tweeters. Designed for use in today's digital studios, these speakers feature magnetic shielding to prevent interference with computer monitors. Both balanced XLR and unbalanced phone jacks are provided to accommodate input signals. For additional information, contact Yamaha Corporation of America, 6600 Orangethorpe Avenue, Buena Park, CA 90622. Tel: 714-522-9011. Web: www.yamaha.com. Circle EQ free lit. #106.

## THIS IS (NOT) ONLY A TEST

**A**udix announces the TR40 microphone, the first in a series of test and recording microphones. The TR40 features a 1/4-inch diameter prepolarized condenser capsule with omnidirectional polar pattern and gold-plated XLR connector,

making it good for certain studio and live recording applications such as piano, ensembles, and choirs. Another recording application for which the TR40 can be used is ambient tracks, which are used to add dimension to a mix. It can be positioned in any room to capture the room's natural sound. The suggested retail price is \$249 and includes a carrying case and clip. For more information, contact Audix Corporation, 9400 SW Barber Street, P.O. Box 4010, Wilsonville, OR 97070. Tel: 503-682-6933. Circle EQ free lit. #107.



# EQ PRODUCT VIEWS

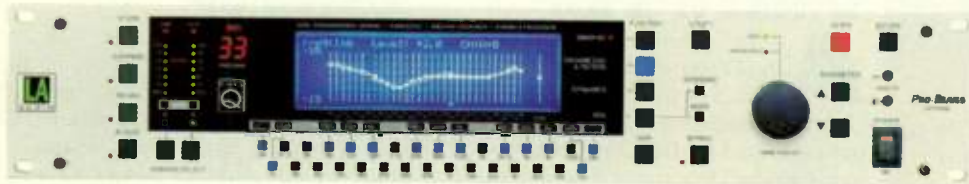
## MIC TO THE MAX

**N**eotek, a division of Martinsound, introduces the MicMAX, a state-of-the-art, dual-channel microphone preamplifier. MicMAX uses discrete transistors and high-voltage, audiophile opamps. Front-panel features for each channel include a two-digit gain readover switch, switchable input impedance, pad switch, polarity inversion, and subsonic filter. The preamplifier's design is based on the circuitry used in the Neotek Elite console system, making MicMAX highly suitable for the most pristine 24-bit recording. The suggested price is \$1200. For more information, contact Martinsound, Inc., 1151 West Valley Boulevard, Alhambra, CA 91803-2493. Tel: 626-281-3555. Circle EQ free lit. #108.



## DIG THAT SOUND

**L**A Audio presents the DigEQ, the latest addition to their Pro-Series line of products. The DigEQ is a programmable graphic and parametric equalizer. It features simultaneous graphic and parametric equalization, sweepable high- and low-pass filters, shelving EQ, compressor/limiter, and noise gate. Options include dual-channel slave units, a choice of wired or wireless remotes, digital delay, and digital I/O. For more information, contact LA Audio, 6-24 Southgate Road, London N13JJ England. Tel: 44-0-171-923-7447. Web: [www.laaudio.co.uk](http://www.laaudio.co.uk). Circle EQ free lit. #109.

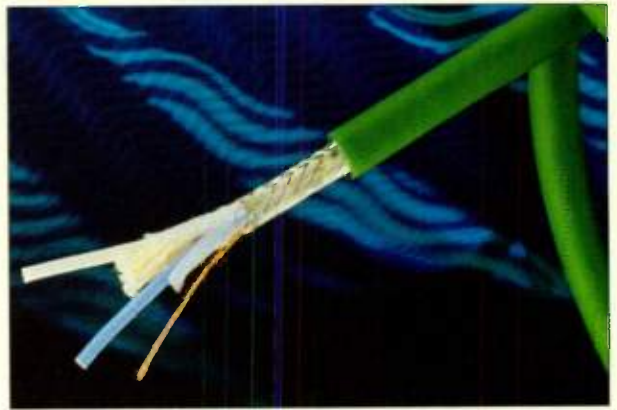


# INTRODUCING THE 48



## A TOUCH OF BRILLIANCE

**B**elden Wire & Cable Company has introduced the 1800F High Flex AES/EBU digital audio interconnect cable, the latest addition to its Brilliance family of audio and video cables. The 1800F is a high-performance, 110-ohm, shielded, single-twisted pair cable that can be used as a digital audio patch cable, an analog audio mic cable, or an interconnect cable for digital audio mics. The 1800F features a patented French Braid Shield in which two spirals are tied together via one weave. This creates 95 percent shield coverage, which results in lower levels of unwanted noise. The cable jacket is designed to simulate the properties and "feel" of rubber. For more information, contact Belden Wire & Cable Company, P.O. Box 1980, Richmond, IN 47375. Tel: 800-BELDEN-4. Web: [www.belden.com](http://www.belden.com). Circle EQ free lit. #110.



## DRUMS WITH AN ATTITUDE

**N**ew from Alesis is the DM Pro 20-bit, 64-voice expandable drum module. Packed into a single rackspace, this new drum/percussion unit incorporates 1664 high-quality drum, percussion and special effect sounds. These sounds can be augmented with additional instruments via the on-board PCMCIA card slot. Both internal and card sounds are simultaneously available. The DM Pro provides 20-bit digital converters, seven-position user-programmable panning capability, 64 memory locations for drum kits with defaults permanently stored in ROM, MIDI In/Out/Thru, and 16 customizable drum trigger inputs — each with gain, crosstalk, noise, decay, and velocity curve parameters. For additional information, contact Alesis Corporation, 1633 26th Street, Santa Monica, CA 90404. Tel: 800-5-ALESIS. Web: [www.alesis.com](http://www.alesis.com). Circle EQ free lit. #111.



## HOUR DAY



## DOUBLE YOUR OUTPUT FOR LESS THAN THE COST OF TWO SINGLE DAT RECORDERS

If you've been asking for more hours in the day, TASCAM's DA-302 Dual DAT Recorder makes your time count double. Finally, you can dub at twice normal speed with ABS time, subcode and PCM data intact. Make two masters at a time, even dub from any location on the source tape — no more rewinding! And the DA-302 costs hundreds of dollars less than you'll pay for two single units — only \$1999 (MSRP). See your TASCAM dealer or call TASCAM FaxBack at 800-827-2268 and request document #2330, The DA-302 Dual DAT Recorder. Put it to work in your studio 48 hours a day, 7 days a week.

**TASCAM**®

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# EQ PRODUCT VIEWS

## ACHIEVING ELECTRONIC UNITY

In cooperation with Yamaha Corp., TC Electronic announces the TC UNITY, the first effects plug-in card for the Yamaha 02R digital recording console. The 02R automatically senses the card when it is plugged into any one of its four I/O expansion slots. This activates complete display and fader access to all the preset and editing screens. The TC UNITY features two independent 24-bit mono in/stereo out signal processing engines, with a wide variety of effects, including reverb, chorus, delay, pitch shifter, and more. The TC UNITY is available in two configurations, one with an 8-channel AES/EBU digital I/O Sub D25 connector, and one without. For more information, contact TC Electronic Inc., 790-H Westlake Village, CA 91361. Tel: 805-373-1828. Web: [www.tcelectronic.com](http://www.tcelectronic.com). Circle EQ free lit. #112.

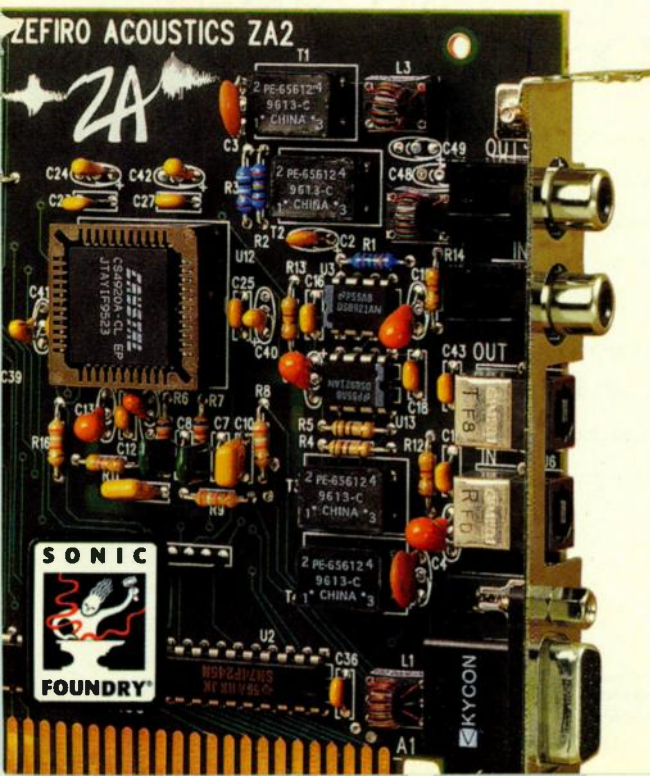
## IN PERFECT HARMONY

Housed in an attractive 1U chassis, the Vocalist Access from DigiTech is a new five-part vocal harmony processor. Designed especially for keyboard players and MIDI enthusiasts, this processor can create up to four natural-sounding vocal harmonies from a single input. The Vocalist Access comes equipped with a large LCD screen and 50 preset harmony and doubling programs. DigiTech's new processor also features ten reverb presets, a clean analog microphone pre-amp, and a Studio Ware control panel for Cakewalk 6.0 Pro Audio. For more information, contact DigiTech, 8760 South Sandy Parkway, Sandy, UT 84070. Tel: 801-566-8800. Web: [www.digitech.com](http://www.digitech.com). Circle EQ free lit. #113.



# No Other Card Can Touch It.

With built-in Sample Rate Conversion and Multi-I/O the **Zefiro Acoustics ZA2** is the Master of CD Mastering.



The ZA2 includes the professional features the other cards leave out. Its powerful 24-bit DSP sample rate converter lets you take inputs directly from a 48kHz pro DAT or a 32kHz LP DAT, and converts them on the fly to perfect 44.1kHz for CD mastering. Its Multi-I/O configuration gives you AES/EBU on real XLR cables and S/PDIF (both optical and coax) inputs and outputs, plus analog outputs for monitoring. You can use all the inputs and outputs simultaneously to do sample rate or format conversion (for example, S/PDIF in and AES/EBU out) or tricks like managing SCMS, or manipulating DAT start ID's or CD PQ codes — and you can switch back and forth between inputs with just a few mouse clicks.

The ZA2 delivers up to 24-bit recording — beyond the range of any commercially available A/D converters. It also works as a Windows sound card, converting all wave audio data (even mono, 8-bit, or 11kHz) to 16-bit stereo. You get drivers for Win95 and NT, plus Sound Forge XP 4.0 editing software and a promotional offer for upgrading to CD Architect.

Basically, the ZA2 packs in more features than we can cover in an ad. Check it out at <http://www.zefiro.com> or call 949.551.5833 and find out how affordable the right card can be.



Our new InBox has an outstanding mic-pre & built-in 20-bit A/D converter for just \$295!

CIRCLE 76 ON FREE INFO CARD



Four track digital recording

ATRAC version 4.3

AMDI time code for multi-machine sync

Individual track editing

10 input mixer

Hot Start instant playback

On the road with  
**Davey Johnstone and John Jorgenson,**  
 the red lights always mean go.



Sometimes it's hard to tell where the road ends and a song begins. That's why Davey and John are recording every chance they get during their world tour with Elton John. Their new acoustic release is going from the Sony MDM-X4MKII MiniDisc multitrack direct to CD. "The editing features make the possibilities endless," says John, "but the sound quality was really the determining factor for this project." Hear what the Sony MiniDisc multitrack recorder can do and you'll be running some red lights, too. And to find out more about their new CD, Groovemasters Vol. 2, visit [www.acousticmusicresource.com](http://www.acousticmusicresource.com).

To get a **FREE CD** sampler of their MiniDisc recording call 1-800-635-SONY ext. MD

[www.sony.com/proaudio](http://www.sony.com/proaudio)

**SONY**

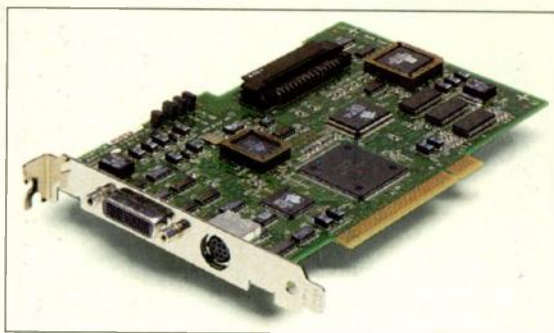


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# EQ STUDIO WARE

## IT'S A CARD

**D**igidesign announces Project II, a 24-bit digital audio card designed for use with the industry's most popular sequencing/digital recording software packages for Apple Power Macintosh and Microsoft Windows NT systems. Project II allows users to have the sound quality of Digidesign's Pro Tools|24 system without having to spend a fortune in hardware. Two audio interfaces can be connected to Project II to support up to 16 channels of professional quality I/O. Suggested retail price is \$795. For more information, contact Digidesign, 3401 A Hillview Ave., Palo Alto, Ca 94304. Tel: 650-842-7900. Circle EQ free lit. #114.



## GUITAR RECORDING REVOLUTION

**L**ine 6 introduces POD, a direct recording tool for musicians who record guitar. This fully programmable stereo desktop unit is designed to deliver a wide range of amp sounds and recreate the sound of miked speaker cabinets. Combined with the TubeTone digital modeling technology found in the AX2 212 and FlexTone Series Digital Guitar Amplifier Systems, as well as the Amp Farm plug-in for Pro Tools TDM, POD offers recording musicians a wide range of choices. The unit features a set of 16 TubeTone Amp Models and 16 professional quality digital effects setups arranged on separate knobs. POD is housed in die-cast aluminum and measures 10.5" x 7" x 3". The complete package includes a CD-ROM with editing software for both PC and Mac platforms. The price is \$399. For more information, contact Line 6, 11260 Playa Court, Culver City, CA 90230. Tel: 877-ToLine6. Web: www.Line6.com. Circle EQ free lit. #115.



## 24 BITS-O-FUN

**W**ave Distribution announces two low-cost, 24-bit, high performance, ADAT-compatible 8-channel AD and DA interfaces — the AD24 and DA24. The interfaces can be combined with ADAT-compatible PCI sound cards such as the SoundLink Alesis ADAT card, Sonorus STUDI/O, MOTU's 2408 Audio System, Event's Layla, and many others. The AD24 features 117 dB dynamic range, while the DA24 features 106 dB dynamic range. The fiber optical signal transmission to ADAT-compatible gear prevents ground loop problems experienced with other sound cards mounted in badly grounded PCs. Other features include 128X oversampling architecture, dual LEDs, and word clock in/out. Both units are built in half-rack chassis and can be used on the desktop or mounted as a pair on a 19-inch 1U shelf. The price is \$549 for the DA24 and \$749 for the AD24. For more information, contact Wave Distribution, 1170 Greenwood Lake Tpk., Ringwood, NJ 07456. Tel: 973-728-2425. Web: www.wavedistribution.com. Circle EQ free lit. #116.





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# ACID

Make changes to tempo or pitch on the fly

Matches loop tempo and pitch to a project in real time

Totally cool track mixing capability

Multiple track looping and editing

Includes hundreds of stylish loops or bring in your own

Volume/pan/effect envelopes per track

Master or slave to SMPTE timecode, whatever works for you

Multiple audio outputs

Save your funky fusion as .WAV or .AIFF

Wired for Windows 95 and Windows NT

admission:

\$399



[www.sonicfoundry.com/acid](http://www.sonicfoundry.com/acid)

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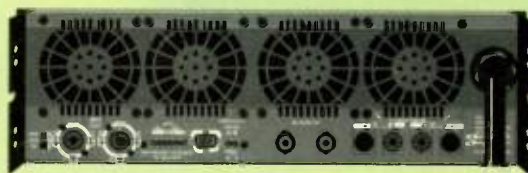


# 9000 WATTS



## PowerLight™ 9.0<sup>PFC</sup> Features

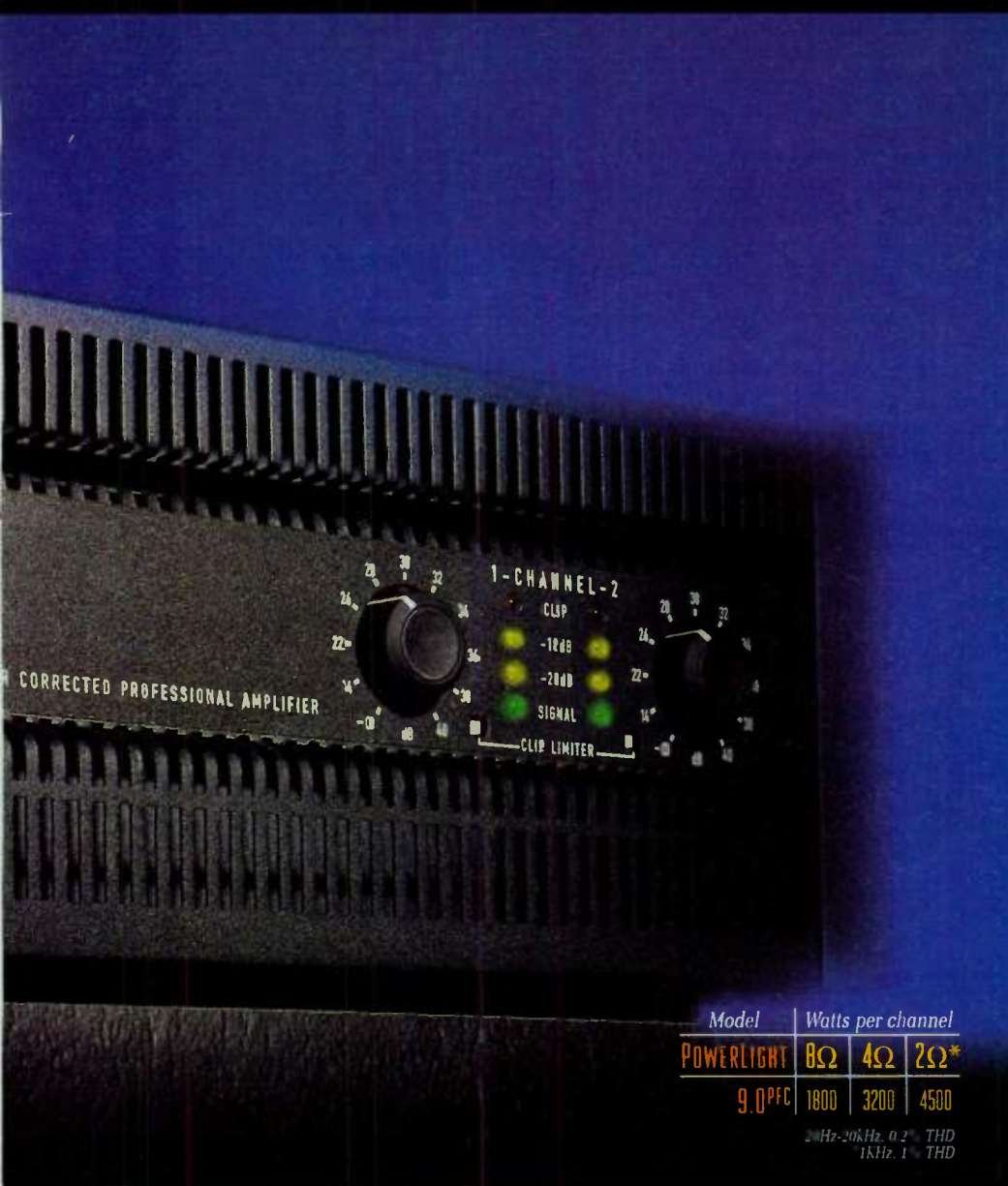
- Power Factor Correction Technology (PFC)
- Ultra-high power N-channel MOSFET's
- Constant high damping, 2000 or greater (up to 1kHz), even during clipping
- Four-step Class H Current-Cell™ MOSFET output
- Uncompromised 20Hz-20kHz full bandwidth performance.
- Distortion- <0.03% THD, 4Ω, 20Hz-2kHz @3200 watts



- Massive current capacity for huge bass
- Variable speed fans

- Lowest AC current draw per output watt
- Computer Control Data Port
- Neutrik Speaker™ output connectors
- DC, sub-audio and thermal overload protection
- Patented Output Averaging™ short circuit protection
- Balanced inputs, Neutrik "Combo" (XLR & 1/4") and Phoenix-type detachable barrier strip
- Zero-inrush at startup
- Stereo/Bridging/parallel mode switch

# 3RU, 59 LBS.



Model	Watts per channel		
POWERLIGHT	8Ω	4Ω	2Ω*
9.0 <sup>PFC</sup>	1800	3200	4500

20Hz-20kHz, 0.2% THD  
1kHz, 1% THD

## INTRODUCING THE POWERLIGHT 9.0<sup>PFC</sup>

The new flagship of the PowerLight family, the PowerLight 9.0<sup>PFC</sup>, delivers the highest continuous output capacity of any audio amplifier. With an unequaled 4500 watts/ch at 2 ohms, even the most power hungry subs will never run out of gas again. And because it includes our exclusive Single-stage Power Factor Corrected (PFC) power supply combined with a four tiered DC supply, average AC current draw is 30-50% lower than conventional amplifiers.

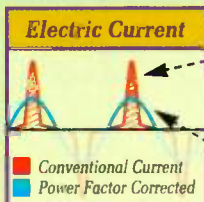
The 9.0 delivers more than just raw power. State-of-the-art high-speed components and high-power MOSFETs ensure the lowest distortion and noise, while its high damping factor maximizes speaker control. And because it's a PowerLight, you'll have a compact 3RU chassis weighing only 59 lbs. so you can drop the name "B Breaker" from your amp rack.

So check out the most powerful amp on the planet. Better yet, listen to it. For the dealer nearest you call (800) 854-4079 or visit our website for more information.

[www.qscaudio.com](http://www.qscaudio.com)

### Power Factor Correction: The Ultimate Power Supply.

The non-linear current draw of conventional amplifiers severely distorts the AC waveform, using less than 70% of the power. The smooth current draw of the PowerLight 9.0<sup>PFC</sup> uses 99% of the AC energy — the result is 9000 watts of undistorted music with an average current draw of less than 25 amps at 120VAC.



Sharp AC draw with distortion constricts usable current.

Smooth AC draw results in more usable current

World Radio History

# QSC<sup>TM</sup>

AUDIO

HEAR THE POWER OF TECHNOLOGY.

CIRCLE 51 ON FREE INFO CARD

# Shaw Thing

Styx guitarist Tommy Shaw gets creative in his new project studio

**STUDIO NAME:** SHOP (Shaw House of Pain)

**LOCATION:** Los Angeles, California

**MAIN PEOPLE:** Tommy Shaw, studio owner; Keith Marks, engineer; David Frangioni, technical consultant

**PROJECTS RECORDED:** Recent projects include the recording and mixing of *7 Deadly Zens*, Tommy's new solo album. Currently writing and recording with James Young for new Styx record.

**CREDITS:** Tommy Shaw has written and/or recorded many platinum records with Styx, Damn Yankees, Aerosmith, and many more.

**CONSOLE:** Yamaha 02R w/meter bridge digitally cascaded to a Yamaha 03D mounted in an Argosy console stand. The 02R contains two ADAT cards and a cascade card.

**RECORDERS:** Sony APR24 24-track w/time-code reader; Alesis ADAT XT machines [2]

**KEYBOARDS:** Fatar MIDI controller; EMU Pro-cussion and Vintage Keys; Yamaha TX816; Korg Wavestation SR

**SAMPLERS:** Akai S3200XL (32 MB RAM fully loaded)

**MONITORS:** Tannoy monitors; Yamaha NS10M w/Crown amp

**COMPUTERS AND SOFTWARE:** Apple PowerMac 7600/180 w/72 MB RAM, 2 GB HD, CD-ROM, Iomega Zip Drive; Digidesign Audiomedia III; Opcode Studio Vision Pro 4.01; Akai M.E.S.A. software for S3200XL; MOTU Digital Performer 2.4; Interval TransferStation 2.1; Zeep Project Manager for 02/R 2.0

**DAT MACHINES:** Panasonic SV3700 and SV3800; TASCAM DA30

**SYNCHRONIZERS:** Alesis AI-2, Studio 64XT

**OUTBOARD GEAR/MICS:** AKG C12VR; GML stereo mic pre; Fairchild tube limiter;


ADL1500 stereo tube compressor; several DigiTech guitar processors; Alesis Quadraverbs; dbx compressors; Yamaha multi-effects processors; Neve mic pre-amps; misc. vintage gear

**EQUIPMENT NOTES:** David Frangioni states: The entire studio was wired by Audio One with ProLink Monster Cable and Neutrik connectors. The patchbays are Signal Transport, as are the panels for tie lines and various interfacing. All balanced power in the room is supplied by Equi=Tech with 60 amps of line conditioning by Furman.

**STUDIO TIPS:** Frangioni continues: Tommy's vision was to create a studio that had a magic sense of atmosphere where he could write and record all of his many projects, yet the studio needed to technically be able to handle that level of demand. If you listen to his new solo album, *7 Deadly Zens*, it will be obvious that his goals were met and then some. This record sounds awesome! Producers Eddie Ashworth and Tommy got some incredible sounds and were allowed to experiment given the flexibility of owning the studio. **EQ**

**OUT IN THE STYX:** Tommy Shaw (right) and David Frangioni contemplate the *7 Deadly Zens*.





Roger Sanchez –  
world renowned  
remixer/producer and  
Sony recording artist.

“I’ve tried  
them  
all...”



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platform, integrated feature set available: multiple hardware support, a myriad of plug-in options, real-time DSP, high powered MIDI sequencing, DTP quality scoring, the list seems endless...

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**emagic**

Technology with Soul.

# CAD VSM-1 Tube Microphone

CAD combines elements of their VX2 and Equitek series to make a versatile new condenser mic

BY ROGER MAYCOCK

If you're in the market for a solid, professional recording microphone that will deliver the results expected in today's highly competitive recording market, check out CAD's new VSM-1 tube condenser mic.

The VSM-1 is a large diaphragm, single-pattern-tube condenser mic that employs a proprietary capsule with a 1.1-inch inside dimension. This capsule uses a special gold-sputtered polymer. With many competing microphones on the market using a mylar-based polymer in their design, the capsule materials found in the VSM-1's construction offer a distinct advantage, as they are less susceptible to stretching due to changes in temperature and humidity.

Another notable aspect of the VSM-1 is its servo-valve topology, which plays a critical role in controlling phase errors. With its solid-state output, this new mic is a bridge between the valve technology developed for CAD's VX2 twin tube microphone and the servo technology found in their Equitek Series — a microphone line that has garnered much critical acclaim. The benefit of the topology used in the VSM-1 lies in its ability to achieve extraordinary bandwidth with exceptional frequency and transient response.

So, what does all this mean? In short, the VSM-1 delivers exceptional gain with a low noise floor. The implementation of high-speed, low-noise, and low-distortion electronics, combined with a very aggressive price designed to fit the budgets of many

recording studios, makes this microphone a good candidate for many recording applications. CAD invested quite heavily, tooling their recently released VX2 microphone, and the VSM-1 benefits from this by employing many of the same design elements in its construction.

From an application standpoint, the VSM-1 not only makes a capable vocal mic, it is equally at home as a tool for general instrument recording. Because the VSM-1 is electronically balanced through its servo-valve topology, it remains very transparent but will still introduce enough of the second harmonic to get that warm

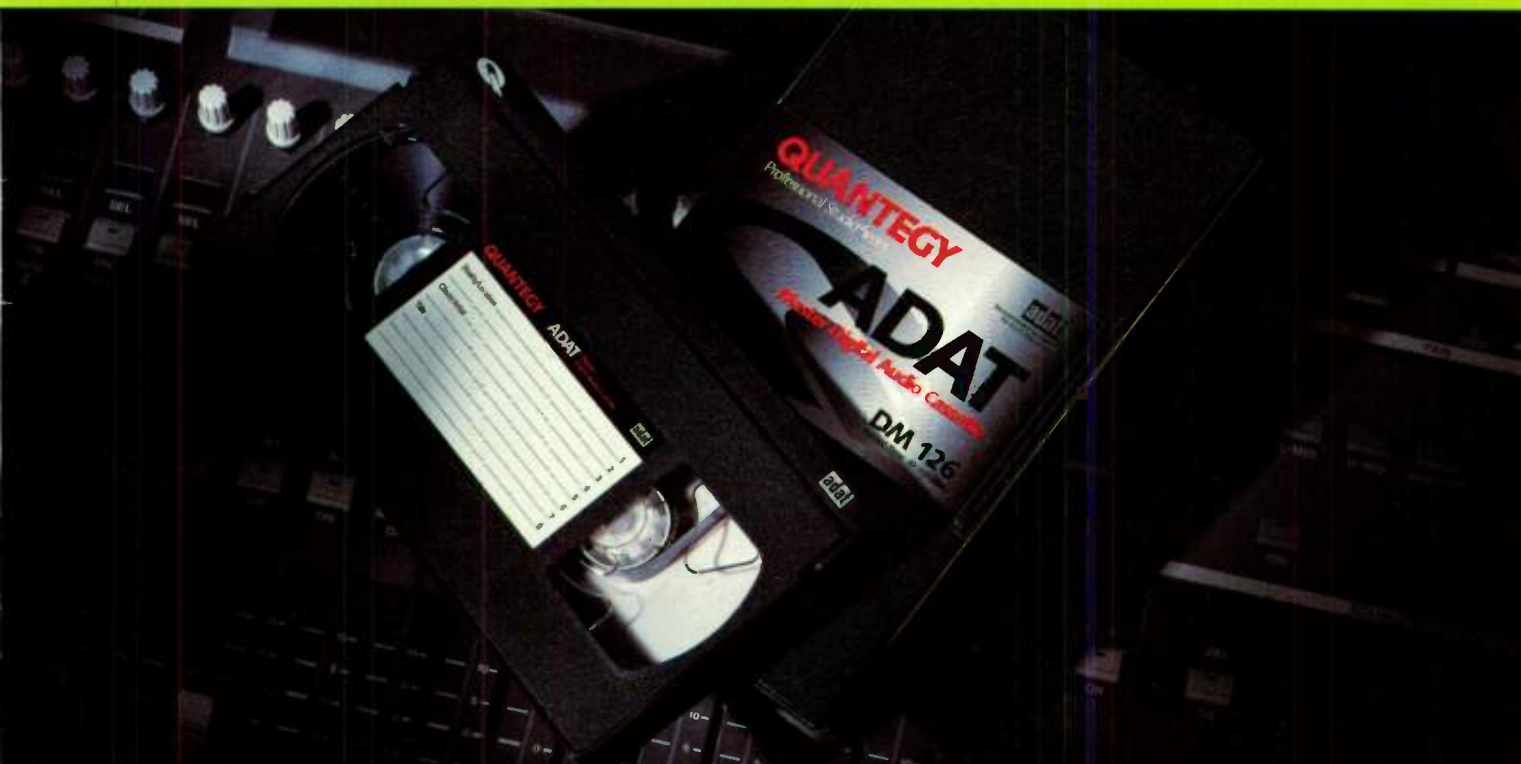
tube sound. According to vice president of Product and Market Development Bruce Forbes: "Our goal was to produce an extremely high-quality, high-performance tube microphone at the most affordable price point possible. There was no cutting corners in terms of the chassis, the body, the headscreen, or any other elements that constitute this mic."

Price is \$1299. For more information, contact CAD, 341 Harbor St., Conneaut, OH, 44030. Tel: 800-762-9266. Web: [www.cad-mics.com](http://www.cad-mics.com). Circle EQ free lit. #120.





**SKIMP ON EVERYTHING BUT THE MUSIC.** There's no shame in driving a '64 Crapola, just as long as your music travels in style. We'd suggest using the tape more gold records are recorded on, so you have every opportunity to sound your best. Ask for the Quantegy Professional Studio Series.



Phone: 800-752-0732 Website: [www.quantegy.com](http://www.quantegy.com).

CIRCLE 53 ON FREE INFO CARD

World Radio History

# Generalmusic Falcon Digital Mixer

The Falcon provides digital mixer benefits with the familiar look and feel of an analog console

BY ROGER MAYCOCK

Competition in the digital mixer arena is heating up — particularly in that market segment dubbed “affordable” or moderately priced. If you’ve been searching for a digital board to call your own but have been somewhat intimidated by the lack of knobs and the overabundance of system screens, you should take a good look at the new Falcon from Generalmusic.

Introduced at Summer NAMM, the Falcon’s look and feel resembles that of a conventional analog mixer more closely than any competing system I’ve come across to date. The console’s layout of knobs and faders is immediately familiar

to anyone who has ever used a mixer and reflects a conscious decision by Generalmusic’s design team to make the product user-friendly. The most obvious benefit of such design lies in the fact that it significantly minimizes the learning curve. The Falcon’s Real Time Control interface also makes the board quite fast in terms of its operation, thus making it a very viable tool for live or broadcast environments, not to mention multitrack recording. The unit provides an LCD for keeping track of system parameters as you work.

## WHAT GOES IN...

On the input side of the equation, the Falcon’s basic layout consists of six mono mic/line inputs employing 20-bit linear A/D converters with 64 times oversampling. Each of the six mono channels provides balanced XLR mic inputs with a 30-dB pad for use with high-quality microphones. These channels have selectable A and B inputs — providing the ability to have numerous signals feeding the console without the need for repatching.

Mixer channels 7/8 and 9/10 are stereo and accept line level or balanced signals. These inputs can function as

stereo returns for analog signal processors or can accept the output signals of stereo devices such as keyboards, samplers, and drum machines. Similarly, a stereo channel could function as a sub-input for external keyboard mixers and the like.

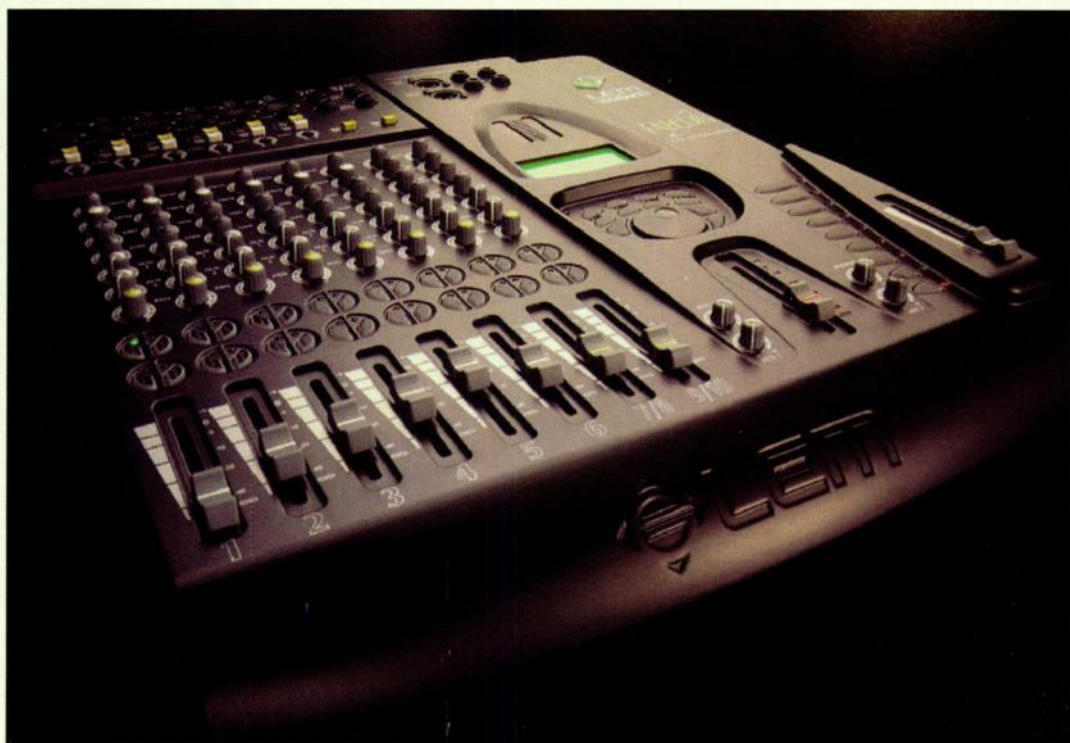
The Falcon also provides support for AES/EBU and S/PDIF digital input in the form of an XLR connector. While S/PDIF inputs and outputs are typically terminated in coaxial connectors, the XLR connector on the Falcon simply means that you’ll have to use an RCA-to-XLR cable (minus the ground). Given the mixer’s abundance of features, this is a reasonable compromise. When you add all the inputs, you arrive at a total of 12.

## TYPICALLY COMES OUT...

On the output side of the equation, the Falcon provides two stereo analog outputs — Mix 1&2. These outputs employ 20-bit linear D/A converters and make it easy to deliver matching signals to both monitor speakers and master recorder. For feeding signal to effects processors or, in a live situation, creating separate monitor feeds, the mixer provides two aux sends. While the number of aux sends

may initially seem rather low, it’s important to note that the Falcon has its own internal DSP capability with two additional “virtual” sends for effects processing (more on this in a minute).

For outputting signals in the digital domain, the Falcon supports both the AES/EBU and S/PDIF protocols. In similar fashion to the digital input, there is a single connector for both digital formats — this time in the form of an RCA (coaxial) phono plug. If you’re mixing down to most DAT machines, you’ll use a standard RCA-to-RCA cable. By the way, do yourself a big favor





and use a cable designed for digital signals — not a multipurpose cable that's been gathering dust in the studio for the last year. If you plan on sending AES/EBU digital signal, you'll need to use another RCA-to-XLR cable (minus the ground). This is known as "unbalanced AES/EBU." Generalmusic is not the first manufacturer to take this approach in the interest of maintaining costs. It works, and that's all that really matters at the end of the day. When you add all the outputs, you arrive at a total of eight.

#### MASTER OF YOUR DOMAIN

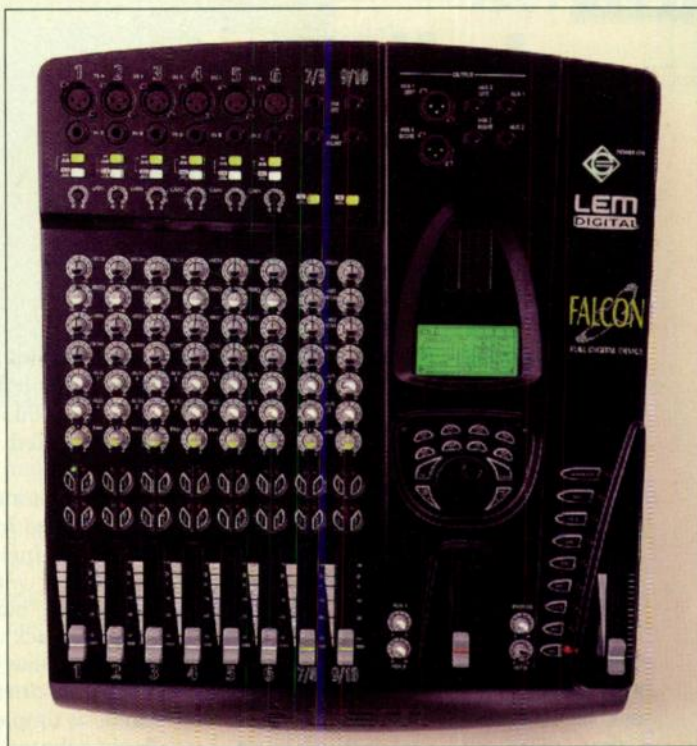
In the master section of the mixer, the Falcon provides a 60-mm motorized data entry fader tied to a series of assignment buttons. This arrangement enables prompt visualization of any parameter in any mixer section and is extremely useful when the console is used under remote control. As an example, if you want to inspect the current setting of an aux send, you simply press the corresponding assignment button and the fader immediately jumps to the current position. If you need to edit that setting, simply move the fader.

As expected, there is a stereo headphone output for monitoring purposes. Its

minimum impedance level is 32 ohms, while the output level is 2 watts.

#### DIGITAL MULTI-TRACKING

If you intend to use the Falcon for multitrack recording and you own either an ADAT or one of the many other recording products or interfaces that support the ADAT "light pipe," you'll be particularly interested in knowing that Generalmusic offers an optional ADAT interface for the console. This interface provides an additional eight channels of digital I/O in the popular format and is completely independent of the other mixer channels. This interface also adds additional DSP processing power that is independent of that



which ships standard with the mixer and effectively doubles the processing capabilities of the unit.

While we're on the subject of digital recording, it's important to note that the *continued on page 146*

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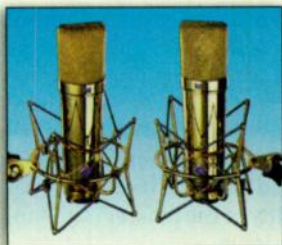
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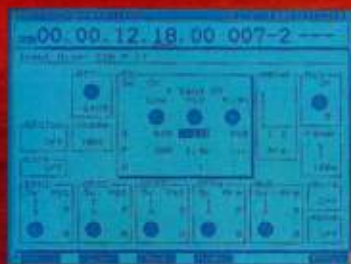
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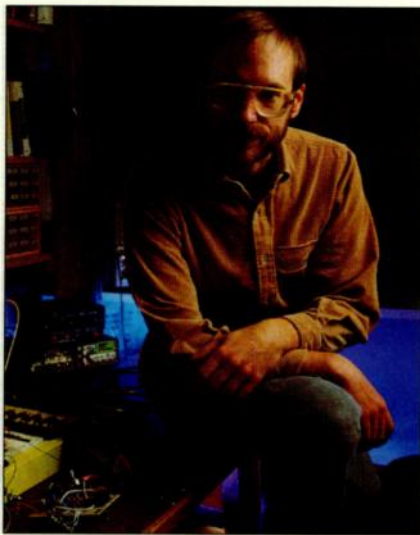
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World Radio History

# Virtual Mics

Adding "mics" after the recording can bring some nice ambience to your work

BY CRAIG ANDERTON



Being an electric guitar and synth kinda guy, I often record acoustic guitar with one mic, as these parts tend to sit more in the background anyway. I then add some ambience with electronic delay and reverb to obtain a somewhat bigger sound. Recently, though, I recorded classical guitarist Linda Cohen in Minneapolis along with harpsichordist Michael Kac, and, in this situation, the guitar was definitely the "up front" instrument in many tunes.

The plan was to record on ADAT, bring the tapes back to my studio, transfer them into Ensoniq's PARIS hard-disk recording system, and do the editing and mixing on hard disk. As we didn't have a lot of recording time, rather than experiment with multiple mics and deal with phase and ambience issues, we went for the most accurate sound we could extract from one high-quality, condenser mic. Engineer Rob Hilstrom and I were able to capture the sound we wanted, in the sense that the

sound in the control room sounded virtually identical to that of the studio.

Upon getting back to my project room and starting the mix, though, the sound was, well, *too* accurate. It sounded like an expensive mic picking up a guitar in a studio with good acoustics, not a friend sitting in front of you in her living room.

I fooled around with various techniques to make the guitar sound somewhat more intimate, including adding ambience. Nothing clicked until I thought about what you actually hear when sitting in front of a guitar, which provided some valuable clues on getting the desired sound.

## A QUESTION OF IMAGE

A classical guitar doesn't have a wide stereo image if you hear it from more than a 2-3 meters away, but up close, it's a different story. If you're facing a guitarist, your right ear picks up on some of the finger squeaks and string noise from the guitarist's fretting hand. Meanwhile, your left ear picks up some of the body's "bass boom." Although not as directional as the high-frequency finger noise, it still shifts the lower spectra somewhat to the left. Meanwhile, the main guitar sound fills the room, providing the "center channel."

To simulate these effects, it was time for the ol' copy and paste. The first step was to copy the original guitar track to two more tracks. The first copy had a drastic treble cut and was panned somewhat left. The second copy had an equally drastic bass cut, and went a bit toward the right.

Adding these two tracks had two immediate effects. First, it pulled out some of the "finger squeaks" and "boom" components that were in the original sound and positioned them in a more realistic stereo location. Second, it stretched out the stereo image somewhat. Because these were signals extracted from one mic, there were none of the phasing problems associated with multiple mic setups.

## REAL WORLD SETTINGS

Fig. 1 shows the actual EQ settings. The original guitar track (track 10) has a -6 dB cut at 226 Hz, where the guitar exhibits a strong resonant peak. The slight, -3 dB cut at 99 Hz was added af-



FIGURE 1: The actual EQ settings for the tracks.

ter pulling the bass-heavy channel into the mix.

Track 8 provides the "squeak" component. The main EQ is a high-pass filter that starts cutting off the low end at around 3 kHz, with 11 dB of total cut. There's a -18-dB shelf, starting at 219 Hz, to take out even more low end. The end result is a bright, articulated, low-level sound, panned somewhat to the right.

The main EQ for the "boom" channel (9) is a low-pass filter that provides -18 dB of cut, starting at 367 Hz. An additional

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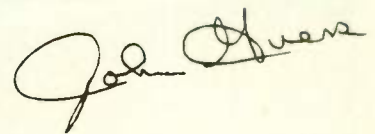
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shelf adds a mild 3 dB of boost, kicking in at 128 Hz. This comes in a little closer to center than the squeak channel.

Regarding the mix of these three elements, the drastic amounts of high and low-pass filtering on the auxiliary channels bring their overall levels way down. In fact, if you listen to either channel in isolation, it sounds as if their impact would be nonexistent due to the low level and restricted frequency range. Mix them in with the main channel, though, and the entire sound comes to life.

#### DELIGHTFUL DELAY

To further differentiate the added channels, I nudged the squeaks about 5 ms late compared to the main track and the boom about 5 ms early. Granted, this is enough to reach into the phase shift zone — 5 ms is the period of a 200 Hz wave, and a guitar's lowest frequency is just under 100 Hz — but both of the extra channels were sitting far back enough in the mix that the delay added a slight bit of "room realism" without causing other problems. Careful moni-

toring in mono as well as stereo confirmed that the phase shift issue wasn't a problem.

Now, some of you might ask, "Why not just use three mics and good miking technique in the first place?" Well, that certainly is an option, and possibly the most desirable one. But it's not the only option. Three mics is three times the noise, three times the preamps, and three times the variations in frequency response. Also, if you depend on mic placement for this specific a sound, you're pretty much locked into it, and it's harder to change after the fact if the nature of the finished song demands something else.

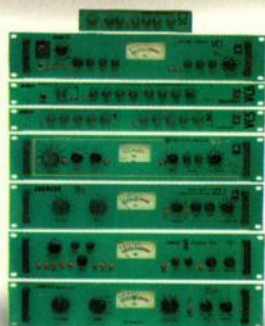
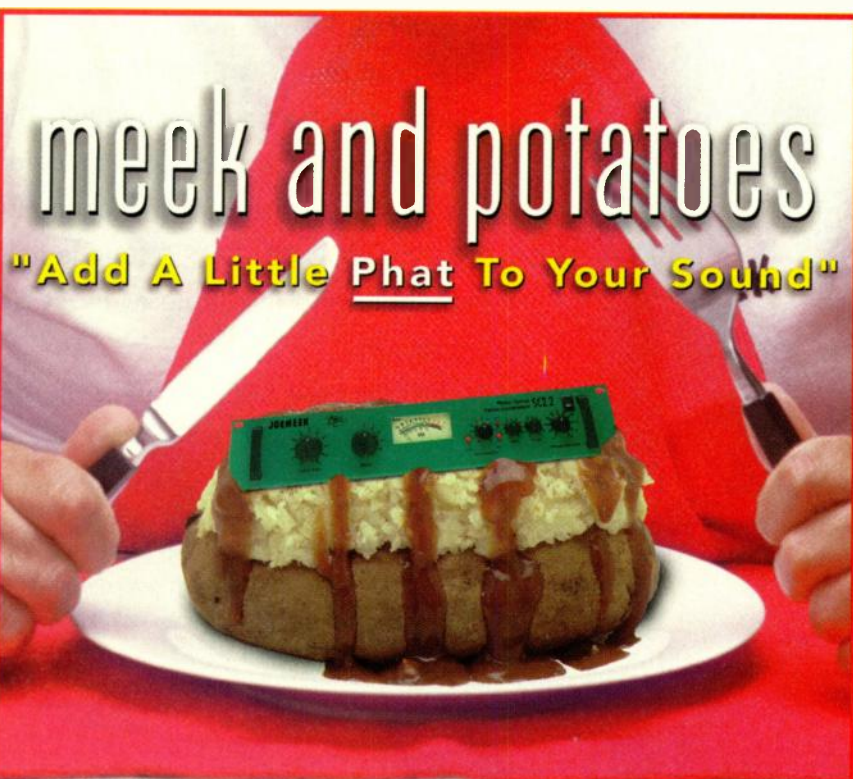
The technique described above is almost like adding "virtual mics," but mics that are designed to pick up only one specific element of an instrument. Adding the 5 ms delay is equivalent to putting the mic 5 feet away from the instrument, which also helps add some of the intimate feel. So in a way, we're adding ambience, but it's a frequency-dependent ambience.

I've started to use this technique in other ways, such as adding a high-frequency "virtual mic" to some percussion parts to help spread their stereo image a bit and allow them to be placed a little lower overall in the mix. You can also obtain mammoth tom sounds by splitting off a little of the bass component, delaying it very slightly, and panning it a little off from the main tom sound.

However, the key to all this seems to be not so much to boost the part of the spectrum you want to emphasize, but to cut the parts you *don't* want to emphasize. Boosting adds an unnatural element, whereas cutting gives a more natural sound. This is why the high-pass and low-pass filters responses were used as the main filtering elements.

No matter how you use this technique, though, check it out when working with acoustic instruments. It can add an intimacy and spaciousness that is difficult, if not impossible, to achieve using only reverb or other delays.

*Craig Anderton is the author of Home Recording for Musicians, Multieffects for Musicians (both published by AMSCO), and Do It Yourself Projects for Guitarists (published by Miller-Freeman Books). He also lectures around the world on technology and the arts, produces and records music, and is a card-carrying humanoid biped.*



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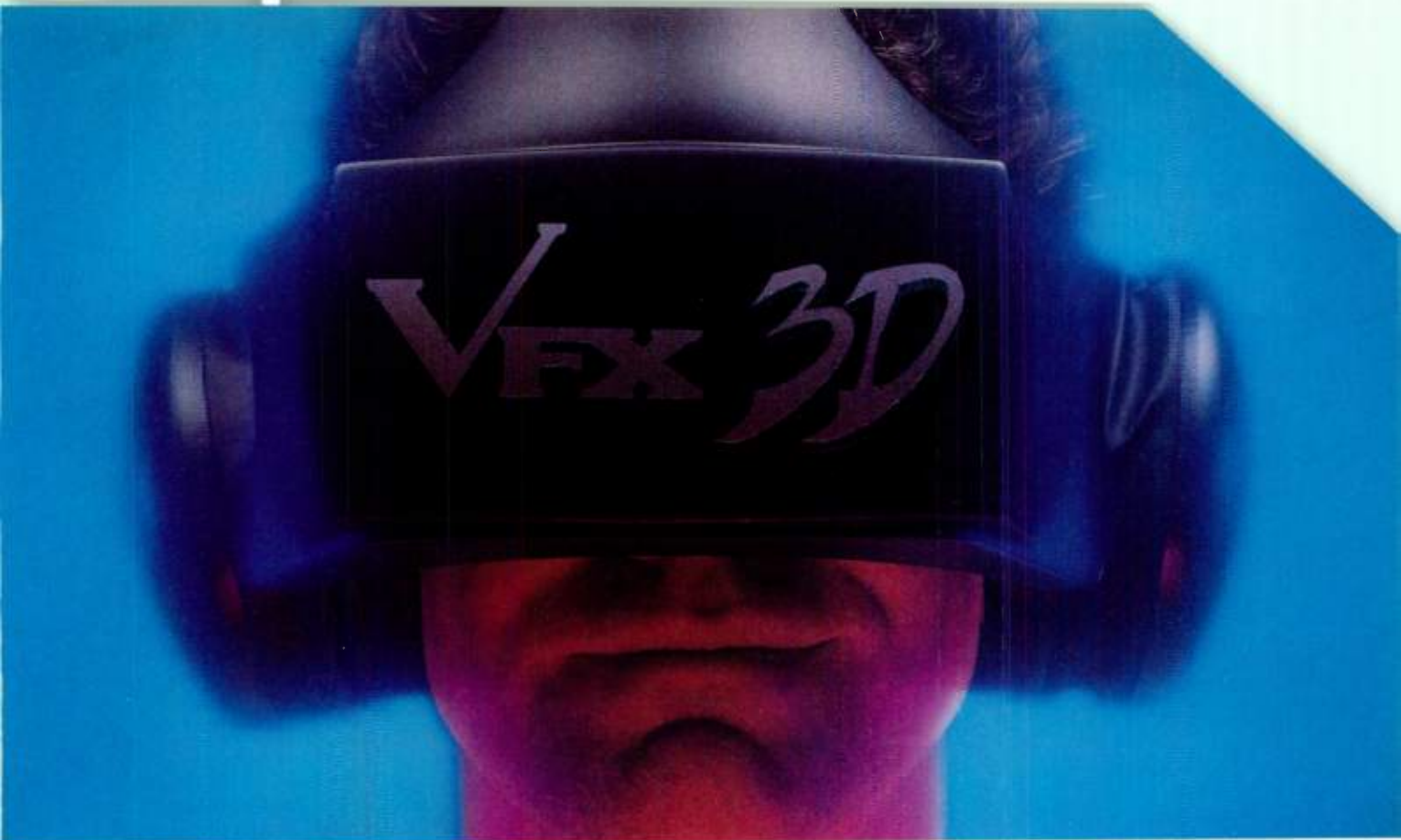
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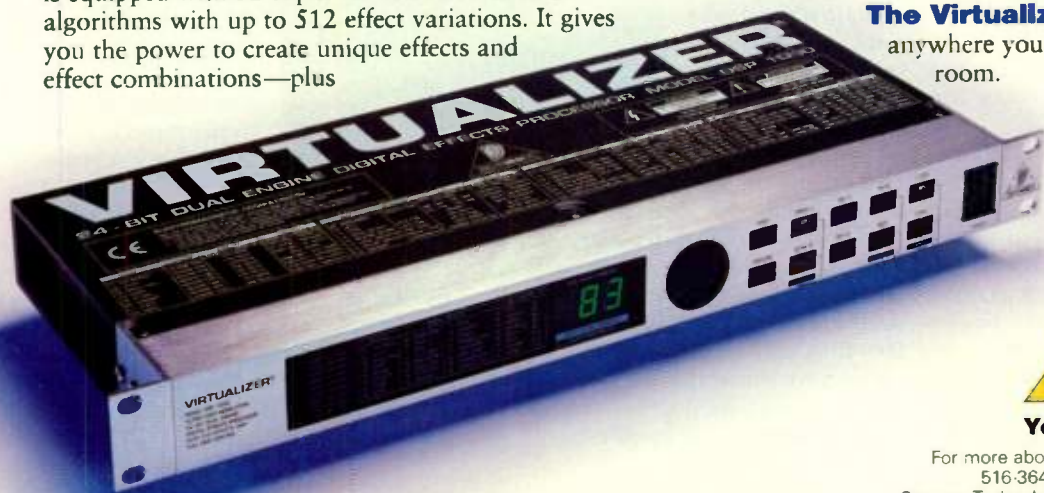
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CIRCLE 05 ON FREE INFO CARD

# Early Apple Scoring



PHOTO BY JONATHAN POSTAL

My first experience with television scoring and using a Macintosh computer

BY AL KOOPER

It's the usual PC Quarterly issue and us Mac owners are just yawning away in the corner. There's no Mac Quarterly ya know. Just one for the system that apex the Mac system and played catch-up ball in the project studio technology business. [Um, Al...the "PC" in the PC Quarterly name stands for personal computers — all personal computers, not just Intel-driven ones. Macs get their fair share of coverage as well. —Ed.]

I don't really wanna trot out all the Mac vs. PC stuff here, although it's extremely tempting. Actually I'm pleased that Microsoft addressed its musical constituents with ample power and plug-in facility so that those people without Macs could also make music with computers. Some programs are actually trailblazing in that idiom now and Mac users must wait until the developers deign to make compatible ver-

sions for us. EQ even has four PC Quarterly issues each year. Imagine that.

I started computering in 1985 when Macs were in their infancy. I had just landed a TV-scoring job: the *Crime Story* weekly series on NBC. The *only* way to get the job done quickly enough was on a computer. Initially we tried real musicians, a Fairlight (rented), and sequencing on Roger Linn's 9000. But my partner-in-crime, Charlie Calello, knew how to fly a Mac Plus, and before you could say "no hard drive," we were composing and sequencing on that baby Mac, transferring each episode to a floppy disk (800 K). I was amazed at the facility, speed, and convenience of computer MIDI. It seemed state-of-the-art almost instantly. We rarely crashed or froze (compared to today), and we were always deadline-ready.

We bought the latest synths (DX-7, Korg EX-8000, Akai 900 samplers [2] and the Linn 9000) and incorporated my guitar playing into the mix. My partner would use the workstation from 10 AM-6 PM, then I would come in at 6 and work until about 3 AM.

We would preview each episode on Monday and divvy up the cues that night. Composing and sequencing would begin the next day, and on Saturdays we would dump everything to 2-inch tape, adding guitar parts as overdubs. Sunday we would mix everything to four track and it would be transferred to mag (film stock) that night. Monday we would start all over again. It was hectic, but without the computer, it would have been impossible.

I fondly remember those days. It was my first TV scoring job, and the most challenging work I had ever encountered. Learning the Mac was unexpected and bizarre. Once assimilated, I could sail through the composing and sequencing and still have time to second-guess myself, if I so desired. The

whole concept of MIDI, though still in its infancy, worked like a charm. I could be the drummer, the bassist, the string section, the horn section, the harpist, etc., all just by pushing a mouse across a pad.

The one "trick" was getting one's brain into a filmscore mode. I don't believe that every musician is cut out to be a film composer, no matter how proficient he/she is on their respective instrument. I had to unlearn every rule of music I knew and blast open many mental closed doors to compose effectively for film. It would take me a week to prepare for each season. I would write dummy cues and permute certain sounds so you could never guess where they came from originally. The job is to enhance the visual with the audio. If you can't imagine playing a C# bass note against a C chord just because it's dissonant and causes a certain mood to come about, then you proba-

bly won't have an aptitude for this sort of thing. That is as basic as I can explain something that is basically inexplicable.

But God bless Jobs, Wozniak, and all the rest of those Apple visionaries who saved my ass in 1985 and continue to perplex me today. And a big loud raspberry for the ill-named PC Quarterly!

Hey editors, how about the "Komputer Kwarterly."

*I don't believe that every musician is cut out to be a film composer, no matter how proficient he/she is on their respective instrument. I had to unlearn every rule of music I knew and blast open many mental closed doors to compose effectively for film.*



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World Radio History

# Geza X



PHOTO BY ED FREEMAN

## The punk pioneer scores in the '90s

BY MR. BONZAI

**Mr. Bonzai:** What are your main recording tools?

Geza X: I like analog 24-track tape, pumped to its bursting point, and Pro Tools, especially the new 24-bit system.

**What's this console?**

It's a Soundcraft, but we're taking out all the capacitors and ICs and replacing them with higher quality parts to make it into a mini-SSL.

**Electronic instruments?**

I work a lot with samplers and synths, doing sound modification and messing around with natural sounds.

**What was your role in the band The Bags?**

The Bags was one of L.A.'s first punk bands, along with The Germs, Weirdos, Scream-

ers, and Controllers. I was lead guitarist, and we all wore bags on our heads.

**Did you enjoy being one of The Deadbeats?**

Yes, it was one of the best musical experiences of my life. Back in the '70s, I idolized Frank Zappa and Captain Beefheart, and loved '60s underground music. The Deadbeats played jazz-punk — really rude, loud, and rowdy, with power chords off flat 5's in a primitive rhythmic setting. At one gig at the Whisky, I threw seaweed at the audience. We were either loved or hated by the punk audiences.

**Are you a hot dog or a hamburger?**

I'm a hamdog.

**Were you the boss in The Mommymen?**

Yes, I was a total totalitarian. I thought we were going to be huge, my version of Beefheart meets the Knack, with nasal vocals courtesy of me as the lead singer known as "Victim," a whining psycho kid. Socially aware but very neurotic.

**Are you a spider or a fly?**

I'm a spy.

**What would you like Santa to bring you this year?**

I think it's illegal.

**Did you ever lose anything?**

Yes, I lost my mind for about eight years. I haven't done any drugs for years, but I used to be a speed freak, and by 1980 I was walking down Hollywood Boulevard in a trenchcoat with my hair sticking out a foot from my head. I was gone, real gone.

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

I'd like to be a Beed, the Indian instrument used by snake charmers.

**Do we really need to make gods out of musicians?**

There was a time when musicians really were gods, a distillation of the counter-culture. The values of the culture crystallized in these individuals, during the '60s and '70s, and then it was co-opted and the record industry learned how to operate the star-making machinery and create stars artificially. The artists were no longer a reflection of the culture, but a fabrication.

**What music would you like played at**

**your funeral?**

Bartok would be nice.

**How did you produce Butt Trumpet for only \$700, the cheapest major label release in history!?**

**Suspect:** Geza X

**Ancestry:** Hungarian Magyar tribes, known as "The Terror of Europe."

**Occupation:** Engineer, Producer, Programmer, Arranger, Songwriter, Guitarist

**Birthplace:** Fort Wayne, Indiana

**Residence:** Los Angeles, CA

**Vehicle:** 1979 Mercedes Diesel

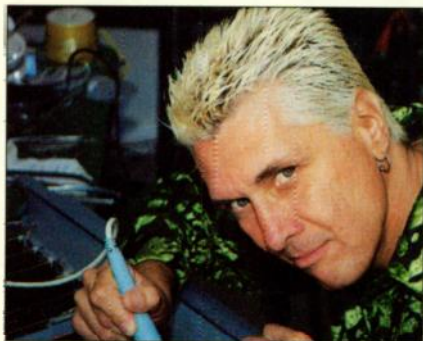
**Diet:** No meat; gourmet cook. "A good dish is like a good mix."

**Location of Interrogation:** Hilltop Malibu estate and studio

**Identifying Marks:** Scar from hot grease on leg resembles Atomic bomb

**Pet Peeve:** "A&R people who think they know how to make records."

**Credits:** Meredith Brooks, "Bitch" (produced, recorded, programmed), Capitol; Butt Trumpet, *Primitive Enema* (produced, recorded, mixed), EMI Chrysalis; Germs, "Lexicon Devil"; *Rage: 20 Years of Punk Rock West Coast Style* soundtrack; produced and mixed Dead Kennedys, Black Flag, Redd Kross, Avengers, Weirdos, Deadbeats, 1000 Mona Lisas, and Magnapop.



PHOTOS BY MR. BONZAI

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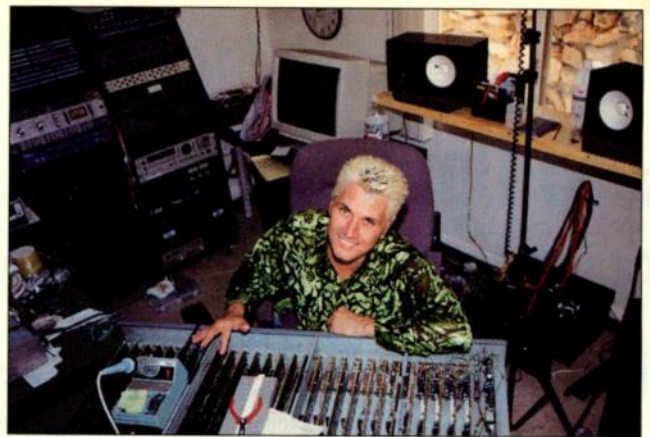
**What is your strangest characteristic as a human being?**

I have Attention Deficit Disorder, which has been both my savior and my nemesis. When you are interested in something, you can hyperfocus beyond normal. When I am mixing, I can hear things between the cracks. If I'm not 100 percent into something, the attention wanders. My teachers used to slap me around a lot. **Do you know any interesting business tricks?**

Yes, keep your hand on your wallet, be-

cause people in the music business will try to skin you alive. **How would you like to be remembered in history?**

As someone who understood the culture that he lived in and had the nerve to say things that were meaningful to others. **What old saying do you hate the most?**



If you want it done right, do it yourself. Which is what I end up doing.

**Who are the most amazing artists you've worked with?**

Jello Biafra, an amazing combo of talent and knowledge, and Robert Fripp, a total outpouring of inspiration.

**What makes a great producer?**

You have to be a good babysitter/psychologist. To get good performances out of people, you have to understand how to prime the pump and anticipate what makes them tick and manipulate them to bring out their best talents. Some producers are skillful in business, some in arranging, some in technology — you must be a master of one thing and maximize. And you must have patience, because there are many "question mark" moments in a recording session. The artist can get side-tracked and discouraged, and you must be sensitive, nonthreatening, and push them to top themselves.

**Have you ever witnessed paranormal phenomena?**

Yes, once in a while I turn the key in my car's ignition through sheer mind power.

**What is the biggest mistake of your life?**

Not learning how to be a mean motherf\*\*\*er. I've been too much of a softy and a sucker.

**Who is the Great Impostor?**

They said it was Reagan, then Bush, and now they say it's Clinton. I guess it's whoever is the President of the United States.

**Have you ever really pissed anyone off?**

My career is a history of pissing people off. Really important people.

**What's a good game plan for making inexpensive, yet professional recordings?**

Luckily, the technology today permits someone with a couple of ADATs and a reasonable amount of education the ability to make good, finished recordings. All you need is a killer song, a decent ear, and the ability to put it down in an artistic, appropriate fashion.

**Now that you've achieved success and have this palace in the hills overlooking the Pacific Ocean, how do you feel being removed from the streetwise ways that brought you here?**

Thank God!



*pictured top left: M 150 and M 160*

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# So You Want To Do Sound For Films

Del Casher reveals what the owner of a music studio should know before taking the plunge

BY BOBBY OWSINSKI

Over the last few years, studio owners have often heard the phrase "Diversify...go into postproduction." While many have successfully made the transition, others have been left with only a room full of video machines and synchronizers for their efforts. Could there be more to this than just the equipment?

Del Casher is one music studio owner who has made that transition, specifically into postproduction for motion pictures. After successfully running California Recorders in Hollywood for 27 years, Del decided it was time to reach out for other business. Of course, being in the film center of the world made it a no-brainer, but Del still found out that the sound recording process for film was a lot different from the recording process for music.

"I figured I knew everything about recording because I owned a studio for a long time," Del Casher states. "When I finally got my first postproduction project I suddenly realized how different the process is. A music person is used to recording a singer under perfect studio conditions, but listening to a film production voice of an actor with a freeway in the background is totally foreign

to the music ear. The similarities between recording music and post sound begin and end at the Record button."

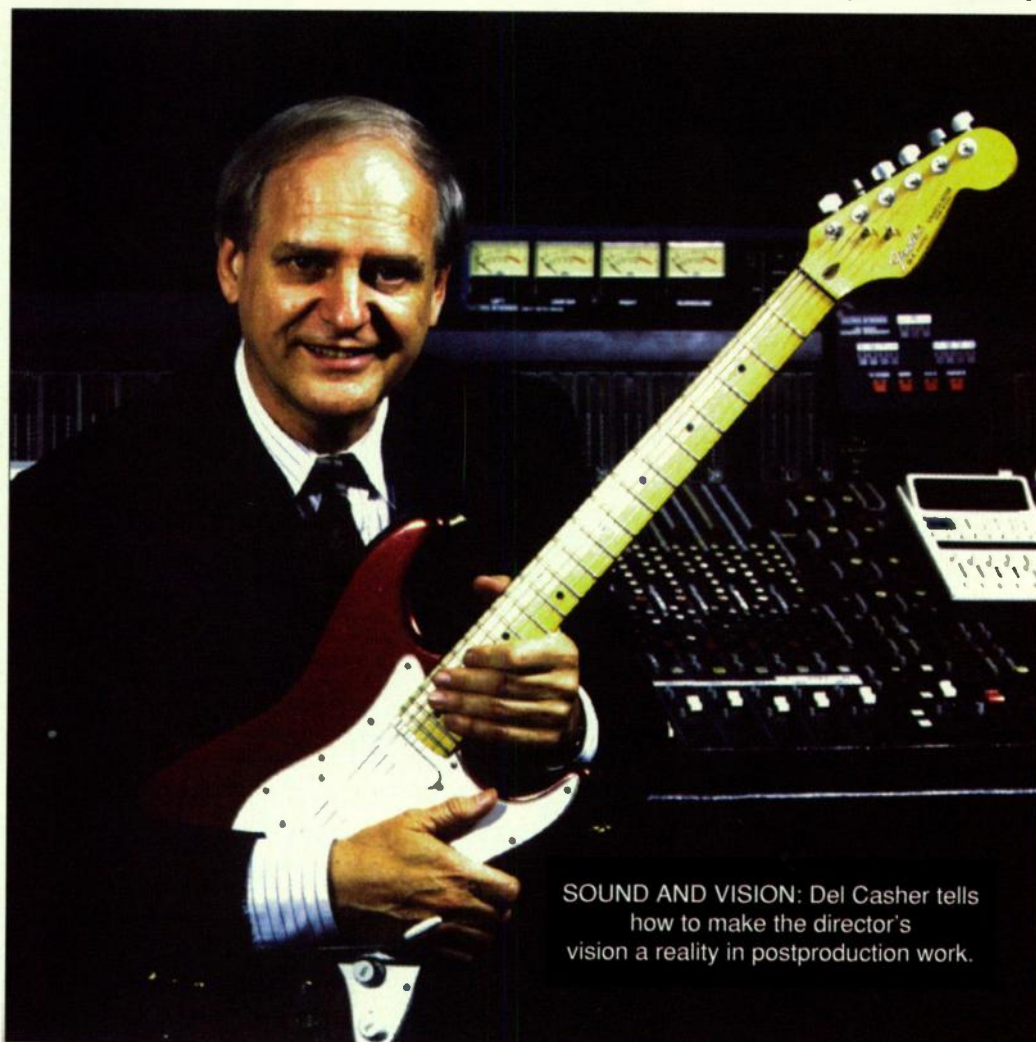
So if the differences between recording music and sound for film post involve more than just the gear, what are they then? Here're some observations by Del as to the typical stumbling blocks that music people encounter when starting out in film post.

## POST EDITORIAL: WHERE THE DECISIONS ARE MADE

Just as in most things in life, experience plays a major part in getting clients. In film post, this track record is far more critical than in music. Explains Casher, "Post is the last stop of a year or two long trip that a director and producer have gone through. The people in charge, be it the bank, the studio, or the production company, care about only one thing, which is: 'This is our last chance because if anything goes wrong with the sound, we don't have a movie.' They're going to be pretty touchy about whom they're dealing with and they want to be assured that the ability of the post people is impeccable. If you don't have the resources and the library and the editing ability, you're eventually going to have some pretty unhappy clients on your hands, even if they liked you when you managed to get the job."

## THAT VISION THING

In music recording, the producer is the boss and the engineer is selected for his expertise and generally allowed free reign in getting sounds. Not so in film. States Casher, "In film there is a vision that comes from the director and/or the editor of the picture. They are the kings of the process in that as the cut of the picture goes, so goes the sound. Music people have to understand the vision of the director and translate it into sound rather than the



SOUND AND VISION: Del Casher tells how to make the director's vision a reality in postproduction work.

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other way around where the engineer says, 'I'm the sound guy and you're going to like what I give you.'

**SETTING SOUND TO PICTURE**

Neophyte post engineers sometimes are not aware of the importance of adding the correct sound against a visual. "Another problem area is that music people sometimes have trouble translating what they're seeing against what they're hearing. For instance, if you pick the wrong sounding birds for a scene and put seagulls in when you need forest sounds, you've got problems."

**PRODUCTION SOUND:  
THE CHALLENGES OF LOCATION**

When a scene is shot on location, the picture element is always given the highest priority.

This can lead to some interesting sound problems later. "When you're recording music, you have the greatest control over the conditions," says Casher. "Even though record producers and engineers sometimes complain about the differences between rooms and mics and speakers, these are minimal when compared to the challenges associated with production sound (the sound from the location recording). Production audio represents a difficult situation that music people are generally not prepared for. They can't believe that the tapes coming in contain sirens and crickets and freeway noise in the background and you can't hear every third word that the actress said.

"I remember trying to do some temp dubs [the film term for rough mixes] for a picture called *Dark Man*. I brought in a music guy to mix it and all he did was criticize how badly everything was recorded, which upset the director greatly. The problem was that he didn't understand the process of film, which is that you have a scene in a certain location where you can't control the audio. Instead of complaining about it, you have to know how to clean it up."

**LOOPING**  
When the dialog recorded on location is lost or obscured in some way, it's necessary to do some fixes after the fact. This is known as looping or ADR (Automated Dialog Re-

placement) and is a reverse lip sync where the actor watches the film on a screen and re-creates the dialog. "Looping is one of the most undesirable things that people ever want to do. You've got to remember that film is re-creation of realism, and having somebody go back in and re-create their lines six weeks later is not realism. So looping is to be avoided at all costs because it just makes the film more plastic."

Doing overdubs in music recording sometimes requires hours and hours to piece together the desired take. Not so in film post. "The difference," remarks Casher, "between doing music overdubs and looping is that if you have a great actor who knows how to loop, he'll give you that line exactly how it's supposed to be right away and then will say, 'That's it.' If you have an actor who doesn't

know how to do it, you might have to record 30 takes and the editor will have to slave over having to put those words back into his mouth. I remember Jack Scalia, who's a great actor, came into our studio to do some looping on a show called "Point Man." He did his line twice, and the editor asked for it one more time for insurance, but Jack said, 'No, you've got what I want you to have.'"

**WHO IS DEL CASHER?**

Besides running California Studios for 27 years and now California Digital Post, Del Casher has worked with the likes of Elvis Presley and Frank Zappa, was advisor on the original Vox Wah-Wah pedal, and penned the NBC news theme that was used for 17 years. He also has the distinction of starting producer/engineer luminaries Bill Bottrell (Sheryl Crow, Michael Jackson) and David Holman (Olivia Newton John, Nelson) in the business.  
—Bobby Owsinski

**BACKUPS, MORE BACKUPS**

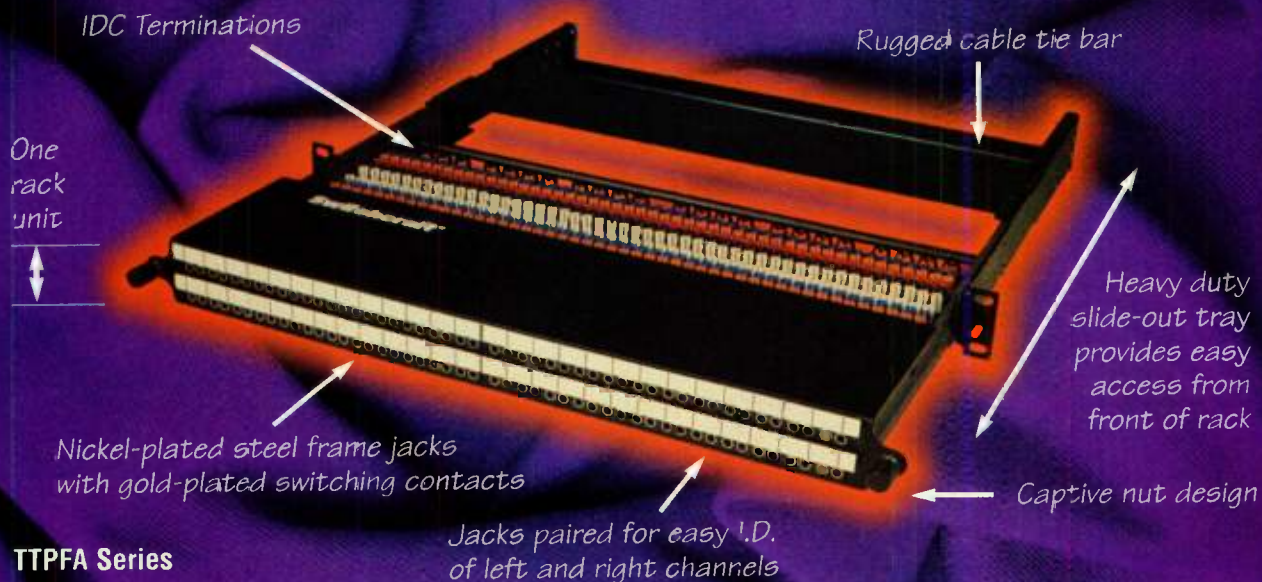
In music, everyone does backups for computer data, program stored on tape is let slide. Not so in film post. Explains Casher: "Music people don't generally realize the gravity of the post recording situation. For instance, if you do a music recording and you don't like the bass track, you can always replace the player or change the part. But if an actor finishes his ADR session and there's a dropout in one line, your chances of getting that actor back can be slim because maybe he's just flown off to Paris. You can't bring in another actor from down the street to replace those lines because there are legal issues to deal with. If you lose anything for any reason, you have destroyed a part that can't be replaced or can only be replaced at great cost. In general, music people can fix things easier than film people."

**MIXING: PRODUCTION ELEMENTS AT ODDS**

Although hearing the lyric of a song loud and clear is usually desirable, it might not



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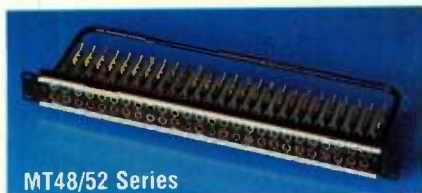
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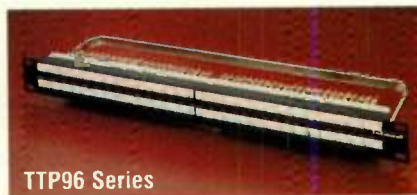
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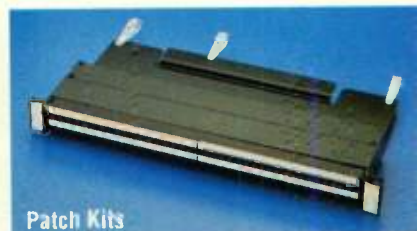
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always be the case, with some vocals intentionally buried. Not so in film, where every word counts. "Not everything is going to sound perfect in every movie," Casher relates, "but if you can't understand the one word that's essential to the plot, you've lost the understanding of the film. That's a whole lot different from when you do your pop or a rock or a rap record where if you miss a lyric, the listener can just play it again. In a movie, you can't play reel one over and over until you understand what was said. The film passes once and you're not going to pay another \$7 to hear it again."

**MULTIPLE ELEMENTS**

Mixing for film can be a tedious adventure to a music mixer due to the conflicting nature of the elements. Casher continues, "The challenge between a music performance of a vocalist for a song and production sound is the fact that, with a vocal, all the other musical elements support it. In film, you have production elements — like birds, gunshots, explosions, freeways, sirens, and other spoken words — that are conflicting with the voice at the same time. You're dealing with foreign

elements to the voice that you don't have in music. This is why a film mix can be really challenging and varies radically from doing music."

**MONITORING: CONSISTENCY IS KING**

Unlike in music where the playback level will vary greatly, in motion pictures the monitoring level is standardized at 85 dB SPL, and that level must be maintained at all times. "When you mix music, it won't be as noticeable if your levels slightly change from one performance to another," says Casher. "In film, each reel is about 10 minutes long and is mixed one to two reels a day. Later, these reels get assembled together into one film. You will hear dramatic changes of volume if each reel is not mixed at the same level from day to day. If you don't lock your monitoring to an absolute 85 dB SPL, you're going to fall into a trap of one reel sounding nice and loud and another sounding soft and another sounding thin and another tubby. Listening levels are critical, as this can be a very expensive mistake to correct."

**THE LISTENING ENVIRONMENT**

Unlike music, where the use of nearfield

monitors and small control rooms is the norm, film post requires quite a bit more room to simulate a theater environment. "It's very important that you have the speakers behind the screen and a room large enough that enables you to listen theatrically," says Casher. "That way, both the sound and picture elements can come together without overwhelming the listener into fatigue. Acoustics are important as well, which is why THX standards are utilized. If a room is too live, the elements will be difficult to discern. Conversely, if the room is too dead, the room will not reproduce the original mix as it was intended."

Although many of the things outlined herein seem to be just good common engineering sense, an education in the film process is absolutely necessary before a music studio tries to make the move to film post. It's beyond the scope of this article to explain this process in detail, but a good place to start would be *Sound for Film and Television* by Tomlinson Holman (the father of THX) on Focal Press. Concludes Casher, "There's a lot of opportunity for music people in postproduction as long as they understand that they've got to do their homework first." **EQ**

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headphone system. These equalizers are *for monitoring purposes only* and have no effect on the signal being recorded.

- Set the low-mid section of both equalizers to 1 kHz and apply maximum cut — which on most EQs is 15 dB. With the two EQs cascaded, this typically results in 30 dB attenuation at 1 kHz.

- Set the high-mid sections of the EQs to 3 kHz (the third harmonic of 1 kHz) and apply maximum boost. This typically results in a 30 dB increase at 3 kHz.

If you wish, you can also use the filter section of the EQ to reduce the level of frequencies above and below this area, thus reducing noise.

- Bypass any noise reduction devices such as Dolby or dbx.

- Set the tape machine to RECORD READY and REPRODUCE. If you don't want to be influenced by what your track meters will read, cover them with a piece of paper or just look away.

- Start recording and adjust your headphones to a very soft level. Certain things like distortion and pitch are more easily perceived at low listening levels.

- Turn the BIAS control fully counterclockwise. Very slowly start to increase the bias. If you're doing this for the first time, you may want to go all the way from minimum to maximum in order to audition the sonic results. Somewhere in this quagmire of tape hiss, asperity noise, and your attenuated 1 kHz tone, you will hear a strident buzzing-type sound that I euphemistically refer to as "the mosquito." That's the 3 kHz (third-harmonic) distortion on the 1 kHz tone.

- Slowly turn the BIAS control back and forth until you hone in on the sweet spot — the point at which the mosquito is least audible. Be aware that since you are monitoring playback, there will be a slight delay in what you hear, dependent upon tape speed and head spacing.

- To verify your setting, rotate the pot slightly left and right around this spot.

- Complete the rest of the alignment as usual.

That's it! You've set the bias for min-

imum distortion. I believe that this setting is not frequency-dependent and works for musical program as well. You now have the option of determining what the setting represents numerically and setting all of the other tracks to that number (back off on the bias to see how far over the peak you are), or start moving your tracks in/out patches to the remaining tracks' and bias the entire machine by ear.

If you are aligning a machine that has a BIAS CALIBRATE adjustment (Studer A80, Ampex 440, etc.), you can "meter document" this bias setting so that you don't have to go through this routine before every session. Simply go into BIAS CALIBRATE mode and set the VU meter to read "0." Next time you align that machine, if the bias calibrate reads "0," it is probably still at your settings.

I've run into two small red flags when doing this whole procedure. First, you may hear a false sweet spot when the bias is very low. Don't be fooled — it will be much weaker and not quite as clean as the real sweet spot. Second, depending on the record level, you may go into saturation. If so, simply back off slightly on the record level and try again. When the alignment is complete, a direct source-to-tape comparison should leave you quite satisfied.

Allow me one combat story. Starting an album project in Montreal, the recording artist booked the studio for rehearsal one day prior to recording. I used this op-

portunity to do my soundcheck. Knowing that the artist had no interest in actually recording at this time, I delivered a foldback (i.e., monitoring) mix to the studio from the *input* section of the split Trident console, rather than from the *monitor* section of the console, which is the norm. This allowed me to do a direct tape/source comparison of the live band to the recording without the delayed tape signal from the multitrack machine going back into the musicians' headphones (and screwing them up! —Ed.).

The studio owner took great pride in having all of his equipment accurately set up for recording, and was mortified when I told him that the low-frequency response

off tape was not correct. He proceeded to roll in his rack of test equipment and show me that I was mistaken. Sure enough, recording a 100 Hz tone resulted in a perfect 0 VU on the recorder's meters. Believing the human ear to be a valid piece of test equipment, I held my ground. The tape machine was set to record and reproduce three frequencies: 100 Hz, 1 kHz, and 10 kHz. But music has over 20,000 frequencies. What was happening was that the bass rolloff inherent in the heads was affecting the response. It was this direct comparison that helped reveal the problem. Since the bass rolloff was an absolute characteristic of the heads, I looked for a way to achieve a bass response that was aurally faithful to the music and not just making the meters read "0."

Here's what I came up with:

- Do your usual alignment (playback and record), but skip setting the bass and — if you are going to be recording project tones — don't make them just yet. You'll do these last.

- Using a *sweep* oscillator set to your operating level, align individual tracks to different low-frequency tones in 10-Hz increments (I stay away from the edge tracks). For example, while in RECORD and REPRODUCE modes (and with noise reduction bypassed) adjust the BASS REPRODUCE (a.k.a. LF PLAYBACK ADJUST on some machines) control for track 2 to achieve a 0 VU reading with the oscillator set to 20 Hz. Then set track 3 to read 0 VU with the oscillator set to 30 Hz, track 4 to read 0 VU at 40 Hz, and so on, up until about 120 Hz.

- Select some musical program rich in low-frequency content and record it on all tracks at your operating level.

- Listening to one track at a time, do a direct A/B comparison (audio memory is very short) and select the track that, to your ear, most closely matches the bass content of the original program (this is also a good time to walk around the control room).

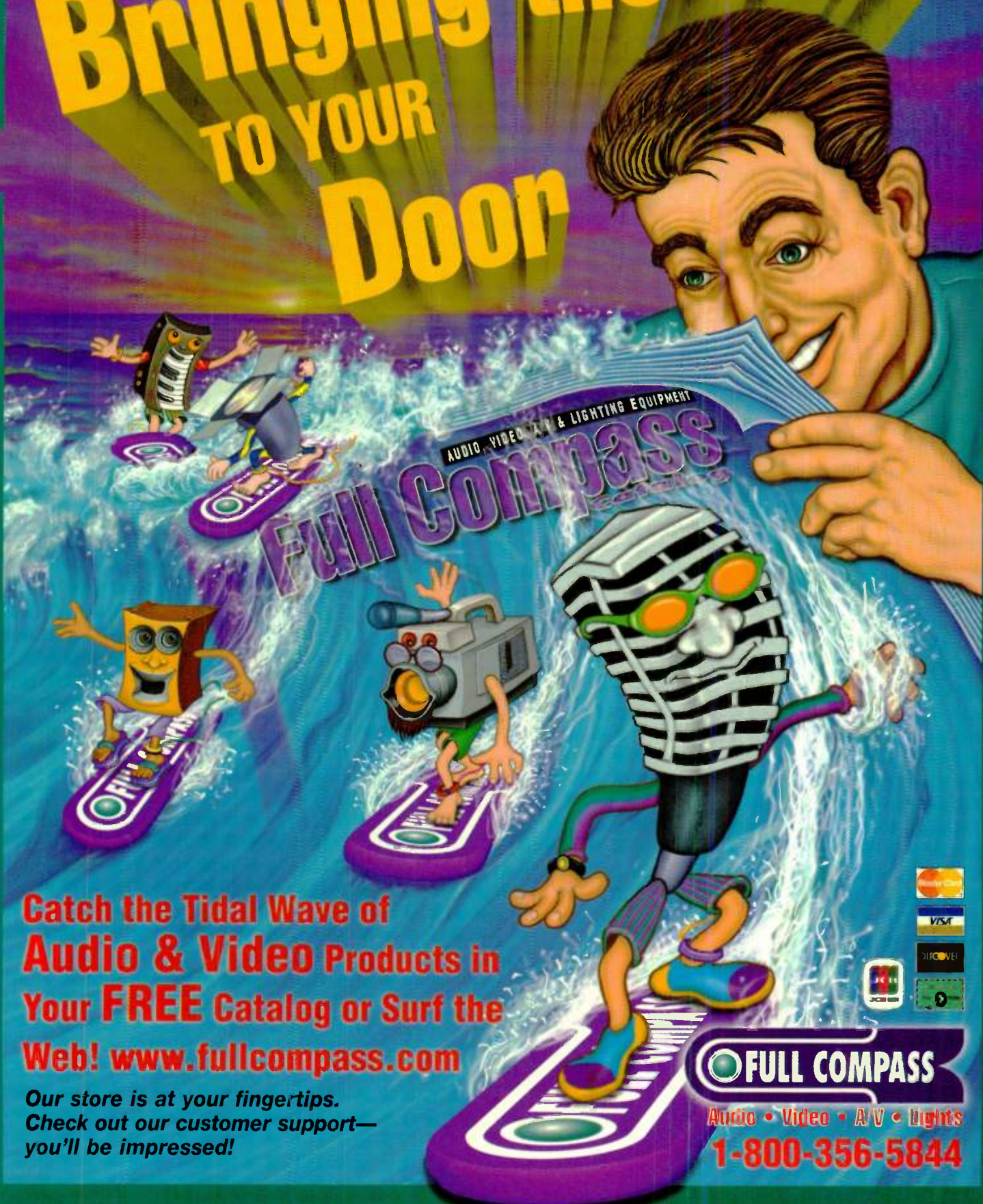
- Go back and align all tracks to this frequency and use it as your low-frequency reference tone for bass.

In my particular situation, on a Studer A80 Mark III running Ampex 456 at 30 ips, the optimum frequency appeared to be 80 Hz. My attention to detail on this project was worthwhile: I received a Juno nomination (the Canadian version of the Grammy) for best engineered pop recording. Good luck and happy aligning.

*Rich Blakin is a freelance recording engineer and is on the faculty of The Institute Of Audio Research and The New School For Social Research in New York.*

*I looked for a way to achieve a bass response that was aurally faithful to the music and not just making the meters read "0."*

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# Squeeze It And Lose It

It's time to put an end to the current trend of overcompressing music tracks

BY BOB KATZ

"Rock 'n' roll is here to stay." Well, we hope so, but a certain trend in equipment marketing and mastering is adversely affecting the quality and sound of our music, and CD sales may be going flat as a result of it. The problem is overcompression — improper and injudicious use of compression for mistaken reasons, and with mistaken results.

Too many CDs are being overcompressed in an attempt to gain airplay and be louder than other CDs. Rather than making a bigger sound, overcompression results in making the sound smaller and causing listener fatigue. In fact, renowned producer/engineer George Massenburg felt strongly enough about this issue to address it in his keynote speech at the 1997 New York AES Convention.

Furthermore, it's fiction that compression makes a tune "radio-ready"; ra-

dio compresses everything you feed into it anyway, so adding compression on top of compression actually makes music sound worse on the radio.

Responsible mastering engineers will not overcompress CDs, but many producers and artists have been pushing for overcompression without realizing that it doesn't help the overall sound. Here's a quick reality check: When mastering and when auditioning test CDs, set levels so the original material and the compressed version are at the same apparent loudness, then compare them carefully. With a fair comparison, in most cases musicians prefer the more dynamic, lively sound. So what can we do to slow down this insidious trend toward overcompression?

## SOLUTION TIME

First, don't believe the hype. Many hardware boxes and software plug-ins try to give the impression that anyone can become a mastering engineer just by using a certain product and adding tons of compression or limiting. These tools can give superb results in experienced hands, but in uninformed hands or improperly equipped studios, the same tools can become a sonic meat grinder.

Second, during mixdown, it's better to use a moderate amount of compression on individual instruments than process the 2-track master. When

you squeeze mixed material too much, the snap of the snare drum suffers first, followed by the cymbals and the stereo separation. Contrary to ads that imply that compression is necessary to create a "radio-ready" sound, preserving normal program transients won't hurt radio play at all.

By not overcompressing, you create a tape that preserves the transients and impact of your material and is ready for mastering. It is the peak-to-average ratio that determines the life and liveliness of your material; less compression gives a higher peak-to-average ratio. The next step is the mastering. A good mastering engineer will objectively look at your record's good points and bad points, and will polish your diamond in the rough, bringing out elements you may not have considered. Writers need their editors, and producers and artists need their mastering engineers.

Please remember that a record should sound good at home — that's the key to successful mixing and mastering. If you're worried about attracting program directors, try payola (just kidding!). Seriously, if necessary, make a special hot "radio single version" of your hit. Just be aware that the single version won't benefit the sound on the radio one bit; you're making it only on the likely chance that the radio P.D. is a loudaholic.

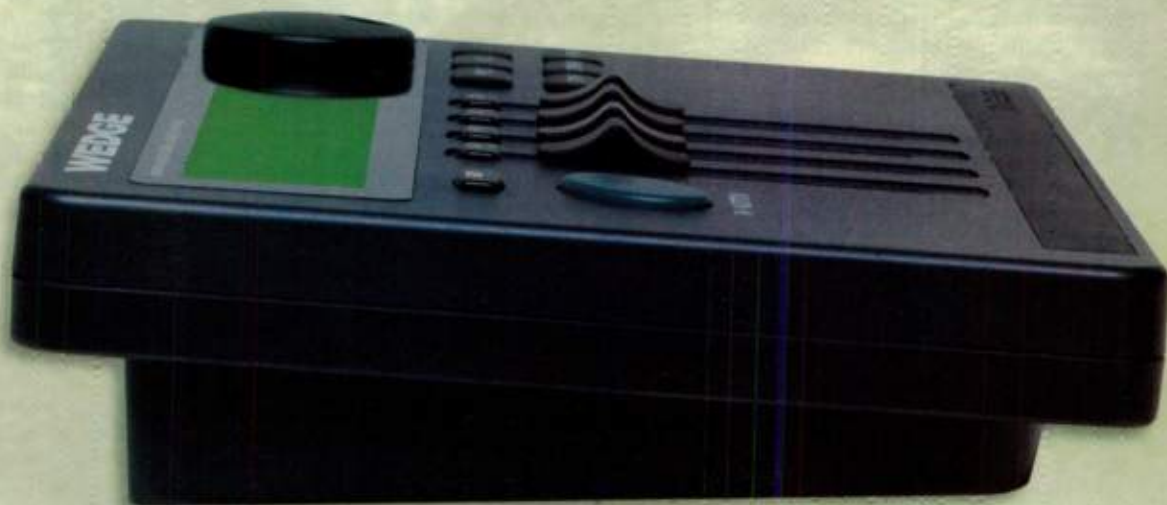
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World Radio History

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# Recording For Fun

# & Profit

*How and  
why I built  
and used  
my project  
studio to  
record my  
latest release,  
Left of Cool  
By Bela  
Fleck*





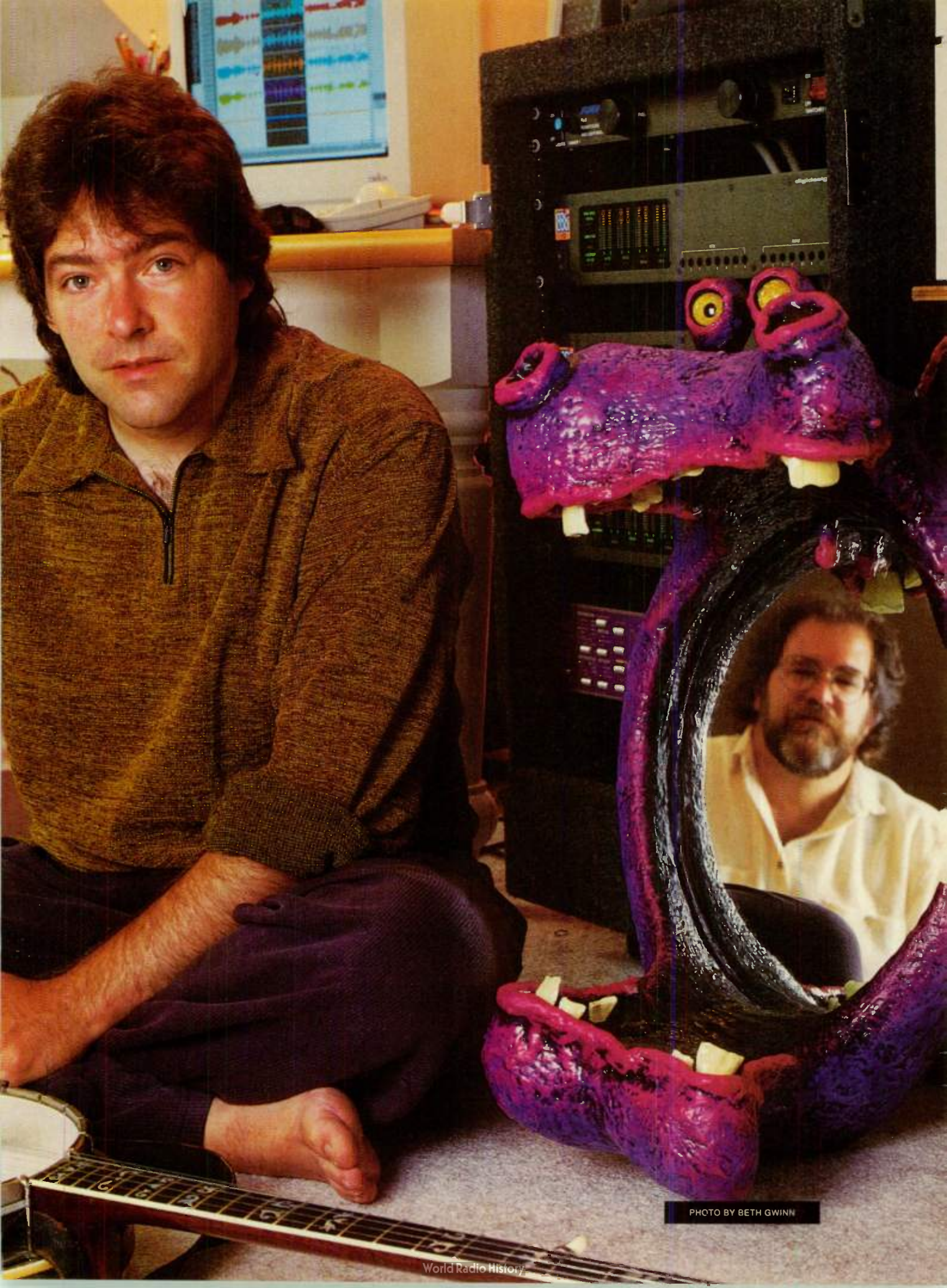


PHOTO BY BETH GWINN

**THE PROBLEM**

I used to record albums for Rounder, Warner Brothers, and others the old fashioned way, which is to say that out of a typical recording budget, the studio and engineers would end up with the lion's share. The musicians would be rushed, end up over budget, and with a finished product that we were not always proud of. The record would sell a reasonable number, but never enough for you to receive any significant royalties by the time you started the next one. Due to something evil called "cross-collateralization," any artist's profit would be applied to the previous unrecouped records, and as soon as you started the new one, all costs would be applied to any previous records that were recouped. Pretty amazing, huh? So you could have a very successful career, sell up to and well over 100,000 units consistently, and still end up in the hole.

**A SOLUTION**

My old friend Leo Eilts, who had been a bluegrass musician, was now also the Digidesign Pro Tools dealer in the Kansas City area. Leo told me all about the gear and it sounded like just the right thing for a live album the Flecktones were about to make. So we dove in head first, got the system, spent the studio budget on gear, and did all the edits and mixes on the computer.

The money previously spent in the studio could now go into equipment that we could keep (an asset). Future albums would be cheaper to make, allowing me to either bill for studio time or just have a lower bud-

get. Albums would recoup sooner [even] with the same number of albums sold. I could actually show a profit on my own records!

What a concept.

**HARD-DISK RECORDING**

I had been a Neve/Flying faders freak ever since producer friend Garth Fundis showed me what VCAs did to the sound. I could hear them on the mixes of that time. And, being a fidelity freak, I was very suspicious of the sound of hard-disk recording. As hard as I tried, however, I couldn't find anything missing except perhaps the

hissing sound of tape, which I had given up on early in the digital age. The mixing capabilities were powerful, although they took a little getting used to.

Of course, we did have some experience with hard-disk recording: We got excellent comments regarding the sound of Live Art, recorded live to ADATs and edited and mixed on Pro

Tools. This double album also won the Grammy for Best Pop Instrumental.

**THE PLAN**

When it was time to make the next studio album, *Left of Cool*, with the Flecktones, I decided to go all the way. The Live Art experiment had gone well. Roger Nichols (perhaps you've heard of him?) had consulted on that project, checking on the EQ of my office/studio for accuracy, critiquing mixes and just reassuring us that it was going to be OK. He also mastered the project. So I thought it would be really cool to have him engineer the tracking dates, which he agreed to. Roger was helpful in so many ways — basically setting up a studio from scratch in my new home. He helped hook us up with Alesis, getting prototypes of their 20-bit machines; Pro Tools, getting



**MEN AT WORK:** Bela Fleck and engineer Richard Battaglia (above); Dave Matthews, Bela, and Jeff Coffin (left); Bela uses Pro Tools.



PHOTOS BY RICHARD BATTAGLIA

# record guitar...?



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**CIRCLE 77 ON FREE INFO CARD**

home and made minor adjustments. Garth Fundis and Justin Niebank made some good comments. Justin came over a couple of times and tried some of his ideas in terms of vocal compression and tweaks, and introduced me to the SansAmp, which we sprinkled onto a vocal and sax.

#### MASTERING

We went into the mastering facility (Georgetown Masters with Denny Purcell) and spent a morning critically listening to the mixes. Things sounded really good, but could use some more way high up stuff. Denny found the frequencies on his board, then we went home and opened up those areas on certain reverbs and particular instruments.

We assembled a sequence one night with the whole band collaborating and turned in the record. While mastering, we were looking for stuff to do. We kept adding tiny bits of EQ and in most cases decided against them. There was no leveling to do. We did like the HDCD process, so we did that.

#### EMERGENCY!!!

At this point we were over the length that the Warner Brothers plant would cut onto a CD (76:30), so we needed to find some edits or delete a tune. Plus the label didn't like the sequence. We were going to lose our June release date, which coincided with some stadium gigs I was playing with the Dave Matthews Band, plus the Flecktones's Colorado tour including the Telluride Festival. It would be a real drag if the record wasn't out by then and yet I was already out of town on tour!

Because I had Pro Tools 4.0 on my Apple PowerBook, I worked out the proposed edits and resequenced the album on a dawn flight to Nashville with Chris Palmer from Warner. I met Carlos from Georgetown Masters at my house, did all the edits to the multitracks, resequenced and got back on a plane to Philly

by 2 PM the same day. Carlos ran the finished master off to Sony optical, locked up behind him and we made our release date.

#### SINGLE EDITS AND REMIXES

With the album put to bed and Roger safely out of town, it was time to cut some of our vocal tunes down and try some creative remix ideas. We called another Nashville resident, Richard Dodd, to assist us with this

project. He had considerable experience with radio as Tom Petty's engineer, and a very different approach to Pro Tools. As far as I was concerned, the singles could be quite different from the album versions and Warner Brothers was OK with that. So we dirtied stuff up, shortened, re-



**ALL TOGETHER NOW:** The Flecktones have a jam session. Victor Lemonte Wooten records his tracks (above).

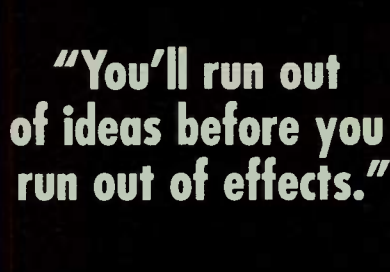


arranged, compressed and got loose with the stuff, eventually using the TC Electronic Finalizer, and sent off our singles to Warner Brothers.

Now we'll see what happens. Wish us luck.

*Left of cool entered the Jazz Charts at #3 and has remained top 5 for its first five weeks. It also entered the Billboard Top 200, the first time for Bela Fleck and the Flecktones. The single "Communication" was 3rd most added on AAA radio in its first week and continues to do well. The next single, "Trouble and Strife," hits the airwaves in September.*

# The New PCM 81 Digital Effects Processor



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run out of effects."**



Scott Martin Gershin  
Sound Designer



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With its huge assortment of superb effects, the PCM 81 is the

perfect tool for a sound designer like **Scott Martin Gershin** of *Soundlux Media Labs*. Scott, who used the PCM 81 to process his voice as the voice of *Flubber*, says, "This is the best pitch shifter I've used. Our job is to create emotional illusions in audio and the PCM 81 is a powerful tool to get us there. I feel I have only scratched the surface of what can be created on the PCM 81 and encourage everyone to explore the depths of this processor."

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Scott Martin Gershin's film credits include:  
*JFK, True Lies, Braveheart, Flubber*  
and *Mouse Hunt*



# PC Quarterly

*Shopping for a new sound card? Want to know more about the new Universal Serial Bus (USB)? Wondering about those new products from Interactive Microsystems, Sonic Foundry, and PowerQuest? Then what are you waiting for? Turn the page and start reading...*





# Windows Sound Card Shootout

*Five sound cards get put to the test — find out which one's best for you*

**BY ERIC BELL  
EDITED BY CRAIG ANDERTON**

The concept is enticing: produce “desktop music” in your computer

without external recording or synthesis hardware. While not a new concept, what *is* new is the price/performance ratio of modern sound cards that do hard-disk recording and provide multitimbral synthesis. But can they really compete with a modular setup? And no matter how much quality has improved since the early days, is it “good enough for prime time?”

To find out, several cards were installed into a Pentium system running Windows 95 OSR2, then auditioned by listening to and recording a suite of MIDI test files. All cards featured full duplex, hardware operation to allow

simultaneous record and playback, and all had a serviceable GM and sometimes a GS set. Many let you load your own sounds — a good thing, because the typical GM synth is a 4 MB ROM set compressed down to 2 MB (typical of synths from the late '80s/early '90s). Still, the new breed of cards offers an intriguing, and sometimes very powerful, mix of features and value. Let's investigate further.

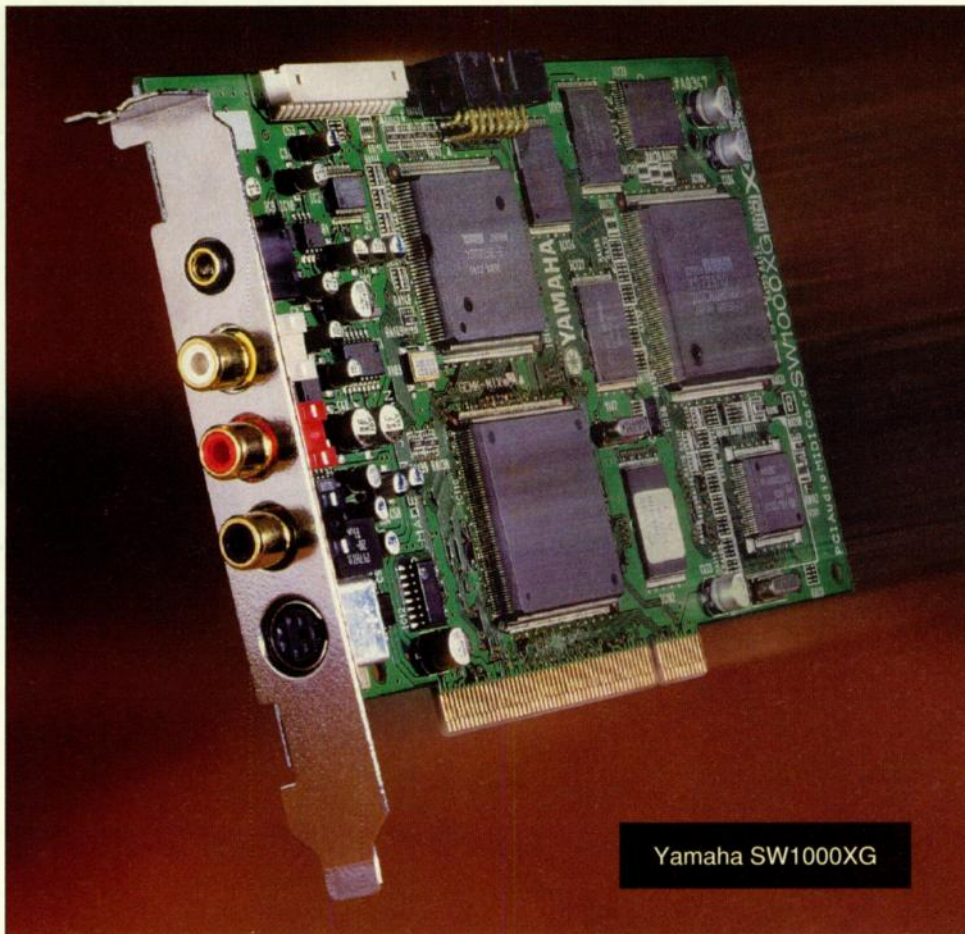
## INSTALLATION NOTES

Plug 'n' Play is great — when it works. Meanwhile, hand tweaking IRQs and BIOS settings remains a necessary black art, and it seems to be largely a matter of luck whether you have a simple install or end up in support hell.

For example, I had trouble getting any of three Apex evaluation units to work with two older Intel motherboards. The Pro version worked fine on a new 233 MHz M-Tech board, with the exception of MIDI In. I tried two different Apex boards in the M-Tech, each with older and newer drivers, different MIDI adapters, basic and manual IRQ settings — after a day of frustration, I moved on.

The TerraTec card required that I install the drivers and software from CD, remove the drivers, then install new ones from diskette. This didn't work, even after reinstalling Windows 95. Only later did I notice in the manual that you should install Windows 95 *without* the card in the machine. I yanked the card, reinstalled Windows 95, then repeated the Win 95 driver dance described above, after which the card worked just fine.

And now, here are the cards.



Yamaha SW1000XG



# Software vs. Hardware: A PARIS Perspective

terly



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**AVM APEX PRO (\$349, ISA BUS)**

AVM Apex, 9774 South 700 East, Sandy, UT 84070. Tel: 801-571-0967. Web: www.avmtechnology.com. Free lit. #138.

- **Audio.** Supported recording rates are 5 kHz to 55.2 kHz with 16-bit input and output conversion. An optional S/PDIF daughterboard (around

\$100) with digital I/O is planned.

One twist: The 20-bit synth chip DAC, which is spec'd at 98 dB S/N ratio, feeds a separate output jack so you can access the higher quality signal before it's truncated for merging into the 16-bit main DAC.

- **Synthesis.** Instruments are shaped from a Kurzweil MA-1 chip's raw samples using algorithmic parameters stored in P-RAM (parameter RAM). The non-Pro version offers 64 K of P-RAM, but the system uses 52 K, leaving just 14 K for user parameters. The Apex Pro model includes 256 K of P-RAM, allowing over 200 K of available user P-RAM.

Highlights include the percussive melodics (glockenspiel, vibes, etc.), organs, and basses (they're generally smooth and deep); the clean and muted guitars work very

well together. The distortion guitar patch is nothing special, but a long, slow filter change as you hold the sound makes it resonate realistically.

The pianos are fine despite some inconsistencies in the Electric Piano 1 voice. The orchestral patches feature subtle timbre changes between different ranges of instruments, making them work well solo or as an ensemble; gentle vibratos grace the string patches. The remainder of the set is certainly passable, and the GM drum set is solid. The hardware itself sounds clean, letting bass drums and guitars ring solidly.

- **Effects.** The AVM has a 24-bit effects processor with reverb, chorus, delay, and flange. Effects are applicable on a per-channel basis.

- **Software.** The review package included Cakewalk 5.0 SE, CoolEdit "lite" for editing WAV files, and the Everest patch editor that accesses the MA-1 patch parameters, but not AVM's patch editor or bank manager software. AVM Sample Studio 1.0 is now available on their Web site, so if you add sample RAM to your Apex (it's expandable up to 64 MB), you can now tweak patches you purchase, download, or create. Unfortunately the Apex Pro provides no add-on patches, but free KRZ files are available on the 'Net for downloading.



FIGURE 1: Some EMU APS applications, including the mixer, autowah and reverb.

**EMU AUDIO PRODUCTION STUDIO (\$699, PCI BUS)**

P.O. Box 660015, Scotts Valley, CA 95067-0015. Tel: 408-438-1921. Web: www.emu.com. Free lit. #139.

- **Audio.** This card has a strong digital side, with stereo RCA S/PDIF In/Out jacks on the card's back flange. A separate, drive bay-sized front panel provides a second set of stereo S/PDIF In/Outs, 1/4-inch headphone jack with volume knob, and left and right analog inputs (which are balanced, switchable between mic/line level, and sport gain controls). The APS also comes with a separate bracket for the game/MIDI port, thus freeing up enough space for 1/4-inch audio I/O jacks — much better than 1/8-inch mini-jacks. The mic input can handle consumer or pro level dynamic mics and provides 12 V phantom power (48 V isn't available) to condenser mics.

Recording rates go up to 48 kHz. Playback results depend on your system



FIGURE 2: Edson lets you tweak your patches.

## Preserving the Past with BASF

### Inside the Polygram and A&M Archives



The A&M team: (back row, l-r) Mike Baumgartner, Chief Engineer; Ron Rutledge, VP of Studio Operations; and Bob Borbonus, Assistant Studio Manager; (front row, l-r) Gary Myerberg, Director of Technical Operations; and Ken Villeneuve, Archiving Engineer.

Imagine, if you will, life without classic Motown recordings. Think about radio without Charlie Parker, Supertramp or Joe Cocker. Consider a world in which the irreplaceable master tapes of these artists were the casualties of decades of decay. Inconceivable? Hardly. Rock and roll may never forget, but magnetic tape will. If it weren't for the intervention of music archiving programs, the march of time would spell the end of our earliest musical recordings.

As caretakers of countless thousands of master tapes, Polygram and A&M Records have had aggressive archiving programs in place for several years. Though on opposite coasts, the Polygram and A&M programs have two

things in common: both are committed to preserving priceless master recordings, and both are doing so with BASF SM 911 analog tape.

"I believe an archiving policy is no longer a luxury for a recording company," says Polygram Studios Facility Director Jim Nevius. "I believe it is a necessity. We have some precious albums in these archives, masters that we can't afford to lose. When you think in terms of the groundbreaking material of somebody like Louis Armstrong, you realize that you have something very precious here that, if lost, would constitute a devastation. And not just for the holdings of a company, but for generations to come who will enjoy and be influenced by his music."

Polygram's mastering facility and tape library (located in

Edison, NJ) is home to over 135,000 such priceless master recordings. Its 7,500-square-foot tape vault contains pop, rock and jazz masters from Motown, Mercury, Verve, MGM, Casablanca, Island, Polydor and other labels. Most of the master tapes in Polygram's vault have safety copies already made, but many do not. A large number of the master tapes from the past 10 or 15 years are stored in the PCM-1630 digital format, a once-popular medium that's proving to be less than adequate for long-term storage. Add to this the known instability of certain tape formulations and the inevitable decay of the older safety copies, and the need for an on-going archiving program becomes painfully apparent.

When the history of a given tape is researched and it's slated for duplication, the master is handed off to engineers who perform the actual recording. The condition of the tape is evaluated, with the most common problems being gummy edits that need to be cleaned up or leader tape that's become brittle with age. Polygram has a pair of convection ovens that are used to bake certain tapes before copying. According to Nevius, the ovens are used only for specific tape stocks that have identifiable

problems that have surfaced over the years. "We don't have any ovens for BASF 911," he laughs. "I rest my case!"

Polygram uses a pair of Studer A-820 decks that are connected directly. The output of the record deck feeds a small mixer for monitoring purposes. All recordings are done to BASF SM 911 tape at 30 inches per second with no noise reduction (Dolby-encoded masters are not decoded). Since the inception of the program nearly four years ago, Polygram has used this process to successfully archive roughly 24,000 tapes.

Three times zones away in Hollywood, A&M Studios is using a proprietary process to archive tapes from A&M Records and its subsidiary labels. A&M's masters include the works of Joe Cocker, Herb Alpert, Supertramp, Peter Frampton, Humble Pie and countless others. With over a hundred masters archived, the A&M program has roughly 3,000 masters to go.

Under the watchful eyes of head mastering engineer Dave Collins and Director of Technical Operations Gary Myerberg, A&M engineers use a "pure-path" concept to transfer masters from a Studer A-820 machine to a pair of ATR-102 record machines. Proprietary electronics feed both record

*Continued on next page*

You can cascade cards for multiple inputs and outputs, and, conveniently, they all use the same IRQs and DMA channels. Note that all the important processing is done in hardware, so even complex effects don't tax the CPU.

• **Synthesis.** The Dream 9407 DSP sound chip gives 64 raw digital "slots." Each slot is the basis for a single synth voice, effect, hardware mixed digital channel, etc.

The basic MIDI sound set is a Roland-licensed, 4 MB GM/GS com-

patible .94b bank loaded into RAM, although you can add your own samples in .94b format, and a beta SoundFont-to-.94b converter is now available. The chip set sounds smooth, I believe, because of some high-frequency rolloff. Any one of several default banks can load at startup.

Basses are great, and the keyboards are pretty good. Piano 1 sounds clean and uncolored and Organ 2 has a great keyclick drawbar sound. Unfortunately, there are some very obvious split points in the Organ 3 sample where the samples aren't too well matched. The guitars are okay, with a nice harmonic guitar, but there's a harsh "clean" patch.

While the brass is fine, the woodwinds are just acceptable, the tympani has an out of pitch wah to it, and the saxes are nothing special. But the GS drums are very good.

• **Effects.** I had difficulty auditioning the chorus and reverb. TerraTec's manuals say the synth responds to MIDI controllers 91 and 93 for these effects; maybe there was a routing problem, but, in hours of fiddling, I wasn't able to make them work.

• **Software.** In addition to Cubasis AV-XL, the card ships with several control panel applets. Unfortunately, style has overcome functionality, which makes them difficult to see and tricky to use.

The control panel does very complex routing among the five converters, two synth engines, effects, ins, outs, etc. There's a button that sends out a GS reset (nice!), and a cool fader app where you preset mixer positions, click a button, and the app automatically moves the various controls smoothly to their new positions at a user-selectable rate.

The long-delayed Ed!son patch editing software (fig. 2) provides fine control over all synth parameters, but be prepared to mouse around — all the settings are changed graphically.

**TURTLE BEACH PINNACLE PROJECT STUDIO (\$599, ISA BUS)**

Turtle Beach, 5 Odell Plaza, Yonkers, NY 10701-1406. Tel: 800-233-9377. Web: www.tbeach.com. Free lit. #141.

• **Audio.** A 20-bit DAC (with 128x oversampling) handles the input and a 20-bit DAC (with 128x interpolation filters) handles the output. Recording rates are 5.5125 kHz to 48 kHz. Coax RCA S/PDIF

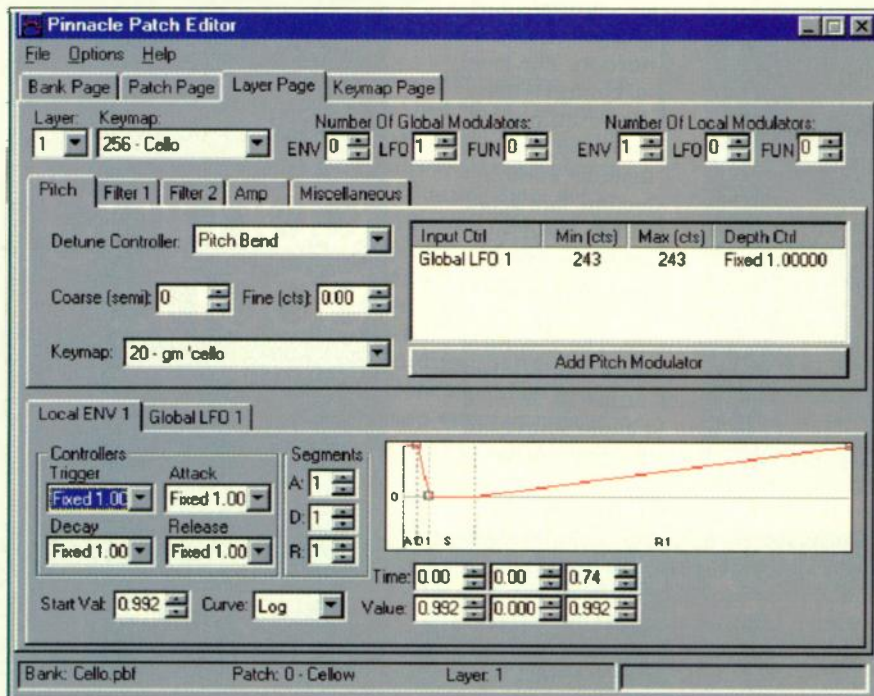


FIGURE 3: Short on glitz but high on functionality, the Turtle Beach patch editor is easy to use.



FIGURE 4: XGWorks does both hard-disk recording and MIDI sequencing.

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I/O connectors (on a separate bracket) connect via cable to the digital I/O daughterboard.

The sound is solid, clean, and bright. It's also realistic — any noise or high-end nastiness is faithfully reproduced. You may or may not like this kind of realism, but it's hard to argue with getting back out what you put in.

• **Synthesis.** I worked mainly with the Kurzweil MA-1-based 32-voice synth

titrack digital audio recording/playback. Added goodies include 50 drum patterns in MID format, and both modified ROM (in P-RAM) and RAM banks to add 25 MB of new instruments to the sampler (if you add RAM to the board). A Patch Editor (fig. 3) accesses all the MA-1 parameters.

Loading sound banks is easy using the Patch Librarian, although there are annoying delays when transfers take place. One nice touch is the ability to

Surprisingly, the overall GM sound set was not significantly better than the other cards. And some individual patches had problems. But you can't fault the sound quality: lots of low end, crisp highs, and great effects (six simultaneous 24-bit digital effects).

The SW1000's strength is the selection of immediately accessible sounds. Need a good-sounding patch quickly? The SW1000 will provide. However, there is no way to add RAM for user sounds.

During the drum bank test, there was a noticeable delay when selecting subsequent kits. Yamaha said this was due to the drum kit select and first note of the bar being on the same MIDI tick, but none of the other cards had this problem. Perhaps it was due to having beta drivers and software, as Yamaha's MU-80 stand-alone XG module does not have the same problem.

Standout sounds were the guitars (far above average, both nylon and steel-stringed), pianos, velocity-sensitive electric pianos, strong organs (particularly rock organ), and fretless and acoustic basses. On the minus side, slap bass and woodwinds were okay, but

nothing spectacular. The rest of the GM set worked well, and I had a blast auditioning all the additional voices.

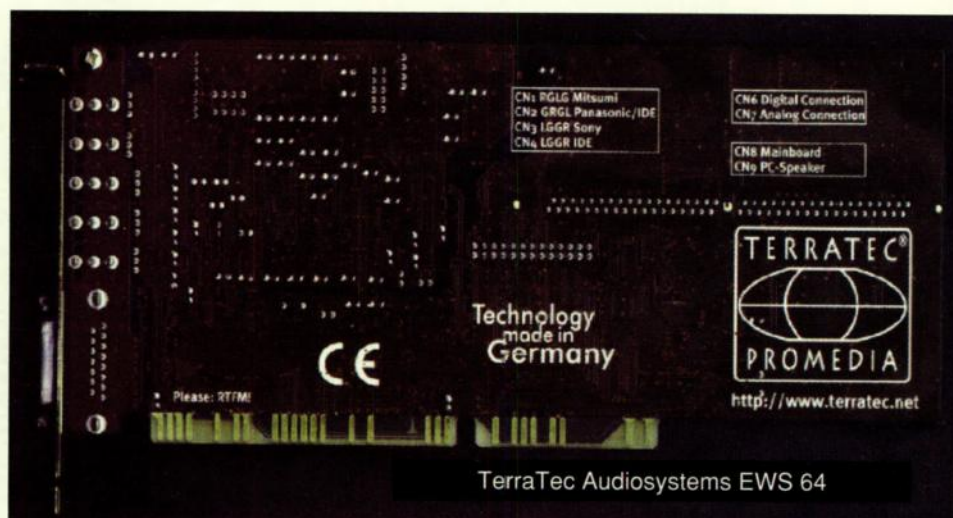
• **Effects.** The effects are very strong, with almost 100 algorithms including amp simulation, rotary speaker, and distortion effects. The internal effects can also process the analog inputs.

• **Software.** XGWorks (fig. 4) is a full audio+MIDI sequencer that gives direct control of XG voice editing and effects programming. There are also plug-in panels for Cakewalk, Cubase, and Logic, and a WAV editor.

#### THE ROUND-UP

For hard-disk recording, sound quality is evolving into less and less of an issue as differences become more quantitative rather than qualitative. Higher-end cards do make the effort to have decent audio, which these days means higher-bit resolutions, oversampling, and better-quality converters.

For synthesis, all of the GM sets had problems on some sounds — a patch out of tune, a poorly selected loop point, etc. Yet this had little effect on how the cards performed *en ensemble* (e.g., playing



(a second, on-board synth is of lower quality). The pianos were somewhat disappointing, and some patches were slightly out of tune. The organs are great, with strong low ends, and the rock organ has a likable drawbar swirl and grind. The basses are solid and the individual strings have a nice bow attack.

The woodwinds are pleasing, the saxes hold together very well indeed, and most of the patches have a listenable, subtle vibrato. However, there are some other weak spots including the bagpipe patch (yeow!) and an agogo patch that is a semitone out of tune. Turtle Beach's use of the WAV file format for patches (in addition to KRZ) ensures a virtually endless supply of samples from CD-ROMs and the Internet. One "gotcha" is that the patch parameters are stored separately from the digital samples themselves (in P-RAM). A 256K P-RAM upgrade will be available soon.

• **Software.** Voyetra's Digital Orchestrator Plus allows sequencing up to 1000 MIDI tracks, along with mul-

easily combine sounds from multiple banks and save them together.

#### YAMAHA SW1000XG (\$699, PCI)

Yamaha, 6600 Orangethorpe Avenue, Buena Park, CA 90620. Tel: 714-522-9011. Web: [www.yamaha.com](http://www.yamaha.com). Free lit. #142.

• **Audio.** Six stereo internal audio channels (12 channels total) allow serious audio recording and playback, but, sadly, there aren't separate line outs for all those channels — a breakout box would have been great. Nonetheless, the SW1000XG's internal routing can apply different effects to different channels via aux busses. Cool trick alert: You can record a stereo track from analog or S/PDIF In and simultaneously dump the synthesized MIDI tracks to a second stereo digital audio track.

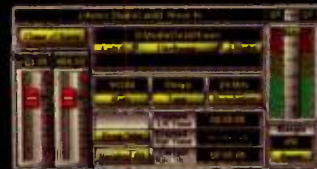
• **Synthesis.** The gigantic 38-MB sample set (compressed to 20 MB) uses 32 channels of internal synthesis and features over 1200 sounds (plus 45 drum kits). You can add a physical modeling synth card or vocal harmony board, and there are connectors to link to Yamaha's new DSP Factory system.

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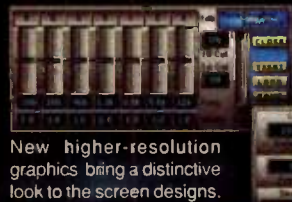
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Whether your professional audio needs lie in theatre, radio, film, recording studios, audio for video, live sound, or multimedia productions, reward yourself with the tool that will turn your creative visions into reality. Evolve into the next dimension of digital audio with SAWPro!

SAWPro Minimum System Requirements: Windows NT/98/95, Pentium II-266 or higher, 128 Mb RAM, X VGA video 1024x768 at 65000 Colors, 16-bit or higher Windows compatible sound card(s), EIDE or ultra-wide SCSI hard drives.

Mix and master an entire session in SAWPro, effectively replacing the entire console, patchbay, outboard effects gear, and all associated cables, hums and buzzes. SAWPro, hosted by a high-end Pentium II computer with a multi-channel optical sound card can deliver up to 24 channels of I/O with full 24-bit resolution. SAWPro truly represents the complete digital tapeless solution! Record, overdub, and mix... SAWPro *does it all*, potentially saving you tens of thousands of dollars!

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MIDI files). Higher-priced boards had a higher percentage of excellent sounds; there wasn't an overly dramatic difference in instrument sets. However, upscale cards had significantly better sounding effects, with the EMU APS a clear winner.

**AVM Apex Pro.** All the basics are there, especially given the low cost. Plus, you can add a digital I/O module and sample RAM. Although it's resource hungry (five address ports and three IRQs), has Plug 'n' Play difficulties with older systems and offers no sounds other than a GM set, if you have access to a library of KRZ sounds or are familiar with creating patches on a Kurzweil K2000, this card could provide a great outlet for your sonic creativity.

**EMU APS.** It sounds wonderful, but has a steep learning curve and wants a fast machine with lots of host RAM. Listening to the EMU APS MIDI/SoundFont demo tracks provided the most stunning audio experiences encountered in the shootout — great samples, clean output, and qual-

ity effects (although it needed a 24 MB SoundFont, containing just a few instruments, to sound this good). The effects are numerous, highly configurable, and of high quality, but can tax your system. If you have the hardware, the cash, and a library of SoundFonts, this one's for you.

**TerraTec EWS64 XL.** Boasting noble sonic characteristics, 64 hardware digital channels that don't tax your system, and 4-band EQ, the TerraTec also has a very good sound set and decent effects. Tradeoffs are few third-party samples, late patch editor, and only 1 SIMM slot for RAM expansion. The EWS64 is an exceptionally flexible piece of hardware and the drive bay front panel provides easy access to the board's ins and outs. While the learning curve is steep, it's worth the effort — the EWS64 is a fine music and audio tool.

**Turtle Beach Pinnacle Project Studio.** Intended as an all-in-one-box recording solution, Project Studio accomplishes that feat nicely. It includes a digital I/O daughtercard and a second synth module, excellent signal-to-noise ratio, and you

can add RAM. While I wish the ROM sounds and effects were stronger (faster patch loading would also be helpful), it's a good overall package with quality software and excellent documentation.

**Yamaha SW1000XG.** This is the easiest way to access many high-quality instrument patches, powerful digital hard-disk recording and playback, excellent sonics, and high-quality customizable effects in one

package. It's a no-fuss solution that you won't soon outgrow. The tradeoff is in dollars and flexibility, as it doesn't support adding your own sounds via RAM, nor

*continued on page 134*

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Want to hear the synths for yourself? Amble over to [www.howlingdog.com/shootout.asp](http://www.howlingdog.com/shootout.asp), where you'll find MP3-format files of all the key listening tests, as well as the original MIDI files used to create them. And don't miss the comparison chart on p. 90.

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\*\*0 dB = 1 mW/Pascal

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**PEAVEY**

World Radio History

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Manufacturer and Price	AVM Apex Pro \$349	E-MU APS \$699	TerraTec EWS64 \$599	Turtle Beach Pinnacle Project Studio \$599	Yamaha SW1000 XG \$699
MIDI Standards	GM	GM, GS	GM, GS	GM	GM, XG, TG3008 (GS)
Polyphony	32 note, 16 voices	64	64 voices + 20 FM	32 voice / 16 timbre X 2	64 voice
Synth MIDI channels	16	32	16 wavetable + 16 FM	16 MA-1 + 16 on daughtercard	32
External MIDI channels	16	16	2 x 16	16	16
Synth Engine	Kurzweil MA-1	EMU10K1	Dream + ESS FM	Kurzweil MA-1	AWM2
Upgradeable synth firmware?	Yes, Flash ROM	No	Yes, in onboard RAM	Yes	No
Synth method	Wavetable playback + sound processing algorithms	Wavetable	Wavetable + FM synth chip	Wavetable playback + sound processing algorithms	Wavetable
ROM Size	2 MB		n/a sound set loaded from disk	2 MB	20 MB
ROM Size (uncompressed)	4MB		n/a	4 MB	38 MB
# ROM Melodic Sounds	128	depends on banks loaded into RAM	depends on banks loaded into RAM	128	1200+
# ROM Drum Sounds	60		depends on banks loaded into RAM	47	200+ in 45 drumkits
Hardware Enhancements	Digital Connector for Summit SST, Digital I/O card	future expansion	Waveblaster connector	Waveblaster connector (synth card included), digital I/O (I/O card included)	cascade connector for DSP Factory DS2416, PLG100-VL, VH, DX
RAM on board	none	uses up to 32 MB host RAM	6 MB	none	none
P-RAM on board	256 K (204 K available)	n/a	n/a	64K (12 K available) 256K as upgrade	n/a
RAM sockets	2 x 72 pin SIMM		1 x 72 pin SIMM	2 x 72 pin SIMM	
RAM max	64 MB		64 MB	48 MB	
Supports DLS	Yes				
Supports SF2	Yes	Yes	Converter planned		
Supports 94b			Yes		
Supports WAV	Yes	Yes	Yes	Yes	
Supports other	.KRZ		.TTF	KRZ	
RAM patches included	None (to be available on www)	200+ MB SoundFonts	6 assorted GM/GS banks, many patches.	25 MB .WAV files	
3rd-Party Availability	Editor translates most formats, Kurzweil .KRZ file compatible	Large number retail and public domain	Limited, but growing	Large number retail and public domain	
Patch Editor	AVM Sample Studio	Vienna	Edison	Pinnacle Patch Editor	XGEdit
FX engine	24-bit DSP	32-bit DSP	Algorithms on Dream chip	20 bit	24 bit
FX types	Reverb, chorus, delay, flange, distortion, filters	Reverb, chorus, stereo echo/delay, flange, distortion, auto wah, pitch shift, compressor, EQ	Reverb, chorus, delay, 4 band parametric EQ, 3D	Digital delay, chorus, flange	Reverb, chorus, amp simulator, distortion, rotary speaker, 5 band EQ
FX routing	Per channel	4 busses, individual sends	Per channel	Per channel	2 system busses, 1 user selectable (system or part) bus, 2 insert switches for any 2 of 64 parts
FX # effects simultaneously	Reverb, chorus per channel	4	?	?	6
Audio jack size	1/8" mini plug	1/4"	1/8" mini plug	1/8" mini plug	RCA (analog out), 1/8" mini (analog in)
Jacks	Speaker, Analog In, Mic, dedicated Synth Out	Board: 1/4" stereo in/out, RCA S/PDIF in, S/PDIF out, Panel: S/PDIF in, S/PDIF out, 1/4" in (line/mic trimable, switchable) 1/4" phones + separate MIDI/game panel	Board: 2 line in, 2 out, mic in Panel: RCA or optical digital in, 2 digital outs, 2 MIDI ins, 2 MIDI outs, 1/4" phones	Board: stereo mic input with 5v phantom, stereo line in, stereo aux input, stereo line out, MIDI/game out + S/PDIF on separate connector	Analog out (L/R), Analog in (mini), DIN for MIDI cable in/out (included), RCA S/PDIF out
Interface Type	ISA	PCI	ISA		PCI
Software	Cakewalk SE 5.0, Cool Edit Pro LE, Apex Media Rack	Cakewalk Express Gold, SoundForge XP	Cubasis AV-XL, Edison patch editor, wave editor, TerraTec control panels, media player, mixer etc.	Digital Orchestrator Pro, patch editor/librarian, AudioStation 2, mixer, wav editor, MIDI Orchestrator	XGWorks, Plug in editors for PLG100 series daughtercards, control panels for Cubase, Cakewalk and Logic, TWE wave editor.
# internal hardware digital channels	Full duplex 2 in 2 out, 32 internal WAV channels into MA-1 chip	2	64 shared with synth and effects		12
Direct-to-Disk recording	Record 2 x up to 55.2 kHz	Record 2x44 kHz	Record 2 x 48 kHz		Record 2 ch analog + 2 ch synth loopback
Digital In/Out	S/PDIF AES/EBU available as S100 add-on	S/PDIF in/out, two sets of ports	Optical digital in, two digital outs	S/PDIF in/out	S/PDIF digital out
SB compatible	Yes	No	Yes	?	No

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**CIRCLE 66 ON FREE INFO CARD**

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# Are You Ready For USB?

*Adding devices to your PC will be a snap thanks to the*

*Universal Serial Bus*

**BY DAVID MILES HUBER**

Face it, even die-hard hardware hackers cringe at the thought of reconfiguring their own, or someone else's, PC. Even with the development of "Plug 'n' Pray," life can still get pretty hairy living on the edge of IRQs, DMAs, and I/O addresses. And it seems that we're constantly being lured into installing new hardware by the perceived or real need for a faster CPU, a better modem, or a newer

sound card. For those who didn't document their system's configuration, installing a new hard drive can have the same dreaded effect, sending them back to the hardware setup drawing board. (Now, how did I configure that card?)

Well, PC warriors, I'm here to tell you there's a new star rising on the connectivity horizon that promises to make hardware installs a whole lot easier. It's called the Universal Serial Bus (or USB, for short). In fact, if you've purchased a new PC in the last few months (like I just did), chances are your system is USB-ready.

## WHAT IS USB?

In short, the Universal Serial Bus (USB) is a "no muss, no fuss" specification for connecting external hardware devices to your PC and for automatically recognizing and configuring them. It uses a standard set of connectors and cables that can daisy chain together up to 127 hardware devices from a single USB port! (See fig. 1.)

Just imagine bringing a modem or any other device to your studio or home, plugging it in, and having it work right out of the box! That's the promise of USB.

## WHY USB?

In the beginning, there was the internal bus architecture of the original PC, which laid out the basic guidelines for designing hardware cards and peripherals that are still followed today (in order to ensure backward compatibility). As systems became more complex, setting up a PC became a daunting task that was hard enough for a pro, let alone for Joe or Jane Consumer. "Plug 'n' Play" was finally added to create a new standard for making connectivity a bit easier, but the conflicts and frustrations of Murphy's Law still apply.

Now, at a time when more and more hardware peripherals are needing to be plugged into PCs with a limited number of ports, the computer and hardware manufacturer industries have rallied together in an attempt to resolve this dilemma once and for all. As a result, USB was developed to address these problems in several ways:

1. Up to 127 external devices can be added to a system, without having to "pop the top" off your computer. (The industry hopes to move towards a "closed box" PC design in the not-too-distant future.)

2. USB automatically recognizes and configures a compliant device.

3. Devices can be "hot plugged," meaning that they can be added (or removed) while the PC is on and running.

4. The assignment of system resources and bus speed is automatic.

5. USB connections allow data to flow bidirectionally between the PC and the peripheral. This means

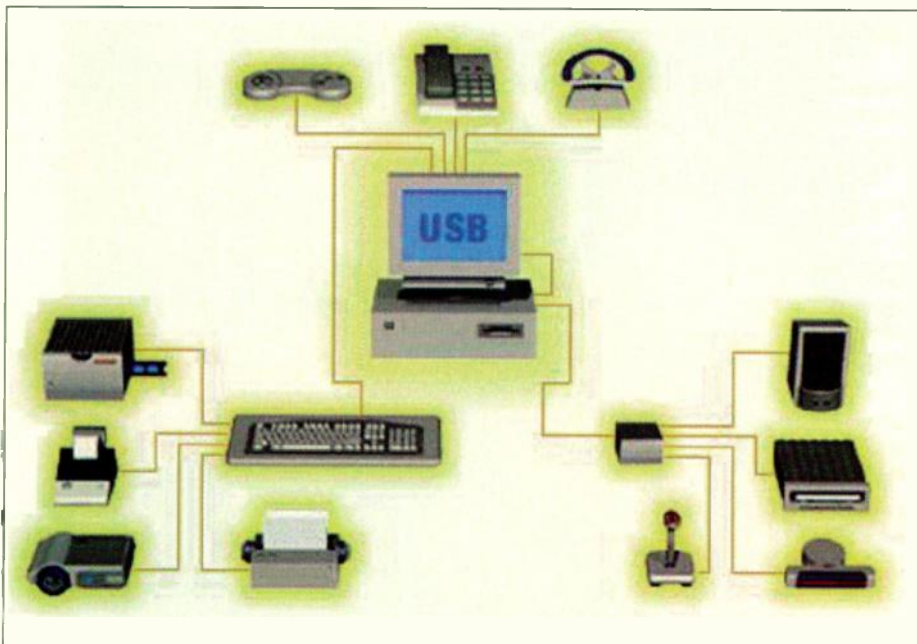


FIGURE 1

# VISION<sup>dsp</sup>



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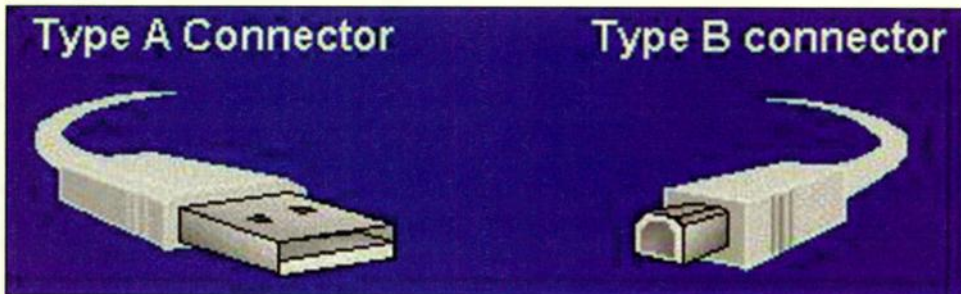


FIGURE 2

you can use your PC to control peripherals in new and creative ways.

**WHAT'S THE SPEED?**

USB supports two bus transfer rates: a low speed for the attachment of low-cost peripherals (such as a mouse or joystick) and a high speed (up to 12 MBPS = 1.5 MB per second) for the attachment of devices that require more throughput (such as telephone gear, sound cards, and digitally compressed video cameras).

Speed selection is automatically detected and set by the PC.

**HOW'S IT CONNECTED?**

USB cables can be up to 15 feet in length (up to 10 feet for low-speed devices) and includes two pair of wires — one for carrying signal data and the other pair for carrying a 5-volt DC supply to devices that use less than 500 milliAmperes (1/2 Amp). Thus, a USB device can be either "self-powered" or get its power directly from the cable.

Standard USB cables have two types of connectors at each end. For example, a cable between the PC and a device would have an "A" plug at the PC side and a "B" plug for the USB device. In addition, cables for high-speed devices are shielded to prevent electromagnetic interference, while low-speed cables don't need shielding.

Cable distribution and daisy chaining is done via USB data hubs. A breakout chain of up to five hubs can exist between any device and the computer, giving a maximum distance of 90 feet from the PC to the end device. (See fig. 2.)

**HOW 'BOUT THE FAQS?**

**Q: Will I need special software to use USB?**

**A: No.** USB driver support is built into Win-  
*continued on page 152*

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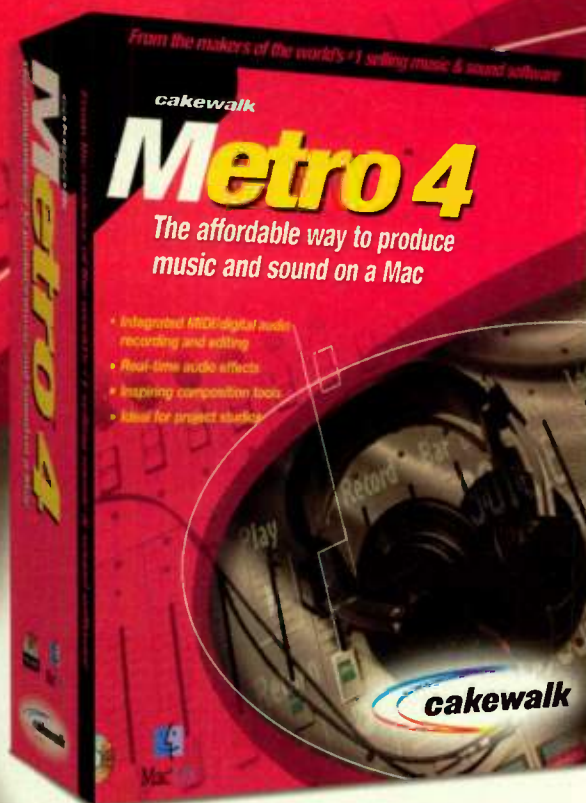
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# Interactive Microsystems

## DSR2000 DAW

*A hard-disk recorder  
designed for people  
who hate to  
set up hard-disk  
recorders*

**BY DAVID MILES HUBER**

Putting together your own digital audio editor can be a real hair-pulling experience. Dealing with system upgrades, hardware installs, and the overall downtime that come with the territory can be frustrating, time consuming, and downright costly. Because of this, the folks at Interactive Microsystems, Inc. (IMI for short) are offering the PC-based DSR2000 digital audio workstation that

has been designed with the project studio and audio professional in mind.

### THE HARDWARE

The DSR2000 is shipped as a fully configured, turnkey system consisting of a 6U rackmountable chassis (that contains all of the computing and audio hardware), PS2 mouse and keyboard, 17-inch color monitor, Windows 98, manuals, and cables for connecting the sound card to your audio system (more on the sound card and editing software in a bit). The entire PC system's color scheme comes in a basic studio designer black that's guaranteed to look very sexy in any studio environment.

On the hardware side, the DSR2000's rackmount case is built like a battleship. Getting to the PC's innards involved taking off a few rear screws and sliding the heavy top plate towards the unit's back until it slid off. Once inside, you could see that a lot of care was taken towards making sure that the hardware was secure and

protected against shock (an important feature for almost any studio, especially for those that are mobile or spend time on the road). On the security side, the case also sports a front glass door that locks. You can simply lock it up and leave knowing that no one can turn it on or even gain access to the floppy or CD drives.

This little puppy is loaded with some of the best PC components presently available on the market. For example, Asus motherboards are considered the Rolls-Royce equivalent, offering such features as an internal data bus speed of 100 MHz (a feature to look for when buying a motherboard that boosts the rate up from the traditional PCI 66 MHz speed). Although the basic unit is shipped with a 266 MHz Pentium II processor, the motherboard can be ordered with CPU speeds of up to 400 MHz. In addition, the Asus board has an on-board Ultra2 SCSI connector that's used to drive the PC's SCSI devices.

The basic DSR2000 is shipped with





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64 MB of RAM, floppy drive, a 9.1 GB SCSI hard drive (5.4 msec. access time), a 32X CD-ROM, and a Ricoh CDR/RW drive. Of course, any of these can be easily upgraded by the user or at the factory. It's also important to note that the system ships with three empty PCI slots and two 16-bit ISA hardware slots, so you can add other toys that you might need to personalize the system.

One last minor point: the system includes an unusual mouse that doesn't have a trackball. Instead it has two-rotating disk feet that don't need to be cleaned (a process that seems to crop up from time to time). It's just one less annoyance that you have to deal with in the middle of a session at 2 AM.

The DSR2000 comes shipped with a pro-quality, fully configured ARC 88 sound card from SEK'D, which gives you access to eight analog ins and outs (via RCA jacks), as well as an optical S/PDIF digital audio port that's built right onto the card.

**THE SOFTWARE**

The DSR2000 comes shipped and fully loaded with Windows 98, along with a full version on CD-ROM. Considering my recent experiences, I'm not so sure if that's a blessing or a curse (but that's fuel for a whole other article). The folks at Interactive Micro did say that they'd be happy to work with clients to install another OS (such as Win 95 or NT).

On the audio edit side, the system comes loaded with SEK'D's Samplitude Studio 4.5 editing software. I've always been impressed with Samplitude's overall power. This real-time workhorse lets you import soundfiles from any or all eight of the analog inputs, S/PDIF optical port, or pull files directly from an audio CD. Real-time mixing can be carried out from Samplitude's main edit window or from a screen that emulates a standard mixing surface. You can even patch DirectX plug-ins directly into a track and process them in real time. Once your mix comes together, you can then write it to the CD-RW as a WAV file or as a standard CD Audio track. Once your mixes are assembled,

you can then import them into Samplitude and arrange and master them into a final CD form.

A few words about the software before we continue. Although Samplitude is flexible and powerful, I've found that this German creation has a bit of a learning curve to it. Sometimes it can really drive you crazy! For example, I called up an effect whose basic parameters were totally wacky, only to find out that there was no undo. So I did what any red-blooded tech-

hold from an audio system that doesn't have dedicated audio processors, beyond the CPU). As expected, pulling sounds from an audio CD and then burning an edited project was easy and straightforward.

Upon loading other editing software editors, I was hit with processing speeds that I'm simply not used to (when working in a non real-time processing environment)...maybe it's time that I upgrade. Put simply, power isn't an issue with this system. CPU and hardware expansion isn't much of an issue either. Since there's no room for another internal hard drive, I suppose that you could add an external SCSI port on the back and daisy chain additional drives.

Noise is always a big concern of mine, but IMI has solved much of the drive noise problem by placing the drive and control access behind the front glass plate. The fans on the front face, however, create enough noise to make up the difference. One other beef that would be easy to deal with: I would like to see IMI add two RCA jacks at the back of the system for passing audio from the 32X CD-ROM drive. You never know when it might be the only CD player around.

**MY 2 CENTS**

In the final analysis, there are three good reasons why someone might consider installing a DSR2000 DAW into their studio:

1. It's a top-quality audio production PC that's built from sleek, rugged and totally sexy components that would be totally at home in a pro environment.

2. It's a turnkey system — just unpack it, plug it in and go. (Of course, you can only collect the \$200 once you've learned the editing software....)

3. Having access to tech support that's expressly familiar with *your* PC! That alone is worth a lot when your system freezes the middle of a session or if you're having install woes of any kind.

If designing a PC-based workstation from the ground up gives you the willies and tech support is high on your priority list, or you simply want a well-built, cool-looking system, the DSR2000 is definitely worth a first and a second look. **EQ**

**MANUFACTURER:** Interactive Microsystems, Inc., 34 Brandywine Road, South Barrington, IL 60010. Tel: 847-426-1950. Web: www.imidaw.com.

**APPLICATION:** A professional turnkey IBM-compatible PC that has been expressly designed to optimally handle the requirements of audio production.

**SUMMARY:** An out-of-the-box, PC-based digital audio workstation that offers 8 analog ins and outs, S/PDIF digital I/O, multitrack hard-disk editing and CD mastering capabilities.

**STRENGTHS:** This system's loaded with the fastest, best, and most up-to-date hardware components the current market has to offer; the rackmount case isn't only cool looking, it's built like a battleship and gives you quick 'n' easy access to the hardware innards; system comes assembled and fully loaded — just plug it in and get to work; I give it five extra points for being installed with Adaptec's Direct CD packet writing software — a must for anyone in any business!

**WEAKNESSES:** The front fan is way too noisy for my tastes. Given the fact that there's a rear exhaust fan on the power supply, perhaps Interactive could slow down the front fans or find a fan that could push air through more quietly and efficiently.

**MANUAL:** Since the system is built from stock hardware and software components, the system comes packed with manuals for the computer's motherboard and Windows 98. Also included is SEK'D's ARC 88 audio card and the Samplitude editing software.

**PRICE:** \$5600

**EQ FREE LIT. #: 122**

no-freak would do: I closed the program — only to find that it destructively overwrote the soundfile anyway! Arrrrggg!

It's nice to know that other editors can be easily installed into the system and can directly access the sound card's various I/Os. This makes it particularly useful when clients want to install their own software for editing and importing projects in an environment that's familiar to them.

**ON THE BENCH**

As you might expect, a Pentium II 266-based system with a 9 GB Ultra2 SCSI hard drive didn't balk when I threw some serious real-time mixing curves its way. Effecting tracks in real time using Opcode's Vinyl and Vocoder DirectX plug-ins came off without a hitch (a true feat to be-

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These companies have announced support for DSP Factory in their Windows® products. Macintosh software coming soon.  
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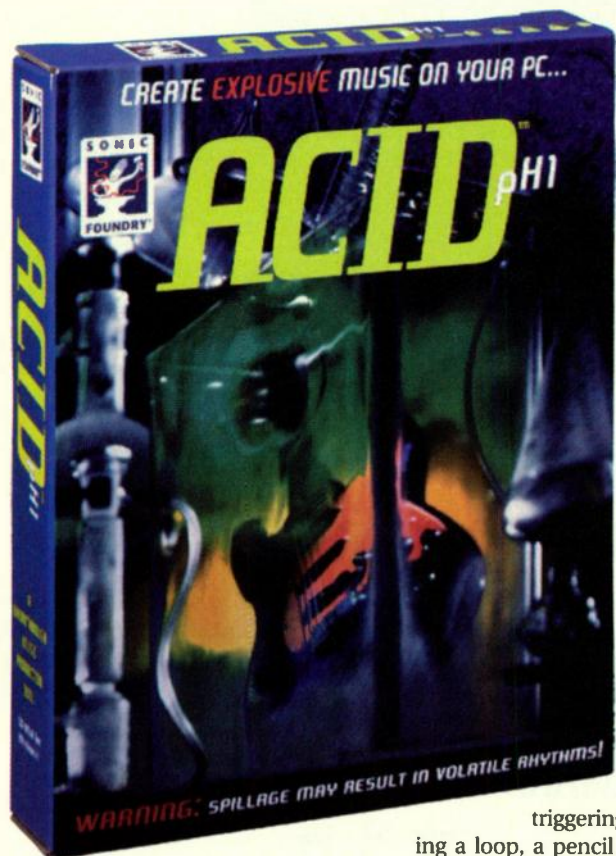
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World Radio History

# Sonic Foundry ACID

*Feeling loopy?  
You may be  
after giving this  
innovative  
software package  
a try.*

BY CRAIG ANDERTON



The backbone for a lot of dance, house, techno, hip-hop, etc., music consists of loops — rhythmic or melodic figures that repeat every few measures. Combine enough of these in interesting ways, put some overdubs on top, and you end up with the musical equivalent of a collage.

Creating good loop music isn't easy: you have to select your loops, load them into a sampler or multitrack hard-disk editing system, trigger them at just the right times to give a repetitive rhythm track, and, of course, make some compelling music. To further complicate your life, loops with different tempos or pitches need to be matched through tedious time compression/expansion or pitch-shifting operations, and these algorithms often mangle the sound.

ACID changes all that, as it can run any loop you load at whatever master tempo you specify. That's right: load in drums at one tempo, bass at another tempo, and an arpeggio at yet another tempo — ACID will convert them into your tempo of choice, with no trips to a wave editor required. You can change the loop pitch as well, and both loop and pitch can change (independently) anywhere in the song.

Furthermore, you can forget about copying and pasting loops, or re-triggering via MIDI. After loading a loop, a pencil (for single tracks) or paintbrush tool (for working across multi-

ple tracks) "draws in" the desired length, with the loop repeating as many times as needed to fill out the length. It's equally easy to extend loops several measures at a time, or zoom in to the waveform level and trim with surgical precision.

**MANUFACTURER:** Sonic Foundry, 754 Williamson St., Madison, WI 53791-8062. Tel: 608 256-3133. Web: [www.sonic-foundry.com](http://www.sonic-foundry.com).

**APPLICATION:** Compositional tool for loop-based music, with some live performance capabilities.

**SUMMARY:** Combining elements of a sequencer, hard-disk recorder, and paint program, ACID is an entirely new type of program for new types of music.

**STRENGTHS:** Ability to match loop pitch and tempo borders on the magical; innovative; high fun factor and extremely addictive; fast, smooth operation; does hard-disk recording for longer, linear tracks; accepts DirectX plug-ins; 16- or 24-bit recording; handles multiple outputs; faders can be grouped.

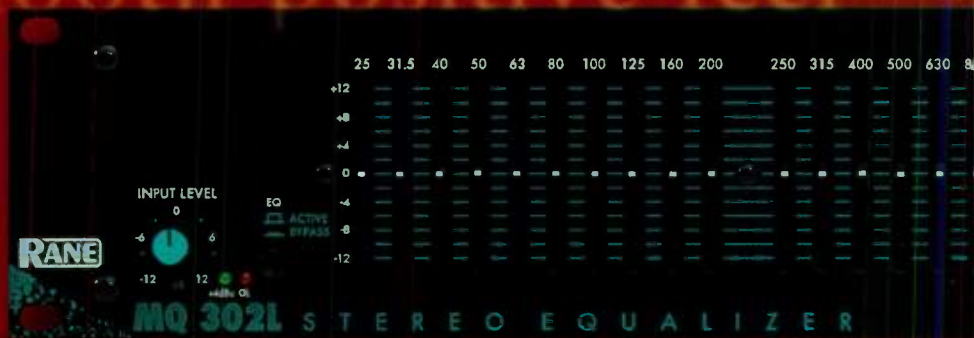
**WEAKNESSES:** No hardware control surface available; envelope automation "rubber bands" should be different colors; can't import audio directly from CDs; no triplet snap values.

**SYSTEM REQUIREMENTS:** Pentium 133 (Pentium II recommended for real time DirectX plug-in previews) or Alpha AXP, Windows 95/98 or NT 4.0, 32 MB RAM, 5 MB hard-disk space, VGA display.

**PRICE:** \$399  
**EQ FREE LIT. #:** 123

After a painless installation (using serial number-based copy protection), you're presented with the main screen (fig. 1). You can preview WAV or AIF loops via an Explorer-like interface, then import them, or just drag-and-drop, into the track list toward the left. Short files reside in RAM (a resource meter shows how close you are to picking up the phone and ordering another 32 MB of RAM), while

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## PCQuarterly

longer files play from hard disk. You can adjust pitch, level, pan, mute, solo, and sends for the two prefader FX busses (ACID accepts up to eight DirectX plug-ins). Each track can feed its own hardware output, which is great for sound cards with multiple

I/O. There are some fine points: with stereo signals, pan acts more like a balance control. And while you can group faders, the response is linear, not ratiometric (e.g., if fader #1 is up full and fader #2 up halfway, bringing fader #2 down all the way brings fader #1 down halfway).

A piano-roll type display (fig. 1,

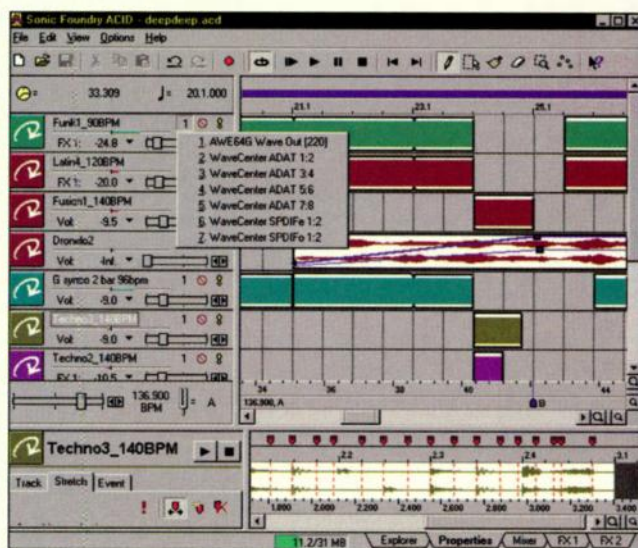


FIGURE 1: ACID's main screen. The Funk track output is about to be routed to one of several possible outputs.

Properties are shown for the Techno3 loop.

right side) shows loops as blocks of digital audio, each with individual, automatable, "rubber-band"-style envelopes for pan, level, and FX send. You can snap loop start and end points from whole notes to 64ths (no triplets, though). A loop start offset function allows for getting creative with loop start times, and crossfading is available to eliminate clicks that might occur with imperfect loop-to-loop transitions.

The screen's lower strip changes to show the Explorer, mixer, or FX sections, or, in this screen shot, Properties. ACID changes tempo elegantly because it uses the ReCycle-like "time-slice" trick that preserves attacks, but just moves them closer together to speed up the tempo (or spreads them further apart for tempo reductions). The Properties window shows where the time slices occur, so you can manipulate them if de-

sired (move, add, customize response, etc.). Pitch shifting doesn't sound quite as accurate, but it's still fine for reasonable amounts of shifting. (Hint: If you create custom loops for ACID, choose 100 BPM or so — ACID speeds up better than it slows down. You can also "ACIDize" a file so that whenever you load it, ACID knows how to optimize it for the best possible stretching).

Recording to hard disk requires a sound card with full-duplex operation; ACID supports 16- or 24-bit word lengths. As expected, overall hard-disk track performance — specifically, how many tracks you can play at once — depends on system throughput, microprocessor clock rate, hard drive access time and rotational speed, amount of disk defragmentation, etc. You

can specify whether or not these files track tempo changes.

Hard-disk tracks are handy when the local diva comes in to do some vocals over your rhythm track. One-shot sounds, where ACID simply triggers a sample, are possible too, although their tempo always remains fixed.

ACID can master or sync to MTC, and generates MIDI clock — useful if you want a sequencer to follow ACID's tempo changes. MTC sync can also be trig-

ger-based, which is great if your sound card has word clock, as that can do the chasing instead of MIDI. Unfortunately, though, there's no parameter control via MIDI. Hooking this baby up to a Peavey PC1600 MIDI fader box would be very cool for live performance, as ACID is relatively forgiving about moving loops around and such without hiccuping.

Among other goodies, the DirectX option is wonderful; there's nothing quite like adding rhythmically perfect echo, or some ring modulation, to percussion tracks. There are lots of other neat features too (such as markers for navigation, SMPTE rulers with offset, and unlimited undo/redo), but we've covered most of the high points.

For musicians who work with loops, this program is nothing short of miracu-

*continued on page 134*

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# PowerQuest Drive Image Backup & Hard Disk Recovery Software

*The answer to beating those heart-stopping system crashes*

**BY DAVID MILES HUBER**

Let's talk about hard-disk crashes, shall we? *Aaarrggg!* You've just installed a new version of Win 98 and your system totally dies. You installed a piece of hardware or software that your system hates and you can't get back to square one on your hard drive. You might have even gone out and bought a new drive to hold your program data. How do you

get up 'n' running with a minimum of time and lost hair? Well, if you're like me, you've found that the backup utility in Windows is totally "USELESS." Pure 'n' simple, it's nearly impossible to do a full program backup and restore any system data of consequence when using this application. So what are your options? You could do what the folks at Microsoft do — reinstall the drive fresh from the original program discs and diskettes every time you have system woes. Or you could save yourself a ton of time and trouble and get Drive Image from Power Quest, Inc.

Simply stated, Drive Image is a backup and restore program that reads the data from an entire hard disk (or partition within that disk) and saves it as a single \*.pqi file. Unlike most backup programs, Drive Image doesn't back up a drive file-by-file. Instead, it stores an exact image of all of the sectors and,

upon restore, creates an exact copy of the original drive — period!

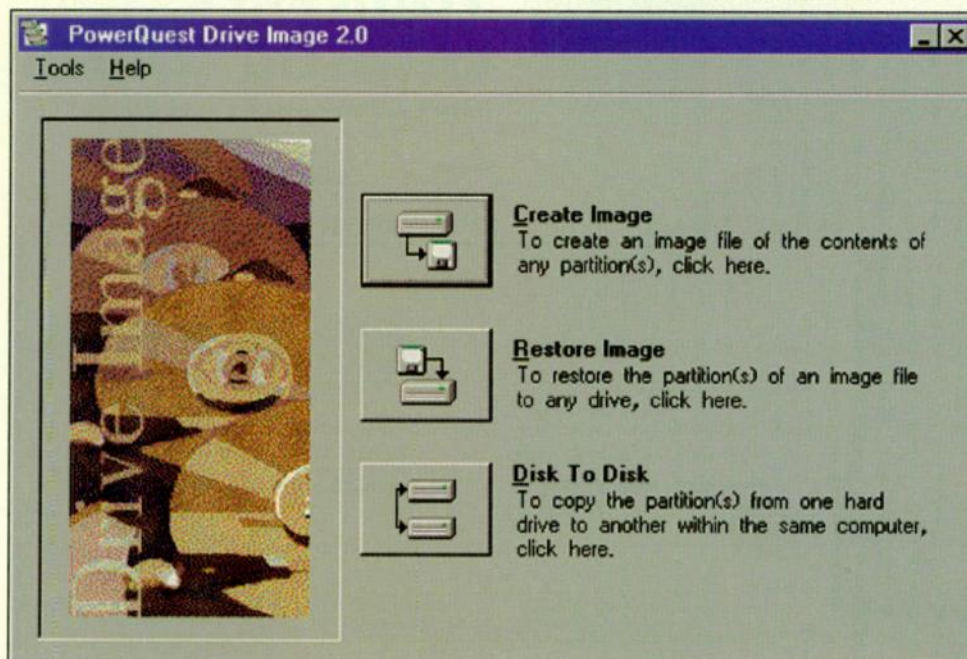
The really wonderful part about Drive Image is that it's a DOS program. Although you install and launch the program from within Windows, once it's started, Drive Image restarts the computer in MS-DOS mode. So what's so great about that? In a nutshell, this means that you can completely restore a drive without having to load Windows at all! Just place the two diskettes that you created when you first install the program into the computer, boot up the PC, and begin the restore process.

**OK, LET'S DO IT!**

Here's how easy it is. First load the Drive Image program into the computer from the CD-ROM drive. It'll then walk you through several steps and create the two rescue disks that you need to restore the files to a drive that's fallen on

hard times. Once you're happy with the state of your hard disk, simply create a backup "image" of the disk onto another partition, another hard drive, or onto a spanable "drive letter" media (such as a Zip, Jaz, or SyQuest drive). You could even do your backup to a drive and then copy the image file to a tape backup or burn it to a CD-ROM disc (my favorite way). If you do either of these last two, you'll need to load the media's appropriate DOS drivers before starting the restore process. By far the safest, fastest, and easiest way is to create and keep a backup image on a drive letter other than your primary boot drive and then copy that file to a removable media for safe keeping.

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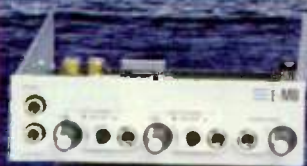
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CIRCLE 19 ON FREE INFO CARD

made some modifications that turned your drive into a dead jelly doughnut. Simple. If you saved a backup image to another drive or drive partition, you start the PC from the boot floppy and then launch the pqdi.exe program from the second floppy. Once you direct the Drive Image to load the appropriate restore file, as well as give it the destination drive and partition, all you need to do is sit back and watch the blue progress bars travel across the screen. After a few minutes, Drive Image will ask you to reboot your PC and you're computer is back in business. It's really that easy! Honestly, if my C: took a nose-dive, I could be up and running in about five minutes (including the time it takes to get out the floppies, reboot the PC, launch Drive Image, and restore the image file). Even at 4 AM after a late-night session, the process would be easy!

**NUTS & BOLTS**

On the detailed side, Drive Image copies almost everything, including hidden files, and fully supports long file names. I've found, however, that certain copy-

protected programs may need to be re-installed due to program encryption safeguards. Other than that, though, the restore process is pretty bulletproof.

Compression is also supported; letting you use no compression, light compression, or a heavier 2:1 compression on a drive that's using FAT16

(a file allocation table that keeps track of the disk's file locations and structure) or one that's using Win 98's FAT32. As a bonus, Drive Image includes PowerQuest's PartitionMagic technology, which lets you create and resize your partitions after you've copied an image  
*continued on page 134*

**MANUFACTURER:** PowerQuest Corporation, P.O. Box 1911, Orem, UT 84059-1911 USA. Tel: 800-379-2566. Web: www.powerquest.com

**APPLICATION:** Software utility for backing up and restoring a hard drive or partition on a hard drive.

**SUMMARY:** Provides a solid way to back up and restore your drive, or to reload a new drive with your program data, literally in minutes!

**STRENGTHS:** Very stable; provides a reliable and extremely fast way to restore program data to your hard drives without having to install an operating system; drive Image includes PartitionMagic's resize technology so you can create and resize disk partitions after copying the back-up data to the destination drive.

**WEAKNESSES:** You may need to re-install "some" programs from CD that require you to enter an install code. This only happens with a few programs and isn't a major nuisance.

**MANUAL:** Well documented and easy-to-read.

**SYSTEM REQUIREMENTS:** PC with any speed CD-ROM drive, DOS 5.0 or higher, Win 3.1, 95, 98, NT or OS/2.

**PRICE:** \$69.95 (\$54.95 with \$15 mail-in rebate included in box).

**EQ FREE LIT. #:** 124

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in this EQ exclusive review.*

*By Roger Nichols*



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MCD 100

MCD 101

**Y**ou don't have to wait for January 1, 2000 to celebrate the new millennium. That's because with the introduction of beyerdynamic's MCD 100 cardioid digital microphone, the new millennium is here today.

#### DIGITAL MICROPHONE?

Almost... There is still a condenser capsule that moves proportionally to sound pressure variations and serves as the transducer between acoustic and electrical energy — but that is where the analog part stops. Immediately the internal 24-bit converter takes over and converts the analog motion of the capsule to digital numbers that are then spewed forth from the XLR connector.

Because there is virtually no signal path length for the analog signal, there is never any time for the addition of circuit noise or induced hum from nearby cables. An AES cable is connected from the microphone to its power supply. This is a special power supply that provides phantom power over the digital cable to the microphone. The power supply also provides a gain adjustment control. Bit-shifting the 24-bit signal from the microphone changes the level. If you are recording to a 16-bit device, you can shift the bits so that you can use detail information of the 24-bit signal instead of chopping it off.

The power supply I used was the MPD 200, which will power and control two digital microphones. Each microphone is individually connected to the power supply and its internal clock is synchronized by the power supply. The output of the power supply is one AES connection. The left microphone is sent on AES channel one and the right microphone is sent on AES channel two. If you only have one microphone connected, the signal appears on both AES channels. The cable from the power supply must also be an AES cable.

There are two additional BNC connectors on the power supply for word clock in and out. If the microphone is the primary source, such as a direct connection to a DAT machine, then the sample rate defaults to 48 kHz and the digital AES signal supplies the clock information. If you need to supply word clock to another power supply or additional gear, then the word clock out connection will provide those signals. If you will be connecting the microphone to a digital system

that needs to be the master, then your word clock (32 k–48 k) should be connected to the word clock input on the power supply. The microphone continues to operate at 48 kHz, while the MPD 200's internal sample-rate converter slaves to the word clock in. To operate the microphone as a slave, however, you must open the power supply and change an internal jumper. There is no external switch.

There are other power supplies available for one to eight microphones, and they all can be cascaded together. The MPD 800 provides metering and gain control for up to eight microphones and has a built-in TDIF and ADAT interface for direct connection to those devices. If you have a digital console that provides "digital phantom power," then you will not need the individual power supplies. You must, however, have a sample-rate converter on the microphone input. There are also suspension mounts and pop filters available from beyerdynamic.



*I wasn't hearing the  
microphone, I was  
hearing the piano, or  
acoustic guitar, or  
vocal as if there were  
no microphone.*

#### CUSTOMIZE YOUR MICROPHONE

Located inside the microphone is a DSP for tailoring curves to fit your needs. If you use one microphone for a particular purpose all of the time, then beyerdynamic can custom program the DSP to include the filter of your choice. There are some situations where there would be a big advantage to having a microphone ready to go with built-in EQ curves. (You can have multiple EEPROMS programmed and change them in the field.)

#### THE SET UP

The first thing I had to do was find some long AES cables. I actually went against my better judgment and tried a long mic cable, but it didn't work. After I got the right cables, everything worked perfectly. I wanted to record directly into Pro Tools as a 24-bit file. Pro Tools was utilizing word clock (slaved to) and SMPTE chasing along with a Sony 3348 digital 48-track. I ran a BNC cable to the MPD 200 power supply for word clock, and flipped the internal switch to "slave." I connected another AES cable from the power supply to the microphone itself. I powered up

everything and put on my headphones. The meters showed nothing and I heard nothing. I sent someone out to the studio to check my connections, and when he opened the door to the studio the sound almost blew the headphones off my head.



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World Radio History

What I was actually (not) hearing was the absolute dead quiet of the digital microphone. It made the mic with the big heat sink I use sound like a raging wildfire in comparison.

**YES, BUT HOW DOES IT SOUND?**

Well, I'm sorry, but I spent so much time talking about technical stuff that I don't have room to cover the actual use of the microphone (just kidding).

Remember the first time you recorded something digitally after suffering with the tape hiss of analog? Remember the clear noiseless background to your mixes? Well, that was my initial response. I wasn't hearing the microphone, I was hearing the piano, or acoustic guitar, or vocal as if there were no microphone. No tubes with rattling filaments, no sputtering FETs, no rustling phantom power noise from marginal connections or someone stepping on a punky mic cable. The smooth frequency response and warm low end were pleasing. The highs were crystal clear. The sound from just one microphone was three-dimensional. It had depth. You could tell exactly how far the instrument was from the microphone without looking.

My first impression left me in a state of too-good-to-be-true-ness. I kept the microphone for two months and used it on everything that moved. Pianos, acoustic guitars, vocals, percussion, drum overhead, harp, zythwingle, and surdo.

The MCD 100 is the closest you can get to recording everything directly into a digital recorder without using a microphone. I'm hooked.

**CONCLUSION**

I only had one microphone for the review. I can't wait to hear what a stereo pair of MCD 100's sounds like. The only drawbacks to owning an MCD 100 are the additional investment in AES cables and the fact that you have to run them through the door — unless the studio where you work had the foresight to run AES wiring to the mic panels. Don't forget that you have to open the power supply to use the mic in slave mode. If you don't change the jumper or run the MCD 100 through a sample-rate converter, then you will end up with digital clicks where you don't want them.

One last thing: Once you figure out how much you are going to save on expensive mic preamps, your new MCD 100 will effectively be *free*. Tell your spouse to call me. I'll explain it.

**MANUFACTURER:** beyerdynamic, 56 Central Avenue, Farmingdale, NY 11735. Tel: 800-293-4463. E-mail: salesUSA@beyerdynamic.com. Web: www.beyerdynamic.com. Circle EQ free lit. #125. **PRICE:** \$2500; MCD 101 (omni), \$2500; MPD 200 power supply, \$1599.

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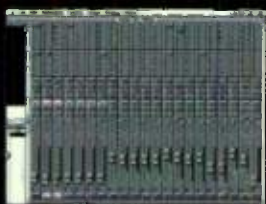
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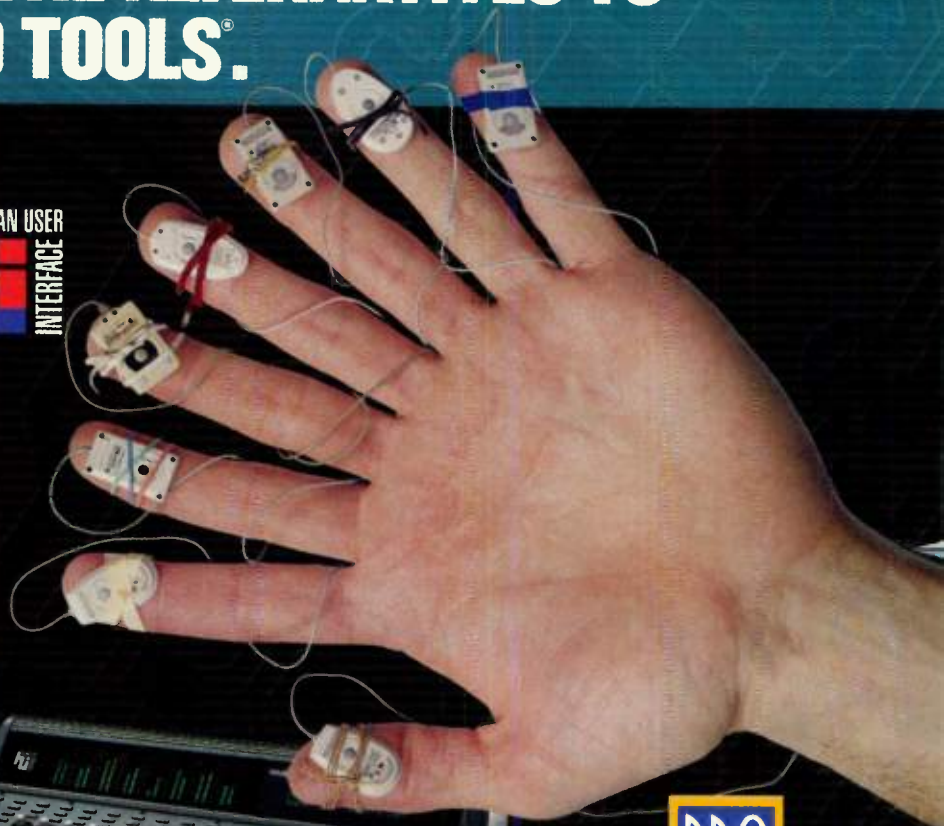
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# YAMAHA 01V DIGITAL MIXER

THE SUCCESSOR TO THE PROMIX 01 ARRIVES  
— STILL AFFORDABLE, STILL COMPACT,  
BUT HOSTING MANY MORE CAPABILITIES  
BY WADE MCGREGOR



# YAMAHA 01V DIGITAL MIXER

**H**ow big is your control room or FOH mixing position? How much do you want to spend on your next mixer? If your space and budget are limited but your expectations are not, Yamaha has developed the mixer for you. The 01V is the successor to the very first affordable digital mixer, the ProMix 01. The ProMix 01 was a ground breaking product that, although many users felt constrained by its lack of outputs and digital inputs, made digital audio mixing really affordable. Yamaha has been listening to these users (and those that didn't buy that unit) as they developed the new 01V. The result is a far more versatile mixer that features more outputs and far greater expandability while retaining the compact size of the ProMix 01.

Many of the better analog mixing consoles available today are versatile, but they pale in comparison with the range of control offered by the 01V. Not only can you access 4-band fully parametric equalization on the first 16 inputs, you also can assign up to 22 individual dynamics processors to inputs 1 to 16, auxiliaries 1 to 4, and the master outputs. The internal effects units include the processing and presets of two independent Yamaha Pro3R effects processors (mono input—stereo output), which can be assigned to auxiliary busses, mix busses, stereo master busses, or to cascade into the other effects processor (don't do this on both effects processors, though!). All the front-panel buttons (except input pads) include an LED to indicate their current

status. All this and every control setting (except input trim/pad) can be stored and instantly recalled when needed.

The 12 mono inputs feature fully balanced XLR or 1/4-inch phone jacks, a 26-dB pad, up to 44 dB of gain trim, and switchable 48 V phantom power. The inputs use the same circuitry de-

24) are sourced from the optional I/O cards mounted in the Option panel on the rear of the unit. These Option inputs have a slightly reduced feature set (such as 2-band parametric EQ and limited direct O/P assignment), but can be swapped with the first eight inputs (individually or globally) to access the full input feature set. The review unit included the MY8-AE option card with eight AES/EBU digital inputs and outputs that worked flawlessly. The only complaint I had was that the garden-hose-sized XLR fan-out cable strained the 25-pin sub D connector. Digital audio signals can be locked to the internal clock or serve as master clock (but only one at a time).

The unit includes a comprehensive monitoring facility (PFL, AFL, and Solo-in-Place) that can be configured to suit live sound, track-



sign as the acclaimed 02R, a console widely used in high-end recording of pop and classical music. The result is a basically uncolored canvas on which to paint your masterpiece with the full range of colors available at the press of a button (or two).

The stereo inputs (13/14 and 15/16) use a single fader and individual 1/4-inch phone jacks for each L/R signal. These inputs can also be internally patched to the 2-track input or S/PDIF digital input. The last eight inputs (17 to

**MANUFACTURER:** Yamaha Corporation of America, 6600 Orangethorpe Avenue, Buena Park, CA 90620. Tel: 714 522-9011. Web: [www.yamaha.com](http://www.yamaha.com).

**APPLICATIONS:** Digital audio mixer with 15 motorized faders and comprehensive internal signal processing for recording, postproduction, or live sound.

**SUMMARY:** An excellent 24 X 6 mixer that competes with any analog or digital mixer in this price range and offers full recall of all settings from memory.

**STRENGTHS:** Powerful and comprehensive equalization and compression on the first 16 inputs and the aux and master outputs; optional interfaces for specific applications; two full-featured Pro3R effects processors inside; vastly improved functionality over the ProMix 01.

**WEAKNESSES:** You can get lost in the pages of parameters, setup may require lots of button pushing, and a methodical approach to troubleshoot the signal path.

**PRICE:** \$1999; \$299 for optional 8-channel I/O cards (including MY8-AE for AES/EBU, MY8-TD for TDIF or MY8-AT for ADAT format digital audio signals).

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**HEADPHONE MIXER  
TIPS & REVIEWS:  
FURMAN HDS-6 & HR-6  
INTELIX PSYCHOLOGIST  
OZ AUDIO Q-MIX HM-6  
By MIKE SOKOL**



**NEW GEAR PAGE 132**

# Is EVERYBODY HAPPY?

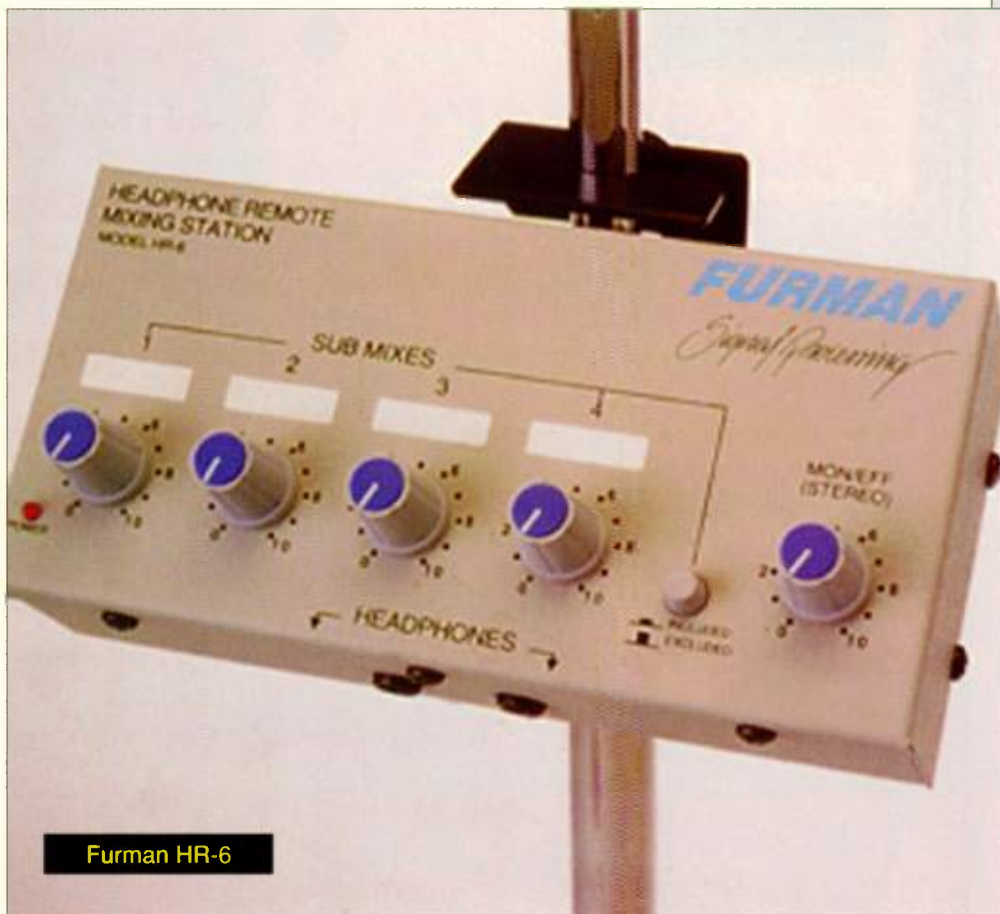
HEADPHONE  
MIXING SYSTEMS GET  
YOUR MIND OFF  
OF THE CANS AND INTO  
THE IMPORTANT  
PARTS OF SOUND  
REINFORCEMENT AND  
RECORDING

By Mike  
Sokol

In the beginning, there was silence and simplicity. And it was a good thing. Without electric amplification, a musician could only be as loud as his personal instrument choice allowed. Now, that wasn't always a quiet thing (think bagpipes), but everyone was accustomed to that fact that you could hear only so much of your own thing above the din of the other things on stage.

In the present era of high technology and amplification, however, musicians may want to hear either everything or just their own thing or maybe a combination of his thing and her thing. The only absolute given is that everyone on stage will want to hear something different from everyone else. Are you still with me?

So monitoring was born. At first everyone was satisfied with a single mix with maybe just the vocals. Then maybe a little acoustic guitar...oh yeah, how about another mix for the drummer? And we need the electric guitar on the other side of the stage... And as mixes became larger and more complicated, so did the mixing equipment. Unfortunately, the price for such toys increased



Furman HR-6

as well. So now while everyone demanded lots of monitor mixes, few were prepared to pay the full tariff. This happens not only on the live stage, but in the studio as well.

Pity the poor project studio with only a single headphone mix run from the recording console. It seems that half your energy will be spent trying to satisfy the "artists" that need their headphone level adjusted. And this isn't a mere annoyance. When an engineer is distracted from important tasks by silly things, it's way too easy to make mistakes. And as I tell everyone that asks me if I ever make mistakes while recording: "When I make a mistake, worlds collide, so stop bugging me." Yep, that's right. You can kiss that blazing solo-of-a-lifetime goodbye, 'cause I never hit the Record button. Sorry, but I was

turned around and cranking up the cans for the lead singer, but hey, how many solos of a lifetime do you get?

Face it, you're not doing your clients any favors by messing with the mundane and then screwing up the important stuff. OK, but how do you deal with the situation? I thought you'd never ask.

Following are reviews of headphone mixing systems — ones that will fit practically every budget. They all allow you to put the controls out next to the musicians so they can mess with the levels while you do the recording. At least one of the systems allows you to patch in an effects device such as a reverb, which can help reduce the "inside your head" feeling you get from headphones. All of them allow four or more musicians to get their own level control while freeing up your console from complicated monitor mixes.





DB-9 and term-strip connectors. This is the traditional way to wire for permanent installations, and, indeed, the Psychologist seems to have been designed with that usage in mind. There are no built-in power amplifiers so you'll need to add a multichannel am-

plifier and run additional cables back to the musicians for a hard-wired headphone feed. Or the matrix could control a number of RF transmitters directly for a wireless personal monitor design.

A single, 18-volt, line-lump power

supply powers the Matrix, which then passes power down through the DB-9 connectors to all of the remote mixers in a daisy-chain arrangement. No actual audio is passed down the interconnecting cables. Instead a digital control signal is used to remotely access the matrix.

This seems to be the Cadillac way of doing things. Instead of actual analog or digital audio passing down the wires to each of the remote stations, a digital control signal is derived, which then talks to the various VCAs (Voltage Controlled Amplifiers) in the master controller. This does allow for extreme flexibility in design, since the maximum number of conductors in the cable doesn't limit the number of mixes desired. Plus, since the audio runs are actually quite short (the length of the interconnect ca-



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omixer to amps), dation of sig- tatter how far atrol cables. I did listen to critically, and they seemed ly transparent, with no additional hum, hiss, distortion, or zipper noise. (Zipper noise is when the graduations of the VCA are too coarse, allowing a rapid movement of the fader to produce kind of a "zip" sound as it jumps levels quickly.)

The remote controls are available with stereo or mono controls, but there are no markings on the potentiometers. You

may accuse me of being anal-retentive, but I really like markings with numbers so I can make a reference sheet for later recovery. These don't have to be marked in real decibels to be useful. A simple 1 through 10 would suffice.

This is a very professionally designed unit. I would, though, think twice about taking it on the road with me because of the custom cables and lack of built-in amplifiers. I do know that the band King Crimson used one on tour a few years back and it worked out fine for them. On my gigs, however, doo-doo happens, and I like to be

able to get spare cables at the drop of a hat. On the other hand, for a permanent installation such as a house of worship, studio, or vocal booth, this would be the most flexible way to provide a headphone matrix.

## OZ Audio Q-MIX HM-6 HEADPHONE MATRIX MIXER

Headphone mixes: Can't live with 'em, can't live without 'em. Sometimes the musicians drive me nuts in the studio with requests for messing with their headphone mix during a session. Now, I'm supposed to be an understanding musician/engineer myself, but in reality I've got more important things to deal with during most sessions; like remembering the punch-in points and what instruments are supposed to be assigned to each tape track. Little (and dare we say, *critical*) things like that.

What usually happens is a series of nonstandardized hand signals (up, down, thumbs up, sometimes the universal middle finger) and a bunch of unhappy musicians. This is especially problematic when you only have one or two headphone mixes. You'll know you're in trouble when after you talk the guitar player into putting his Full-Stack in the iso-room, and he wants his headphones to match the level of a live stage. Other musicians getting that guitarist's headphone mix will be most unhappy. So, on occasion, I've actually hired a second engineer and placed a second console just to mix headphones in the

**MANUFACTURER:** OZ Audio, 1102 Bonnevill Avenue, Unit B-2, Snohomish, WA 98290. Tel: 360-568-3636.

**APPLICATION:** Headphone matrix mixer for studio and live monitoring.

**SUMMARY:** The Q-MIX HM-6 provides six separate stereo headphone outputs, each with individual level control, stereo effects return, and direct injection of up to four additional signals.

**STRENGTHS:** Well-built steel case with 1/4-inch phono connectors for all signals, balanced inputs, and standard IEC power connector (no wall warts); clear markings on all connections; surprisingly high-quality sound — good enough for fairly critical listening.

**WEAKNESSES:** Signal swing is a little low for high-impedance headphones or really loud mixes; no numerical markings on pots.

**PRICE:** Retail \$349

**EQ FREE LIT. #:** 129

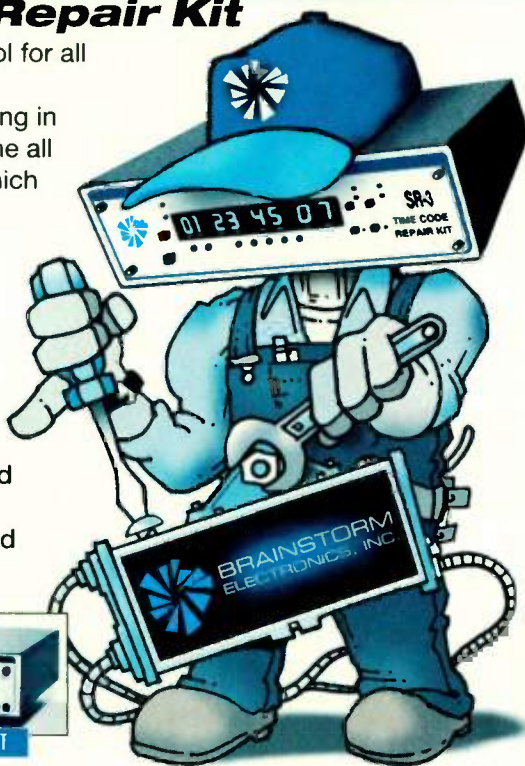
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"... It's a beautifully simple machine to operate  
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CIRCLE 32 ON FREE INFO CARD  
World Radio History



studio. This is certainly impractical in most project studios.

Well, the folks at OZ Audio came up with a very clever solution: give the mixing chores back to the musicians themselves. Plus OZ has added some additional mixing capabilities that might not be easy to get in a small studio environment. The Q-MIX not only has six separate headphone amplifiers, it also has an effects send and stereo return, and a direct-inject control for each headphone that allows you to add in additional signal level for those problem tracks such as electric guitar and vocals.

Here's how it works: You send the Q-MIX a basic stereo mix from the aux or monitor bus on your mixing board. Then you can also send up to four direct outputs from specific channels or busses. For instance, in one session I simply sent the direct out of the guitar channel to the "A" inject return and the direct out of a vocal

lead to the "B" inject return. I patched in a spare Yamaha SPX90 for

headphone effects, and then set the Q-MIX out where the musicians could play with the knobs. After about 10 minutes of playing around, they had a headphone mix that everyone was happy with. A simple plate reverb patch from the FX is usually all that's needed in 'phones to keep them from sounding too "centered" inside your head. And throughout the rest of the session, the singer could play with the level of the vocals in his own headphone mix without changing it in anyone else's mix. They all left me alone and stopped making hand signals at me! Then all I had to



worry about was getting the sushi to the session without anyone getting food poisoning.

The Q-MIX is a well thought out piece of gear. It's ruggedly constructed and looks like it would sur-

## OZ AUDIO HR-4 HEADPHONE MIXER

Headphone amplifiers generally aren't glamorous or exotic pieces of gear like mic preamps tend to be, but, nonetheless, they are important for most studio session work. The HR-4 (\$219) is a good example of a standard design. It's a traditional rack-mounted 4-output stereo headphone amplifier, but with the addition of an extra switch on each channel that allows you to select either the common "main mix" for each headphone set or a direct custom mix that you supply from your own monitor matrix.

You can't use the HR-4 to add in an effects processor for headphone reverb, nor can you select and cross-mix from the various direct inputs (as is possible on the HM-6 Q-MIX). That being said, the HR-4 is a good, 4-output headphone amplifier in a 1 RU rackmount package. Quarter-inch phono connectors are used throughout (none of those nasty RCA jacks) and the inputs are TRS balanced, which can be very beneficial for reducing hum in electrically noisy environments. Duplicated headphone jacks are provided both on the back panel (for permanent wiring installations) and on the front panel for quick plug-'n'-go situations.

I wired the HR-4 up to my voice-over booth and it worked as advertised. The hum level was nonexistent, and there was more than enough gain for the decibel-hungry DJs. The pots had a nice feel and the sound was high-fidelity quality.

One caveat for audio engineers who have never worked at a radio station: Never loan a DJ your head-

phones or your girlfriend. They'll treat your girlfriend a whole lot better than your headphones. On that note, the HR-4 would make a good headphone amplifier for radio station work, since you could use the channel selector to listen to either the cue bus or a tuner that's picking up the transmitter.

Headphone monitoring in a radio station is serious business. If you think live FOH engineers scramble when the main speakers go down, you need to be at a radio station when for whatever reason the transmitter fails. Every PD (program director) and owner can hear the sound of thousands of radios being tuned to the competitor's frequency. That's why all station engineers wear a beeper and most drive a 4-wheel drive vehicle. Every minute that a station's down is one less commercial that can be billed out. Most radio control rooms have a way to listen to their transmitter via a receiver that's tuned to the station, and the HR-4 would work great in that situation. And if you've got a "morning zoo" show, each of the talent and guests could get a headphone level that's individually comfortable.

Of course, it would be right at home in a standard recording studio situation, but you may find it lacking if you try to get really loud sound levels from high-impedance headphones. But for the other 99 percent of the time, it would do a fine job. If you don't need the matrix mixing capabilities of the Q-MIX, and rack mounting is important, check out the HR-4. —Mike Sokol



vive a few drops to the floor. I like the IEC power plug (no wall wart) and 1/4-inch phono plugs for inputs and outputs. The output voltage swing was a little low for low-sensitivity phones such as my Yamaha YH-3's (250 ohms), but it could drive my Koss Pro-4AAA's to ear-shattering volumes. Remember that with headphones, it's not the wattage of the amplifier that counts, but rather the voltage swing. And high-impedance headphones need lots of voltage to make them jump up and shout. Even though you may use a 50-watt amplifier to drive a set of hi-Z phones, don't think for a millisecond that 50 watts is going to the drivers. It's more likely 500 milliwatts. In that vein, OZ has printed a small but clearly written manual that not only details basic operation, but also how you can easily patch in an external amplifier for industrial-level headphone mixes.

The overall "sound" of the Q-MIX was very quiet and transparent. In fact, I spent an afternoon listening to several of my old DAT mixes it, and I never felt that I was let down by the sound quality. What's not to like? Oh, yeah, I would like to see numerical markings on the level controls. Call me old-fashioned, but rolling a pot up to the number 5 or 8 (or whatever) gives me more confidence in the repeatability of said potentiometer than a line at the 12:00 position. But it's probably not worth quibbling about. It may be just a holdover from my days doing test equipment calibration. I just like lots of numbers. That one minor criticism aside, the Q-MIX is a real deal for the project studio or live musician who needs a way to get extra headphone or personal mixes painlessly for the whole band. And it's so inexpensive that it can be used in a dedicated voice-over booth that might need a little monitoring flexibility once in a while. Try it, you'll like it.

*Mike Sokol is a live system and recording engineer with a long love-hate relationship with monitor mixes and headphones. As if writing for EQ magazine wasn't enough, he's also working on a science fiction novel this summer, and yes, there is audio/video recording and time-travel involved. No kidding. Check out his Web site at [www.soundav.com](http://www.soundav.com) for details.*

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## DIGITAL COMBINER

Need to combine multiple AES/EBU sources? The Graham-Patten DMIX-41 may be just what you're looking for. It combines up to four AES inputs, transparently and cost effectively into a single AES output. Inputs may be enabled or disabled remotely, using simple contact closures. Optional sample rate converters allow you to combine sources with different sample rates. Housed in a compact, rugged aluminum enclosure, it's ideal for studio or field use.

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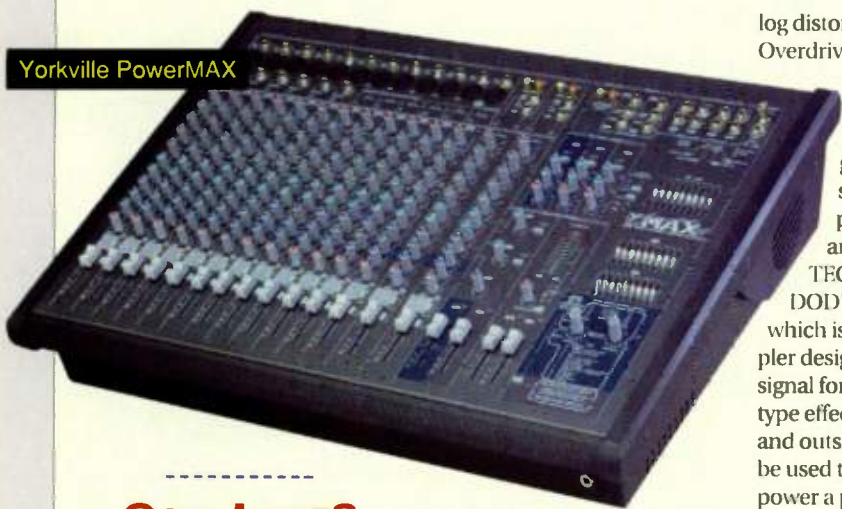
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## ROAD GEAR

Yorkville PowerMAX



### GOT JUICE?

Yorkville Sound has introduced the PowerMAX line of powered mixers. Available in both 16- and 22-channel configurations, these new mixers are capable of outputting more than 2000 watts of continuous power. The four internal amplifiers are configured to handle 2 x 800 watts at 4 ohms on the mains and 2 x 275 watts at 4 ohms on the monitors. The mixers provide 3-band EQ with mid sweep, switchable high-pass filtering, mute and solo switching, stereo graphic EQ on the mains, two monitor graphic EQs, and a dual-mode digital effects processor with 255 stereo presets or 2 x 16 in mono mode. The mixers provide scratch resistant front panels, phantom power, balanced XLR, and 1/4-inch phone and dual RCA inputs. For more information, contact Yorkville Sound, Inc., 4625 Witmer Industrial Estate, Niagara Falls, NY 14305. Tel: 716-297-2920. Web: [www.yorkville.com](http://www.yorkville.com). Circle EQ free lit. #130.

### LOOK MA, NO HANDS!

Audix announces the HT-1, a professional, full-range headset microphone. The HT-1 is

lightweight, resistant to moisture, and padded for extra comfort. The microphone is designed for optimum sound off-center of the mouth and an adjustable gooseneck allows for precise positioning. Designed for keyboard players, drummers, vocalists and on-stage presenters, the 3 oz. HT-1 has a frequency range of 50 Hz-18 kHz and an impedance of 100 ohms. The unit can be used with wireless transmitters or as a standalone cabled microphone with phantom power. The HT-1 is available at a suggested retail price of \$299 and comes with a phantom power adapter (9-52 V). For more information, contact Audix Corporation, 9400 SW Barber Street, P.O. Box 4010, Wilsonville, OR 97070. Tel: 503-682-6933. Circle EQ free lit. #131.

### ANYTHING AND EVERYTHING

The TEC4X is the latest addition to DOD's TEC family of floor-controlled multi-effects guitar preamp/processors. The processor is equipped with 30 new factory-preset effect combinations and memory for 30 additional user-defined programs. The TEC4X's analog compressor features two ana-

log distortion types: Classic Overdrive and Grunge. Up to seven digital effects can be used at once, including a noise gate, 3-band EQ, auto swell, pitch shifter, phaser, chorus, delay, and many more. The TEC4X also features DOD's new "pixillator," which is a digital undersampler designed to degrade the signal for an industrial music-type effect. With 1/4-inch ins and outs, the output jack may be used to feed an amplifier or power a pair of headphones. The TEC4X operates on a single 9-volt battery and is available for \$169. For more information, contact DOD, 8760 Sandy Parkway, Sandy, UT 84070. Tel: 801-566-7005. Web: [www.dod.com](http://www.dod.com). Circle EQ free lit. #132.

### ON THE ROAD

Radial Engineering has introduced the Roadster-TX, a user-configurable, multichannel audio interconnect system. It is made with a low-profile, U-shaped 14-gauge steel outer casing. Two high-density neoprene pads provide shock mount and scratch resistance. The 14-gauge steel inner shell houses both the "input" and "output" panels. The inner housing is flared at the "output" end to allow a choice of heavy-duty Kellems grips or choice of multipin connectors to be mounted. Options include Radial CA-150

modified Veam, Ram-Latch, Mass geophysical, EDAC/EI.CO, and Cannon DL or AMP CPC. Several sizes are available and all systems come with premium Radial Torsion cable or Mogami as a recording option. Also, the Roadster-TX may be supplied with Jensen audio transformers. For more information, contact Radial Engineering, #114-1585 Broadway, Port Coquitlam, B.C. V3C 2M7. Tel: 604-942-1010. Circle EQ free lit. #133.

### FAR OUT POWER

Galaxy Audio introduces the Far Outlet, a portable power source that delivers 110 volts of household current. Unlike a generator, the Far Outlet requires no fuel, is completely silent, and emits no noxious exhaust fumes. This 33-lb. unit, which doubles as an automatic charger for 12-volt batteries, is designed for street musicians, mobile DJs, or anyone who needs to run a sound system in a remote location. Galaxy's DigiScrub filtering circuitry is designed to prevent the Far Outlet from producing the ground static and interference common to generators. Charging is as easy as plugging into a wall socket or a car's cigarette lighter. For more information, contact Galaxy Audio, 601 E.



Radical Roadster TX

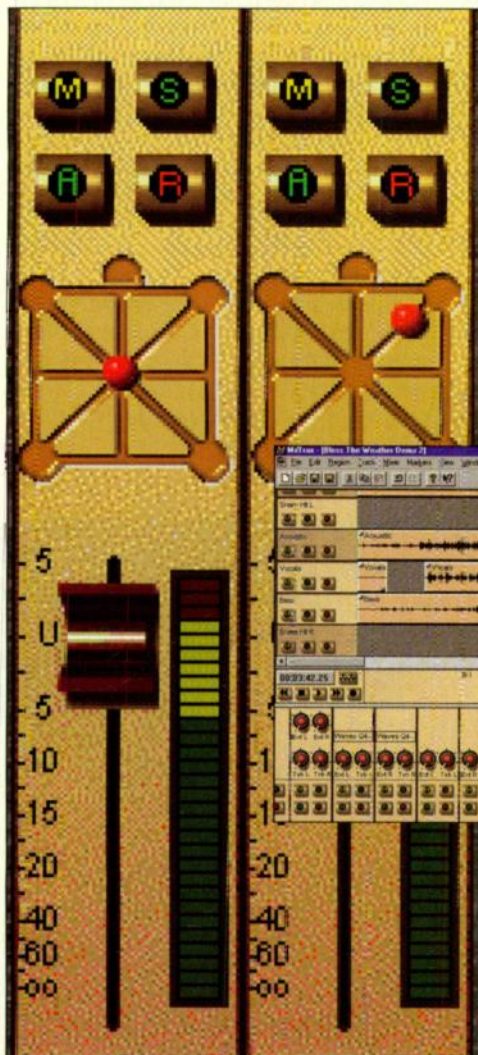
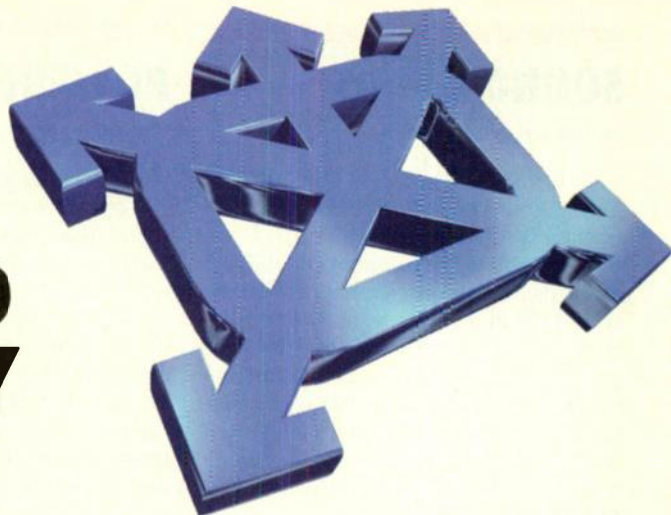
Pawnee, Wichita, KS 67211. Tel: 316-263-2852. Web: [www.galaxyaudio.com](http://www.galaxyaudio.com). Circle EQ free lit. #134.





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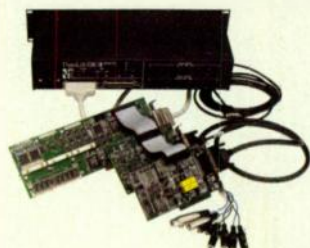
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The V8 from Digital Audio Labs is a modular audio workstation platform for the PC. Systems can be configured with a choice of analog and digital I/O, MDM interfaces for ADAT and DA88, and realtime DSP options Contact Digital Audio Labs for information:

(612) 559-9098 [www.digitalaudio.com](http://www.digitalaudio.com)



\*Some options require additional hardware.

Prices and specifications subject to change without notice.

## SOUND CARDS

continued from page 88

sport as many access ports as the EMU and TerraTec boards. Still, it's a one-stop, off-the-shelf project studio solution.

And that's just about it. Overall, for all cards, the playback hardware quality and the quantity of sounds and software goodies seemed to follow the "you get what you pay for" scale. Technology may change, but perhaps not surprisingly, the laws of economics remain pretty constant.

### ACKNOWLEDGEMENTS

Thanks to the following composers for supplying test MIDI files: John Englemann for GETAWAY.MID ([www.geocities.com/SunsetStrip/Backstage/9187/album.html](http://www.geocities.com/SunsetStrip/Backstage/9187/album.html)) and Michael Walthius for CATALINA.MID ([www.keybdwizrd.com](http://www.keybdwizrd.com)).

*Eric Bell has been involved in PC audio since the advent of sound cards. As Top Dog of Howling Dog Systems he programs MIDI software for Windows. Eric has been writing about various computer music topics for a number of years.*

## POWERQUEST

continued from page 106

to the destination drive. This option lets you optimize the drive letter's partition size so that the least amount of space is wasted by resizing inefficient FAT cluster sizes. Suffice it to say that this can be used to recover disk space (up to hundreds of megabytes) that you didn't even know you lost.

Practically the only thing Drive Image won't let you do is copy an image from a larger disk to one that has less disk space (but with today's drive prices, who does that anyway). In order for the disk-to-disk copy to work, the destination drive has to have free space that's the same size or larger than the original backup drive or partition.

### MY 2 CENTS

In short, if you're not into spending "hard time" trying to repair or restore your program data back onto a hard disk, I strongly recommend that you spend a few bucks and order Drive Image. If you don't agree that it's the best protection since safe sex, they'll even give you your money back. **EQ**

## ACID REVIEW

continued from page 102

lous. For those who haven't worked with loops, ACID is a fine way to find out just how much fun — and challenging — the process can be. Beyond that, though, Sonic Foundry deserves commendation for truly "out of the box" thinking. They haven't just created a new product, but a new genre of musical software.

This program could be tough to market; it would be easy for traditional musicians to miss the point, even though this is as serious a tool for music making as any hard-disk recording program or sequencer. Sonic Foundry is planning on releasing several loop libraries (registering your purchase gets you one gratis), so even if you're not into making your own loops, there should be plenty of raw material in addition to the existing universe of sample CDs.

ACID is brilliantly conceived and executed, with some hotshot coding to back up its aspirations. We're talking true innovation here; even if you don't think you're into loop music, catch a good demo of what this software can do. You just may discover a whole new way of making music — along with the perfect tool for the job. **EQ**



## COMING UP IN EQ OCTOBER

**PRODUCTS, PRODUCTS, PRODUCTS.** It's Christmas for audio engineers as the AES rolls into San Francisco. EQ does the legwork for you, providing information on all the new products and keeping an eye out for the latest industry trends.

**BRIAN WILSON'S IMAGINATION.** The legendary Beach Boy invites EQ into his project studio and discusses how he made his latest release, *Imagination*.

**AMONG THE CONVERTED.** In the market for a new digital converter? Mike Sokol provides an in-depth look at models from Frontier Designs, Benchmark Media, SEK'D, and Canorus.

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**NICK TIDY**  
Recording artist/composer/producer for ethnicrobot, Nervous Records



The Yamaha A3000 gives you the power to capture sound and to stretch, warp or blast it into any shape you can imagine. **A3000 VERSION 2** now adds loop divide and remix functions, 10 new filter types (16 total), MIDI controlled LFO, effect routings, new modulation matrix features, new sample management features, improved interface and disk features, more CD-ROM support and Akai, EMU and Roland compatibility. See and hear for yourself why the A3000 Version 2 truly **YAMAHA®** is a superior sampler.

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**FRANKIE BLUE**  
Composer/producer/remixer/programmer for Jamiroquai, Garbage (Stupid Girl), The Egg, Lili Hayden

# TL Audio Ivory Series PA-5001 & PA-5050

A pair of processors  
that pack a lot of power  
for the price

BY DAVE FOISTER

ny has managed to bring the Ivories in at a lower price still, with few apparent compromises. The two boxes reviewed here have contrasting appeals, yet share certain common features — most notably

show the drive level to the valve stage. This follows the solid-state initial gain stage so that the input level control effectively determines the amount to which the valve will make its character apparent. This can be driven quite hard before undesirable distortion results, so that the output control is then needed to deliver appropriate levels to the equipment that follows.

The real point of the preamps,



We're running out of colors. Focusrite got to all the primary colors first, so the rest are left with more exotic shades. TL Audio has given us Crimson and Indigo, plus RAF Blue for the Classic range, and now brings us the Ivory Series processors — presumably not to be associated with any endangered species.

TL Audio could already be thought to have covered all the bases with its existing ranges, having surprised us time after time with a new twist on valve [tube] circuitry at affordable prices. They already represent among the best value available for such equipment, and yet the compa-

distinctive ivory front panel and the use of valves. TL Audio features valves in all its ranges except the Crimsons, and here, as elsewhere, the valves are integral to the units' operation, not bolted on for the sake of the sound.

The PA-5001 contains four identical and very simple microphone preamplifiers. This unit offers no frills, just the basic facilities and the emphasis on the sound. Each channel has input and output level controls, plus switches for phantom power, 90-Hz high-pass filter, and phase reverse — and that's it. A red LED lights to show clipping (monitored at two stages in the signal path) and a yellow one glows with variable brightness to


**EQ** MANUFACTURER: TL Audio (Tony Larkin Audio), U.K. Distributed in the U.S. by SAS-COM Direct. Tel: 905-827-9740. E-mail: Sales@sascom.com. Web: www.sascom.com. Circle EQ free lit. #136.

**PRICE:** PA-5001, \$699; PA-5050, \$449. Prices are factory direct.

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though, is not overdriven valve sound, but clean quiet preamplification. The degree to which this is achieved is quite remarkable at the price. When I first started using the units I had no idea how inexpensive they were, and was astonished to find out the price. These are excellent preamps that are suitable anywhere that little extra

# The 'p' is for *power*.



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\*Ultra Low Noise=EIN<-129dBV unweighted 22kHz bandwidth 150-ohm termination



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CIRCLE 38 ON FREE INFO CARD

something is needed, and represent extraordinary value for money.

The 5050 takes one of these preamps and adds a valve compressor to create a simple direct-to-tape chain. The preamp sacrifices its phase reverse, but adds a rear-panel line input and the familiar TL front-panel instrument jack. It retains the hybrid solid-state/valve topology, and, used alone, shares the characteristic style of sound — clean, quiet, and open. This feeds directly into the compressor, a simple-but-flexible stage with, again, the bare minimum of controls and the sound quality foremost.

The central gain element is again a valve, and control of its behavior is taken care of by a minimalist complement of two knobs and two switches. Threshold and Ratio are continuously variable with good useful ranges, but Attack and Release times are on Fast-Slow pushbuttons. The actual times have a program-dependent element in them and also interact a little, which on the one hand forces you back on your ears as to what they are doing (no bad thing in my book), and on the other makes them far more versatile and forgiving than first impressions might suggest. For example, particularly fast transients will shorten the time values accordingly, and the Fast release setting is extended when Slow attack is selected, so the compressor will handle virtually anything with an unexpected amount of control as to how processed the end result sounds. I was particularly impressed by its ability to deal with predominantly low-frequency sounds without complaint, usually the Achilles' heel of a simple compressor. The whole thing is followed by a gain make-up control.

The compressor can be hard-wire bypassed, and an LED shows when it's active; this and the power on LED are the only two lights on the front panel apart from the two meters. These are identical horizontal bargraph displays, one showing gain reduction and the other output level. Usefully, the gain reduction meter works even when the compressor is bypassed, allowing a rough adjustment to be set up "offline" if required. The output meter appears after a big rotary output fader with a nominal unity gain setting in the middle.

Both rear-panel inputs are balanced, but, curiously, the unit's main output is unbalanced on a 2-pole jack.

*continued on page 143*

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# IFEZ Introduces *Streamcore*



PHOTO BY STEVE JENNINGS

## A new angle on Web site audio

BY JON LUINI &  
ALLEN WHITMAN

Ever watch your pet sit up and cock his head to one side while looking off into space? What is he listening to? Maybe it's the voices in his head. Maybe it's the music of the spheres. Maybe it's an earthquake. We can't hear it, and it makes us wonder. But, unlike our pets who, after a period of time lie down and place their head on a paw and go to sleep, we want to do something about the voice in our head. Humans tend to want to express themselves. This is sometimes called sentience. Or glossolalia.

We're going to straddle the line between Internet radio and music appreciation. It may be both or neither. Here's an idea to incorporate both traditions. What name might we give to our odd child of distantly related parents? Internet radio has been called "cybercasting," "netcasting," and "webcasting." Let's chuck the whole "-casting" suffix and call it "streamcore."

Some of you have Web sites with

encoded audio. You offer streaming and on-demand downloads. You've optimized your sounds and made your site attractive and relevant. You've promoted yourself, upgraded your apps, and spent quality time creating a vibrant and useful work of art. You've even made double-plus-good sure that the music on your site is music you have the legal right to place there. What's next? Well, how about creating original, radio-

like programming for your Web site?

The idea here is to put a slightly different twist onto the way audio is commonly presented on Web sites. We're going to assume you have already encoded RealAudio files and made them available on your Web site through individual links. How about stringing them together to create a program like you might hear on the radio? To make it more personable, how about dropping

### WHAT'S NEW

What the hell is going on in the land of Streaming Media Apps? First the RealNetworks folks cozy up to Jabba the Microsoft Hut and exchanges of stock cement their inevitable alliance. Now, suddenly, RealNetworks reels away from its bigger-than-the-Big-Bang host and cries: "Foul, foul!"

It seems that after the RealAudio folks (having since changed their name to RealNetworks) and Microsoft worked together for a while, the latter quietly made available a streaming media player (called Media Player) for its Windows operating system that has been known to override the RealPlayer app installed on your computer. Sure, the integration of a simplistic player with one's computer OS is efficient. The question is: What is Microsoft's commitment to upgrading the technology? RealNetworks constantly releases new versions in their laudable effort to increase the quality of their product. It seems unlikely that Microsoft will focus as much or more energy towards updating their Media Player to always play these new versions. There are so many other more important things to do. Like using their Washington-based trade group Business Software Alliance to sue schools in Los Angeles for illegally making copies of Windows operating systems. A company as omnipresent as Microsoft should be giving away their products to schools. But we digress.

It's difficult to tell who is playing whom in the verbal skirmish between Microsoft and RealNetworks. Microsoft actually owns a considerable chunk of RealNetworks. It would be a lot more entertaining if, instead of spending time in front of congress, they'd both spend it bridging the gap to where we, the users, could manipulate and listen to music online that sounds as good as a CD playing in a \$40 boombox. We really don't care about the legal wrangles of corporations. We'd like music on the Web to sound good. OK kids, time to stop pointing fingers and make it work. Sharing time is happy time.

In other news: Xing Streamworks has announced the release of its new MP3 software encoder. It's built up from a proprietary codec created by their own big-brained engineers rather than the oft-used German Fraunhofer-Gesellschaft codec. The company purports its product to be eight times faster than other MP3 encoders. How that figure is measured we don't care, as long as it's accurate. The encoder comes in two versions: a streaming encoder and a static encoder. The streaming version is freely available right now (along with the server), while the static encoder will run you \$19.95. We'll be looking at it closely next month. You can get more info and buy it online for at [www.xingtech.com/products/mp3encoder/](http://www.xingtech.com/products/mp3encoder/).



## WHAT'S COOL

RealNetworks has upgraded their free server product. What used to be their EasyStart server is now known as Basic Server 5.0. This product will stream your own RealAudio or Video, eliminating reliance on your ISP, should they even support it. All you need is a computer that's online all the time and has enough Internet connectivity to support the size of your audience. The Basic Server 5.0 provides 25 streams. Go to: [www.real.com/server/basic/](http://www.real.com/server/basic/). Typically an ISP will not let you install your own streaming application on their computer, which is why you'll need one of your own. One (legal, not software) limitation with the free version is that you cannot resell the free streams to others.

Also available is the Basic Server Plus (\$695) which offers the ability to serve up to 60 simultaneous streams and permits commerce. Along with the Plus comes an offer to include RealFlash

streaming (a vector/animation app created in concert with Macromedia) for an extra \$295 and a one year upgrade and tech support option for an additional \$395. Charging almost four hundred dollars for the privilege of asking questions does not even come close to paying for the real live human technician at RealNetworks who provides the answers, but it's still galling that a consumer must pay.

The value of actually buying the Plus is assuring the next version (which likely will be released before 1999) will be free to you. The RealNetworks Basic Server is for Windows or UNIX operating systems only. Mac users are SOL. Maybe now is a good time for Mac users to bombard the marketing and promotions departments of RealNetworks with requests for Mac versions of this Basic Server and the new G2 client. Here are some e-mail addresses: [worldsales@real.com](mailto:worldsales@real.com) or [solutions@real.com](mailto:solutions@real.com). Make your voice heard!

in some verbal editorial content between these pieces of music? You can describe the music, explaining how it was made, who wrote it, or even how it can be purchased. How can you do this, you ask? Through the wonderful little file called a RealMedia metafile.

A RealMedia metafile is the file whose name ends with ".ram" and contains a list of one or more RealMedia files (audio, video, etc) to play. Since you already have RealAudio files on your Web site, you're already familiar with creating them (if not, please reference to FezGuys column #4, Feb. '97). Typically, each metafile has only one entry, but with a little knowledge and creativity, you can list any number of RealMedia audio files and create your own program. This metafile could play while a visitor to your site is browsing through your various pages, reading text, looking at images, or even rewriting their resume. This metafile can be used like radio, but there's no need to limit yourself. After all, in this original approach to broadcasting your listeners don't have to suffer through monster truck advertising, boring programming, and stilted commentary. Of course you can do that if you want, but it's been done already.

You can create your metafile any damn way you please. You can have samples of your cat's meow or 17 minutes of foghorn blasts. Don't scoff; it's been done. The point here is that the same techniques you used to create your online audio content can be applied to assembling potentially interesting and original programming of your own. Remember that if your ISP doesn't have streaming capability you can always use HTTP streaming (see the "Letters" section below).

Let's go further and suggest that you could create 17 different metafiles of sound and voice. If you activate a different metafile, each day visitors to your site get another reason to visit you repeatedly: dynamic content! Even easier, you could make seven different HTML pages, moving a different one into place each day. You UNIX-jockeys have the privilege of being able to write script for this to occur automatically.

In keeping with our commitment to bring you practical explanations and applications of our suggestions, we've provided a simple example of metafile programming on our Web site. Try playing with our programming at:

*continued on page 143*



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## YAMAHA 01V

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ter. These are the costs of using less space in your studio or mix position. However, this is more than made up for by the fact that each and every parameter and setting can be recalled from memory. Just don't lose the Owner's Manual; it's well written, comprehensive, and invaluable in finding the more obscure controls and parameters. You may be able to get audio through the unit without the manual, but you won't be able to set the compressor on Auxiliary 4 without it.

If you are using MIDI to control your studio or live rig, this mixer can act as both a MIDI controller with moving faders (adjust your outboard reverb with the 01V faders!) and offer dynamic automation connected to a MIDI sequencer. The unit can even emulate the MIDI controller map of a ProMix 01 or 03D, offering access to numerous existing third-party software controller maps in software from Cakewalk, Steinberg, TB Systems, and many others.

Yamaha will be shipping even more optional interfaces for this mixer in the next few months, including the MY8-AD, a 20-bit eight-input analog input card; MY4-DA, a 20-bit analog 4-channel XLR output card; and the MY4-AD, a 24-bit analog 4-channel XLR input card. In addition, the 01V features the ability to link two mixers with a single cable, synchronizing the solo busses, selection buttons, and screen displays for up to 48 channels of mixing. The RS 422 port will also allow for full computer control of the unit and many other third-party enhancements to this powerful audio platform. The 01V will also make an excellent control surface for the PC card/software version of the 02R: Yamaha's DS2416 DSP Factory.

The 01V is a mixer with the size and price suited to the small project studio, small club, or local/regional live sound tech, but needs no apology for sound quality or capability. You know that you will be dealing with more digital audio signals in the next few years. Now you can afford a mixer that can directly interface with these devices and offer significant expandability as your needs grow. The 01V is a little mixer with very big capabilities.

*Wade McGregor is a principal consultant for Mc System Design Group, an acoustical consulting firm based in North Vancouver, BC. For more info visit their home page at [www.mcsquared.com](http://www.mcsquared.com).*

## TL AUDIO IVORY

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This doesn't seem to make any practical difference in a typical studio setup, but it does let the image down a bit — I had to fish out an adapter just to patch it in. It smacks of corner cutting, but there are worse corners to cut to squeeze a product into a price bracket. It's the only hint on the whole box that this is anything other than a full-price contender; in all other respects it does the business with a great sound and a surprisingly flexible control surface. The two units together suggest that the Ivory range will be yet another TL Audio winner, delivering far more than we have a right to expect at the price. **EQ**

## FEZGUYS

continued from page 141

[www.fezguys.com/audio/TheFez](http://www.fezguys.com/audio/TheFez). We've also registered our little stream-core project under a new domain: [www.ifez.com](http://www.ifez.com). We figure, instead of the traditional "K" or "W" letter denoting a traditional United States radio station, we'd use the letter "I" (for Internet, of course!).

Internet streamcore may be the birth of a new art form.

### LETTERS

*All right...I downloaded RealAudio's encoder and I want to stream music from my Web site but my ISP does not have a "RealServer." Is there a place I can get online tutorials or do you have any sage advice on how I can publish my streaming media? It seems easy enough to encode WAVs and AVIs, etc., but I just don't know what to do next! Hep Me! Ow, my eye! —The Butt*

Dear Butt — Check out FezGuys columns #4 (Feb. '97, "Placing Your Song On The Web") and #6 (Apr. '97, "Geek Thy Neighbor") on how to encode RealAudio and then use HTTP streaming of RealAudio files, respectively. There is more in-depth information on HTTP streaming available at <http://service.real.com/solutions/RAPO0623.HTM>. And get somebody to look at that eye! —The FezGuys

### CORRECTION

In FezGuys column #21 we incorrectly reported that Audioactive was in Detroit. It's actually in Cleveland. Whoopsie! The FezGuys apologize for the error. **EQ**



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# GENERALMUSIC

continued from page 35

Falcon's internal sampling frequency is fixed at 48 kHz. Dynamic range for the console tops out at a very respectable 105 dB.

## GETTING YOUR SOUND

When it comes to contouring your audio program, the Falcon provides an abundance of control. For starters, each input channel is equipped with a 3-band full parametric EQ. This provides ample opportunity to bring out the nuances of percussive sounds, shape the guitar's midrange, or get just the right amount of bottom on the bass. There's also a 4-band graphic EQ for the stereo channels, enabling you to have one last crack at tweaking the summed output of the mixer before you print to DAT.

The Falcon's digital processing capability is unquestionably one of its major strengths. The mixer uses an exclusive 40-bit DSP that incorporates 14 powerful internal processors — two of which can be assigned to the unit's "virtual" sends (identified as Aux 3 and 4 on each channel), and twelve that can be assigned to the Environments. By em-

ploying the Falcon's Environment Structure, these various effects can be interconnected either serially or in parallel, enabling each mixer channel to have upwards of four effects assigned, while up to four can be assigned to the mixer's outputs. If you don't need any effects on the outputs, all 12 effects can be assigned to the inputs. Each environment, which contains up to four digital processors, can be compared to a traditional effects rack and can be assembled and inserted into the signal path as needed.

## RECALLING YOUR EFFORTS

By the time you've applied EQ, racked up your internal effects, patched in your favorite external equipment, and positioned all your pan and level settings, the last thing you want is to be forced to manually re-create any of this ever again. Fear not: the Falcon provides 128 snapshots for recalling all system settings. These snapshots can be recalled manually, via MIDI Program Change messages or by RS-232 control. If you use a sequencer to control a series of synths and samplers, it could easily call individual snapshots by simply sending MIDI Program Change messages to automate your mix. Additionally, all system parameters are assignable to MIDI con-

trollers, thus enabling dynamic automation from a MIDI sequencer or via Falcon's included control software for Windows. A planned software upgrade will include MMC transport control of external equipment and support for eight locate points. The Falcon provides MIDI In, Out, and Thru terminals, as well as an RS-232 serial port for such connections.

## A FEW PARTING WORDS

Generalmusic's new Falcon integrates the familiarity of conventional mixer design with significant advances in DSP functionality to create a very useful and friendly tool for managing all the signals typically encountered in small recording projects or live sound engagements. With its operating system in Flash Memory (thus facilitating an easy upgrade path via MIDI or RS-232), a programmable footswitch connector, and a ton of useful features, this is one digital mixer worth checking out.

Price is \$1395. For more information, contact Generalmusic, 1164 Tower Lane, Bensenville, IL 60106. Tel: 630-766-8230 or 800-323-0280. Web: [www.generalmusic.com](http://www.generalmusic.com). Circle EQ free lit. #137.

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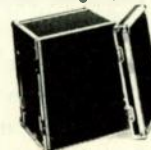


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## DIGITAL MIXERS

# MACKIE

## Digital 8 Bus Mixing Console



Everything you've been waiting for and more!!! The new digital 8 bus from Mackie features great sound quality, full recording and mixdown capabilities, motorized faders and an array of digital features geared to take you flying into the next century. See for yourself what the entire industry is raving about.

### FEATURES-

- 48 channels of automated compression, gating, EQ and delay
- Built-in 3-way meter display keeps you on top of your mix.
- Built-in meter bridge.
- Ultramix II automation for complete control, hook up an S-VGA monitor and you'll feel like you spent a lot more money.
- All functions can be automated, not just levels and mutes. Store EQ, reverb, compression, gating and even Aux send information.
- Fast SCENE automation allows you to change parameter snapshots on every beat.
- Reads Standard MIDI tempo maps, displaying clock info on the built-in position counter.
- Truly the cutting edge of mixing technology.



# Panasonic

## WR-DA7 Digital Mixing Console



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

### FEATURES-

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



# TASCAM

## TMD1000 Digital Mixing Console



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

### FEATURES-

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



## MIC PREAMPS

# Focusrite

## Green 3 "Voicebox MKII"



The Voicebox MKII provides a signal path of exceptional clarity and smoothness for mic recording, combining an ultra-high quality mic amp, an all new Focusrite EQ section optimized for voice, and full Focusrite dynamics. The new MKII now includes a line input for recording and mixdown applications.

### FEATURES-

- Same mic pre section as found on the Green Dual Mic Pre includes +48V phantom power, phase reverse, and a 75Hz high-pass filter. Mute control and a true-VU response LED bargraph are also provided
- EQ section includes a mid parametric band with frequency and gain control as well as a gentle bell shape to bring out the character of the voice.
- Dynamics section offers important voice processing functions of compression and de-essing combined with a noise reducing expander
- Single balanced Class A VCA delivers low distortion and a S/N ratio as low as -96dBu

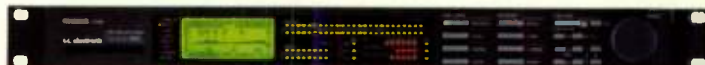


## EFFECTS PROCESSING

# t.c. electronic

ULTIMATE SOUND MACHINES

## Finalizer Plus



Improving on the multi-award winning Finalizer platform, The Finalizer Plus delivers an unprecedented level of clarity, warmth and punch to your mix. Inserted between the stereo output of your mixer or workstation and your master recording media, the Finalizer Plus dramatically rounds out your material, creating that "radio ready" sound.

### FEATURES-

- Balanced Analog as well as Digital outputs including AES/EBU, S/PDIF, & TOS.
- 24-bit precision A/D & D/A Converters
- 5-band 24-bit stereo EQ
- Enhance - De-essing, stereo adjust or digital radiance
- Real-time gain maximizer
- Variable slope multi-band expander
- Multi-band compressor + Word Clock Sync
- MIDI section useful for controlling sequencer fades or any of the Finalizer's parameters from a remote MIDI controller.

# Lexicon

## PCM81 Multi-Effects Processor



The PCM-81 has everything that made the PCM80 the top choice among studio effects processors, and more. More effects, more algorithms, longer delay and full AES/EBU I/O.

### FEATURES-

- 300 Presets include pitch, reverb, ambience, sophisticated modulators, 20 second stereo delays, and dynamic spatialization effects for 2-channel or surround sound applications
- 2 digital processors including Lexicon's Lexchip for the reverb and a second DSP engine for the other effects.
- 24-bit internal processing
- Dynamic patching matrix for maximum effects control.
- PCM card slot

## EQUALIZERS

# Focusrite

## Green 2 "Focus EQ"



The Green 2 Focus EQ is suitable for a variety of applications combining a Focusrite equalizer section with a multi-source input section. Use it as a high-quality front end for recording applications or patch it into the send/return loop to upgrade a single channel of console eq, either way, it sounds great.

### FEATURES-

- XLR & 1/4" inputs are similar to the Dual Mic Pre but have been adapted to cope with a wider range of levels.
- VU metering via a 10-LED bargraph
- EQ section derived from the Red and Blue range processors for superb audio quality.

## COMPRESSORS

# JOE MEEK

## VC1 Studio Channel



The Joe Meek Studio Channel offers three pieces of studio gear in one. It features an excellent transformer coupled mic preamp, a great compressor and an enhancer unit all in a 2U rackmount design. Find out why more and more studio owners can live without one.

### FEATURES-

- 48V phantom power, Fully balanced operation
- Mic/Line input switch
- Mono photo-optical compressor
- High pass filter for large diaphragm mics
- Extra XLR input on front makes for easy patching
- Compression In/Out and VU/compression meter switches
- Twin balanced XLR outputs with one DI XLR output for stage use
- Enhancer In/Out switch and enhance indicator
- Internal power supply 115/230V AC

# dbx

## Blue Series 160S Stereo Compressor



The dbx 160S combines the best features of all the great dbx compressors in a well-built unit where the craftsmanship is as stunning as the engineering is innovative. This is truly a desirable compressor.

### FEATURES-

- 127dB dynamic range • Program dependent "Auto", or fully variable attack and release
- Hard knee/OverEasy switchable.

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## HARD DISK RECORDERS



### VS1680 Digital Production Studio



The new VS-1680 Digital Studio Workstation is a complete 16 track, 24-bit recording, editing, mixing and effects processing system in a compact tabletop workstation. With its advanced features, amazing sound quality and intuitive new user interface, the VS-1680 can satisfy your wanderlust.

#### FEATURES-

- 16 tracks of hard disk recording, 256 virtual tracks.
- 24-bit MT Pro Recording Mode for massive headroom and dynamic range.
- Large 320 x 240 dot graphic LCD provides simultaneous level meters, playlist, EQ curves, EFX settings, waveforms and more.
- 20-bit A/D D/A converters
- 2 optional 24-bit stereo effects processors (VS8F-2) provide up to 8 channels of independent effects processing.
- New EZ routing function allows users to create and



save various recording, mixing, track bouncing, and other comprehensive mixer templates for instant recall.

- 10 audio inputs: 2 balanced XLR-type inputs w/ phantom power, 6 balanced 1/4" inputs, and 1 stereo digital input (optical/coaxial)
- 12 audio outs: 8x RCA, 2x stereo digital & phones
- Direct audio CD recording and data backup using optional VS-CDR-16 CD recorder.

## AKAI DR16 16-Track HD Recorder

The Akai DR16 is a digital hard disk recorder with sophisticated non-destructive editing functions for near instant data access. Recording & playback is as straight forward as tape. The DR16HD ships with an internal 2GB drive for 24 minutes per track of record time.

**TURN YOUR DR16 INTO A PRODUCTION WORKHORSE WITH THESE POWERFUL EXPANSION OPTIONS!**

- **MTB Mixer controller** • **DL16 Remote control unit** • **IB801S SCSI Interface board**
- **IB802T SMPTE interface board** • **IB803M MIDI interface board** • **IB804A ADAT interface board**
- **IB805R RS422 interface board** • **IB806B Bi-phase interface board**
- **IB807V VGS monitor interface board** • **EQ16 16-channel digital EQ board** • **ALX50 Remote Cable**



## DIGITAL MULTI-TRACK RECORDERS

### TASCAM DA-98 Digital Audio Recorder

The DA-98 takes all the advantages offered by the DTRS format and significantly ups the ante for the professional and post-production professional alike. With enhanced A/D and D/A converters, a comprehensive LCD display and full compatibility with the DA-88 and DA-38, the DA-98 delivers the absolute best in digital multitrack functionality.

#### FEATURES-

- Confidence monitoring for playback and metering
- Individual input monitor select switch facilitates easier checking of Source/Tape levels
- Switchable reference levels for integration into a variety of recording environments with internal tone generator
- Digital track copy/electronic patch bay functionality
- Comprehensive LCD display for easy system navigation

- Dedicated function/numeric keys make operation easier
- Built-in sync with support for MMC and Sony P2
- D-sub connector (37-pin) for parallel interface with external controller
- Optional RM-98 rack-mount ear for use with Accuride 200 system



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

**DA-38** The DA-38 was designed for musicians. Using the same Hi-8 format as the highly acclaimed DA-88, the DA-38 is an 8 track modular design that sounds great. It features an extremely fast transport, compatibility with Hi-8 tapes recorded on other machines, rugged construction, ergonomic design and sync compatibility with DA-88s.

## ALESIS ADAT XT20 Digital Audio Recorder



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

#### FEATURES-

- 10-point auto/locate system
- Dynamic Braking software lets the transport quickly wind to locate points while gently treating the tape.
- Remote control
- Servo-balanced 56-pin ELCO connector.

- Built-in electronic patchbay
- Copy/paste digital edits between machines or even within a single unit. Track Copy feature makes a digital clone of any track (or group of tracks) and copies it to any other track (or group) on the same recorder.



## SOFTWARE



### SONIC FOUNDRY CD Architect & CD Factory

CD Architect is the perfect solution for designing professional audio CDs to Red Book spec on Windows NT and Windows 95. Sample audio from compact disks, record from DAT, or digitize material through a sound card. It comes complete with an editor including dozens of effects and tools to process sound files and can optionally operate as a Sound Forge plug-in. CD Factory adds a CD burner, SCSI card and cable for a complete production package.

#### FEATURES-

- Multi file playlisting
- Master volume faders (-96dB to +20dB)
- Adjustable envelope levels for any region
- Mix or crossfade overlapped regions
- Convert from mono to stereo on the fly



Multiple levels of undo/redo  
 Up to 99 tracks with 99 subindexes per track  
 Make glass-masters directly from burned CDs.

## STUDIO DAT-RECORDERS

### 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. Panasonic DATs are found in studios throughout the world and are widely recognized as the most reliable DAT machines available on the market today.



#### FEATURES-

- 64x Oversampling A/D converter for outstanding phase characteristics
- Search by start ID or program number
- Single program play, handy for post.

- Adjustable analog input attenuation, +4/-10dBu
- L/R independent record levels
- Front panel hour meter display
- 8-pin parallel remote terminal
- 250x normal speed search

## TASCAM DA-30MKII

A great sounding DAT, the DA-30MKII is a standard mastering deck used in post-production houses around the world. Among many other pro features, its DATA/SHUTTLE wheel allows for high-speed cueing, quick program entry and fast locating.



#### FEATURES-

- Multiple sampling rates (48, 44.1, and 32kHz).
- Extended (4-hour); play at 32kHz.
- Digital I/O featuring both AES/EBU and S/PDIF.
- XLR balanced and RCA unbalanced connections.

- Full function wireless remote.
- Variable speed shuttle wheel.
- SCMS-free recording with selectable ID.
- Parallel port for control I/O from external equipment.

## Fostex D-15

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



#### FEATURES-

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

### D-15TC & D-15TCR

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

## SONY PCM-R500

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.





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## MIDI HARDWARE



### Mark of the Unicorn **MIDI Time Piece™ AV** 8x8 Mac/PC MIDI Interface

The MTP AV takes the world renowned MTP II and adds synchronization that you really need like video genlock, ADAT sync, word clock sync, and even Digidesign superlock!

- FEATURES-**
- Same unit works on both Mac & PC platforms.
  - 8x8 MIDI merge matrix, 128 MIDI channels.
  - Fully program-able from the front panel.
  - 128 scene, battery-backed memory.
  - Fast 1x mode for high-speed MIDI data transfer.

### Digital Time Piece™ Digital Interface

Think of it as the digital synchronization hub for your recording studio. The Digital Timepiece provides stable, centralized sync for most analog, digital audio, and video equipment. Link together ADATs, DA-88's, ProTools, word clock, S/PDIF video, SMPTE, and MMC computers and devices flawlessly. It ships with "Clockworks" software which gives you access to its many advanced features and remote control of some equipment settings such as record arm.

## OPCODE

### Studio 64XTC Mac/PC MIDI Interface

The Studio 64XTC takes the assorted, individual pieces of your studio-your computer, MIDI devices, digital and analog multitracks and even pro video decks, and puts them all in sync.

- FEATURES-**
- 4 In / 4 Out 34 channel MIDI/SMPTE interface/patch bay with powerful multitrack & video sync features
  - ADAT sync with MIDI machine control
  - Simultaneous wordclock and Superclock output, 44.1kHz or 48kHz for perfect sync with ADAT, DA-88 and ProTools
  - Video and Blackburst in (NTSC and PAL)
  - Cross-platform Mac and Windows compatibility

## SAMPLING

### E-MU e-6400 Sampling and more!



The e-6400 from EMU features an easy interface that makes sampling easy. Automated features like looping, normalizing and more allow you to flexibly create your own sound palettes or access any of the 400 sounds provided on 2 CDs for unlimited sound creation. It is upgradeable to 128MB of RAM (4MB standard) and features 64 voice polyphony, 8 balanced analog outputs, SCSI stereo phase-locked time compression, digital re-sampling and more. A dream machine.

## KEYBOARDS & SOUND MODULES



### XP60 & XP80 Music Workstations

The XP-80 delivers everything you've ever wanted in a music workstation. An unprecedented collection of carefully integrated features provide instant response, maximum realtime control and incredible user expandability.

**XP80 FEATURES-**

- 64-voice polyphony and 16-part multitimbral capability
- 16 Mbytes of internal waveform memory, 80Mbytes when fully expanded (16-bit linear format)
- 16-track MRC-pro sequencer with direct from disk playback. Sequencer holds approx. 60,000 notes
- New sequencer functions like "non-stop" loop recording and refined Groove Quantize template
- Enhanced realtime performance capability with advanced Arpeggiator including MIDI sync and guitar strum mode and Realtime Phrase Sequence (RPS) for on-the-fly triggering of patterns
- 40 insert effects in addition to reverb and chorus
- 2 pairs of independent stereo outputs, click output jack with volume knob
- Large backlit LCD display



### SR-JV80 Series Expansion Boards

Roland's SR-JV80-Series wave expansion boards provide JV and XP instrument owners a great-sounding, cost-effective way to customize their instruments. Each board holds approx. 8Mb of entirely new waveforms, ready to be played or programmed as you desire.

**Boards Include-**

- Pop, **Orchestral**, **Piano**, **Vintage Synths**, **World**, **Super Sound Set**, **Keys of the 60's & 70's**, **Session**, **Bass & Drums**, **Techno & Hip-Hop Collection**.



## KURZWEIL

### K2500 Series Music Workstations

The K2500 series from Kurzweil utilizes the acclaimed V.A.S.T. technology for top-quality professional sound. Available in Rack mount, 76-key, and 88 weighted key keyboard configurations, these keyboards combine ROM based samples, on-board effects, V.A.S.T. synthesis technology and full sampling capabilities on some units.

**FEATURES-**

- True 48-voice polyphony
- Fluorescent 64 x 240 backlit display
- Up to 128MB sample memory
- Full MIDI controller capabilities
- 32-track sequencer
- Sampling option available
- Dual SCSI ports
- DMTI Digital Multitrack interface option for data format and sample rate conversion (Interfaces with ADATs or DA-88s)



## KORG

### Trinity Series Music Workstations DRS

Korg's Trinity Series represents a breakthrough in sound synthesis and an incredible user interface. It's touch-screen display is like nothing else in the industry, allowing you to select and program patches with the touch of a finger. The 24MB of internal ROM are sampled using ACCESS which fully digitizes sound production from source to filter to effects. Korg's DSP based Multi Oscillator Synthesis System (MOSS) is capable of reproducing 5 different synthesis methods like Analog synthesis, Physical Modeling, and variable Phase Modulation (VPM).

**FEATURES-**

- 16 track, 80,000 note MIDI sequencer
- Flexible assignable controllers
- **DRS (Digital Recording System)** features a hard disk recorder and various digital interfaces for networking a digital recording system configured with ADAT, DAT recorder and hard disk
- 256 programs, 25% combinations
- Reads KORG sample DATA library and AKAI sample library using optional 8MB Flash ROM board

*(Digital IF, SCSI, Hard Disk Recorder, and sample Playback/Flash ROM functions are supplied by optional upgrade boards)*



88 Weighted-key/Solo Synth



76-key/Solo Synth



61-key/Solo Synth



61-key

## MONITORS

### KRK V8

#### Powered Studio Monitors

These new powered studio monitors from KRK supply 130 watts of clean performance. Their 8" woofer & 1" silk dome tweeter ensure crystal highs as well as the bass response needed for today's studio environments.

**FEATURES-**

- 49Hz - 22kHz
- Magnetically shielded for use near video monitors



### Hafler TRM-8

#### Powered Studio Monitors

Winner of Pro Audio Review's PAR Excellence Award in 1997, Hafler's TRM8s provide sonic clarity previously found only in much more expensive speakers.

They feature built-in power, an active crossover, and Hafler's patented Trans-nova power amp circuitry.

**FEATURES-**

- 45Hz - 21kHz, ±2dB
- 75W HF, 150W LF
- Electronically & Acoustically matched



## MACKIE

### HR824

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

**FEATURES-**

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



### TANNOY Reveal

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

**FEATURES-**

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



unbalance, use ground and one signal pin and leave the other signal pin unconnected. The output will be 6 dB lower, but the signal will not distort.

### HERE COME THE NUMBERS...

The balanced output amplifiers of the SV-3700 can deliver a maximum signal of +24 dBu (+18 dBu). Numbers in "( )" indicate the output when operated in the "safe" unbalanced mode. The gain structure is set to deliver +22 dBu (+16 dBu) when the recording level is 0 dBfs. (Doing the math: 18 dB above +4 dBu is +22 dBu.) Remember that the amplifiers feeding pin 2 and pin 3 can only deliver +18 dBu "max." With only 2 dB of headroom, under normal circumstances, operation in the "unsafe" mode will attempt to add 6 dB of level, 4 dB above "max." *Yeeouch!* This means any signal recorded within 4 dB of Full Scale will distort the output amplifiers. See the sidebar to learn how numbers are born...

### PROBLEM SOLVED

To fix this problem, check out the schematic in fig. 2, which shows the complete output schematic for the right channel plus IC 905, the affected section of left-channel circuitry. Changing the value of R929 and R930 (left and right, respectively) from 5.6 kohms to 2.21 kohms lowers the output gain by about 4 dB. (This was the "nearest standard value" I had available. Table 1 indicates values that deliver precise dB increments. Use 1-percent metal-film for low noise.)

In order to deliver the nominal +4 dBu at the XLRs, a tone formerly recorded 18 dB below full scale must now be recorded 4 dB louder. Nothing really changed on the record side of the A-to-D converter, but increasing the reference level by 4 dB reduces the headroom by the same amount. (You still can't record above "0.")

### LET'S GET PHYSICAL

For the physical part of the modification, I chose to remove the original resistors and insert Vector® "inboard" pins, part number K26C. The whole circuit board has to be removed for this mod, but once the pins are press-fit into the PCB and soldered into place, any changes can be soldered from the top. Please note that I chose a fixed value. If adjustable output is desired, a back-

panel switch or pot could be wired to the pins. Fig. 3 is the PCB layout showing one resistor installed (R929 on the left) and just the pins in place for R930.

### THE ROOT (OF ALL EVIL) AND THE INSPIRATION (FOR ALL GOOD)

The inspiration for this modification came from the needs of a mastering house. But since that time I have had other complaints by way of e-mail and phone calls. Consider that everyone slams level onto tape and it's easy to see that a -18 dB reference is too low for pop music. The machine's resulting output level will be too high for most of the gear in the signal chain. Of course, I couldn't leave without tying this in to my workshop, so here are a few enticing words from the participants.

### WHERE HAVE ALL THE GOOD KNOBS GONE?

JLCooper's first fader controller was part of an automation system made in the late '80s. The operator's manual for the original "FaderMaster" prophetically stated that, "You've probably noticed a trend in recent years for music manufacturers to remove knobs and sliders from their equipment to cut down costs. Ironically, this trend has paralleled the development of increasingly sophisticated products. Never before have products offered so many features, with so little control." —*Eli Slawson, JL-Cooper Systems*

### MIDI OR AES24

**Q: Is there a MIDI controller standard for parameters such as those used in an equalizer (bandwidth, frequency, level, etc.)?**

**A:** There is no real standard, and it is my opinion that MIDI should not be used for the remote control of effect devices. MIDI is a point-to-point unidirectional connection originally defined to connect keyboards to synths. A new standard is on its way (AES24). Both as an active committee member and as head of software development at TC, it is my belief that this is the future for sound system control ranging from project studios to large permanent installations. MIDI is OK for simple automation of parameters and program changes. —*Morten Lave, TC Electronic*

### "WHY ISN'T IT WORKING?"

Not many devices indicate the status of an incoming digital audio signal. A "Status Indicator" would be especially helpful considering that many pieces of gear do not output data according to existing standards. Here are some things

an indicator might display:

1. Frequency of received data (does the flag agree with the incoming signal?)  
2. Is the data any good? A "data-valid" flag exists within the digital audio bitstream but is not correctly implemented by all manufacturers.

3. S/PDIF copy status. Has copy protection been embedded with the audio? Can it be removed?

The data stream may also include one or more of the following: phase lock, parity error, CRC error (pro only) and biphasic coding error. The Crystal Semiconductor receiver chip, for example, has output pins for some of these flags. —*Dave Hill, Crane Song, on the topic of machine-to-user feedback.* **EQ**

## PC QUARTERLY: USB

continued from page 94

dows 98 and the latest versions of 95. (To find out if your Win 95 copy is USB-ready, right-click on the "My Computer" icon on the Win 95 desktop and select "Properties"; USB requires version 4.00950B or later.)

**Q: What kinds of USB peripherals can I connect to my PC?**

**A:** USB carries data at a rate of 12 megabits per second, which is fast enough for medium- to low-speed peripherals. This includes telephones, digital cameras, modems, keyboards, mice, digital joysticks, some CD-ROM drives, tape and floppy drives, digital scanners, and printers. USB's data rate can also handle a whole new generation of peripherals, including MPEG-2 video-based products, data gloves, and digitizers.

**Q: Will traditional PC serial and parallel ports disappear?**

**A:** While USB won't replace traditional PC ports overnight, it's expected to rapidly become the preferred way to connect I/O devices and medium-speed peripherals. Higher-speed peripherals (such as mass storage devices, digital audio, and digital video) will most likely be handled by the much faster "Firewire" 1394 protocol.


**Q: Does USB affect the cost of PCs and peripheral devices?**

**A:** It doesn't significantly affect PC prices, and by eliminating add-on cards and separate power supplies, USB can help make PC peripheral devices more affordable than they otherwise would be.

**Q: Where can I find out more about USB and what products are currently available or on the way?**

**A:** Check out these sites: [www.usb.org](http://www.usb.org), [www.peracom.com](http://www.peracom.com), [www.intel.com/design/usb](http://www.intel.com/design/usb), or surf your favorite search engine for sites relating to "USB." **EQ**

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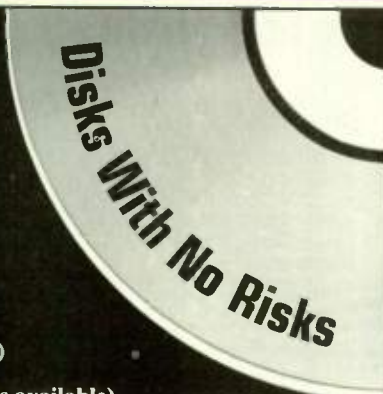
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## ACROSS THE BOARD

continued from page 162

Even 16-bit recordings sound better with 20-bit or 24-bit converters because of the increased linearity. Even more improvement can be realized with dithering or noise mapping schemes that are available in both hardware and software versions.

### DITHERING AND NOISE SHAPING.

Dithering is the process of adding some low-level noise to the digital signal to increase the apparent resolution of the smallest bits. Using dithering, it is possible to get acceptable audio quality for some applications with only one or two bits. You know those recordings that you hear at the airport, "This area for loading and unloading of passengers only...?" Those message playback systems are one to four bits at very low sample rates, but they perform their job just fine because of the use of dithering. Adding dither to your 16-bit digital audio will add about 1 1/2 bits worth of additional resolution to your audio. In other words, your 16-bit signal would sound almost as good as an undithered 18-bit signal.

There are different methods of adding dither to your signal, and the best results depend on the audio content in your recording. If you can, it is a good idea to listen to your recording with different types of dither to decide which method works the best for you. The most common methods for music are usually triangular dithering or random noise dithering.

Noise shaping is a little more complex, and the methods employed vary among manufacturers. Noise shaping needs DSP power to perform correctly. Sometimes noise shaping can be available right in the converter box that you are using. Because of the DSP processing that is needed, these converters are usually of the more expensive variety.

There are plenty of noise shaping algorithms available, but the two most common noise shaping methods are UV-22 from Apogee and Super Bit Map from Sony. Sonic Solutions has a Sony Super Bit Map plug-in for their system, and Sony makes a stand-alone SBM box. Sony has also included SBM in some of their DAT machines. For Apogee's UV-22, there is a plug-in for Pro Tools called Master Tools. Other manufacturers will also be offering UV-22 plug-ins for their software.

Simply stated, dithering adds noise in the very lowest levels of the signal. Noise shaping takes this noise and mathematically moves it to a portion of the audio spectrum that the human ear is less sensitive to. You pay the extra price because of the complexity of the math involved, but you reap the benefits in the additional apparent resolution in the audio signal. A well noise-shaped 16-bit recording will give you about 19 bits worth of resolution. I guess you could say that the noise shaping guys are getting in their two bits worth.

### ALTERNATIVES

There is an alternative to all of this. You can buy one of the new 24-bit DAT recorders from TASCAM to record your mixes, you can buy more hard-disk space and upgrade your Pro Tools to 24-bit, and then you can start worrying about converting to 96 kHz or Sony Bit Stream recording. Face it, you can never win when it comes to keeping up with technology.

*As a reminder, Roger's Web site has changed. The new address is [www.rogernichols.com](http://www.rogernichols.com). Check it out.*



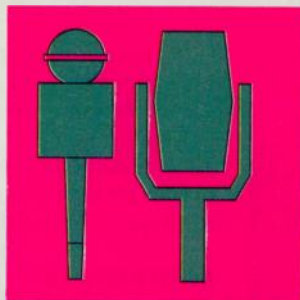
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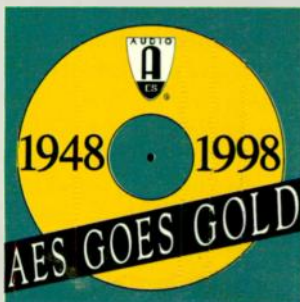
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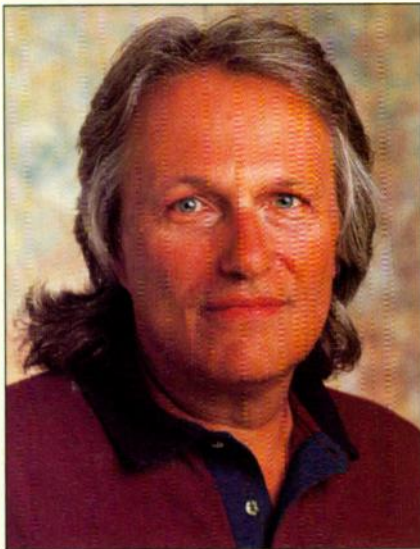
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# My 2-Bits Worth



Sixteen-bit is not dead (in fact, it's busy helping 20- and 24-bit recording)

BY ROGER NICHOLS

You all know, of course, that it is usually mandatory that you start reading at the back of *EQ* (right here). Well, I will allow you to read other articles first, but not all of the time.

## MAC EXPO

I went to the big Mac Expo in New York last month. There were some cool things, and some surprises. The new iMac doesn't have a SCSI connector anywhere to be seen. I hope this is not going to be the trend for all new Mac products. Some vendors decided not to exhibit at the show because Mac no longer supported their SCSI devices.

## IS 16-BIT OBSOLETE?

No. That is like asking if dollar bills are obsolete. Fives and tens are better, but there are still plenty of uses for one dollar bills.

Twenty-bit and 24-bit converters have actually helped 16-bit recording. The most important factor in the specifications for an A/D converter is linearity. Linearity is the relative voltage value of each bit in the conversion process. Let me back up a little bit (pun intended).

## CONVERTERS 101

The analog waveform consists of changes in voltage over time. By now you have all seen audio waveforms in some sort of audio editing software. Let's start at the zero crossing point, the line in the middle that the waveform crosses when going from positive to negative. Right on this line is zero voltage. If you short out the input to your converter and record, you will get a flat line at exactly zero. At the loudest value, up where the waveform clips, the value is usually +10 volts. The clipped waveform at the bottom is -10 volts. With 16-bit information, there are 65,536 steps between the negative clipping point and the positive clipping point. This means that each step is equal to 10 volts/32,767 steps, or approximately .0003518509476 volts per step. Each step is represented by a bit. When counting in bits, each bit is exactly twice the size of the bit before it. The smallest bit has a value of 1, the next bit a value of 2, the next bit a value of 4, then 8, then 16, 32, 64, 128, 256, 512, 1034, 2048, 4096, 8192, 16,384, 32,768, and finally 65,536. Here is where the linearity comes in.

When we assign a value of one to the smallest bit, it is very easy to make each bit twice the value of the one before it. But, in our audio converter, the value of the smallest bit is .0003518509476 volts. This means that the value of the second bit must be exactly .0007037018952 volts. This is the basic reason why some 16-bit converters sound different than other 16-bit converters. This is also the reason why some 16-bit converters cost more than other 16-bit converters. Even with

a single manufacturer of converters, there are different grades of converters in the product line. The ones that come off the assembly line with perfect linearity receive the highest grade and get the highest price on the market. So if two companies use the same brand of converter in their product, it doesn't mean that they will perform exactly the same.

There are other factors that also determine the quality (and cost) of a converter, like shielding, reference voltage stability, clock jitter, and the accompanying analog circuitry, but for this little discussion we will focus on linearity.

When the first 16-bit digital recording machines showed up 20 years ago, there was no such thing as a 16-bit converter. You had to use a 12-bit converter and 4 bits of an 8-bit converter to get 16-bits. When 16-bit converters started showing up on the market, the top 12 or 14 bits were pretty good, but it was potluck on the linearity of the last couple of bits. Remember that the biggest bit is 10 volts, but it must be 10.000000000 volts. A variation of .01% would give you 10.001 volts. Not too bad, but that kind of deviation in manufacturing would make the smallest bit of the 16 off by more than 300%.

The point of all this? Well, manufacturing techniques have improved over the last 20 years, and we now have 24-bit converters. The tolerances have to be 256 times better than for 16-bit converters. The pay

off is that the first 16 bits of a 24-bit converter are going to be 256 times better than 16-bit converters from 20 years ago.

There are a couple of good reasons to record 16-bit. Maybe you haven't upgraded your 16-bit recorder, but you want to improve the quality of your recordings. Or, maybe you don't have the 50 percent more hard-disk space for 24-bit files.

*continued on page 160*

*The most important factor in the specifications for an A/D converter is linearity. Linearity is the relative voltage value of each bit in the conversion process.*

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