

SPECIAL ISSUE 50 PAGES OF EQ LIVE SOUND COVERAGE

EQ

**THE PROJECT
RECORDING &
SOUND
MAGAZINE**

**PRODUCT REVIEWS:
APHEX 661 EXPRESSOR
YAMAHA QS300 SYNTH
GROOVE TUBES MICS
NOVATION BASSSTATION
PHILIPS SOUND ENHANCERS**

JANUARY 1996

BIG SOUND SMALL PLACES

**OZZY &
ANTHRAX
IN THE
CLUBS**

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MPA II MicroMic Phantom Power Adapter

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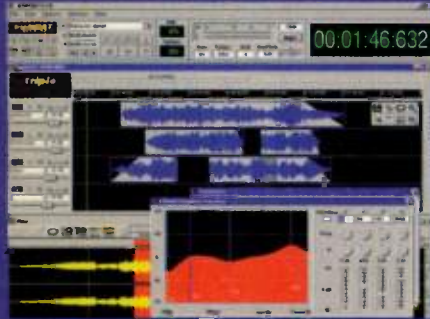
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EQ



PROJECT RECORDING
& SOUND TECHNIQUES
VOLUME 7, ISSUE 1
JANUARY 1996



ON THE COVER:
Ozzy Osbourne takes the stage.
Photo by Michael Mazur.
Inset photo: Samson Mixpad 12

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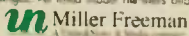
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LETTER FROM THE EDITOR

Analog Lives!

I HAD A HORRIBLE THOUGHT the day that 3M announced that it had decided to stop making audio and video tape.

What if all those tens of thousands of perfectly good, wonderfully reliable, and fully productive analog tape machines sitting in studios around the world had to be ditched simply because the manufacturers of professional audio tape decided to get out of the recording studio business?

It's an especially disturbing thought for all of us who firmly believe that, even in this day and age of digital recording, analog still plays an integral role in producing innumerable great sounding records. Analog remains the primary (and sometimes exclusive) storage medium for thousands of studios large and small. Even hardcore digital adherents admit that analog is a critical sound "effect" in their bag of tricks.

Despite all the headlines and articles you read in this magazine and in others about the wonders of affordable digital recording, don't count out analog quite yet. The word on the street is that Studer's 2-inch machines are in such great demand that they are currently back-ordered. And the folks over at TASCAM still sing the praises of their analog profit center, even in light of their huge emphasis on the digital domain.

Could it happen? Nothing to worry about yet, since Ampex and BASF are still firmly supporting the analog tape machine population. However, even those two companies have undergone their own boardroom shifts in recent times. Agfa was the first company to leave our business before selling out to BASF several years back. Ampex, meanwhile, recently spun off its tape division (now known as Quantegy), explaining that it no longer produces the hardware that needs the software supply.

Meanwhile, all the new storage medium suppliers on the scene are playing the digital game — exclusively. Sony is making its presence known as a serious magnetic tape provider to the studio marketplace, with a full line of digital products. Iomega is now a supplier to our business, but don't expect this computer storage company to get warm and fuzzy about the virtues of analog tape. Other companies (i.e., TDK, Maxell) are looking at pro recording for line extensions of their higher quality consumer goods.

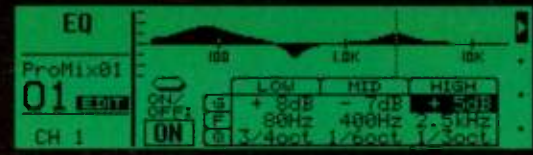
All of which leaves those of us who still value analog (which is more than most are willing to admit) with one less supplier to choose from — and that supplier happens to be 3M, which not only has cut its last link with our business (remember their analog and digital multitracks?), but which also happens to be the company that upped the ante of analog sound quality with the introduction of its 996 formula several years back.

The only recourse is for end-users to stand up and be counted and finally admit that, though ADATs, DA-88's and hard-disk editors are wonderful new dream tools, a chunk of our creative technique would be lost forever if there was nothing to feed our trusted analog tape machines.

...Until some brave entrepreneur introduces "the world's first" analog tape signal processor, that is.

Martin Porter
Executive Editor

Pro Mix 01 AND THE SUBTLE ART OF eq.



YAMAHA
20
BIT
TECHNOLOGY



Pro Mix 01 parametric eq gives you dozens of frequency centers in three overlapping bands, from a very low 32 Hz to a sparkling 18 kHz. Q is adjustable in 1/6th octave steps with low and high frequency shelf. A graphic LCD display shows the details of every move you make.

Call the 800 number below for your free Pro Mix 01 Video and Application Guide.

Mixing is something like painting. Whether it's for a live audience or in the studio, equalization, or eq, is like the "palette and brushes" that let you adjust the shade and tint of each sound in your mix.

In the eq world, true parametric eq is the most precise of all. But it can be very expensive. It's normally available only as an integral part of a large console. Or as a separate add-on unit that can cost thousands.

So why would someone pay big bucks for parametric eq? With Pro Mix 01 you can afford to find out—because Pro Mix 01 is the only mixer in its class with true parametric eq on every input channel.

Fundamentals and harmonics: the hues and tints of music.

Each sound in your mix is made up of many "colors" or frequencies. If you look closely at a shiny object, you notice it's not simply gold or silver—it displays a complex array of colors that let you know it's reflective.

When you listen to a sound by itself, you mostly hear its predominant frequency—the fundamental. But like the shiny object, if you listen closely you'll hear subtle frequencies called harmonics that give the sound its character.

Eq lets you control these subtleties. Making an acoustic guitar seem larger than life—more out-front—by simply boosting the high-frequency harmonics from the strings. So the guitar becomes more noticeable in your mix, without

actually raising its volume.

You can also use eq to solve problems in a mix. Such as removing feedback in a live concert; removing hum or noise from an electric instrument; or taking the "edge" off an instrument that's stealing attention from a lead vocal. With eq, you can make sounds stand out or blend in. In short, it's the accent that can turn a group of sounds into a great mix.

A different shade of blue?

Most equalizers give you a pre-determined choice of two or three frequency locations at which you can boost or cut. That can be really limiting—like having only two or three colors to paint with. You'll quickly discover this when you want to add presence to your vocal track, solve a feedback problem, or remove electronic "hum," and need frequencies that fixed-band equalizers don't provide. Parametric eq, as provided by Pro Mix 01, gives you a spectrum of frequency choices. Like having all the colors of a color wheel available to paint with.

What size brush?

In addition to frequency and gain controls, the true parametric eq on Pro Mix 01 includes a Quality Factor or "Q" control. Going back to our painting analogy, Q is like the width of your paintbrush. It lets you determine how wide or fine an effect you want the eq to have. Unlike the pseudo-parametric or "sweep" eq some mixers provide, true parametric eq lets you boost and cut subtleties in your mix with the precision of a Renaissance artist.

The Pro Mix "Paint Box."

Now that you know why parametric eq is so highly regarded, just imagine applying that artistic freedom to your next project. What could you do with more colors and more control over them? With 3-band parametric eq on every channel and the main stereo output, Pro Mix 01 gives you dozens of frequency centers to choose from. It's like enhancing your mix with a paintbox that includes every color in the rainbow.

A memory for the details.

Pro Mix 01 also saves you time by remembering all your eq settings in memory. So once you've found that magic eq curve, you can instantly call it up weeks later, along with all the other settings in your mix. Pro Mix 01 even includes a built-in eq library which holds 30 time-tested eq curves for you to use. You can call these up as starting points, modify them according to taste, and store your own custom settings in the library for use at any time. The large, backlit LCD display gives you visual as well as precise numeric representation of your eq on each channel—making eq'ing with Pro Mix 01 an illuminating experience indeed.

We could go on and on about Pro Mix 01's other advantages. But that's another ad. In the meantime, get the book and see the movie. **Just call 1-800-937-7171, ext. 550** for your free copy of the new Pro Mix 01 Application Guide and Video. Then take a spin at the dealer nearest you, and see how Pro Mix 01's parametric eq handles the curves.

Pro Mix 01 gives you three bands of true parametric eq. As well as a library of 30 time-tested eq curves, plus room for 20 more custom curves of your own.

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YAMAHA
Smart Mixing

CIRCLE 70 ON FREE INFO CARD

LOST IN THE CONVERSION

Re: The Roger Nichols 02R review

In a recent *EQ*, (October, 1995) you published a review of Yamaha's 02R console that was penned by Roger Nichols. On page 158, Roger states that he "successfully used the Otari DCF-24 format converter box to connect the TASCAM interface cards in the 02R to a Sony 48-track digital machine." While we are pleased that Roger mentioned our newest digital product in his article, the model description of our product was stated incorrectly. For the record, our format converter product is called the UFC-24.

The UFC-24 converts between ADAT, TDIF-1, SDIF-2, PD, and optionally AES/EBU formats. It performs this task 24 channels at a time and also allows the user to digitally map output channels. Multiple units may even be linked for greater than 24-channel operation. The features and configuration of this product are completely unique in the industry and would, we're sure, be of great interest to your readership.

Doug Wood
Product Manager
Otari Corporation

GETTING STARTED

I read with interest Hector G. La Torre's response to a question about running one's own studio as a business. Some of the advice was very good, but as a studio owner for 18 years, I felt some of the ideas were a bit off the mark.

Mr. La Torre suggested networking with the local Chamber of Commerce and offering to produce some free spots. It's been my experience that these organizations are bureaucratic time-wasters of the first degree. They take forever to make a decision, everything is done by committee, and they certainly will have no appreciation for work you slave over that doesn't cost them anything. You'll feel like hanging yourself by the time they ever do anything at all for you. My suggestion is to avoid governmental folks at all costs and get out there and spend your time with potential clients in the real world.

I also feel that the suggestion to "pick a game plan...jingles, pop music, voice-overs, etc." at the beginning of your studio career is very limiting. Be a generalist early on — see where the market niches really are, see what you like

doing the most, see where the biggest profits are to be found, and so on. You can always specialize as you gain clients, experience, and cash reserves.

I'm saving my biggest reservations for the suggestion, "If it gets too expensive or confusing, find a partner." I'm sure that sometimes this could work, but it can certainly be a walk off a cliff. Not only would you now have the usual start-up problems (under-financing, inadequate equipment, lack of accounting and billing experience, and lack of direction), but you will now have another person pulling you in several directions and splitting the meager early monetary returns with you. I suggest you set sail, assess your strengths and weaknesses, build a base, and *then* bring in a partner who complements your areas of expertise. Unless you can find a silent partner with loads of cash (and there aren't any of those, by the way), get it rolling on your own.

I love your magazine and find the product reviews very helpful!

Ken R. Deutsch
President
Ken R. Inc.
Toledo, OH

DISC TAKER

Just received my copy of *EQ* on CD. I'm very impressed. I've been an *EQ* subscriber for about a year and have found it to be a terrific magazine. Lots of practical tips and applications I can use.

I'm production director at WHO Radio and KLYF radio in Des Moines, IA. Broadcast production is usually fast, right-now, high-volume (as in quantity) work. There usually aren't the luxuries of racks full of effects boxes, lockers filled with a selection of mics, or time to experiment with mic placement. But *EQ* still has plenty to offer me in practical tips from the *EQ* & A column thru product reviews. Now that I've got 30 back issues on one CD, I can get rid of my three ring binders with articles I've archived. (My wife passes along her thanks as well!)

Looking forward to future releases! Keep up the good work!

Craig Rogers
via America Online

BONE TO PICK

Paul Dean's letter re: Digidesign (*EQ* 12/95) struck a chord with me.

Since my purchase of a Sound Tools system some years ago, Sound Designer II has become one of those products essential to my everyday work. Therefore, it is disturbing to me to feel that Digidesign tends to treat its customers in a callous and cynical way.

I started to feel this way when, as an original Sound Tools owner, I saw the new plug-in modules such as DINR come out, unable to run on the original Sound Accelerator card, with no upgrade path being offered. It seemed to me that users were being steered towards coughing up the price of the new Sound Accelerator boards and interfaces (about \$3000), even if they had no pressing need for them. A briefly offered \$500 Sound Accelerator trade-in/rebate was too little, too late.

Then, between Sound Designer II versions 2.5 and 2.8, Digidesign dropped all support for third-party samplers, dropped the original Sound Accelerator card, and reinstated copy protection. Also, the new copy-protected SDII 2.8 now has to be installed on the same partition as the operating system (a major drawback in my opinion) and has become incompatible with a very benign Control Panel of mine called ClickChange. I am currently running SDII versions 2.5, 2.7, and 2.8 just to work around Digidesign's various arbitrary decisions about software functionality.

Professional users need reliable, well-behaved software that can be safely backed up, defragmented, and stored on whatever partition is convenient. We pay for software and register with the manufacturers because we rely on them for after-sale support and upgrades. We oppose piracy because it is counter to *our* best interests. Professional music users accept a lot more paranoia from music software companies than would

WRITE TO US

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Making cool sounds. That's pretty much the purpose of all multi-effects processors, and a task that the Sony HR-MP5 executes extremely well. It all starts with our dual-effects block architecture. Each block boasts both an effect and an equalizer. These can be used at the same time to create the exact sound you want, with your



quality that's better than expected for the price... smooth reverbs, digital clarity but with a warmth that sounds distinctly undigital.**

Yes, the Sony HR-MP5. It's versatile, convenient, affordable, and great sounding. In conclusion, allow us to leave you with some quotes from Keyboard Magazine, who wrote, "...clean

GET GREAT RECORDING EFFECTS WITHOUT BANGING YOUR HEAD AGAINST THE WALL.



OF COURSE, WE COULD MAKE THAT SOUND PRETTY COOL AS WELL.

choice of a serial, parallel, or dual mono configuration. Throw in the fact that each preset can be programmed with a different configuration, and it all spells one magical word: versatility.

With the HR-MP5, you get an abundant variety of effects, 51 in all. These include Delay, Chorus, Flange,

Pitch Shift, Reverb, and Dynamic Filtering. Add to the menu 100 pre-programmed and 100 user-definable presets, and it's easy to see that the HR-MP5 has a fully stocked effects buffet.

But don't just take our word for it, listen to what the experts are saying. Such as EQ Magazine, "Sound

and smooth presets...the display is big, bright and packed with information...friendly, easy-to-understand icons at every turn...this user interface is one of the best we've seen...A+ for Sony.**

What more can we say? For more information, call 1-800-635-SONY, ext. MP5.

SONY

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**EQ, August 1994. **Greg Rule, Keyboard Magazine, April 1995.

CIRCLE 68 ON FREE INFO CARD

Don't be a Tape-based googlehumper.

LETTERS TO EQ

be tolerated in the business software world. My copy of Microsoft Works isn't copy protected, but you don't hear *them* crying the blues!

Also, professional users cannot always blow huge sums of money on new hardware just because it's cool. The cost of an item must be weighed carefully against its potential for generating income. With Digidesign, I feel like I never know when they will decide to extort some more money by dropping support for their current hardware.

I have expressed these opinions to Digidesign; in fact, this letter is largely paraphrased from my last two letters to them. However, I have received no indication that my opinions are of any concern to them. Digidesign is, in many ways, the front runner in the moderately priced computer-based DAW market. Their encouragement of third-party developers has helped to ensure that. If they also cultivated the loyalty of their professional customers by offering reasonable upgrade policies, maintaining as much backward compatibility as possible, and eschewing copy-protection schemes that unfairly penalize the user, they would be unbeatable. Unfortunately, they seem to regard the cultivation of customer loyalty as unnecessary.

Jon Gordon
New York, NY

THE DEFENSE RESTS

Re: Jon Gordon's letter

(1) Jon complains about copy protection on Digidesign's products. Copy protection is understandably a "hot button" issue for our entire industry. I only wish that most folks had as much integrity about illegally copying software as Jon has, (I've known him for almost 20 years), but unfortunately, the audio software community hasn't found this to be the case. Digidesign's software protection method (which is used by virtually all of the major manufacturers) is the least intrusive and most reliable that we can offer. It does allow disk defragmentation.

(2) Jon is frustrated that his original Sound Accelerator I card is no longer supported by Digidesign and that sampler support has been dropped from Sound Designer software. The first thing to note here is that this decision is quite a

continued on page 133



GOOGLEHUMPERUS
TAPEZOIC PERIOD

Extinct due to its diet of magnetic tape,
limited brain power and incredibly
slow speed

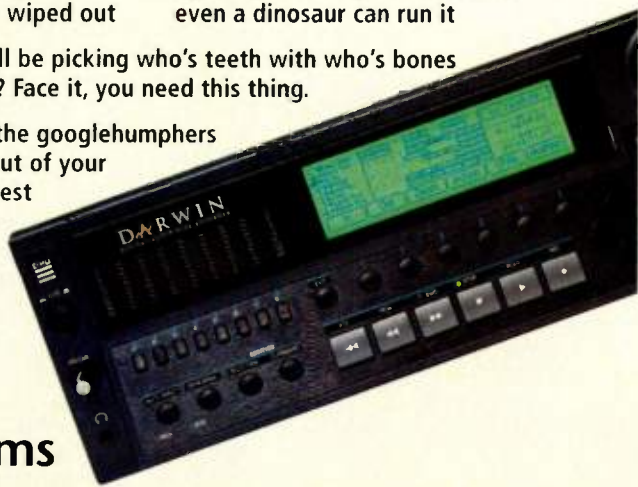
In 1856, Charles Darwin determined that the *Tape-based googlehumper* species died off because of its failure to evolve with the times. 150 years later, E-mu's DARWIN 8-track Digital Hard Disk Recorder is proving to be the salvation of the digital recording species, with its highly evolved functionality and streamlined cost. It's true: DARWIN delivers the power of digital audio workstation-style recording and editing at a price every *Homo erectus* can afford.

Play music? Doing some recording? You won't believe what DARWIN will do for your creative process! That's because DARWIN's heart pumps with the power of non-destructive random access recording technology. Consider the benefits of that over taped-based beasts:

- Effortlessly cut and paste that perfect chorus throughout a tune
- Create a virtually unlimited number of tracks from a single unit
- Completely rearrange a composition without screwing up the original
- Avoid time wasted waiting for tape rewind
- Instantly resurrect that insane guitar riff you accidentally wiped out
- Operation so easy and evolved, even a dinosaur can run it

Any question about who will be picking who's teeth with who's bones in the recording food chain? Face it, you need this thing.

Don't make the mistake of the googlehumpers before you. Spit that tape out of your mouth and sail to your nearest E-mu dealer to learn about the DARWIN Digital Audio Disk Recorder in the flesh. After all, DARWIN is... the natural selection.



E-MU
E-mu Systems

To find your local E-mu dealer, contact: PO Box 660015, Scotts Valley, CA 95067-0015 • 408.438.1921
UK Office: Suite 6, Adam Ferguson House, Eskmills Industrial Park, Musselburgh, EH21 7PG • 44.131.653.6556

CIRCLE 24 ON FREE INFO CARD





AMPEX
489

Recommended by Alesis for ADAT Recorders

adat

DIGITAL MASTERING
AUDIO CASSETTE

EP

EXTENDED PLAY TIME

AMPEX
488

Hi8

H-60

AMPEX
467

DAT

STIFIED MASTERING
TO CASSETTE

Born Digital. Bred For Gold.

Ampex 489 ADAT, 488 Audio Hi8 and 467 R-DAT. Highest consistency, lowest error rates. No wonder more studios go gold on Ampex than on all other tapes combined.

You're on the cutting edge. You record in the newest generation studio. You need tapes that are designed specifically for digital audio applications.

So we consulted with the most demanding artists and engineers in digital recording and spent months in development back at the lab. The results are Ampex 489 S-VHS, 488 Audio Hi8, and 467 R-DAT, designed specifically for digital mastering.

They are simply the finest mastering tapes you can buy. In fact, more artists, engineers and studios go gold on Ampex than on all other tapes combined.

Thanks to our unique dual coating technology, Ampex 489 and 488 feature low dropouts, high output, and the most consistent quality tape after tape. Plus, low abrasivity

to ensure long headlife. Which is why Alesis, the creator of the ADAT format, recommends Ampex 489 ADAT.

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CIRCLE 07 ON FREE INFO CARD



EQ&A

DAMORE ON 02R

Q I have questions about the Yamaha 02R console that didn't seem to be covered in Roger Nichols's review (EQ, October 1995).

If you have 32 tracks of TASCAM DA-88 hooked up using the optional I/O cards (as Roger did), does the 02R supply full-featured channels (i.e., EQ, dynamics, FX sends, etc.) for all 32 tracks?

Can the 24 analog inputs be used at the same time as the 32 tape tracks, possibly in a submixer role? I need to simultaneously handle 24 tracks of tape, eight stereo FX returns, and 16 tracks of virtual MIDI at mixdown. I presume that more than one 02R will be required, but I don't have a clear picture about how the I/O is configured.

Any clue from the folks at IQS [Innovative Quality Software] about plans to market a "Son of SAMM" program for the 02R?

Garry Simmons
Simmons Recording
Pittsburgh, PA

A All 40 02R inputs (16 mic/line inputs, 4 stereo line inputs, and 16 tape returns) have the same exact features. When you connect 32 tracks to an 02R (16 on the tape returns and 16 on the main inputs), every track enjoys the same 4-band parametric EQ, eight aux sends, a compressor/limiter/gate, access to all the bus outputs, and complete automation of every channel setting.

Here's how it works: The 02R rear panel has four card slots, each of which holds one I/O card. Each I/O card allows you to connect eight tracks of digital audio to the 02R. The same card also sends eight digital bus or direct outputs to the multitrack. The first two card slots are "normalled" to the 16 tape returns. The other two card slots can be selected to appear on the first 16 inputs in place of the 16 mic/line preamps. When all four card slots are used to return 32 tracks of

tape to the 02R, four remaining stereo inputs are still available for additional analog or digital sources. By the way, Garry, the 02R includes two additional stereo effect returns dedicated to the onboard FX, for an actual total of 44 inputs.

Regarding your system requirements: A single Yamaha 02R can handle your 24 tape tracks and provide 16 (eight stereo) effect returns. To accommodate your 16 virtual MIDI tracks, sub-in a ProMix 01. You can connect its digital output to a digital stereo input of the 02R. In this case, the ProMix 01 provides the master word clock for the system.

Lastly, concerning IQS: Using the 02R's RS422 port, Yamaha 02R Project Manager Software (currently in development for the 02R) will control multiple 02R's from a Macintosh computer. Right you are. Innovative Quality Software's SAMM software is a great controller for the ProMix 01. With regard to SAMM for 02R, IQS tells us they are definitely looking at 02R as the obvious next direction. Details regarding specs and timing have not been defined as yet. Contact IQS (702-435-9077) for details.

For more information on the Yamaha 02R digital recording console or the ProMix 01, feel free to contact Yamaha Corporation of America at 714-522-9011. Or write to Yamaha Corporation, 6600 Orangethorpe Avenue, Buena Park, CA 90622. Thanks for your questions.

Peter Chaikin
Product Manager, Recording Prods
AGS Division
Yamaha Corporation of America

DAT'S A PROBLEM

Q The recent EQ articles [Eddie Ciletti's maintenance columns, August, September 1995] about alignment in DAT recorders brought up some questions for me. While playing a DAT tape on my Sony TED D5 or Aiwa HHB1 Pro, sometimes there is a period of 1-3 seconds when there is what I would describe as a high-pitched noise, which then clears. I've never seen this addressed. It is usually not repeatable, though sometimes it occurs again at the same spot, and then doesn't. Is this an evanescent [transitory or disappearing] head alignment problem?

Dropout? What do you suggest? The Aiwa is a good machine (I need a portable to use far from rechargers), and I would be glad to find a competent place to service it. Any suggestions?

I liked Eddie Ciletti's columns so much because even though DAT recorders are a great technology, not too much is written about keeping them going.

Stephen Bezruchka
Seattle, WA

A The noise you describe sounds like the result of a tape path problem, possibly poor mechanical recovery after using the reverse scan feature (reverse play under capstan control). This happens every time you press skip or (while in play) FF or RW.

Not all machines suffer from this problem, which can be caused by misaligned guides, back-tension brake fatigue, and/or excessive dirt on the capstan and pinch roller. Panasonic solved this problem on its SV-3500 DAT machine by not engaging the pinch roller during the above-described modes.


For service, check with the manufacturer for an authorized service station or look in the back of your favorite magazine. Expect a minimum charge of about \$100 plus parts. (Labor is typically \$50-\$100/hr.)

[Although Aiwa keeps a very low profile when it comes to its DAT machines, I did come up with a local authorized service center: Precision Audio Service, 6215 Roosevelt Way NE, Seattle, WA. Tel: 206-522-7607. If that doesn't work, you may want to contact HHB, with whom Aiwa developed your model, Tel: 011-44-181-962-5000; fax: 011-44-181-962-5050 in the U.K. or Aiwa in Mahwah, NJ at 201-512-3600. —H.G.L.]

Eddie Ciletti
Manhattan Sound Technicians
New York, NY

SPLITSVILLE

Q Help! I need to send digital S/PDIF to more than one destination from one source. That is, my Digital Audio Labs EdDitor needs to feed the input of my Ensoniq ASR-10 sampler and a DAT. Can I just put them in parallel, or is some form of elaborate splitter necessary? Nobody in the free-speaking



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world has been able to give me a conclusive answer on this one.

Thanks for your help!
Allan Blackwell
GET REEL Productions
via America Online

AThe technical specs for a S/PDIF transfer require: (1) Signal levels to be maintained ± 20 percent. (2) A 75-ohm transmission cable, with a matching impedance termination at

the transmitter and receiver.

The bad news is that splitting the signal out to two pieces of gear violates both of these requirements. So the question really is, "Can You Cheat?" This is where we find some good news.

Due to the impedance-matching circuitry, splitting the signal results in a 1/3 drop in the signal level. In playing around in the lab, we found our pro DAT recorder to be tolerant to signal levels down to 1/2 of the nominal spec.

We tried another piece of gear with an S/PDIF input, and it worked well with signals below 1/4 the nominal spec.

So, even though gear is not required to work in this configuration (going strictly by the spec), it probably will. Try it with your gear, and if the receivers lock and the audio sounds clean, don't be afraid to use it. This setup certainly won't damage any gear.

Here are a few tips to give it the best possible chance to work:

1. Split the signal right at the output of your I/O CardD (or Digital Only CardD).
2. Use high grade 75-ohm cables.
3. Keep the cable runs as short as you reasonably can.

Jeff Wilson
Digital Audio Labs

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CIRCLE 34 ON FREE INFO CARD

BEING PC(I)

QI'm looking into buying a hard-disk recording system. Because of the plug-ins and because it's becoming the industry standard, Digidesign's ProTools seems very attractive. Now, as everyone knows, NuBus is a dead fish. Will Digidesign bring out ProTools on PCI cards? If so, when? PCI cards would also mean that ProTools could be compatible with PCs (with a little ROM on the cards and the ProTools software, of course). Is this going to happen?

A big thank you for the finest magazine on recording. Keep up the good work.

Eric Lewis
Livingroom, I presume Studio
Berne, Switzerland

ADigidesign is releasing a PCI-based product line in early 1996. The PCI-based ProTools III Core System is expected to be slightly more capable (in terms of DSP processing power, not in track count) than the existing NuBus-

continued on page 133

This is where your questions get answered. Send your queries to:

EQ Editorial Offices,
939 Port Washington Blvd.,
Port Washington, NY 11050

Fax: 516-767-1745

E-mail: EQMagazine@AOL.COM

INSIDE
THE
PL4.0

The Best Sounding Amp Is Now The Most Powerful

PowerLight

4.0

PowerWave™ Switching Technology allows for the high-speed transformer to be small and dramatically light weight.

The charged capacitor bank distributes current as needed before the transformer—delivering continuous, stiff supply voltage.

A temperature-controlled, continuously variable speed fan blows heated air rear to front, keeping the amp and the rack cool.

An aluminum heat-sink tunnel designed with the maximum possible surface area transfers and dissipates heat.

The new PowerLight 4.0 introduces massive power to a series of amplifiers that have already become a benchmark for excellent audio performance and reliability. **PowerWave™ Switching Technology** (patent pending), at the heart of the PowerLights, is **the power supply technology for the future**. The 4.0 clearly demonstrates why...

SUPERIOR AUDIO

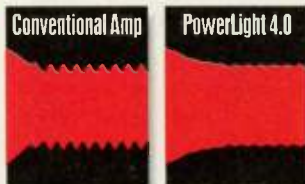
The 4.0 achieves remarkable audio quality because **voltage supply to the output section is powerful and stiff**. There are virtually no sags following transients or long peak power demands. You won't hear typical modulation from AC ripple or garbling during clipping. The bass is ultra-clean and fat. Highs are pure and unstressed.

MAXIMUM EFFICIENCY

A **PowerWave transformer "flies" at 115 kHz** (2000 times the frequency of a conventional transformer). Waste heat from resistance is almost nil. The supply is 90% efficient! And the 4.0 features **the latest three-step Class H linear output circuitry** for maximum audio quality and efficiency.

"NO-FAIL" PERFORMANCE

QSC's renowned protection circuitry is enhanced by the PL 4.0's "smart" supply which matches power delivery to changing musical demand. The 4.0's thermal management keeps the amp cool under extreme conditions (even 2 ohm loads). And with the 4.0, **EMI and RFI are absent**, making the amp safe for wireless mics.



Less power sag, less clipping intermodulation, more bass impact, cleaner transients...PowerLight.

INCOMPARABLE AMP

You won't see or hear another amp with the power and performance of the PowerLight 4.0. **Call your QSC Dealer or QSC direct at 714-754-6175** for complete details.

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4 PowerLight Models

	1.0	1.4	1.8	4.0
PowerLight 1.0	200 Watts	325 Watts	500 Watts	700 Watts
PowerLight 1.4	300 Watts	500 Watts	700 Watts	900 Watts
PowerLight 1.8	400 Watts	650 Watts	900 Watts	1400 Watts
PowerLight 4.0	900 Watts	1400 Watts	2000 Watts	

*20 Hz-20 kHz, 0.1% THD, ** 1 kHz, 1% THD

PowerLight 4.0 Key Features

- ▶ PowerWave™ Switching Technology
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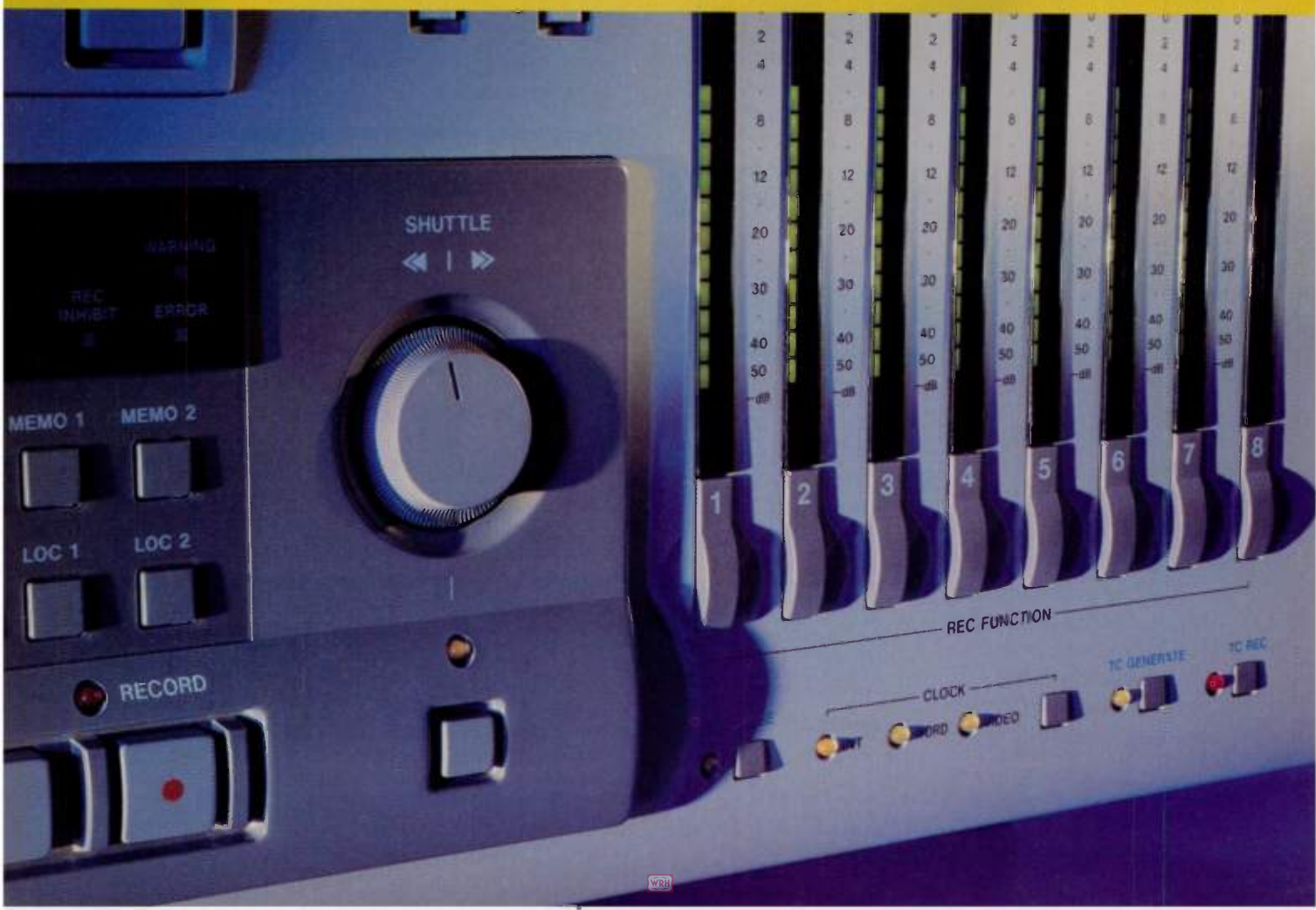


How

the DA-88 became
the hottest digital recorder for post production.

For starters, virtually every production studio has at least one. If your business is post-production audio for dialog, sound effects and music — nothing is faster, nothing is more reliable and nothing sounds better than the TASCAM DA-88. Fact is, when deadlines are looming, the last thing you want is a machine that spends more

time in the shop than in the studio. Plus you need a machine that synchronizes and locks up fast — typically 2 seconds or less. What's more, only the DA-88 can record an entire feature on a single tape. That's why the TASCAM DA-88 is the choice of production professionals. And that's how it became the undisputed industry standard.

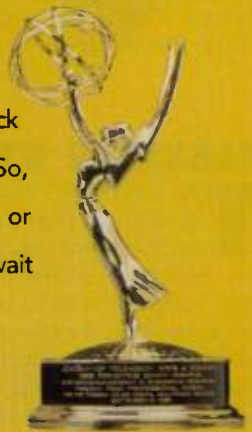




Why you need to get a DA-88 in your production studio.

Because without one your studio could be wasting time and losing money. The DA-88 seamlessly integrates into any production studio to directly interface with SMPTE, MIDI and Sony 9-pin equipment — TASCAM's expert software makes it possible. Its blazingly fast transport means you spend less time waiting and more time producing. Plus, a truly modular design makes expanding and enhancing a DA-88 with third-party products quick and easy and makes it simple to service.

Fact — the DA-88 delivers what production professionals demand — economy, reliability, speed and synchronization that really works. That's why the DA-88 is the only modular digital multitrack to win the coveted *Emmy Award*. So, whether you already own a DA-88, or are waiting to buy your first, why wait another minute?



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EQ NAMM VIEWS

It's January — time to work off those holiday spreads and see what's new at the Winter NAMM show. That's exactly what we did, and here's what we found...

TRANS AMP

Hafler's P1000 Trans Ana (Trans-conductance Active Nodal Amplifier) is a 1U system, providing two channels of power amplification. Power ratings are 50 W x 2 @ 8 ohms, 55 W x 2 @ 4 ohms and 110 W bridged mono. Passive cooling is utilized in the P1000 to minimize mechanical noise, and a MOS-FET output stage comes as standard fare.



Other features include a soft-start circuit that prevents destructive turn-on and turn-off transients to speakers, a thermal sensing network, and an LED for each channel, thermal protection circuitry, clip, and signal. Each of the P1000's channels is its own self-contained module. List price is \$499. For more information, contact Hafler, 546 Rockford Drive, Tempe AZ 85281. Tel: 800-366-1619. Circle EQ free lit. #102.

FLEXIBLE STORAGE

The TimeLine Vista MMR-8 (modular multitrack recorder) can use either magneto optical discs or a hard disk for storage. Features include plug-and-play magneto optical and/or Nara disks, event location for selected tracks, nine location memories, transport controls with record and rehearse functions, memory loop function, jog/shuttle wheel, trim function for data and memory registers, machine master timecode offset, and unlimited track slip capability. The MMR-8 also includes four biphase inputs and biphase generator, timecode chase synchronizer, video, word clock, and digital audio reference sources. The recorder also offers 48 and 44.1 kHz internal sampling rates as well as external remote track ready and transport control. For more information, contact TimeLine Vista Inc., 2401 Dogwood Way, Vista, CA 92083. Tel: 619-727-3300. Circle EQ free lit. #103.

SAMSON STRIKES 12

Following in the footsteps of the Mixpad 9, is Samson's new Mixpad 12 ultra-compact mixer. Its dimensions are 12" x 8 1/16" x 1 1/2", and it features 12 channels. The Mixpad 12 provides six electronically balanced XLR mic/line inputs and three stereo inputs. Additionally, there are two aux sends per channel (one pre, one post), two stereo effects returns to



the left and right main outputs, and independent 2-band EQ. Mic input trims allow the signal-to-noise ratio to be optimized at the inputs. Like its predecessor, the Mixpad 12 also offers constant-level pan controls (mono channels) and balance controls (stereo channels). Peak LEDs on the left and right main outputs allow users visual monitoring. Other features include: a balanced stereo output, one-piece extruded aluminum construction, and an external in-line power supply. Retail price is \$329. For more information, contact Samson, P.O. Box 9031, 575 Underhill Blvd., Syosset, NY 11791-9031. Tel: 516-364-3888. Circle EQ free lit. #101.





BIG SOUND, SMALL MIC

Electro-Voice's RE1000 condenser microphone has been designed specifically for home and project studios. The diaphragm's design was chosen to combine the high output of a large diaphragm with the transient response and pattern control of a smaller one. The result is an ultra-thin, gold-laminated diaphragm built to remain stable through changing temperature and humidity conditions. The transformerless output circuitry ensures low bass distortion and hum. For further information, contact Electro-Voice, 600 Cecil Street, Buchanan, MI 49107. Tel: 616-695-6831. Circle EQ free lit. #104.

RANE ON ME

Control your vocals better with the new VP 12 voice processor from Rane. It's a studio-grade preamp with built-in signal processing. Processing includes sweepable high- and low-cut filters, a de-esser, a gate/expander, a compressor, and two bands of full range parametric equalization. The VP 12 comes in a single 19-inch rack-mount chassis, and retails at a price of \$599. For more information, contact Rane, 10802-47th Ave., West, Mukilteo, WA 98275-5098. Tel: 206-355-6000. Circle EQ free lit. #105.

WHERE IT'S AT

The latest addition to Audio-Technica's 40 Series microphones is the AT4041. It's a pressure-gradient capacitor mic with a uniform cardioid polar pattern, and is designed for professional recording. Audio-Technica's AT4041 utilizes a fixed-charge capacitor element design that yields diaphragm weight reduction. The low-mass diaphragm improves transient response bandwidth, and reduces handling and mechanical noise transfer. The AT4041 also features an 80 Hz, 12 dB/octave high-pass filter that provides easy switching from a flat frequency response to a low-end rolloff. The recessed high-pass switch reduces the microphone's sensitivity to wind noise, "popping" in close vocal use, and handling noise. The AT4041 operates in conjunction with any remote phantom or simplex power source, and features an output impedance of 100 ohms. The AT4041 is housed in a case constructed of turned brass and is finished with a nonreflectance black coating. For more information, contact Audio-Technica U.S., Inc., 1221 Commerce Drive, Stow, OH 44224. Tel: 216-686-2600. Circle EQ free lit. #106.



HAVE YOU HEARD?

"Out with the old and in with the new" seems to be **Barcus-Berry's** (714-897-6766) New Year's resolution. The company will release the 3000A piezo buffer preamp as a replacement to some of its older pre-amp models. Barcus-Berry will also be releasing the 4000A active direct box to replace the model 1002 active transformer, which will be discontinued...**Buchla and Associates** (510-528-4446) has created *Lightning II*, a complete electronic musical instrument consisting of a specialized MIDI controller integrated with a 32 voice synthesizer. The controller senses the position and movement of wireless, infrared emitting wands, performs detailed analysis of gestures, and transforms the resulting information into MIDI signals for expressive control of sound...**Crest Audio** (201-909-8700) has expanded its V and Vs Series of amps to include the V and Vs 650 and 1100 models. The power specifications are 325 and 550 WPC at 4 ohms, respectively. These new models join the V and Vs 450, 900, and 1500 models...**HBB** (207-773-2424) has introduced the *Bit Box CD-R Optimizer* that allows easy transfer of track start ID information between DAT and CD-R recorders. The *Bit Box* features include variable digital delay to compensate for late start IDs, on-board sample rate conversion to allow transfer of 48 kHz DAT tapes and imperfect 44.1 kHz DAT machines, as well as supporting AES/EBU, SPDIF, and optical digital I/Os...**Klipsch Professional** (501-777-0693) has added a new compression driver, the KP-65-EKP-262 to its KP-362 Bass Reflex speaker system. Coupled with Klipsch's 60° x 40° Tractrix Wave horn, the KP-65-E makes use of a heavy-duty titanium dome diaphragm...Carrying a load takes on new meaning with **Kart-A-Bag's** (815-723-1940) *Kartmaster HD500S*. It has two shelves to offer more flexibility when hauling your stuff around. It even carries some audio gear.

EQ NAMM VIEWS



FLEX YOUR MUSCLE

Audix has introduced a new clip assembly designed to be used with its D-Series instrument microphones. The D-Flex clip is suited for drums, percussion instruments, and guitar cabinets. The clips are made of a nylon-composite material and consist of a spring clamp that attaches to any surface ledge. The D-Flex's flexible 3-inch tubing allows the mic to be placed into any position and remain stable. Additionally, the

D-Flex is lightweight, slip and shock proof, and resists vibration. For further information, contact Audix, PO Box 248, Lake Forest, CA 92630. Tel: 800-966-8261. Circle EQ free lit. #107.



FOURPLAY

dbx has introduced its new 1046 4-channel compressor. The 1046 provides four channels of smooth dbx OverEasy or hard-knee compression designed for use in the studio as well as on the road. Each of the 1046's four channels features threshold, ratio, an input/output meter, output gain control, a hard-wire bypass control, PeakstopPlus (limiting control for setting maximum allowable level regardless of compressor settings), and Stereo Link (which links channels 1 and 2 and 3 and 4 for two channels of true stereo compression). Other features include selectable auto or manual compression, differentially-balanced gold-plated XLR, 1/4-inch inputs/outputs, true RMS level detection, and switchable +4 dBu/-10 dBv operation per channel. For more information, contact dbx Corporation, 8760 S. Sandy Parkway, Sandy, UT 84070. Tel: 801-568-7660. Circle EQ free lit. #108.

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SEND IT DOD

The DOD 512 effects processor features true stereo effects and dual-effects capability for processing two channels independently. Effects include multiple reverbs, delays, choruses, flanges, pitch shifting, and vintage effects such as phasing, tremolo, and panning. The 512 incorporates a 44.1 kHz CD-quality sample rate for full bandwidth effects. The 512 also offers two real-time parameter editing controls for tweaking effects and modulation speed, as well as noise reduction with adjustable threshold. For the full story, contact DOD (A Harman International Company), 8760 S. Sandy Pkwy, Sandy, UT 84070. Tel: 801-566-8800. Circle EQ free lit. #109.

KEYING IN

E-mu recently threw its hat back into the keyboard market with the introduction of the Emulator 4 Keyboard (E4K). Standard features include fast access to a large library of presets, on-board effects, real-time control of timbres, standard MIDI file playback, and an ergonomic design. There are two versions of the E4K available, which are identical in all respects except one has 64 voices and the other 128 voices. The 64-voice version can easily be upgraded to 128 voices with the addition of a channel booster board. For the inside scoop, contact E-mu Systems, Inc., 1600 Green Hills Road, P.O. Box 660015, Scotts Valley, CA 95067-0015. Tel: 408-438-1921. Circle EQ free lit. #110.



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EQ NAMM VIEWS



THE STATE OF STATUS

Otari's Status R console features on-board automation, console-wide image recall, and the ability to save the settings of every fader, knob, and switch to a built-in floppy drive, and then recall this data. Each Status input module has two independent signal paths and a 4-band equalizer. The 12-track busses and 8 aux busses may be sourced from either signal path. The Status R is available in three frame sizes: 32-, 40-, or 48-input modules. For more information, contact Otari Corporation, 378 Vintage Park Drive, Foster City, CA 94404. Tel: 415-341-5900. Circle EQ free lit. #111.

GET POPPED

The WindTech SPS-1 studio pop screen is 5 inches in diameter and will help to control explosive consonant bursts. The SPS-1 employs a dual-fabric design to ward off the dreaded "pop." The injection-molded frame was made in America and will not splinter like some wooden frames do and has no rivets to adjust. The SPS-1 is available alone or packaged in a kit with a black, 19-inch gooseneck and microphone stand clamp (SPS-K). For more details, contact Olsen Audio Group Inc., 7845 East Evans Road, Scottsdale, AZ 85260-6929. Tel: 602-998-7140. Circle EQ free lit. #112.



A DATE WITH EIGHT

The Topaz Project 8 is Soundtracs' successor to its Topaz 8-Bus console. The console has been designed for use in project studios and features ultra-glide rotary pots, equalizers on main and secondary input channels, Solo and Mute functions, and SSM input IC by Analog Devices. The Project 8 is available in two versions, 24 and 32 channels. For more information, contact Samson Technologies Corp., P.O. Box 9031, Syosset, NY 11791-9031. Tel: 516-364-2244. Circle EQ free lit. #113.



HEAVENLY GATES

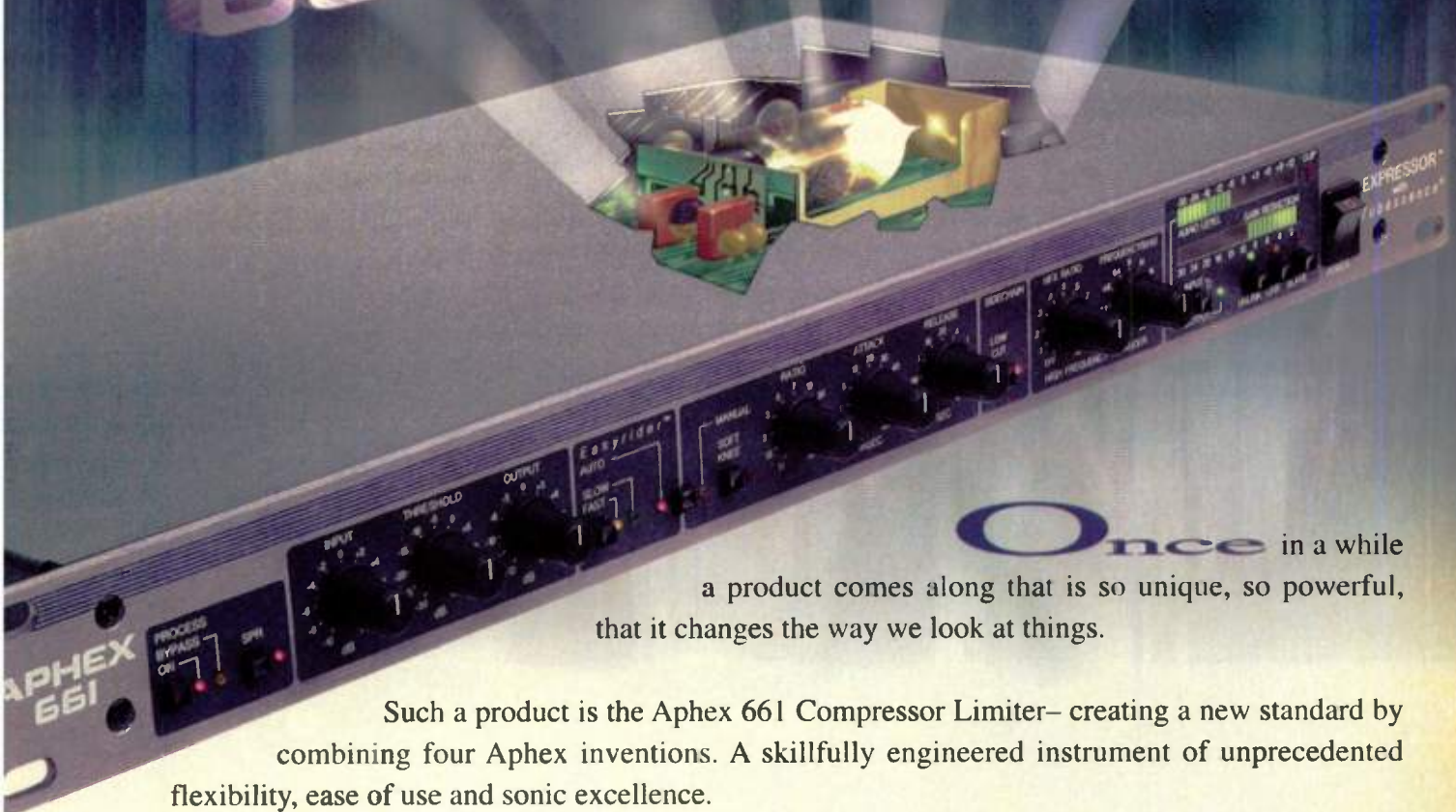
The 8-channel ACP-8 from PreSonus offers eight independent compressor/gates. The ACP-8 is housed in a steel, 2U-rack-space case. Each compressor features threshold, ratio, attack, release, and gain controls. Each gate features threshold, release, and attenuation controls. The ACP-8 accepts both balanced or unbalanced inputs or outputs, and has a sidechain jack for every channel for spectral processing or keying. Front-panel buttons include hard/soft-knee compression, peak/auto compression, bypass, and link. Each channel boasts full gain reduction metering, compression, and threshold and gate threshold indicators. For more information, contact PreSonus Audio Electronics, P.O. Box 84008, Baton Rouge, LA 70884. Tel: 504-344-7887. Circle EQ free lit. #114.

THE POWER OF THE PEAVEY

Peavey Electronics recently announced the release of the RP 500 high-performance, MOSFET, studio-reference power amplifier. The RP 500 uses an all-discrete component and is convection-cooled for noise-free operation. The slew rate of the RP 500 is 40V/μs in stereo mode, with a frequency response of +0/-3 dB from DC to 50 kHz at 400 W (RMS). A damping factor of 400 provides tight bass response, while distortion rates at a low 0.003%. Other features include gold RCA inputs, XLR 1/4-inch combo jacks, and gold binding posts for use with heavy-gauge speaker wire. For more details, contact Peavey Electronics Corporation, 711 A Street, Meridian, MS 39301. Tel: 601-483-5365. Circle EQ free lit. #115.



APHEX TUBE COMPRESSOR



Once in a while
a product comes along that is so unique, so powerful,
that it changes the way we look at things.

Such a product is the ApheX 661 Compressor Limiter— creating a new standard by combining four ApheX inventions. A skillfully engineered instrument of unprecedented flexibility, ease of use and sonic excellence.

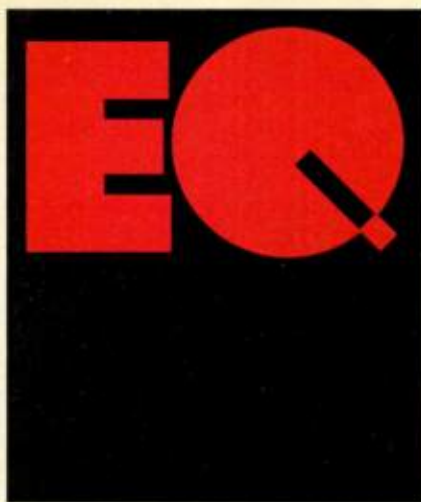
Tubessence[®] - true vacuum tube technology and warmth; High Frequency Expander (HFX)[™] for automatically retaining the high frequencies lost during compression; Easyrider[®] circuitry for an Auto mode that really works; and the world's best VCA - the ApheX 1001, the fastest, most accurate and transparent available.

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PRO-GRESS

Yamaha introduced its ProR3 digital reverb unit. The ProR3 is targeted for the professional studio market and incorporates the new Yamaha DSP chip. Features include 32-bit digital signal processing power, coupled with high-performance 20-bit A/D and D/A converters. True stereo processing, parametric EQ, and gating are included in the unit to enhance the many reverberation programs. For more information, contact Yamaha Corporation of America, 6600 Orangethorpe Avenue, Buena Park, CA 90622-6600. Tel: 714-522-9011. Circle EQ free lit #116.



POWER HOUSE

The new SoundTech Power Source 800 amp yields 800 watts (mono @ 8 ohms) in a 1U, 16-pound, rack-mount package. The key to the lightweight Power Source Series is a hybrid switch-mode power supply that reduces the need for bulky main transformers. The Power Source 800 features variable speed dual-fan cooling, complete speaker protection, mains protection, balanced XLR, unbalanced 1/4-inch inputs, bridged mono operation, and rear-panel attenuators. For the full scoop, contact Washburn International, 255 Corporate Woods Parkway, Vernon Hills, IL 60061. Tel: 708-913-5511 x131 or x132. Circle EQ free lit. #117.

LISTEN TO MOM

NOW! Recording Systems has unveiled its Mothers M-2010 Mark II Series 10-pocket audio cassette recorder/duplicators. As a master recorder, the M-2010 (master unit) real-time, stereo/mono multitracking unit can produce ten master cassettes from DATs, CDs, mixing boards, or any line source. As a cassette-to-cassette duplicator, the M-2010 can produce 1:9 stereo/mono, real-time/2x cassettes. For more information, contact NOW! Recording Systems, Inc., 32 West 39th Street, New York, NY 10018. Tel: 800-859-3579. Circle EQ free lit. #118.

A BETTER

BETTER DE-ESSER
with ratio control.



BETTER input section with both mic and line (wireless) inputs that can be summed together

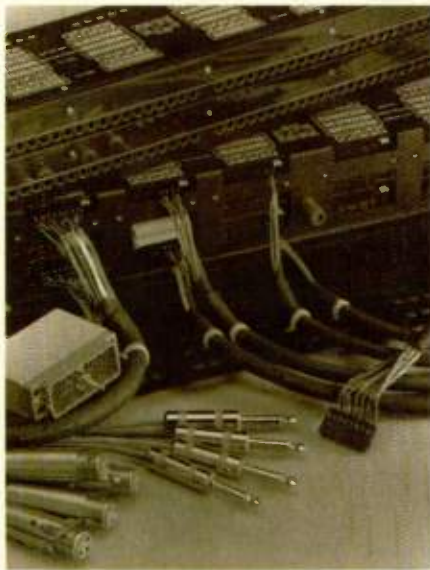
BETTER Signal-To-Noise Ratio : 97dB.

BETTER mic preamp
utilizing the SSM 2017 chip

VOICE PROCESSOR

I'M STILL STANDING

RAXXESS Metalsmiths recently announced the addition of two new Speaker Stands available in heights of 36 and 42 inches. The stands are designed to support reference monitors in studio applications and are constructed of 3/4-inch particle board and finished in grey, granite-like zoloton techno paint. Additionally, the stands may be filled with sand (through a plug in the underside) for acoustic decoupling. One-square-foot platforms on both the top and bottom of each stand provide stability at the floor and enough support at the top to accommodate virtually any near- and midfield monitors. For more information, contact RAXXESS Metalsmiths, P.O. Box 417, Riverside Station, Paterson, NJ 07544-0417. Tel: 201-389-1712. Circle EQ free lit. #119.



PATCH THINGS UP

David Carroll Electronics and Audio Accessories, in a joint venture, have released a new patchbay system designed for project studios. The Project Patch is a mini (bantam) patchbay wired with a printed circuit board. The system starts with Audio Accessories' hand-tested Mini patchbay, wired at the jacks to special 8-channel connectors. Then a full line of compatible audio cables are added. The key to the system is the modular Project Patch interface connector. Project Patch cables are fitted with mating connectors that are end-to-end stackable, so each 8-channel cable may be plugged into each group. For further information, contact David Carroll Electronics, Inc., 3219 Pierce St., Richmond, CA 94804. Tel: 510-528-8054. Circle EQ free lit. #120.

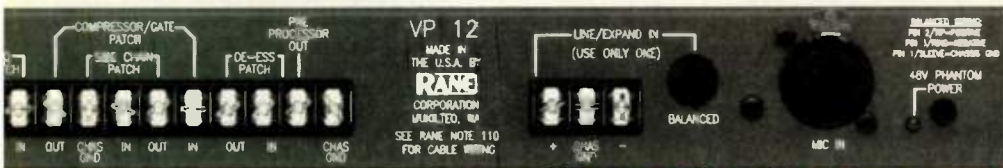
MOU THTRAP

BETTER EQ section with each band covering 20-20K with filters in series.

BETTER output section with main and aux to feed 2 devices or a stereo input.



Rane Corporation
10802 - 47th Ave. W.
Mukilteo, WA 98275
(206)-355-6000
Fax (206) 347-7757



BETTER THD+Noise spec : 0.009%.

BETTER Equivalent Input Noise spec: -130 dBu.

BETTER Price (Really!)

BETTER contact your local RANE dealer and check one out!



CIRCLE 55 ON FREE INFO CARD

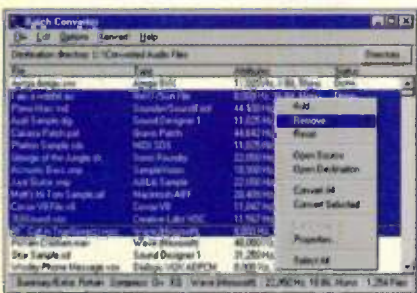
EQ STUDIO WARE



CREAM OF THE CROP

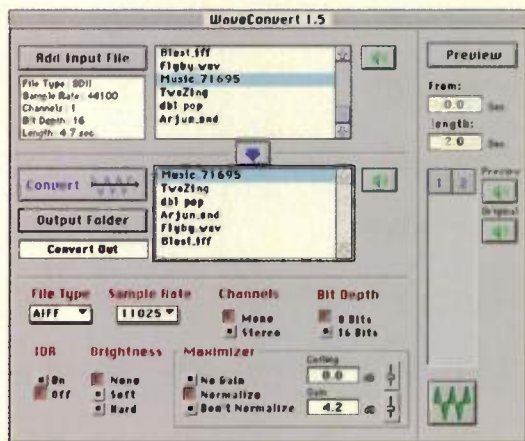
CreamWare has introduced a hardware/software system for digital audio recording and editing for Windows in the form of tripleDAT. The tripleDAT system consists of a plug-in card with integrated analog I/O and a selection of digital I/Os (including a MIDI adapter), packaged with a Windows interface. CreamWare's tripleDAT

transforms your Windows-PC into a DAW for desktop publishing of digital audio for under \$1800. For more details, contact CreamWare, Inc., 4872 Topanga Canyon Blvd. #201, Woodland Hills, CA 91364. Tel: 818-710-0100. Circle EQ free lit. #121.



MAKING WAVES

Waves announced the release of WaveConvert, a batch file multimedia audio mastering application for both the Apple Macintosh or Windows platforms. It converts Macintosh and PC audio files between sample rates, word lengths, channels (stereo/mono), and file types (AIFF, snd, and .WAV). Included is a sample-rate conversion range of 5-48 kHz, audio level maximization, presence enhancement, 16- to 18-bit conversion, automatic gain enhancements, and batch processing. For more details, contact Waves, 4302 Papermill Road, Knoxville, TN 37909. Tel: 423-588-9307. Circle EQ free lit. #123.



FORGING NEW TECHNOLOGY

Sonic Foundry recently unveiled its Batch Converter plug-in. It is designed to provide multiple file conversion and signal processing capabilities for a multitude of soundfile formats. Available in both 16- and 32-bit versions, the Batch Converter plug-in is designed to specifically run with Sonic Foundry's Sound Forge 3.0. The plug-in will allow users to convert a large group of soundfiles to a different file format. For more information, contact Sonic Foundry, Inc., 100 S. Baldwin #204, Madison, WI 53703. Tel: 800-57SONIC (800-577-6642). Circle EQ free lit. #122.

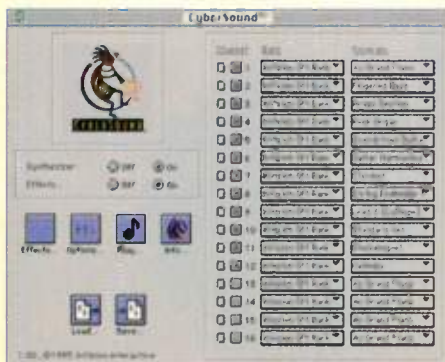
TUNE INTO THIS STATION

Audiomation will launch the Audio Station digital controller, a software-programmable control surface designed to interface to a digital audio workstation. The Audio Station features eight motorized touch-sensitive faders, 12 function keys, and six rotary controls, all of which can be programmed to control facilities such as a workstation's level and EQ. For more information, contact Audiomation, Inc., 30 Main Street, Ashland, MA 01721. Tel: 508-881-7903. Circle EQ free lit. #124.



HAVE A VISION

CyberSound VS is the first professional-quality, software-only MIDI synthesizer for the Mac developed by InVision Interactive. CyberSound VS, which is compatible with most Macs, ships with over 500 sounds, and includes built-in digital effects and an integrated sequencer. No hardware other than the computer is needed, and it is fully MIDI compatible. CyberSound VS can be used with any MIDI keyboard, synthesizer, or sequencer for composition, scoring, and recording, and it also features CyberPlayer, a 16-track MIDI recorder/player. For advanced sequencing applications, CyberSound VS is OMS- and FreeMIDI-compatible; it also supports MIDI Manager, Sound Manager, and QuickTime. For more information, contact InVision, 2445 Faber Place, Suite 102, Palo Alto, CA 94303-3316. Tel: 415-812-7380. Circle EQ free lit. #125.



Rembrandt



The New Masterpiece from Amek

Head Office, Factory & Sales:
AMEK Systems & Controls Ltd
Tel: 0161 834 6747
Fax: 0161 834 0593

In the USA:
AMEK US Operations, Inc.
Tel: 818 508 9788
Fax: 818 508 8619

In Germany:
Mega Audio GmbH
Tel: 06721 2636
Fax: 06721 13537

In Singapore:
AMEK Systems & Controls Asia
Tel: 65 251 1629
Fax: 65 251 1297

CIRCLE 03 ON FREE INFO CARD

24x4x2...SWEPT MIDS...PFL/AFL...6 AUX NOW SHIPPING: MACKIE'S SR24•4, THE

GREG MACKIE DID IT AGAIN... The new 4-bus SR24•4 is the first live sound console with the **high headroom**, low noise and superb sound quality that have established our 8•Bus console series as an industry standard.

That's because the SR24•4 is a **direct descendent** of the 8•Bus and is equipped with many of the same features, components and circuitry.

Through **economies** of materials and manufacturing processes, we're able to offer the SR24•4 at an astonishingly **low price**.

Call us toll-free for full information. Better yet, visit your nearest Mackie dealer. The SR24•4 is in stock right now.

VLZ (Very Low Impedance) circuit design developed for our 8•Bus consoles reduces noise and crosstalk at critical points in the SR24•4's signal path.

CHANNELS 1-20 are mono with 3-band EQ, 1/4" TRS balanced line inputs and Mackie's renowned, high-headroom, low-noise mic preamps.

SWEEPABLE MID EQ from 100Hz to 8kHz. 1.5 times wider bandwidth than other consoles for more musical equalization. 15dB boost/cut.

-20 SIGNAL PRESENT LED on every channel.

80Hz LO SHELVE EQ. Even at ± 15 dB, it doesn't interfere with mid EQ the way many shelf EQs do.

New-design **60MM FADERS** with the same precision, log-taper as our 8•Bus consoles give you more useful control range than cheaper, D-taper faders. SR24•4 faders use a recently-developed, long-wearing wiper contact material first employed in sophisticated automotive sensors. You'll get longer fader life and improved resistance to solid and liquid contaminants that inevitably get into live sound boards.

SOLO/MUTE LED on every channel (plus our mondo master rude solo LED over in the master section).

HI SHELVE EQ with 15dB boost/cut at 12kHz. Designed with the same circuitry as our 8•Bus Hi EQ, it won't interfere with mid EQ.

LOW CUT FILTER with 18dB/octave roll-off at 75Hz just like on our 8•Bus console. Gets rid of room rumble, wind noise and mic thumps — which can save amp power, too. Also allows you to safely use Lo EQ on vocals — the audible bass range is boosted but the unwanted frequencies below 75Hz (like microphone handling noise) are chopped off. Also very useful for miking during studio recording.

INSERTS on every mono channel and subs as well as main L/R outputs.

The **MOST COMPACT 24-CHANNEL** live sound console ever!

At 30.75" wide, the SR24•4 takes up less space than most 16-channel live sound boards, yet its controls are still spaced so that they're easy to use.

Mackie's renowned ultra-high headroom **MIC PREAMPS** on Channels 1 through 20. -129.5 dBm E.I.N., ultra-wide bandwidth and 0.005% distortion. The same Mackie mic preamps top artists and groups are using to track their current albums.

Not shown but definitely there: The usual Mackie **INTERNAL FEATURES** like impact resistant, double-thru-hole-plated fiberglass circuit boards, sealed rotary controls, gold-plated interconnects, RFI rejection, electronic protection and ultra-high headroom mix amp architecture.

SENDS...8-BUS SOUND QUALITY...\$1599* MSRP. BEST LIVE SOUND CONSOLE VALUE EVER!

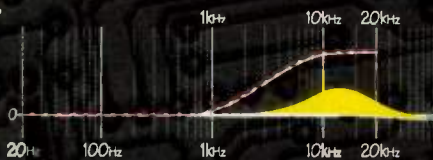
CHANNELS 21-24 are stereo line input channels with Hi & LO shelving EQ plus 2 peaking Mid bands.

6 MONO AUX SENDS per channel, ALL accessible at any time. Aux 1 & 2 are pre-fader; 3 & 4 are switchable pre/post; 5 & 6 are post-fader.

Balanced 1/4" TRS OUTPUTS. PHANTOM POWER switch.

Balanced XLR MAIN OUTPUTS with +28dB capability.

FACTORY "AIR" on each submaster! A unique peaking equalization circuit for enhancing guitars, vocals, drums — and sound reinforcement speaker systems themselves. Centered at 16K, AIR applies a gentle boost to the extreme high end without affecting lower treble octaves like HI shelving EQ does (red line). You've gotta hear AIR to believe the "hi fi" effect it has on PA systems, with horns and compression drivers.



SUBMASTER FADERS have Pan controls, L/R Assign & Solo switches.

drives two stereo Phone outputs and Control Room output on rear panel. Switch can route stereo Tape Return to Phones/Control Room for monitoring 2-track recording.

PHONES/CONTROL ROOM level control

AUX SEND MASTER level controls with Solo switches.

BNC Lamp socket.

3-WAY METERING shows internal operating levels

of main L/R, solo (channel, bus, Aux send or Aux return) or stereo tape return. -40 to +28 range with marking for easy, accurate level setting via solo.

PFL or SOLO IN PLACE. Globally switchable Pre Fade Listen (for checking a signal at full level before fader or pan) or stereo Solo In Place/AFL (after ch. fader, EQ & pan).

TALKBACK section with separate rear XLR input (so you don't tie up a channel), level control & assign buttons to send Talkback to main mix or to Aux 1 & 2 for stage monitors.

TAPE RETURN TO MAIN MIX not only routes Tape Returns to Main L/R outputs but also disables all other inputs to the mains. This feature enables you to play a tape or compact disc during intermission without losing channel and submaster settings.

BALANCED INPUTS & OUTPUTS. Important, but really hard to point to with a yellow arrow.

Bal. "DOUBLE-BUSSED" SUB OUTS let you feed an 8-track recorder without repatching.

HEADPHONE OUTPUTS on the back so that headphone cords can't snag faders.

Bal. **STEREO AUX RETURNS** also feed Aux Sends 1 & 2 via separate controls so you can return delay or reverb to stage monitors.

Balanced **MONO MAIN OUT** with separate output level control.

AUX RETURN 4 can be assigned to main L/R, Submasters 1 & 2 or Submasters 3 & 4.

HOW DID WE DO IT? There is no "catch." The SR24*4 is built without compromise and features solid steel main chassis, sealed rotary controls and our famous impact-resistant horizontal circuit board design. We've drop-tested, drop-kicked and "beta-tested" the SR24*4 with local grunge-thrash bands for months before release. This is one tough mixer.

***THE USUAL FINE PRINT.**

Price is U.S. Suggested Retail only. Slightly higher in Canada.

COME SEE US AT NAMM BOOTH #2792
MACKIE

The Wheel Thing

Asleep at the Wheel's
Ray Benson
stays up late working in at
Bismieux — his
Austin, Texas-based
project studio

STUDIO NAME: Bismieux Studio

LOCATION: Austin, TX

KEY CREW: Ray Benson (owner); Frank Campbell (studio manager/engineer); Larry Seyer, David Gratz, and Allen Crider (engineers).

PROJECTS RECORDED: *Asleep at the Wheel, Tribute to the Music of Bob Wills, Wheel Keeps On Rollin, 3 CD Box Set*; Wylie and the Wild West, Don Walser *Rolling Stone From Texas*; Sue Foley *Without a Warning*; Various Jingles (Levis, Franklin Federal Bank)

CREDITS: Owner Ray Benson of *Asleep at the Wheel* is a six-time Grammy winner and Larry Seyer is a five-time Grammy winner. Ray, Larry, and Frank have worked as a team on many commercials such as Levis Jeans, McDonald's, Southwestern Bell, and Franklin Federal Bank. Ray has produced and scored films such as *Liars Moon, Never Leave Nevada*, and *Wild Texas Wind*. Ray has also produced numerous *Asleep at the Wheel* albums including *Route 66, Live & Kickin', Keepin' me up Nights*, and so on. He also produced the Aaron Neville/Rob Wasserman cut "Stardust" from *Duets*, and the Bruce Hornsby/Willie Nelson duet "Nobody There But Me," from *Island in the Sea*.

CONSOLE: 40-channel D&R Triton with Audiomation automation system

MONITORS: Genelec 1038A and 1031A;

Yamaha NS-10

AMPLIFIER: McIntosh

COMPUTER: Macintosh Quadra with Audiomation automation software

RECORDERS: Alesis ADAT with BRC [6]; TASCAM ATR 80 with 24 tracks Dolby SR; Panasonic DAT SV3700; Marantz 610 CDR; 3M 79 16-track recorders [2]; Philips 5022 Converter.

OUTBOARD GEAR: Mic Pre's — custom Balz/RCA [8], Summit [4], Trident [2], Geoffrey Daking & Co. [2], Jensen [2], Sontec [2], Neve 1066 [2], Neve 1272 [2], and API [8]; EQ's — Sontec, Sontec/Massenburg, Neve, Geoffrey Daking & Co., Trident, API, and Pultec; Compressors — Teletronix, Tubetech, Altec, Urei, Ashly, and dbx; Reverbs — EMT 251, Lexicon PCM 70 and PCM 80, Klark-Teknik DN-780, Alesis Q2 [3], and Yamaha SPX 90

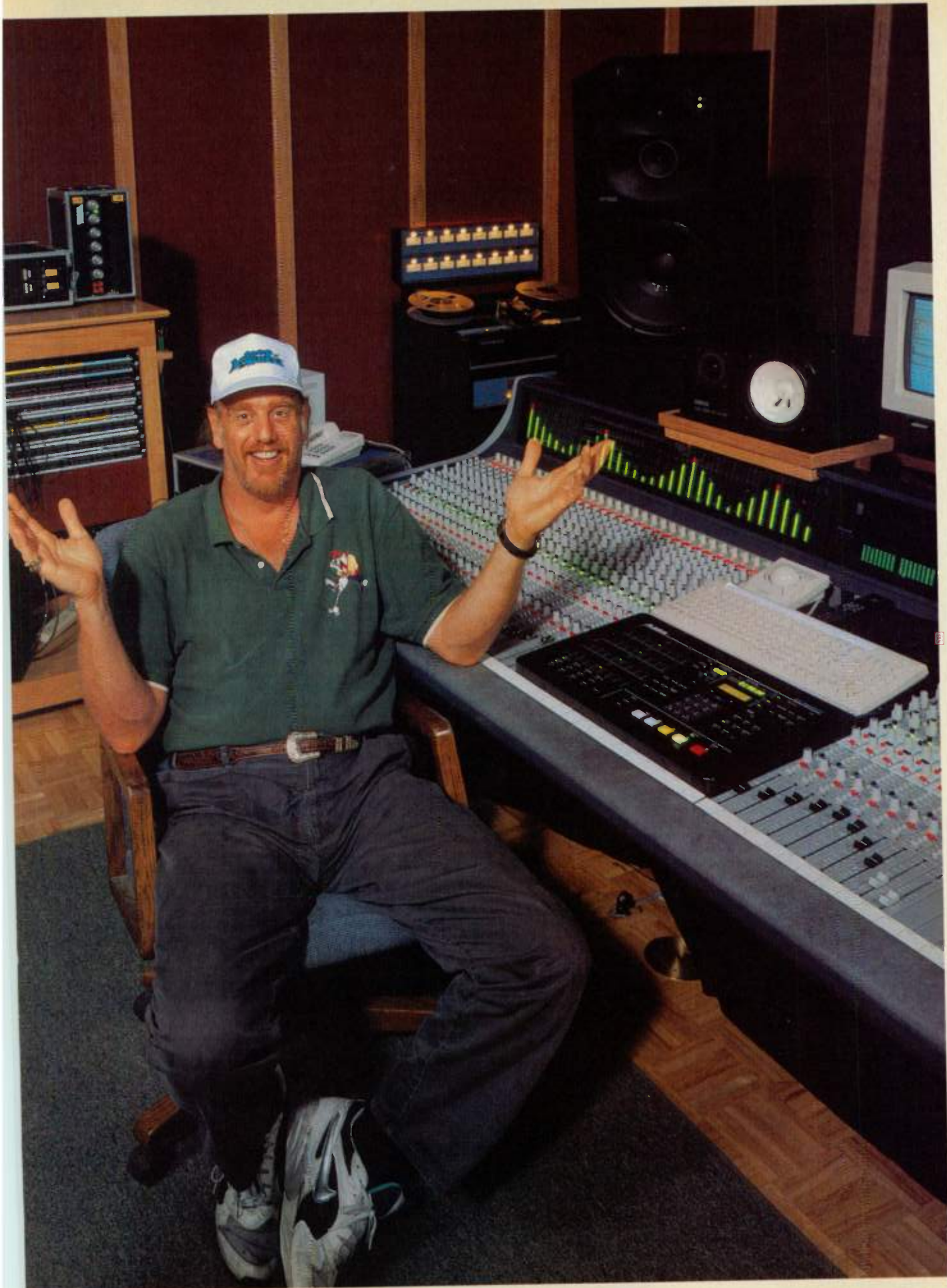
MICROPHONES: Neumann U47, KM64, and KM54 [2]; AMS Soundfield; AKG C24, 414, and 451; Electro-Voice RE-2000 and RE-20; Sennheiser 421; Shure SM57 [6].

STUDIO NOTES: Studio manager Frank Campbell states: Bismieux Studio started out as a garage. We brought the ceiling up and attached some iso booths. It now features a 23' x 27' control room. The cutting room is 23' x 31' with additional iso rooms. The control room has a 20-foot, 2-hole, putting green to keep the producer occupied. The golf course is in the back of the room on a raised platform so that no noise bugs the engineer. Get 18 in a row and you get free studio time.

EQUIPMENT NOTES: Campbell continues: We bought the D&R console about a year ago because of its quietness and D&R's service. Sonically, it is a good console. We retrofitted an Audiomation automation system (Mac based MIDI system) that reads quarters of frames.

We own six Alesis ADATs. We are about to get the XT. We are also an authorized ADAT repair center. We've also got a TASCAM 24-track 2-inch and the 3M 79. We record directly to ADAT. The ADATs have been hot-rodded with Burr Brown op amps on the input and output, giving us the sound we want.





Altec 633A

Add some flavor to your recordings with this salt-shaker mic

MICROPHONE NAME: Altec 633A

PRICE: Around \$75 (1962)

FROM THE COLLECTION OF: Tom Grimley

TYPE OF MIC: Moving coil dynamic

POLAR PATTERN: Omnidirectional (see notes below)

FREQUENCY RESPONSE: 35 Hz–12 kHz

SENSITIVITY: -55 dBm, re: 10 dynes/square cm

RATED SOURCE IMPEDANCE: 30 or 50 ohms

POWER OUTPUT LEVEL: -59 dBm, 0 calibration re: 1 milliwatt, 10 dynes/square cm.

DIMENSIONS: Length: 3 1/2 inches; diameter: 2 inches

WEIGHT: 16 ounces

MIC NOTES: The Altec 633A is more famously known as the “salt-shaker” microphone (think about filling it up from the bottom). Although records of its lifespan are sketchy, it was manufactured from at least 1956 through 1969. Although the microphone has a nondirectional characteristic, the polar pattern can be modified by adding a baffle sleeve that fits over the front of the mic (supplied as an accessory, part number 8B). The 633A was also available from Altec as part of the MA Series Microphone Assemblies with metal desk stands, and a push-to-talk switch as might be used in a dispatch office.

USER TIPS: Owner Tom Grimley states: I mainly use this mic for vocals and inside of the kick drum. For the kick drum, I don't put any effects on it — I go straight to tape. With vocals, I might compress it for an effect — especially if someone wants their vocals screwy.

It has a real honky sound. Very midrangey. I have to crank it a lot to get it to tape, but it sounds really good in the kick. Because the midrange is so good, it gets the kick drum snap. But even then, I'll use it only in combination with another mic placed about a foot back.

EQ



Photo by Edward Colver



The Soundcraft DC2020 -because not all EQs are equal.



Whether working in post-production or music recording, you are judged by the sound of your finished product - however diverse and whatever the quality of the source material.



With outstanding new EQ design, Soundcraft's DC2020 delivers an unrivalled degree of control - invaluable when assembling audio from more than

one source. Add to that moving fader automation, touchscreen driven machine control,

video sync, plus on-board hard disk storage, and the argument for choosing DC2020 becomes irresistible.

Discover more about the DC2020 by calling 818 893 4351 today.



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SOUNDCRAFT, PO BOX 2200, 8500 BALBOA BLVD, NORTHRIDGE, CA 91329. TEL: 818 893 4351, FAX: 818-830-1220



A Harman International Company



CIRCLE 27 ON FREE INFO CARD

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the Alesis ADAT
changed the way
you think about recording**

Think Again



How do you improve on the most successful professional multitrack tape recorder of all time? Listen to your customers. Do some heavy thinking, and...

Make the transport four times faster and put it under constant software control. Incorporate advanced onboard digital editing with track copy, auto punch, track delay, tape offset, 10-point autolocator, rehearse mode and more. Use the latest oversampling converters for the ultimate in digital audio quality. Design a beautiful vacuum fluorescent display



that provides all the critical information. Wrap all this well-thought-out technology in an utterly professional six-pound solid die-cast aluminum chassis. Of course, make it 100% compatible with over 70,000 ADATs already in use worldwide.

Introducing the new, definitely improved **ADAT-XT[®] 8 Track Digital Audio Recorder**. Consider it a think tank for your

creativity. See your Alesis dealer. Don't think twice.

adat xt



*4 Times Faster
Intelligent Transport
Onboard Digital Editor
Onboard Autolocator*

For more information on the ADAT-XT, visit your Authorized Alesis Dealer or call 1-800-841-2272.
The Alesis ADAT-XT has the advantages of the most advanced digital multi-track recorder as well as
the advantages of compatible products from and for the Alesis Group.

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Alesis Corporation 3630 Holdrege Avenue Los Angeles, CA 90016 310-841-2272 alescorp@alesis1.usa.com

ALESIS

CIRCLE 02 ON FREE INFO CARD

COME SEE US AT NAMM BOOTH #3735

Z-Systems z-q1 Digital EQ

Z Systems' digital EQ can distinctively shape your sounds

BY STEVE LA CERRA

Z-Systems is a company that is probably most well-known for its sample-rate converters, but that is about to change with the introduction of the z-q1 (a.k.a. "the z-qualizer"). The z-q1 is a 2-channel, 4-band parametric digital equalizer that, while intended primarily for mastering use, will surely find its way into the recording studio. In spite of the fact that the unit has a minimum of front-panel controls, Z-Sys has somehow made navigating through the functions of the z-q1 a breeze.

The first thing that you notice about the z-q1 is that there are no analog inputs or outputs. You must have other means of getting your audio into the digital domain such as a ProTools system or some sort of outboard A/D converter. Of course, you could also use the A/D built into your DAT deck provided the deck has AES/EBU I/O. In addition to the balanced AES/EBU ports on the rear, the z-q1 also has a balanced XLR input for SMPTE/EBU timecode (more on that later) and a pair of DB9 connectors for RS232 or RS422 connection. Z-Sys has done its best to make the z-q1 behave like an analog EQ, which means you can adjust parameters in real time without glitches or popping noises. But unlike

traditional EQs, the z-q1 has 80 memory registers for user-defined curves.

The front-panel controls help the z-qualizer behave like an analog EQ. A button labeled "mode/esc" toggles the unit between system parameter and EQ modes. In EQ mode, the three front-panel knobs control boost/cut, center frequency, and bandwidth with an LED display above each knob indicating current values. With the boost/cut knob set to 0.0 dB, the filter is digitally bypassed. All four parametric filters are controlled by these knobs and the user selects which to access with a set of filter select buttons. There are actually six of these — one for each band plus two more for the high- and low-shelving filters (when accessing the latter, the bandwidth control is inactive). Each has a corresponding LED to indicate which filter is currently active and parameters of the active filter are shown in the LED displays. After you have selected a filter, simply turning the knobs on the front panel modifies the parameters of that filter. In stereo-link mode, moving the knobs will affect both channels. In dual-mono mode, a button toggles between the left and right channels, indicated by two LEDs labeled "L" and "R" (both of these will be lit in stereo mode).

System Mode is used to set global parameters in the z-q1, including dual-mono or stereo operation, output word size, and overall system gain. While in this mode, the same knob that controlled boost/cut for the individual filters is used to set overall gain structure. This allows you to turn down the master gain so that you can EQ a particular band without clipping the audio. The center knob is now used to set output word size

and dither. The z-q1 can be set for a variety of output types including 24-bit, 20- and 16-bit dithered, or undithered and (optional) 16-bit encoded with Apogee's UV22 process, which allows 20-bit resolution with 16-bit storage. The last knob will select stereo or dual-mono operation, which function much as you would expect, but if the unit is changed from dual-mono to stereo during an EQ session, the active-channel settings are copied to the other channel.

Of course, this kind of EQing flexibility is best served in a unit that can actually remember your settings, so the z-q1 can store 80 user-defined EQ curves (Z-Sys has reserved preset 00 for a default/bypass state). But the z-q1 can go beyond just loading and storing your curves. You can load curves to an A register and a B register, and then instantly toggle between the two for A/B comparison (try that with an analog EQ). And a snapshot automation package is available consisting of an internal SMPTE/EBU timecode reader and Z-Systems' z-q1 Manager for Mac or Windows. The software allows you to define, edit, store, and recall "sessions" consisting of up to 80 timecode points and associated EQ curves, and later download them to the z-q1 via RS422/232 ports for snapshot automation. Z-Sys expects to start shipping the z-qualizer at the beginning of 1996 at an MSRP of \$3800 for the standard unit and \$4800 with the timecode option its \$4800. The UV22 option is available with either version for an additional \$900. **EQ**

For more information, contact Z-Systems, 4641-F N.W. 6th St., Gainesville, FL 32609. Tel: 904-371-0990. Circle EQ free lit. #126.



START SAVING: The Z Systems z-q1 may be pricey, but offers a flexibility that is mighty attractive for a project studio owner.

TANNOY®

Get Real



PBM II

For more than three-quarters of a century, Tannoy has been designing and producing loudspeaker systems and components to meet the demands of the world's most demanding user. A philosophy of constant research and investment in state of the art materials, technology and processes enables Tannoy to ensure that every monitoring system we produce will re-produce absolute fidelity to the source, true dynamic capability, and most importantly, real world accuracy. This is why Tannoy systems are used in more of the world's professional facilities than any other brand.

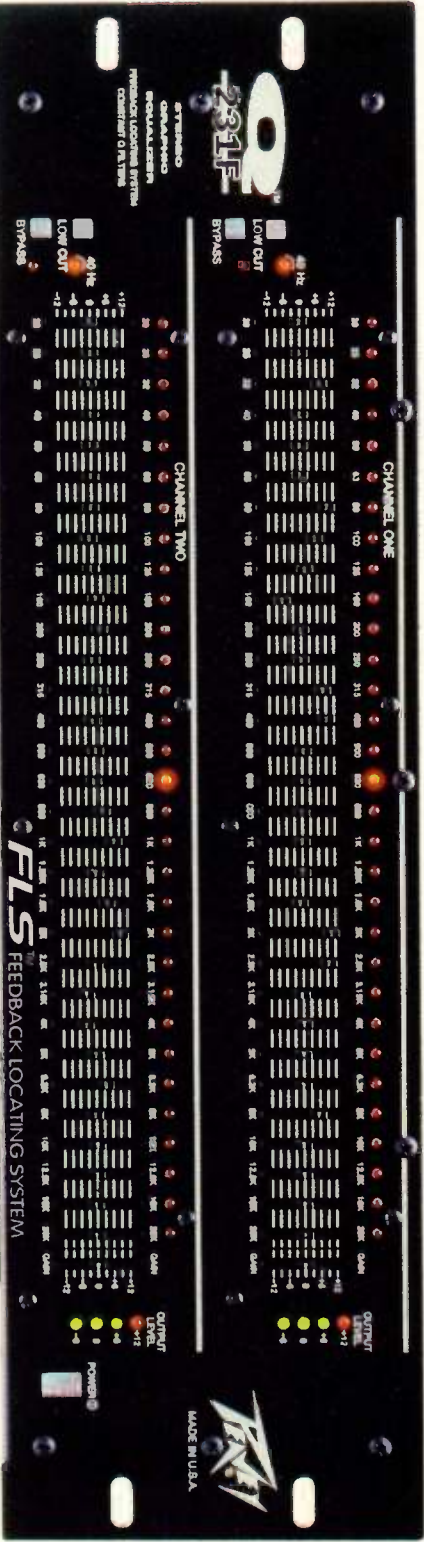
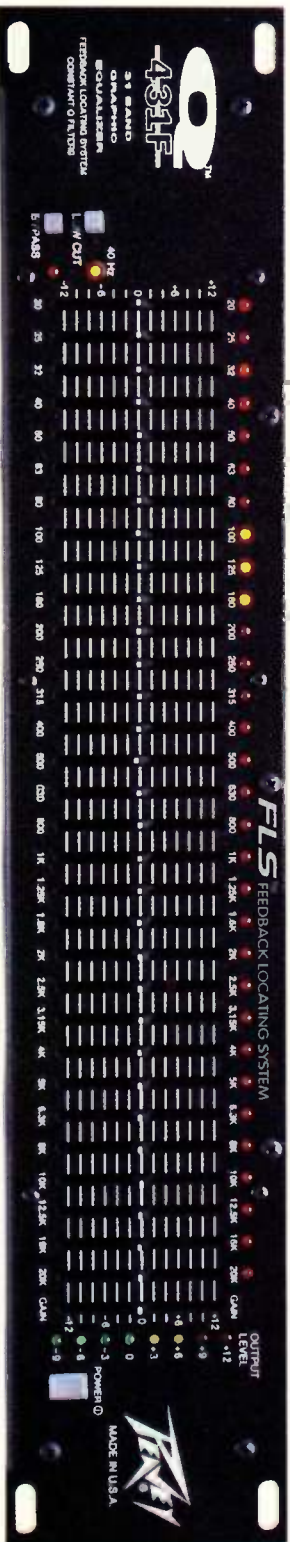
In the North American marketplace, Tannoy has been the number one monitor of choice for several years according to the Billboard's international recording and equipment statistics. This clearly illustrates why Tannoy enjoys its reputation as the world's leading manufacturer of reference loudspeakers. In fact, **leading the market is what Tannoy is all about.** While other multi-faceted manufacturers, not dedicated solely to the

art of reference monitor loudspeakers, scurry to produce products to compete with Tannoy's original highly acclaimed and award-winning PBM series, **Tannoy moves on.**

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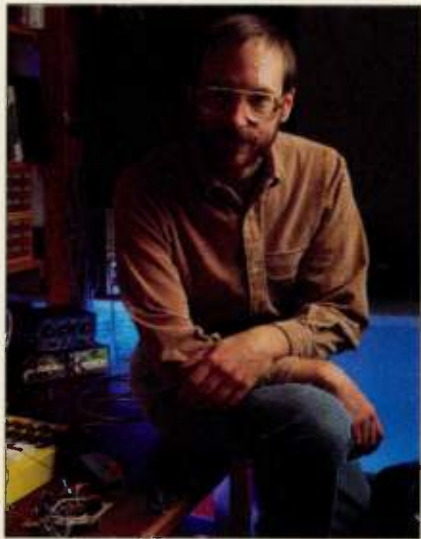
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CIRCLE 35 ON FREE INFO CARD

Top 12 Studio Construction Tips



A dozen do's on building your project studio right the first time

BY CRAIG ANDERTON

My friend and occasional musical collaborator, Spencer Brewer, is sane in most respects except that he decided to build a studio. He was tired of the compromises and costs involved in going to commercial facilities, and after having several albums make the top 10 on the "adult contemporary" charts, he decided it was time to take control over his own recording destiny.

Unlike many potential studio-philosophers, though, he spent the bucks to hire a professional studio designer—Dan Ryman, who had done several great-sounding rooms around California and is also a well-known sound designer/musician (e.g., the movie *The Color Purple*) and concert mixer, including B.B. King, Pointer Sisters, Van Morrison, and Eddie Rabbit.

After visiting Laughing Coyote studios (located about 2.5 hours north of San Francisco in Redwood Valley), I

was pretty impressed with the level of quality they had managed to obtain on a moderate budget. So, I twisted their arms and asked them to write up a dozen tips on things a potential studio constructor should do to ensure a good-sounding room; here they are.

1. Lotsa Glue Is Good For You: Using glue on every surface decreases the amount of sound bleeding through the construction materials and ensures that the surfaces will never squeak. Use the highest grade of "tube-squeezed" panel adhesive you can buy (preferably MD200 or 400 series glue). In building 1200 sq. ft. with 14-foot ceilings and four separate rooms, they used close to 78 cases.

Another 60 cases of clear silicone provided sealant between every wall, joist, rafter, floor, window, door, and

so on. Caulk all the joists first with a gun, then put on rubber gloves and spread the caulk in all surfaces that connect with the joists. It's major work, but remember — if air or water could get through, so can sound.

Finally, 30 cases of expanding foam were used to go into any spaces that were too large for caulk. Check out the different brands before you buy lots of cases; some work better than others. Do not get this on your hands or clothes when it's wet, because it will not come off!

2. Get In Touch With Your Inner Wall: Cut 4-inch solid rigid foam to size and place it between every joist; caulk between the foam and the joists. Then, going from the outside of the wall inward, you have several layers (fig. 1): 1/2-inch sheetrock, 1/2-inch soundboard (a very dense wood that's

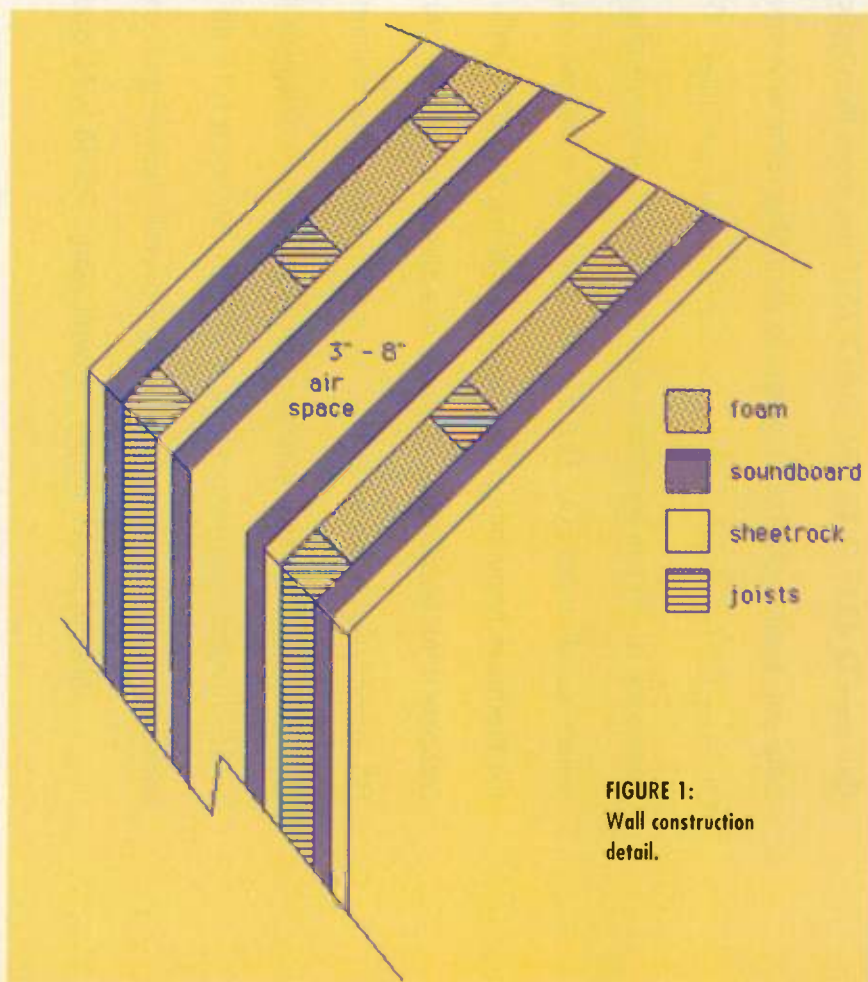


FIGURE 1:
Wall construction detail.

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made out of pressed sawdust and glue), the joist/foam combination, 1/2-inch sheetrock, then 1/2-inch soundboard. All these sheets get screwed into the joists.

Leave a 3-8-inch air gap, then add another mirror image "sandwich" (in other words, the layers go in the following order from air gap to wall surface: soundboard, sheetrock, joist/foam, soundboard, and sheetrock). The wall will end up around 16-26 inches thick, depending on whether you use 2 x 4-inch or 2 x 6-inch joists, and how much dead air space you have in the walls. This is one of the least expensive ways to add dead space in walls; more expensive methods put sand in between the air space, or other exotic approaches.

3. Don't Blow A Gasket, Use Torchdown: To further minimize leakage, use rubber Torchdown (other names are Dibitin or Meltdown) as a gasket for all the joists that are either touching the floor, an adjoining wall, or the ceiling. This is very dense rubber that is typically used on roofs (it's available at roofing supply houses)

and costs about \$60 a roll. Glue the rubber on the wood first with the construction caulk gun because nails or tacks transfer sound into the wood.

4. Don't Be A Square: You don't want a square room, since this encourages standing waves that mess with your sound. Factor in a 2-to 3-1/2-inch lean from floor to ceiling (in other words, the top leans outward compared to the bottom) so that sound traveling across the room hits the reflective surface, then bounces up and dissipates in the ceiling texturing.

5. Double Your Pleasure, Double Your Glass: When building a see-through drum booth or isolation room, use two sliding glass doors separated by a dead-air space of 4-18 inches. Hard, composite plastic-sliding door systems resist sound migration better than metal. Since you'll end up with four panes of glass, don't use the normal tempered glass that is used in almost all sliding-glass doors. Request clear glass, or your vision between rooms will be slightly "fuzzy" due to the layering of the glass.

6. A Kinder, Gentler Surface: The

surfacing on the walls is very important. Most project studios (and even some commercial ones) cover the walls with foam, curtains, egg cartons, etc. Using soft woods (pine, cedar, some kinds of birch, or, for your most expensive option, spruce) at strategic locations for texturing provides a more sonically balanced room. You can't just throw up wood anywhere; you need to decide the type of balance you want between more reflective and more absorptive surfaces. This is where a professional's viewpoint is essential. These wood accents are also visually pleasing, and bring warmth to the space.

7. Go With The (Air) Flow: One problem all studios face is the sound of air flow (from air conditioning or heating) into the rooms. A regular home air conditioning/heating unit will do unless you have a really huge amount of floor space; the trick is to use industrial-size ducting. A normal duct is 8-10 inches in diameter. With 20-24-inch ducts, the air "falls" out of the vents instead of being pushed out, which reduces noise dramatically.

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Never split duct lines. Each line needs a clean line of travel back to the main unit, or bleed between rooms will occur. Also make sure the inner walls of the ducting have wool surfacing on them. If you're really a fanatic, wrap all your finished ducts with dense insulation for an extra quietness. Laughing Coyote ended up with seven vents and two intake vents over four rooms; the entire cost was roughly \$4000 for heat and air conditioning. Finally, do not use vents that close outward. Almost all of the ducts you have should either be clear (no adjustments) or close inward so they block any air coming in. Otherwise the interaction between outgoing and incoming air can give a wheezing sound.

8. You Got Me Floating (And I'm Floored): A floating floor is just that. Begin with a concrete slab (Spencer and Dan started with a 14 x 22-foot concrete slab in the main room). Next, buy a bunch of 3 x 3-inch rubber cushions with air holes in them, which are about 1-1/2 inches thick and available for around 10 cents each at flooring supply houses. Staple these to the bottom of 3/4-inch plywood, about a foot apart. Then lay the plywood on the concrete with the rubber surfaces face down (make sure you leave around a 1/2-to-1-inch gap between the flooring and the walls).

Next, lay down 3/4-inch particle board or chipboard in cross-end patterns (in other words, if the plywood layer goes north-south, the particle board layer on top of it should go east-west). You have not used any nails, screws, or glue up to this point. Finally, put 3/4-inch tongue and groove oak flooring on top of this using wood glue and an explosive flooring nail gun (which shoots 2-to 2-1/4-inch staples) into all three components. This flooring should also be in a cross pattern compared to the next layer down. The staples will travel through the various woods without connecting with the concrete. This results in a floor that floats above the concrete, which isolates sounds bouncing off it from the concrete.

For those who can't afford the \$3-\$4.50 a square foot for the flooring, there's another option. All large wholesale flooring companies sell what are called "shorts." These are the mill ends that are left over from red or

continued on page 132

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Ring in the Old

Denis Degher records modern music using some time honored — and honed — techniques

BY MICHAEL GELFAND

Over the last fifteen years Denis Degher has made the transition that many project studio owners are currently experiencing — building a creative private studio into a full-blown, hot commercial facility. And, as a lesson to those of us still sweating away in our spare bedrooms, he did it based on creative, engineering talent, not on mega-console investment.

Fortunately, the musical trends were working in favor of an engineer who emphasized technique, rather than high technology. “Since grunge came into style, everyone’s been going for a more retro sound,” Degher says. “It’s a late ’70s sound, like the Eagles, where the drums are right in your face, the guitars and vocals are dry, and everything is just right there. That’s my goal — to make everything as clean and punchy as possible.”

Degher’s has built his reputation on getting straightforward sounds to tape. His resume includes work with Corrosion of Conformity, The Pharcyde, and Joshua Kadison, as well as soundtracks to *The Lion King*, *Picket Fences*, *L.A. Guns*, and *Partners*, so it’s not surprising to find that such a retro guy engineered and coproduced the debut record from ’90s-style alternative “supergroup” Thermador, which features players with industry-cache like Stone Gossard (Pearl Jam) and Chad Smith (Red Hot Chili Peppers).

“I think people are starting to realize that I get to the sounds I want very quickly,” he says. “There are a lot of people who are able to record synthesizers and drum machines, but there are very few who can really get a kick-ass drum sound or guitar sound — and get it fast — so that everyone can play without a lot of wasted time.”

So what’s the Thermador connection? “Initially, I did the demo that got David King and Rob Rule their deal for the band Rob Rule on Mercury Records,” says Degher. “They then called me up after their second record and told me about their idea for Thermador, and from there the project came together very quickly.” With Degher behind the console at Red Zone Studios, which he’s owned for nine years in Burbank, CA, Rule and King cut seven songs with Gossard and Smith back in May/June, and seven more with Josh Freese, who’s the drummer for the Vandals, and Chris

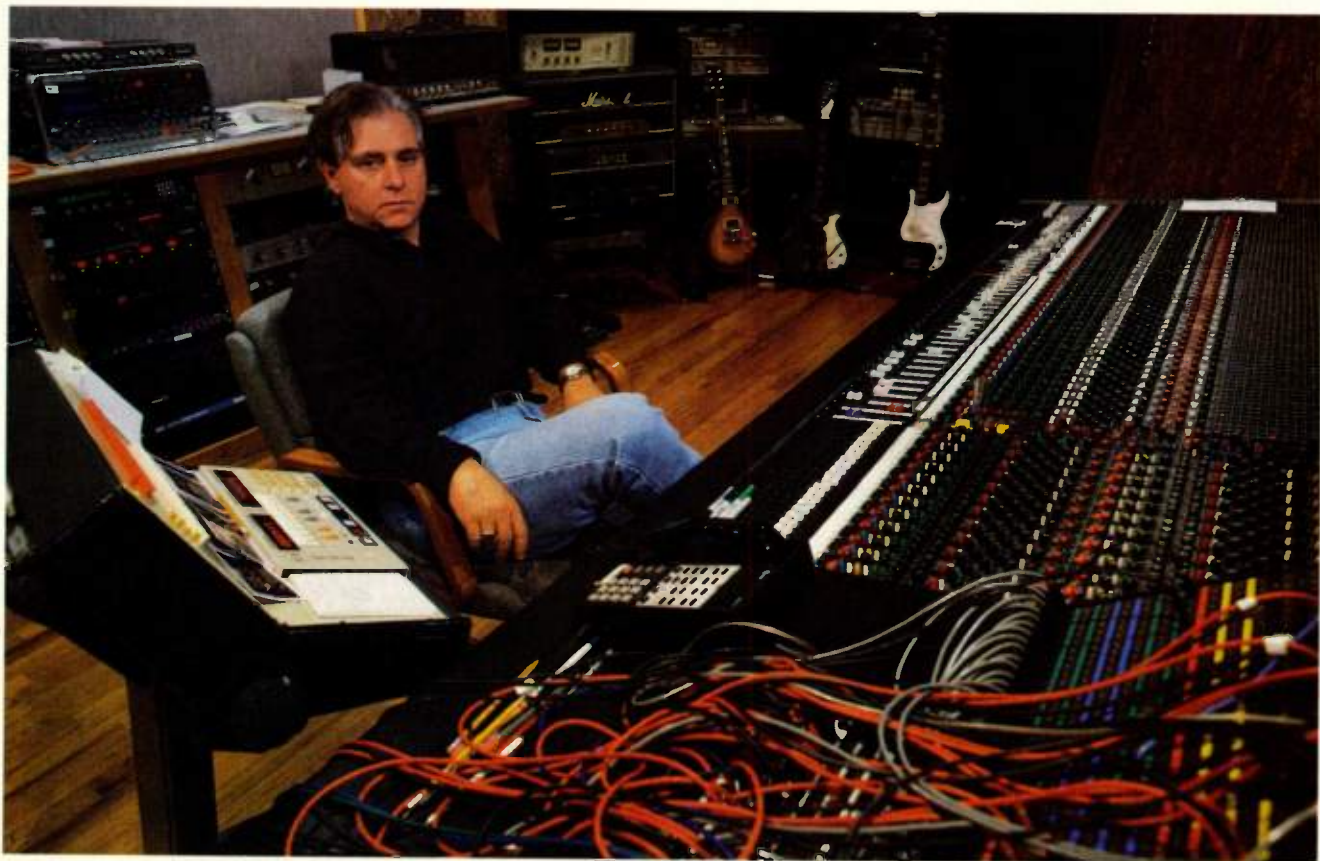


Photo by Edward Colver

IN THE RED: Red Zone Studios' proprietor Denis Degher records unconventional bands through conventional means.

We've Strengthened Our Cast

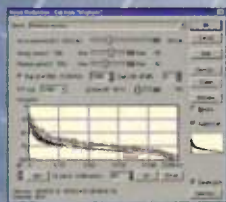
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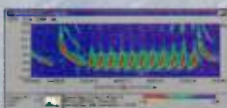
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TECHNIQUES RECORDING

"Wag" Wagner, who was a member of Mary's Danish with King, in late October. The record is presently slated for release in March on Automatic/Atlantic Records.

"For the Thermador sessions, I used a combination of ambient miking, various room mics, and some close-miking," says Degher. "Having worked in this genre before, I pretty much know what sound the player is looking for when I'm miking up their Marshall stack. I can go out in the room and work with the guitarist, for instance, trying different pickups or changing the axis of the mic in relation to the speaker depending on the type of sound we're looking for. Basically, I try to

function within the aegis of the band's sound to capture what they're doing."

DRUM BOOGIE

Although Degher himself is a guitarist, he has a special affinity for rock-solid drum sounds. "I typically go for a pretty heavy sound where the kick carries a lot of bottom end and still has some attack to it," he says. "I want the kick and the bass to really be the bottom end." According to Degher, that wasn't a problem with Smith. "Chad Smith's a big guy, and he really wails on the kit," he explains. "I chose to use a Shure SM57 on his snare for this reason. I don't like using condenser mics with really hard-hitting drummers. I've

NATURAL EFFECTS

Don't anticipate anything arena-sized when it comes to Thermador's final mixes. "They're pretty straightforward in terms of reverberation and techno-wizardry," says Degher. "There's not too much gimmickry. I go for a very organic and clean sound without a lot of effects. I use effects when it's necessary to create an effect, but as far as feeling obligated to add reverb to everything, the answer to that is no."

As you'd expect, most of the effects Degher employed came about in a natural way. "For most of this record, we either used a Neumann M49 or a Neumann U87. They're pretty similar once you get them processed, but on one song, we decided to use a Shure SM57.

"I was behind the console after recording the basic tracks, using the talkback mic to communicate with the band, and they really wanted to throw down a rough scratch vocal track just to capture the moment. So Rob Rule just picked up my mic and started singing. It came out cool enough at the time, so we kept it," recalls Degher. "A few days later, we came back to lay down the real vocal track with a U87, but the SM57 worked, and that's how it stayed."

Past-Forward

As owner of Red Zone Studios, Degher has happily witnessed a resurgence in the popularity of retro sounds, but he and his studio aren't strangers to ghosts from the past. Red Zone Studios was previously known as Kendun Recorders, which played host to a few memorable sessions in its time.

According to Degher, Quincy Jones virtually lived there for over two years, REO Speedwagon recorded *High Infidelity* there, and Marvin Gaye laid down "Sexual Healing" in Kendun. Other artists who recorded in the Tom Hidley-designed room include Chuck Mangione, Frank Zappa, Ringo Starr, and George Harrison, to name just a few.

"The building was empty for several years when we got here," recalls Degher. "I had done some sessions back in Kendun in 1980 when they had mastering suites over here, and when I decided I wanted to open up my own room, this location just happened to appear.

"The studio has a long history of being a comfortable place to record. The studio is large, as are the isolation areas, which are really important for recording live. In the last few years, I've really noticed a comeback of the live-tracking isolation, and it's been in the last couple of years where we've started to gain popularity again as a live tracking room. You can get four, ten, or eight musicians in there at the same time live."

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found that unless I really pad condensers down, they don't have the response that I'm looking for in a hard-hitting session."


Degher no longer mices the bottom of the snare drum, thanks to Red Zone's extremely live-sounding drum area. "In the late '70s and '80s, people started recording drums in deader areas. They relied more on digital reverb and tended to mic the bottom of the snare to get a little bit more of the strainer sound in there, but we don't have that problem in Red Zone at all. It's been my experience that you can only get so much level into the stereo mix bus, anyway. If a substantial portion of that is reverberation, then you're obviously adding less source signal."

A RUSTY GINSU

Degher's project studio roots are illustrated by his love of the razor blade — he quickly admits that he'd rather slice tape with a rusty Ginsu knife than use digital editing tools. "I'm still a tape cutter," he says proudly, "and I think it's equally as accurate as digital editing. If you know what you're doing, that is. New technology is a double-edged sword," he explains. "There's a lot to love, but it's easy to get shackled to it."

"The learning curve with new technology can really affect your creative level," he adds, "and I think we really have to be careful of feeling obligated to use these new toys that people are spending \$20,000 on."

His reluctance to exploit new technology stems from his earliest days in the studio. "The difference between the way a lot of people are becoming producers and engineers today versus when I started out is that there were mostly commercial studios back then," he says. "When you came in and worked as an apprentice or an assistant engineer, it made you really pay attention to what was going on."

"You had to learn miking technique and you came to realize what sounded good, but as we all know, that can be a subjective reality," he says. "People often say that if you accept the status quo, then there's no room for experimentation. However, it's like learning basic math before you go on to calculus: You learn the basics, know how to do things right, and then you branch out, assuming you have the creativity and the adaptability to move on." 

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SAMSON

Punk Out

Rhino's "Do-It-Yourself" series turns the spotlight on the early indies — and some tricky remastering problems

BY STEVE LA CERRA

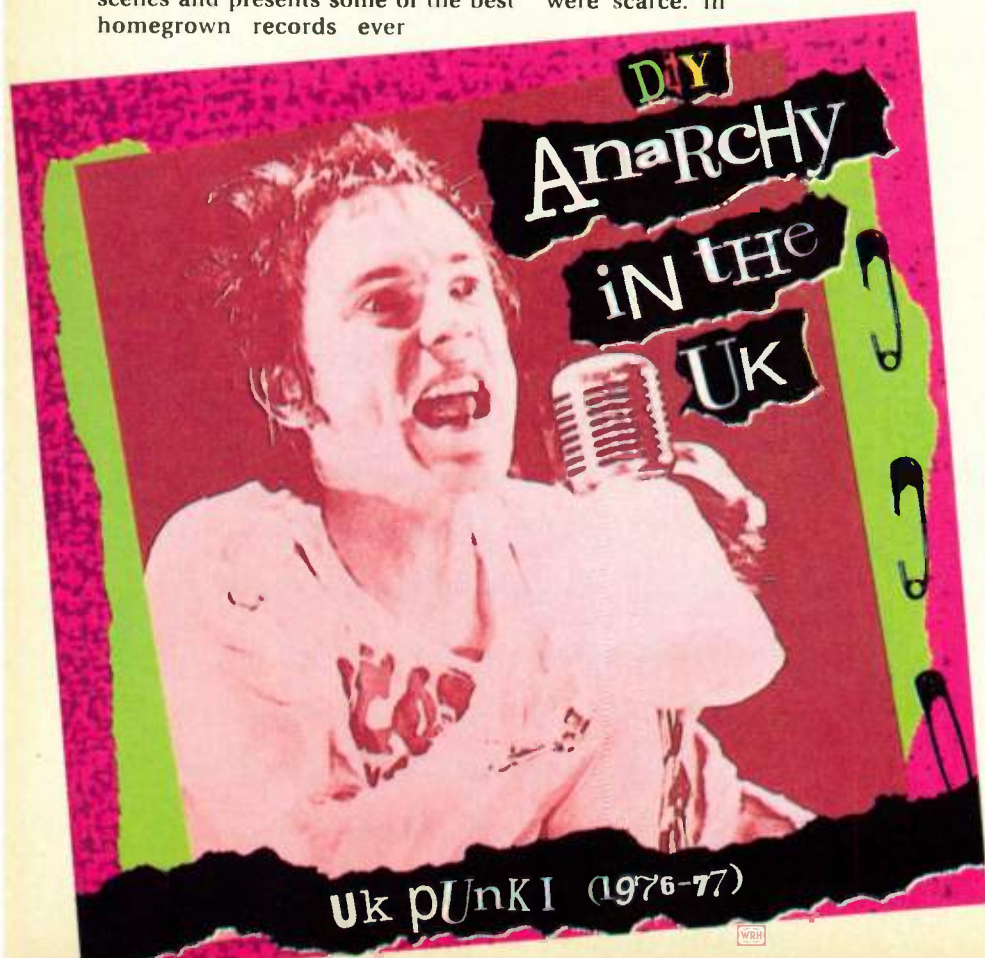
Over its 17-year history, Rhino Records has built a reputation for being a label that boldly goes where no label has gone before. Its nine-volume DIY (Do-It-Yourself) series is a sweeping overview of the punk, power pop, and new wave music scenes and presents some of the best homegrown records ever

produced. These recordings (spanning the period from 1976 through 1980) were born during a period when independent record labels were scarce. In

retaliation to corporate rock, disco, and metal, the industry was virtually redefined by a network of independent labels that paved the way for the commercial breakthrough of bands like The Police, The Pretenders, and The Go-Gos.

Bill Inglot is Rhino's director of mastering, and he explains how the DIY series got its start. "Like most Rhino ideas, it was one person's concept but everyone sort of reached the same idea at the same time. When you get into a series such as DIY, the choice of material becomes very subjective and gets coupled with our ability or inability to license certain tracks, which is always a problem. Artists have restrictions on their catalogs for one reason or another. Or the label may be planning a career retrospective from the artist so they might allow licensing of certain songs but not others planned for release on the anthology. That is why you have obvious holes in a series like DIY and we always hope that they are obvious. If you put out a folk series without Dylan, it's not because you didn't think of Dylan, it's because the material wasn't available for licensing."

As for artists that are no longer signed, Inglot notes that, "As you get more into modern times, the labels own the masters for a limited time and



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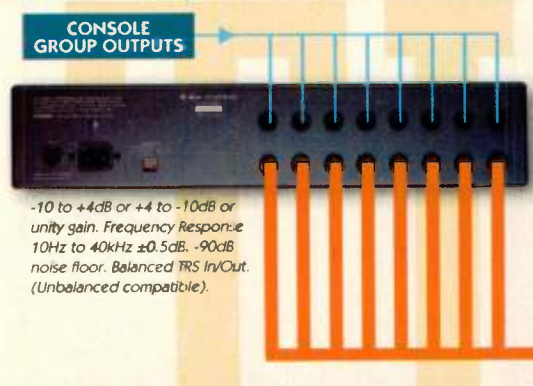
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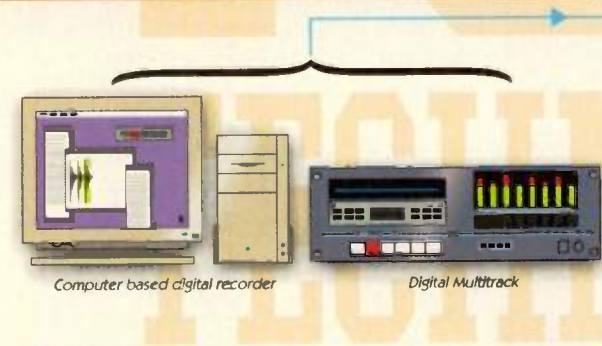
Digital is great isn't it? Superb quality and ultra clean. We've come to expect all this and more from today's sophisticated multitracks. However in amongst all this high fidelity there's often the feeling that there's something missing and as a result recordings can sound cold - sterile even. No longer. Now you can add all the warmth you need with the new TL Audio VI-1 Tube Interface. Ian Silvester from Digital Audio Technology, London agrees:

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TECHNIQUES REMASTERING

then the recording goes back to somebody — the artist or maybe a production company. Normally we are dealing with labels, but occasionally songs will revert back to the artist or to whomever represented the artist for that particular deal. It is often much easier to do the paperwork deal than it is to physically get your mastering source."

And locating that mastering source is paramount, says Inglot. "If we have a good source, most of the work is done. We deal with so many labels and so many tapes on a day-to-day basis that we see a lot of material where it doesn't belong. I wonder, 'What is this stuff doing here?' Meanwhile 15 reissues have come out on that artist."

"More than once we have had a project in development where we've had a whole artist's catalog sitting with us because we've been using it and suddenly two other packages pop out with the same material. It makes

me wonder what they used. They sure were not using the masters. The running joke at Rhino is that they bought five Rhino CDs to put their record out, and, unfortunately, that is not a joke. Transferring a song from one CD to another is not the way to go from a quality standpoint. There is a quality loss when copying in the digital chain. Digital tends to degrade in a different manner from analog but there is still a degradation."

Ultimately, Inglot's goal is to transfer every song for a compilation in real time, in sequence from the original master to a 3/4-inch U-Matic 1630 tape with equalization applied in the analog domain on the way. Inglot refers to a lot of material in the Rhino catalog as "absolute first-generation digital. The tape that was in our machine was the tape that went to the plant. There wasn't a clone for production. Sometimes it's frustrating

TALK ABOUT...PUNK MUSIC

Gary Stewart is the producer of the DIY series and his goal in assembling the compilation was to capture some of the excitement of the punk scene for the music history books. "Punk represents a very important part of my own life. I was living in LA at the time and I remember how exciting the scene was — to be experiencing these bands for the first time. Punk in America was more of a cultural reaction, sometimes almost forced and naive, but still very raw and pure."

While the Rhino series does in fact cover most of what was happening in the punk scene, there are some notable omissions such as The Clash, The Radio Dogs, and Talking Heads. Gary acknowledges this and explains that the reason certain bands were "left out" was due to licensing. In particular, The Clash and Talking Heads both have recording contract riders that forbid their appearance on compilation albums. "With others it was space, and with some I was conscious that I was being subjective; including records that were important to me but didn't really fit into many people's concept. I wanted to focus on a time when the music industry was truly alternative and underground, which in this country came in reaction to the disco culture, progressive, and heavy metal and the vapidness of AM radio. It was a reactionary music in the best sense. An essential part of the series' philosophy was to catch the feel of the first recording, not a later, more polished version. It was the spirit of spontaneity which was so important."

There are some bands represented in the series that fans of the UK punk music scene might feel are questionable inclusions. But, according to Stewart, bands such as the Yachts and The Records "had a fair amount of success here (the US) and meant far more than they may have in Britain." The reality is that if it were not for Rhino's DIY series, a lot of great songs might never have made it onto CD, and Stewart was well aware of that fact. "I was very conscious that this was the last chance for some of these records to be documented. DIY might not be the last punk compilation, but it will probably be the last one to go into such depth. If I didn't go for the obscurities, there might never be another collection which does."

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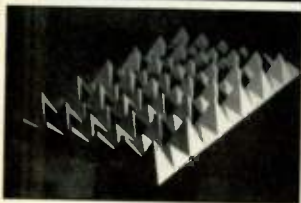
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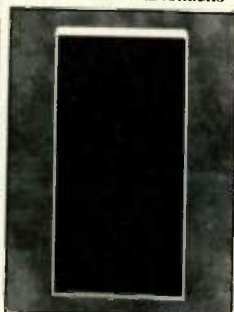
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DOLBY
TEENAGE KICKS



time. Once it has been decoded, it's over with."

TIME MARCHES ON

With the technological upheaval in the recording industry over the last ten years, some recording formats are already outdated. In particular, Inglot has found it difficult to locate Mitsubishi and 3M digital machines

because if the plant screws it up we have to start over again, which we have done. We are not sending them a clone but we do back ourselves up with simultaneous masters."

DOLBY DILEMMAS

If a label will not allow Rhino access to the original master tape, Inglot will request a transfer to analog 1/2-inch, 30 ips with no noise reduction. "I am probably one of the last people out there who actually asks for analog transfers, and I endeavor to supervise most of them because if a tape is transferred off-azimuth or with the wrong EQ characteristic or without the proper Dolby calibration, we are stuck with the result.

A lot of people don't realize that Dolby 301, the early version of Dolby A, has a different playback characteristic. Plus, you have a serious problem where a great many tapes are labeled 'Dolby' but aren't actually encoded. It is also not uncommon for one channel to be Dolby-encoded and the other not. That is why we always try to get the master tape. If someone has decoded it and it didn't need to be decoded or the calibration was off in the recording or playback process, you may have to elevate or decrease the Dolby level just to get a correct playback. When we do transfers from 'Dolby sources,' they are always transferred undecoded so that we can deal with it at the back end. I'll calibrate the machines and copy the Dolby tones so we have a reference. We use that reference to start working with what we think the Dolby level might be. We'll compare the tape with contemporaneous recordings to make sure that we are right. Dolby is frequency and program selective and level sensitive. It's working all the

on which to play some of these master tapes. "For all intents and purposes, Mitsubishi is a dead format. There is one digital format that is absolutely dead and that is the 3M format. There are no machines out there to play back those tapes, and when we run into that situation I always hope that someone made a copy to analog. It was quite a popular digital format for about a year, and a lot of labels have tapes in that format. I found one machine out here (Los Angeles) but they wouldn't let outside clients use it. The physical alignment is very critical and once the machine is up you pray. So the concept of a rental is laughable. It's ironic that the best sounding digital formats are the ones that are not around anymore. The Mitsubishi machine was musically a good sounding machine with a higher sample rate than other machines today. We put up some of those tapes and they sound great."

Problems with older tape formulations failing is no secret, and Rhino's mastering ace has a lot of experience in this area. "Somewhere around October 1973 (but not September!) you begin to find Ampex 406 (and later 456) having the shed problem. Basically you go out, buy a \$150 convection oven, put the tapes in the oven for about two hours at 130 degrees (F) and then use them. End of story.

"There is so much misinformation out there about baking tapes and tapes falling apart. I have been doing this for about 14 years and I have never had a tape 'crumble in my hands.' We do have an occasional problem where a leader sticks and it'll pull off a piece of oxide. In the '60s you had a sticking problem with acetate-based tape where there might be oxide damage on the inner wraps of the tape. You hope that there

continued on page 132

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Demo Queen Unplugged

The doting Daily
Demo Queen tries
to get a musical idea down
on tape in a powerless
project studio

BY C. REEDER

Basking in the rays of a warm Pacific sun, my light-depraved body floats blissfully on a raft being rocked by gentle surf. Contented, I am like a newborn babe safe in the arms of a loving mother. Friendly dolphins playfully surround me and tickle my toes until I spill over from laughter, and, with a joy that is fast approaching ecstasy, I glance toward a beach as white as new Montana snow.

My love is beckoning to me from our beach towel with a Rum Runner in each hand. Every nerve ending is tingling with excitement as I swim for shore, run to him, and, with our lips just inches away...*Crack, Crackle, Kaboom!*

I curse the thundering storm that is taking me away from my umbrella drinks and a languid beach on Bali, when one of the hundred flashes of lightning that electrifies the planet every second zaps my telephone. RING!!!! "Could this be God calling?"

Cradling the receiver, I reverently listen for divine instructions. Silence. God isn't on the line as far as I can tell, or at least not to chat about the weather. But maybe this is a heaven-sent thunder bolt after all, because now a creative spark of a musical idea is swimming around in my head with the dolphins in my fast-fading dream.

I throw off the covers I'm hiding under and stumble around in the dark, frantically fumbling for the flashlight I keep in the drawer next to my bed along with the scented candles, a dictionary, pencils, a cassette recorder, tarot cards, several rolls of undevel-

oped film from a recent trip, a screwdriver, my lucky rabbit, and a remote that would turn on the lights if the electricity was in the outlets instead of illuminating the sky and buffeting the ground around me.

I find the flashlight, but the batteries are dead, so I reach for the other drawer where I keep more essentials: a cigarette lighter, night cream, incense, the latest book I'm reading (which this week is *This Business Music* for the third time), manuscript paper, my photo album, and, of course, the batteries.

Light is no longer an issue, and I push the record button on my cassette recorder and sing my heart out only to discover on playback an older demo still on tape. I'd forgotten that I'd punched out the holes on the edges so I wouldn't accidentally record over what was then, but not at this moment, a genius idea that I didn't want to lose. I wander through the dark house to a drawer in the kitchen where I keep the Scotch tape (adhesive, not magnetic), which I will then use to cover the holes and record away. This seems to be a better idea than going out into a raging



Illustration by Amy Hill

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storm to look for blank tapes, which I know are in my car where I left them earlier in the day.

The Scotch tape, however, is empty, and the main suspect for this foul deed is my 10-year-old daughter, who thinks she can deny anything if no one actually catches her in the act. The tape no doubt fell victim to one of her many collage projects.

Oblivious to the storm, my daughter is sound asleep, and looking every bit like an angel, so my speech about

the tape will have to wait. I tip toe out of her room, careful not to step on her latest creation, which is a work-in-progress all over the floor, and miraculously my beam of light zeros in on several cassettes scattered around my daughter's boom box. She must have raided my tape stash to make cassettes from CDs. She doesn't know about punching tabs out of cassettes, so I make an executive decision and choose Pearl Jam for the sacrificial cassette.

Listening to my idea in the light of the next day I still like it and am ready to work on the demo, but the electricity is still off. Why not try bouncing ideas back and forth on two little cassette players, sort of 2-track recording, but only one at a time? I'm sure this does not seem so brilliant to somebody like a Les Paul, but I don't have his little black box or the juice to power it.

I retrieve fresh tapes from my car and play the acoustic piano part on one recorder. Then I play that back and sing the song, while recording on the other player. This gives me a piano/vocal demo, which is good enough for writing sessions or even some publishers, but I need more.


I play the piano/vocal tape and lay down a solo idea, then I play that and sing a background part. Suddenly empowered and free from technological restraints, I continue on this way going back and forth between my cassette recorders for three more passes. Luckily the batteries go dead and the battery drawer is empty after our flashlight feast the night before, because after six passes the piano is barely audible.

Still, I have more ideas, and being somewhat of a studio junkie who isn't getting her fix and feeling the effects of withdrawal, I scribble feverishly on manuscript paper trying to salvage the last remaining ideas.


And, right on cue, the pencil I'm using breaks, surging the right frontal area of my head into a sort of dithyrambic throbbing. Undaunted, I search in vain for the manual sharpener, and by now I am becoming painfully aware of my codependency on electricity and all the machines that depend on it, including my electric pencil sharpener. My enabler, the electric company, is ignoring, what seems to me, an increasingly desperate moment in the Demo Queen's digital domain.

As I reach for a sharp kitchen knife, keeping it far away from my wrists, and lean over the kitchen sink to sharpen my pencil the way my wise mother did 70 years ago, a small, almost imperceptible voice sends greetings from the ancient part of my brain stem and gently calms my frayed nerves with this little refrain, "Write on, Demo Queen. Write on." At least that's how I heard it. Hey ho... **EQ**

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HIT THE CLUBS



1996

LIVE



SOUND

SPECIAL



Inside: Alan Parsons Records Live, Soundcheck Tips, Open Back Amp Miking, Mixing Position, Lots of New Gear

THE WIZARD OF



Photos by Michael Mazur

EVEN TITAN HEAVY METALERS have to be flexible enough to move from clubs to stadiums these days. How do we take that big sound and make it work in small places? Consider, for example, Ozzy Osbourne's "Retirement Sucks Tour." Earlier this year [1995], we played stadiums in South America, and towards the end of '95 we started doing smaller club-type shows (like NY's Roseland) in the U.S. and Europe. In 1996 we head back to the U.S. where we'll start doing arena-size rooms again. We are carrying our own production with Showco Prism systems. In the smaller venues we use cabinets that are specially designed for that purpose.

We started out knowing in advance what types of venues we were going to play and wanted the FOH and monitor control sections to remain the same so that we would have continuity.

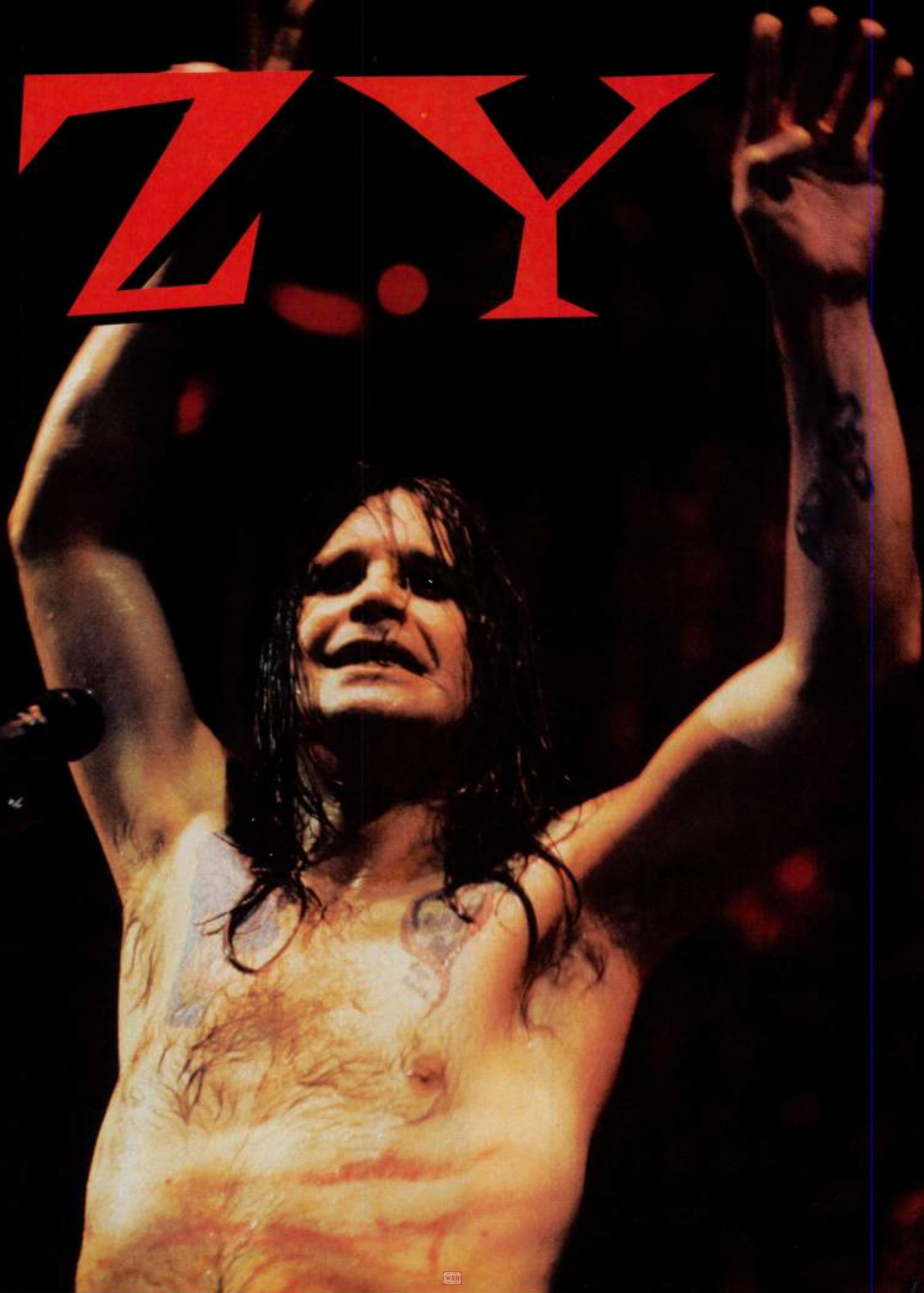
BUS CALL

I'm using a Harrison HM5 console with 32 inputs. The band itself only has 20 microphone inputs, so it's basically just drums, bass, and guitar. There are keyboards, but I can still only amass about 20 channels out of it. Then I use the rest of the channels for effect returns and things like that. Besides the 32 regular microphone channels, the Harrison board has eight stereo effect returns with bus assignment. So the reality of it is that I have the potential for 48 channels.

HOW I KEEP OZZY OSBOURNE HARD ROCKIN' FROM CLUB TO ARENA AND BACK AGAIN

BY GREG PRICE

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EQ LIVE

To make the show easier to mix, I do a fair amount of subgrouping. For instance, the kick and the snare are on their own subgroup without the hi-hat. That way it is very easy to add or subtract kick and snare from the overall mix. Then I put the toms, hi-hats and overheads on their own subgroup and I direct the toms to a VCA so that I can do tom swells without affecting the overall drum mix — it's a really cool thing. Of course, everything is postfader, so the effects follow the VCA fader moves. It's a great way to manage drums and have certain spots for tom fills or tom splashes, but not have it affect the overall mix as far as bringing the drum kit up and down. If you bring the overhead mics up and down along with the kick drum, it might sound a little funny.

Basically the subgroup stays in a static mix position, so I'm making the toms a "special" — it's almost like they are double assigned, but the VCA over rides everything anyway. When I bring up the toms with a VCA, the VCA controls the channel faders that feed the reverb, so the 'verb remains consistent. Whereas if I brought up those toms via subgroup, my reverb relationship would change.

Ozzy is notorious for his trademark vocal sound on his records and we run similar effects live. I have two Eventide H3500 Harmonizers and I use one of those for Ozzy in conjunction with a t.c. electronic 2290 to keep the delay and pitch change effects completely exclusive. The panning of these effects is really the proof of the pudding. If I use a short delay time to

THAT "GUNQUE"-Y SOUND

David Selg, a.k.a. "Gunque" is the man behind the monitor console for the "Retirement Sucks Tour." Here is what he had to say about setting up monitors for Ozzy:

I have a 32-channel Harrison console and I am using Showco 600 biamped floor monitors (each with a 15- and a 2-inch). For the smaller rooms, I have two Showco Prism cabinets per side as sidefills, but in the States I will be flying three Prism cabinets per side from a special bar that Showco made for me. I will also be flying two more Prism cabinets directly over Ozzy's head (up in the lighting truss), pointing straight down. I have four wedges in front of him and two wedges underneath the drum riser behind him. Ozzy wants that stage to sound like the house PA, so I use the overhead cabinets to increase the on-stage level.

Ozzy's center position is time-aligned to the sidefills with three delay units. I place a condenser mic at center stage, plug it into an input on the console, and solo it to look at the level. Then I run a 100 cycle tone (and later a 1K tone) into the sidefills and get the level to read around -3 on the VU meters with the mic soloed. Next I run the tone to the floor wedges and watch that the addition of the floor wedges does not take away from the input level to the mic. The next thing is to use a time-alignment delay, scroll through delay times, and watch the meter until I get to where the cabinets come into phase and the sound becomes additive. Of course, as you get out of the ballpark it becomes subtractive again. So if I started at -3 on the VU, I might now be at 0 on the VU. Then I will go through the same process for the overheads and the butt fills (i.e., the wedges under the drum riser pointing at Ozzy's back). It's very loud and very intense.

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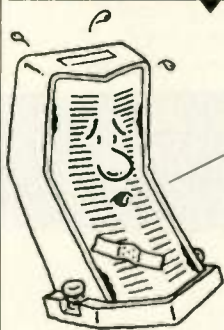
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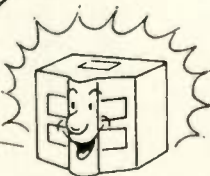
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vocal, but I don't really use it much because this music doesn't lend itself to that. If I use too much 'verb, I lose that cutting and defining edge of certain things. Most of these rooms are reverberant enough, and to add it on to the vocal is not a very wise thing to do. I try to use the "boing" or bounce of the room to help tune in the vocal sound. I also use compression on the vocal from a Summit DCL-200 tube limiter and it works like a million dollars on Ozzy's voice. He has two Sony wireless systems that I treat separately and we are always going back and forth between them so I use one channel of the Summit for each microphone.

The insert on the HM5 console is a preamp-out/EQ-in insert point so the compression comes between the preamp and the EQ. But I don't use the equalizer in the console. In this vocal chain, I am using Klark-Teknik DN360 1/3-octave EQs. This gives me tremendous tonal capabilities and I don't have to worry about running out of EQ because I have a 1/3-octave unit with 30 bands on it. Now that doesn't mean that I am hacking away with EQ, but I have the option if I am in a tough spot. The vocal is the most important thing on the stage. To keep that intelligibility, I want to

have all the options I can while the show is going on, and a 1/3-octave EQ gives me that. If I was in a really tough room, there is a chance that I might run out of EQ on the channel.

When this vocal effect package is up and running, I compress it like I compress the lead vocal. Once you have built this other "child," you have to restrain it. You can't assume that just because you are compressing the microphone that it's going to help the effects. On the contrary — now that I have duplicated Ozzy, those effects need their own compression or all of the building that I have done will be out of control. Since the effects have their own subgroup, I compress the subgroup with one stereo compressor that takes care of the 2290, the Eventide, the long delays, and anything else I might dump in there!

MAKING ROOM

When coming into a new room, my main concern is speaker placement. It's just like if you and I would come into your living room to listen to a CD — we would pay attention to where we are putting those speakers in your living room. Well it is no different in a big arena. For instance, we are coming up to doing large arenas in the United States, and most



of these arenas, whether they were developed around a hockey rink or a basketball court, have a relatively similar width and height because they were designed for the same basic purpose. And over the years I have found from experience that a specific amount of feet from the center of our staging to the mix position gives me a window between the speakers that is optimum for these types of rooms.

I have been in each of these places at least four or five times, so the trial-and-error part of my career is sort of over. If I have a 60-foot gap between the speakers, I would try to be around 120 feet from the stage, give or take 10 feet. In some places you can't be that far away or the seating arrangement dictates where you can and cannot go. But here is a great rule of thumb: If you can get it right in a small room and you keep that small room thinking, it'll work in a large room. The only thing different about a large room is the environment and your ability to deal with that environment. The mix stays the same, the EQ should stay the same, and your plan should stay the same.

SPLIT THE DIFFERENCE

Ozzy's guitar player for this tour is Joe Holmes, who runs left and right effect cabinets and a separate dry cabinet. The left and right cabinets are miked with beyerdynamic MC740 mics. It's a studio condenser mic, and for guitar, whatever you hear at that speaker cabinet is what this microphone represents — and that is really my main objective. I want to produce — at 300 feet away — what the guitar player is producing or hearing on stage, and this mic really helps in that regard. I

have the amp close-miked at less than two inches away. I like to place the mic across the horizon of the speaker and the circumference of the dust cover. Of course, every guitar system sounds different, so you have to find the sweet spot on the amp.

On the dry cabinet I use the RE38 N/D from Electro-Voice. It's a dynamic mic with 15 different settings on the back that can be dialed in to change the tonal characteristics of the capsule. It's great for straight guitar, and that mic is in a similar position as the MC740's. In the mix, the MC740's are split left and right and the RE38 N/D is panned to the center. During solos, I fade that dry mic up about +5 dB, instead of bringing the whole thing up as a mix. Those three mics are sub-grouped with my second H3500 so that if the guitar needs to be louder in general, then I would raise the group. I pan the Eventide hard left and hard right so it follows the effect treatment that the guitarist is using with his effects. This H3500 is set for a doubling effect, and the rest of the effects come from the guitar player himself.

THE BOTTOM LINE

Geezer Butler, the bassist, is a powerful part of the band for this show because there is a lot of movement and a lot of notes being played by him. He has his own effects on stage, though this is not really a show with bass effects per se. My treatment for him is more on the compression/ peak limiting/management

THE VOCAL IS THE MOST IMPORTANT THING ON THE STAGE. TO KEEP THAT INTELLIGIBILITY, I WANT TO HAVE ALL THE OPTIONS I CAN WHILE THE SHOW IS GOING ON, AND A 1/3-OCTAVE EQ GIVES ME THAT.

point. I try to keep the bass almost running flat out, and with the right treatment it never overshoots the mix. Because the band is in essence a power trio, the bass is a very integral part of the overall sound, so I try to get the articulation of the instrument without a bunch of low-frequency swimming and harmonic buildup. With the right compression and the right peak limiting, I can create a bass guitar sound that is not narrow in dynamic range but is consistent in level.

I take the bass from a DI and I mic the amp, because with the direct I only get the bass guitar. If the bass player has a little dirt and growl coming from the amps, I am not going to get that from the DI. The only way to get that is to mic it. I use separate compressors on the channels for the DI and the mic, and I compress much, much harder on the DI. On the direct I am controlling the dynamic range within about 10 dB of its true starting point. So categorically you would see between 7 and 10 dB of gain reduction on the direct channel. If you were to look at it on a VU meter, when Geezer starts playing it would go up to 0, stay there and then drop back down when he stopped. So I am removing a lot of the dynamic range of the instrument, but that gives me incredible intelligibility.

In fact, when using that much compression, anything that is played softly will come up instead of being hidden and anything that is played really hard is going to come down instead of overshooting the mix.

I don't compress the mic that hard, so I can still get some of the dynamics out of the amplifier, and I add that per-taste as to how much of the grunge or growl of the bass I want to add into the direct.

RETURN TO OZ

It seems to me like Ozzy's three-year absence from live performance only made his fans want him to return to the stage even more. After we finish this European leg of the tour, we will bring the show to at least 20 cities in the United States and then it's off to Japan. When all is said and done we'll have brought this show to millions of people in over 70 cities. So who wants to retire anyway?

I'd like to mention Richie Agamemnon, systems engineer for the "Retirement Sucks Tour." He helps make it all possible. **EQ**

This is Greg Price's 19th year in the biz. He has worked with everyone from Glenn Campbell to Poison, with acts like Steve Miller, Boston, and Huey Lewis and the News in between.

ANTHRAX'S NEW STOMPING GROUNDS

IN THE MID-80s, heavy metal rockers Anthrax played to hordes of hard rock fans in coliseums and stadiums throughout the world as opening act for the likes of Ozzy Osbourne and KISS. Nowadays, the band is still rocking as hard as ever, but they find themselves confined to more cramped quarters — clubs.

Like Anthrax, a lot of national acts (heavy metal or otherwise) have found themselves having to play the club circuit now in order to get their music out to the people that really want to hear it — the fans. The benefits to playing clubs over coliseums is that it significantly reduces production costs. Unfortunately, it also limits the number of people who can see the band, forcing the

band to play more dates to make up the lost ticket revenue. It also brings up the problem of bringing that big arena sound into the clubs without causing hearing damage.

George Geranios (Anthrax's live sound engineer since their *Among The Living* tour in 1986) is doing just that with the band on their current tour, which is in

support of Anthrax's most recent release, *Stomp 442*. Geranios has put together a relatively small touring system in order to save the band some money; save some space on the truck; and save himself the hassles of setting up and breaking down a large system night after night.

"What we're doing on this tour is using a 'stacks and rack' system," explains Geranios. "We're using local stacks and racks (the sound system owned by whatever club they are playing), and if we're scheduled to play a club that doesn't have a sound system, we'll try to convince them to bring in the best stuff possible from a local or regional sound company. So during this particular tour I'm sure we'll be using an assortment of interesting non-state-of-the-art gear that will require a massive struggle to make

even a band like Anthrax (who usually has an incredibly powerful live sound) sound any good."

As Geranios explains, he and the band are willing to sacrifice the raw power of a sound system for the consistency they'll achieve from carrying both a monitor system and a front-of-house console. "In order to maintain a certain band consistency from show to show, we've concentrated on bringing out a monitor system with us. We contracted an engineer from BBI (formerly Bernard Brown of Dallas, TX) to bring out an appropriate monitor system for the band, especially for Charlie Benante [the band's drummer], because of the levels they're playing at. They're using a vocal monitor system, Turbosound TMS-3s for sidefills and drum monitors (with Meyer subwoofers), and a new series Yamaha 3210M console that, unlike the original 24 series, is a bit more sophisticated, but it still maintains our theme of lightness and portability."

Photos by Julian Jaime

ANTHRAX TAKES THEIR HEAVY METAL SOUNDS TO THE CLUB CIRCUIT TO PROMOTE THEIR LATEST DISC *STOMP 442*
BY ROBERT GRANGER

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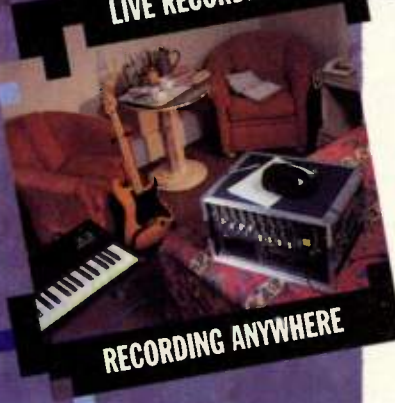
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LIVE RECORDING AND MIXING



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The FOH console Geranios chose for the tour is a small, yet very effective, Crest Century GT. "We chose this particular console because it was physically small, it sounded very good, and it had enough inputs (32) to accommodate the band. Plus, on evenings where I might be sharing it with the support acts, it's got enough inputs to make my life semi-hassle free. What we're trying to do with the support acts is encourage them to play on the local console, which in some cases may actually be a better console than ours. I mean, even if we're definitely going to go into a club with a local console that's going to be a Yamaha



PM3000 — I really don't care. It makes no difference to me because what I get

night after night from working with the same board is a certain consistency. Plus, I

won't have to reset my gain structures, my effects, or my effects returns after the

BIG SOUNDS, SMALL PLACES

By Robert Scovill

One of the most important concepts to grasp and bear in mind when doing sound in very small venues (300-500 seats) is, regardless of the genre of music, decide whether you are going to approach it as a sound "mixing" gig or a sound "reinforcement" gig. By definition, there is a difference, and the *Reader's Digest* version of the differences in the two is as follows: The former is a full-blown mix of every input coming from the stage and is not treated all that differently from a studio mixing scenario. The latter is just what the description implies in that you will be "reinforcing" what is emanating from the stage. In venues this size, in almost every instance, you most likely would benefit from approaching the job as a sound "reinforcement" one.

It has been my experience that a lot of mixers in small venues choose the wrong approach and end up overpowering the room with an "all-or-nothing" style mix. Now, while this "all-or-nothing" style can appear desirable from the band's perspective (i.e., "if it is too loud you are too old, so go home"), you are really kind of shooting yourself in the foot, because the result can end up anything but powerful — in fact, it can border on distracting. But if you subscribe to the sound "reinforcement" mentality, you can create a very powerful sound with head room to spare — and without a large PA system at your disposal.

It is in your best interest — as well as the interest of the listeners — to first get the stage sound sorted out as well as possible. This means getting guitar and drum sounds that are tonally unobtrusive and of a balanced volume on stage as well as in the listening area before attempting to "fill in" the missing frequency content and amplitude. This will also help reduce undesirable bleed into other microphones. Remember, though, sound "reinforcement" is an additive process, meaning that if a guitar is ripping your face off at 2 kHz, your only option may be to add guitar to the PA system that is completely void of 2 kHz to help offset it. You cannot take that 2 kHz away. While this may leave you considerable headroom in the PA, it will surely eat up all of the "listeners" headroom (i.e., "ear room").

Once your stage levels and tones are under control, you are now in a position to incorporate one of the more important devices used in rock music: the compressor. When properly used, this device can make or break a rock vocal. However, without a somewhat controlled stage volume and frequency content, the compressor can work against you by bringing up the average level of all of the bleed into the mic it is being used on. Don't blame the compressor, it is doing exactly what it is supposed to do. The better sorted out your vocal mic isolation, the more compression you can use, and this is generally very desirable on a

rock vocal. From the "reinforcement" mentality, the vocal requires the most reinforcement because it will generally be the least amplified thing coming from the stage. So let's give it all the help we can.

My final — and possibly most important — "tip du jour" is this: If you have the ability to dictate the location of the PA system, the golden rule is get it to as many ears as possible. Try to get at least the high- and maybe even the mid-frequency components of your PA above the heads of the audience and aim them down at the listeners. I know big stacks of speakers look cool and impressive, but think about it as if you were trying to "light" the entire audience. If you were, you would not set up the lights at the head level of the people down front and then aim it at the back of the room. The people down front would be getting their hair singed, but it would end up pretty dark back where you are mixing from. If you can get the intelligibility components of the system up high and aimed down, you'll cover a larger number of people with out having to overdrive the PA in an effort to have it heard at the back of the room.

Robert Scovill has toured with RUSH and Def Leppard and is currently on the road with Tom Petty. He reviewed the JBL EON system in the September '95 issue.

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support acts have done their thing. So, I'm willing to sacrifice having the coolest gear in the world for having consistently good gear."

"When I originally bought the effects package for this band," explains Geranios, "my goal was not to spend \$20,000 of their money. So I found things

that I felt would work for them. If we were mixing Phil Collins, then maybe the delays that are coming out of the Alesis Quadraverb I use for Anthrax would be inappropriate because you'd be dealing with a more open-spaced mix where the delay may have a lot more space to 'live.' The effects really

tend to fit the band. Anthrax has a very heavy, tight sound, and these sorts of effects work quite well and I can get away with the reverb coming out of a Yamaha SPX 90, though I would obviously prefer reverb from a Lexicon 300." The outboard rack for this tour consists of one SPX 90, two Yamaha SPX 90 II's, two

Alesis Quadraverbs, and two Gatex noise gates — all controlled by a DigiTech PMC-10 MIDI pedal.

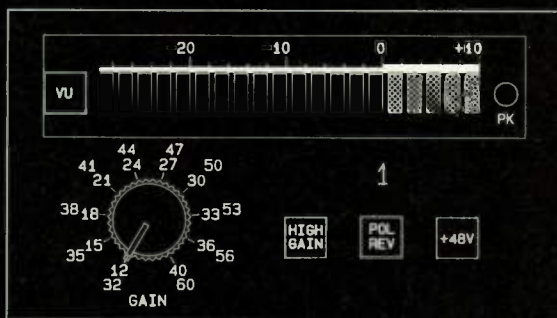
HERE COMES DDRUM

When it comes to capturing Anthrax's huge, in-your-face live sound, Geranios has a couple of tricks up his sleeve. One of the most surprising things is his use of ddrum electronic drums for most of the FOH drum sounds [see sidebar]. "Since we're mostly using ddrums, most of the problems that are typically associated with miking up a kit are eliminated. Plus we get a consistent beefy drum sound every night, no matter what.

"In the past we've used the Electro-Voice 408 mics for the drums mainly because of physical reasons — they had small capsules and they could swivel easily. Charlie tends to crowd his kit pretty close together and he likes to keep his metal [cymbals] very close to his toms, so trying to mic up his rack toms with standard Sennheiser MD421's would have been virtually impossible. There would have been no room for any actual drums.

"We're relying mainly on the ddrums now, because without sidechain

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gating it's almost impossible to get an effective tom sound at the drum monitor levels we're running. Plus I'd have to double-up six of my channels because I'd need a place for the gate triggers. So to avoid all that we're using the ddrums for FOH and we're using E-V stuff as an absolute back-up. We're using a Shure

Beta 57 to mic up the top of Charlie's snare because it's a little brighter than a normal SM57, and we're using a regular SM57 for the bottom. As for the overheads, we're using Shure SM81's, although they're not my first choice. I would prefer an AKG 414 because with the amount of metal that's up there, the 414's patterns allow you to have a little more flexibility in what you're picking up. But what I've found is that as the stages get less and less deep in these clubs that we're playing, if there's a lot of vocal gain you're going to pick up all the metal on the drum kit through the vocal mics. So what happens is you've got too much metal being picked up and those ultra-sophisticated mics you've hung over the drum kit end up getting turned off."

GUITAR MEN

As for the guitars and vocals, Geranios takes more of a traditional



CRANK IT UP: Engineer George Geranios keeps Anthrax's sound loud but intelligible even in small clubs.

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approach. "In the past we've had the means to acquire a couple of Beyer GL740 large-diaphragm condensers. The GL740 is a wonderful microphone for Scott Ian's guitar [rhythm] because Scott has such a huge sound, and the GL740 can accurately capture it. Unfortunately, the GL740 is not an option for this tour, so in order to get that really big rhythm sound, we're using 421's, which are a little more Hi-Fi than the SM57's. For guitarist Paul Crook, who joined the band for this tour, we're using standard SM57's because he's got a basic straight-ahead, in-studio sort of guitar sound. In order to make Frank Bello's bass sound a little thicker, we're running a DI off his Ampeg amp and blending it with an Electro-Voice 408 that's placed in front of his cabinet. As for the vocal mics, John's using a Samson wireless with a SM58 capsule, and we're also using SM58's for Frank and Scott's backing mics."

LOVE IT LOUD

So the question still remains: How does Geranios get that big heavy metal sound into these rather small-scaled clubs without literally bringing the walls down or making the audience deaf? "I like to use a little stop-gap compression," offers Geranios. "I like to build a wall of compression just to keep the vocals in the track, because if you don't, the vocalist's mic technique and excitement may end up all over the mix.

"Lately I've been keeping the peak section of the Behringer compressor/limiters (which were supplied by the sound company) on fairly high ratios to keep the vocals from overriding the mix. It's really impor-

HEAVY METAL MONITORING

The use of electronic drums may seem to be an unusual choice for a seemingly low-tech, raw band like Anthrax, but it actually makes perfect sense. As soundman George Geranios explains, "The reason a band like Anthrax needs to use the electronic drums, and why you'll find a lot of very heavy, back-to-the-roots metal bands do the same, is because these bands are extremely loud and they must have drum monitors on stage. Drummers need to hear themselves on stage and acoustic drums simply do not read well in a very loud, live situation, so the electronic drum sample units are a great answer to the problem.

"I worked with a heavy metal band called Morbid Angel, and their drummer, who is very fast and very skilled, had to use samples because there was no way to get an acoustic kick drum through his monitors without feedback, so they resorted to Alesis D-4s for kick drum samples. Even before that, we had the same problem with Anthrax drummer Charlie Benante, so we started to use electronic drums for our on-stage monitor situation. This set-up allows us to get everything except the snare and one rack tom into the monitors at reasonable levels that Charlie can live with."

The electronic drum system is pretty easy to comprehend set-up wise. Benante's electronics rack houses two electronic drum units, one main and one back-up. Small triggers are clamped onto the drums to read the hits, the signal is sent to the unit where it's processed, and then the sample is fed to an output source. "Electronic drums are actually more sensitive than the MIDI standard, which only allows 127 volume units," Geranios continues. "The electronic drum standard allows 1000 volume units, so between the softest and the loudest there's about eight times the resolution. So when a drummer uses electronic drums, he has the ability to do a press roll and have it actually come out through the electronics. Trust me, you pay for that."

Not only does Geranios and Anthrax use the sampled electronic drum sounds for monitoring purposes, they also use them for Benante's live sound. "If Charlie's going to use this on stage, I'll use it FOH," states Geranios. "It has an advantage in that it has fabulous consistency day-to-day. It doesn't matter what the weather is, it doesn't matter if you just changed the drum heads — it's always the same sound. Depending on how they're used I don't have anything against using sampled drums. If you use very 'cheesy' samples the overall drum sound is going to sound like samples, but if you use really good samples, like the stuff we've got, it's going to sound like drums."

In addition to their drum samples, Anthrax also uses several other sampled bits to add a little something more to their live performance. "We have two Akai S1000HDs in Charlie's electronics rack. The two Akai's are run from a Drum Kat and there's all kinds of little sayings and funny little things that come out when Charlie hits a trigger. Some of the songs from the new set begin with little sample segments that aren't necessarily rhythms, but simply little bits that add a little 'drama' to the song. 'In a Zone' is a song from the new set that incorporates a pedal tone loop, triggered by the Drum Kat, that they run through the first minute of the song. It's not done that way on the record, but that's how they wanted to do it live and it sounds really cool. These things provide a tremendous amount of flexibility for an array of applications."

—Robert Granger

tant because at these levels, you're trying to keep the track huge, so you need to put everything in its place. With almost every band out there — even a band like Dokken that's very vocal heavy — you have to make sure that the vocals aren't eating up the mix because they will in an instant. If you don't apply proper compression (*a great deal of compression*) to your vocals they will eat up the mix and take over

the entire sound system. I do like to run compression on the main outs when I have it, and I especially like to run it in small rooms because it tightens up the mix. It actually fits the mix into the room better, giving the sound a greater sense of overall power.

"If I have a set of dbx 160's that the local company has supplied as part of their drive rack, at some point in the evening during a small gig, I'll go to the

160s, put them on over-easy and drop 2 dB of compression into the mix. From there I'd use the output levels to determine the absolute output. I find that this really tightens everything up, smoothes everything out, and keeps you from hurting people."

Geranios's philosophy as a live soundman is plain and simple: "My job isn't getting people into venues; it's my job not to drive them out."

ALAN PARSONS: BEST IN SHOW

IF YOU ARE reading this magazine, chances are pretty good that you already know Alan Parsons's history of making great-sounding records. Sure, he's worked with The Beatles, Pink Floyd, the Alan Parsons Project, and a multitude of successful artists, but are you aware that AP also plays guitar? In the past, the engineer's engineer has mainly worked in the studio environment, but over the last year and a half, Parsons and his band members have brought their music to stages in Europe, South America, and the United States for the first time ever. After giving us almost 20 years of wonderful music recordings, Alan put his music where his mouth is and brought it to the concert hall. He also recorded the whole thing for a CD — *The Very Best Live* (available in the U.S. on the RCA label).

TAKING IT TO TAPE

The band's nine-show European tour was recorded onto four TASCAM DA-88's by front-of-house mixer Gary Bradshaw (of Pink Floyd and Simple Minds fame). While Bradshaw mixed the show for the house on a Yamaha PM3000 console, the instruments were recorded without use of an additional desk or remote truck. Parsons explains: "The DA-88's were at the front-of-house, which seemed like the best place for them. We obviously couldn't plug the mics straight in, so we put the machines close to the mic pres. The direct outputs of

the console were used to route signal to the tape machines, so we weren't hearing any of Gary's EQ on tape. We were essentially recording flat and we managed to squeeze everything onto 32 tracks."

To avoid the need for carrying yet another DA-88, keyboards were submixed prior to the recording process.

a Yamaha DMP7 and stored his fader adjustments as snapshots for each song.

"Richard is more conversant with MIDI, so he was probably doing all of his changes with MIDI volume. But the keyboard mix was very repeatable and pretty automatic every night — Richard didn't have to do a lot of

parts were sequenced by Cottle on a Roland MC500 hardware sequencer, but Parsons says, "It wasn't done just for the sake of sequencing. It was done because two guys weren't physically capable of playing all the parts — just to replace hands, literally. We kept it down to a minimum and where there were sequences

used on the records, we tended to use sequences live. But we're not an outfit that is usually into sequencing, frankly."

Instead of cueing to the typical click, drummer Elliott would get a tempo from a metronome at the front of each tune and then the band would play to a musical loop such as in songs like "Games People Play" or "Luciferama."

Sharp-eared audience members may have noticed that Cottle and Powell used a healthy dose of analog synthesis. "The analog sounds were coming from the (Sequential) Prophet," continues Alan. "Richard and Andrew each had a Prophet, which probably was the basis for both of

their keyboard setups. We are talking analog here, and we had all kinds of problems with them, like dumping their memory. They are notoriously unreliable — especially when you start carting them about in a truck — but they sound notoriously good. You have to put up with it and take the rough with the smooth. The only way to store those



ALAN PARSONS TAKES TO THE ROAD TO RECORD HIS LATEST ALBUM *THE VERY BEST LIVE*

BY STEVE LA CERRA

"We recorded two keyboard mix outputs," Parsons continues, "one for each player. Andrew Powell and Richard Cottle each had their own stereo mixers on stage and handled the level adjustments between the various instruments and rack units. In fact, on the recent American tour (it wasn't the case on the European tour), Andrew used

adjustments as he went, which is a good thing. Cottle was later replaced by Gary Sanctuary, who stepped in at the end of the American tour and took over from that point on. Gary's job was made easier by the fact that with a given setup, he at least knew what Richard had been working with on each song."

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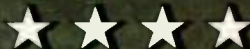
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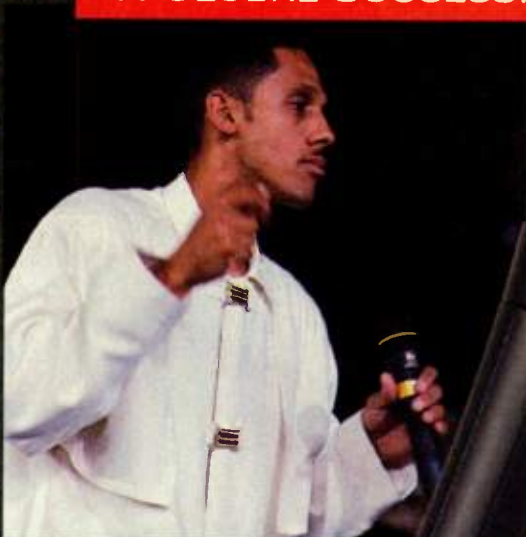
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sounds is on tape, and we had plenty of backups with us. But even with that they sometimes would still get us into trouble. And tuning was always a problem."

NO SAMPLING, PLEASE

Although it would have been an option for the drums to be recorded and reproduced live using triggered samples, Elliott and Parsons opted for the real thing. "It is another nightmare to deal with if you start triggering: getting the samples set up, making sure that they are triggering at the right levels, and getting all the gates sorted out. It is something you can do without. I'd rather just get a good drummer like Stuart with a good, solid drum sound. The drum mics were sent to tape completely flat and without any gating. Interestingly, that is another technique that I am not keen on. I have found the benefits of gating toms just not worth the effort. I prefer the openness, and I think it's a more real sound if you avoid gates. If there were real problems between the hi-hat and snare, then I might think about gating the snare, but I don't gate the toms."

Guitars and bass were recorded in a variety of ways. Jeremy Meek's bass guitar was recorded to a single tape track via DI, but Ian Bairnson's guitar amplifier was miked and recorded in stereo. No off-stage cabinets were used by the guitarist — the cabinets that were miked were the ones that Ian used on stage. According to Parsons, Bairnson has always taken a lot of care in getting the best sound possible from his cabinets, and although he does have a very good speaker simulator system, it was not used for the recording. Parsons's guitar was recorded direct (with a touch of chorus added from a pedal-effect box to the PA mix only), and monitored through the stage wedges without any additional amplification.

POST-SHOW WRAP-UP

After the shows had been recorded, it was time to go back to Parsonics for some postproduction and mix-down. The first step was for the band to sort through the recordings and choose the best performance of each song. None of the songs were edited from different nights. Before the recordings could be mixed on Parsons's Amek Angela, there was some touching up to do, so a fifth DA-88 was locked up and used to record the overdubs.

In general, track repairs were made for sonic reasons (such as a musician going off-mic) as opposed to creative ones. Vocalist Gary Howard used in-ear monitors, which helped to reduce leakage on the songs he sang, but vocalist Chris Thompson preferred to use the traditional stage wedge for monitoring. Parsons admits that the vocal mics suffered from leakage, "to a fairly substantial degree, but that is part of playing the live game. I think that the biggest problem was picking up audience noise (rather than the band) on the vocal mics. We didn't have too many problems, but when I wanted to pick up a quiet vocal line that had a lot of drums or audience on it, when we found that to be a problem — we tended to replace it. Singing live is one of the most difficult things in the world to do, so there were a fair number of vocal repairs. And I probably replayed my acoustic guitar part on just about every song because a DI electroacoustic never sounds very nice. When it's loud and booming out of a bright PA, it sounds reasonably decent, but when it's exposed on a recording it really needs some attention, so I just tracked it again using an Audio-Technica condenser mic." [Parsons endorses A-T — Ed.]

Parsons explains that there were also some problems matching the sound of the

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applause between different shows. "We were going from rooms of 1600 to 9000 capacity, so there was a huge variation in the sound of the rooms. Needless to say, we chose one of the bigger ones to feature as the principal audience!"

During the mixdown process, Alan found a creative solution to the problem of matching the ambiance of the recordings so that the CD would have continuity between songs. "The audiences were very lively and were actually clapping in time on the intros to songs, and it would have been criminal not to leave that in. So wherever possible I tried to add in a little of the real atmosphere. I wanted to work in the audience mics (Audio-Technica AT4051's) at a level where you could actually sense the sound of the room. But from night to night we would have those mics at a different distance from the stage, so there would be different delay times. One of the beauties of the TASCAM system is that I could pre-delay tracks or delay everything else to match the audience mics. I was doing quite a lot of that — I was actually delaying the instruments from the stage to match the audience mics. I would then have the benefit of the acoustics of the room and none of the delay problems."

To further maintain the sense of spaciousness, Parsons used digital reverb (Yamaha Rev 7) on the tracks to complement the natural sound of the hall. "I picked a reverb setting that I felt gave us an average stage acoustic that seemed to work with all of the shows — a reverb time of just under a second with a bit of pre-delay. I generally went with the same reverb sound on everything just to make it sound more live. I thought that if I started playing with effects, then people would say 'unfair.' I tried to make it, in fact, represent what was actually happening. I did not try to cheat it too much."

KEEPING TRACKS

The Alan Parsons tour used four TASCAM DA-88 tape machines to record the band (and audience) onto a total of 30 tracks. All microphones used for the tour and the recording were Audio-Technica. During the postproduction stage of the project, a fifth DA-88 was used for recording overdubs and as a mixdown deck. The stereo mix was recorded to a pair of empty tracks on the fifth machine. Listed below is the track assignment for the first four machines.

DA-88	TRACK #	INSTRUMENT
MACHINE 1	1	BASS
	2	KICK DRUM
	3	DRUM OVERHEAD LEFT
	4	DRUM OVERHEAD RIGHT
	5	SNARE DRUM TOP
	6	SNARE DRUM BOTTOM
	7	HI-HAT
	8	TOM 1
MACHINE 2	9	TOM 2
	10	TOM 3
	11	TOM 4
	12	VOCODER
	13	IAN GUITAR LEFT
	14	IAN GUITAR RIGHT
	15	ALAN ELECTRIC GUITAR
	16	ALAN KEYS
MACHINE 3	17	SEQUENCER LEFT
	18	SEQUENCER RIGHT
	19	MAIN VOCAL
	20	SECONDARY VOCAL
	21	JEREMY VOCAL
	22	ALAN VOCAL
	23	ALAN ACOUSTIC GUITAR
	24	LESLIE CABINET
MACHINE 4	25	AUDIENCE MIC LEFT
	26	AUDIENCE MIC RIGHT
	27	TRIX* KEYBOARD LEFT
	28	TRIX* KEYBOARDS RIGHT
	29	ANDREW KEYS LEFT
	30	ANDREW KEYS RIGHT
	31	OPEN
	32	OPEN

*aka Richard Cottle

Alan mixed the songs with no overall compression to preserve the dynamic range of the original recording. Parsons describes himself as an "anticompression merchant for anything other than bass and vocals. I always have disliked compression unless you are actually trying to create an effect out of the medium. But just to use it as sort of an everyday regular thing...I don't do that at all."

Rather than to DAT, the songs were mixed to a pair of open tracks on the fifth DA-88, which he found "invaluable for on-the-fly punch-ins to the mix. Then Parsons brought one of the machines with him to Simon Heyworth

at Chop 'em Out for mastering. Once there, the mixes were digitally transferred into Sonic Solutions for sequencing the album and editing. "I did a dry mix of everything without applause and occasionally when we had problems I would blend in the audience at the mastering stage. Now that I have ProTools I would probably do more of that kind of stuff in the studio, but I didn't have it then. Basically I just did the raw mixes with the applause running alongside on two dedicated tracks ready for crossfades. Any 'interactive' applause was, however, committed to the mix. We sorted all the applause out in mastering." 

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EQ GUIDE TO A SMOOTHER SOUNDCHECK

AH THE SUMMER touring season — outdoor gigs in the hot sun, the smell of freshly constructed stages on the beach, the warm breeze from those nighttime shows...Sorry, you'll have to wait about six months for that, but with the busy winter sound season here, there might still be a few new battle tactics you'll need to make soundcheck fly more smoothly.

THE PLOT THICKENS

A simple way to make your soundcheck happen quickly and efficiently is to have a stage plot ready when you get to the venue. Better yet, fax it to the stage manager when you advance the gig. (You *did* advance the gig, didn't you?) Whether you are playing in a small club or large theater as a warm-up or a headliner, the house crew will get a lot of answers to their questions from a stage plot without having to bug you constantly.

Make it as complete as possible by including the arrangement of the backline as well as the location of instruments, mics, monitors, and direct boxes. If you are supplying some of your own vocal mics or DIs, make note of which ones. You should also have an input list (which lets the stage crew and monitor engineer know in advance what they are dealing with) and a list of preferred mics. That last one is a stretch in some situations, but at least the house or systems engi-

neer will know what mic you like to use on which instrument. If you are the one providing PA for a band, you should request this documentation.

GROUP THERAPY

One of the problems you may run into with club systems is that you don't have enough signal processing gear to accommodate the instruments you are miking. A typical problem is that there are not enough gates or compressors available to process the audio exactly in the manner you might want. A way around this is to do some judicious sub-grouping of instruments and then patch the processors on the group inserts.

For example, you would obviously want an individual compressor for each vocal mic, but if they weren't available, you could (for example) bus several vocal mics to a subgroup — which you might be doing anyway — and then strap a single compressor across the group insert. It won't give you the maximum flexibility of compressing individually on every mic, but it's better than not having compression on all the



mics, especially if more than one band member sings lead vocals. This concept works well with multiple keyboard setups as well. You can try a similar game with gates and drum mics, but the effectiveness is limited. You could certainly group the top and bottom snare drum mics and gate them together, but using this idea on toms kind of defeats the purpose of gating in the first place.

DOUBLE YOUR PLEASURE

Here's a little trick for getting some interesting snare drum sounds: Mic the snare drum from the top and the bottom, preferably with the same brand and model mic (you'll probably need to reverse the phase of one of these). Run the fader for the bottom mic at

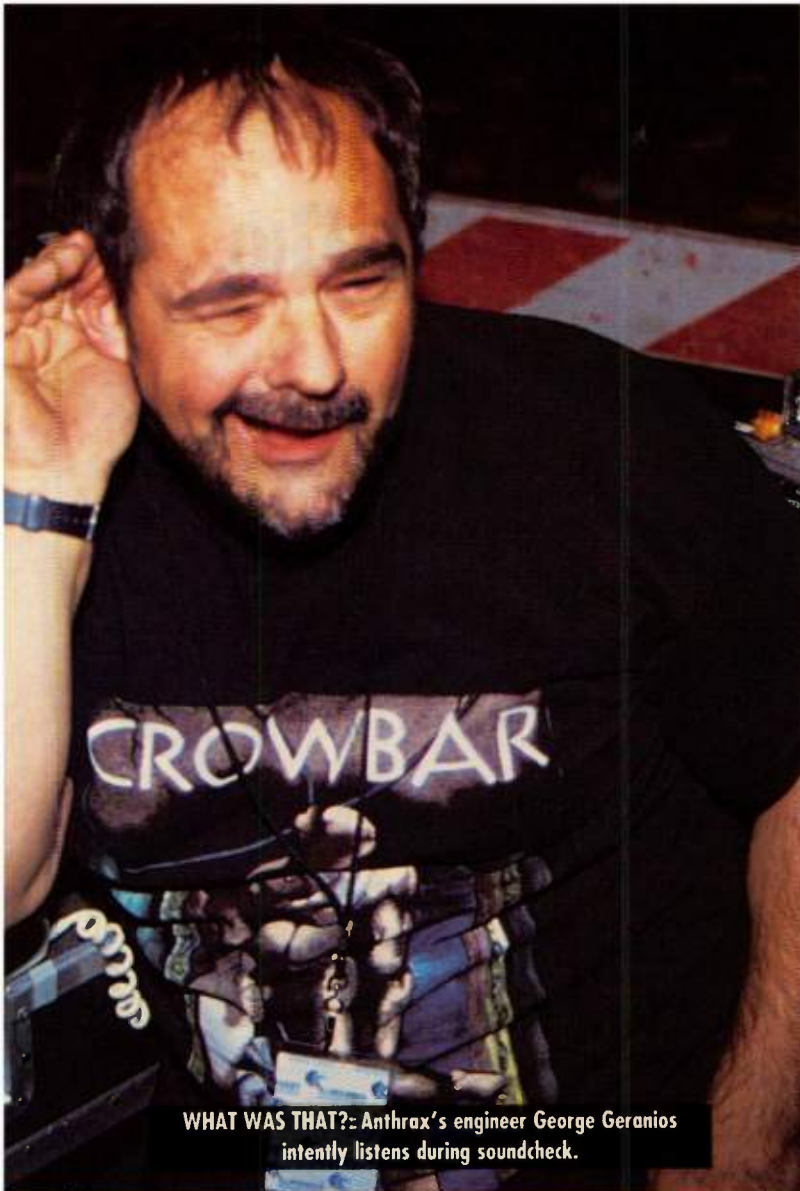
about half of that for the top mic. Send the top mic to the PA as you would normally, but do *not* assign the bottom mic to a subgroup or to the L/R mix. You can EQ the bottom mic to reduce some of the low frequencies that leak in from the kick drum. Now bring up the reverb send on the bottom mic so that this mic drives the reverb. This definitely will place some different sounds on your palate from the standard practice of using the top mic for the reverb send.

CHECK IT OUT

If you come across a piece of gear for the first time, examine the unit carefully! Let me relate a recent experience: I was using a particular 2-channel compressor/gate for the first time,

SOME TECHNIQUES FOR GETTING YOUR WINTER GIGS TO GO MORE SMOOTHLY

By STEVE LA CERRA



WHAT WAS THAT?: Anthrax's engineer George Geranios intently listens during soundcheck.

Photo by Julian Jaime

and (unlike most units of this type) this model had four inputs and four outputs. Normally the unit functioned with a compressor and gate in each channel, but if you wanted, you could have access to the compressor and gate separately for each channel. Of course this was a gig where there was almost *no* out-board gear, so I decided to patch the compressors on two separate vocal mics and then use the gates for two low toms (I already had four channels of gate for the kick, snare, tom 1 and tom 2).

The systems engineer and I connected the device to the appropriate channels and the soundcheck went fine. But at the beginning of the show, every time I brought up one of the vocal

mics I got this huge wash of drums that would not go away. After checking the subgroups for misassigned channels, ruling out various other possibilities, and then pulling some of my remaining hair out, I looked over at this four-headed monster (which had no indicator light for its switches). Someone — whether accidentally or on purpose — had engaged the Sidechain Listen switch so the lead vocal/compressor was now passing the signal from the gated tom channel along with the lead vocal mic. Super. Needless to say I will make every effort to avoid using one of these things again.

Oh, and bring along a space heater — some clubs and theaters are cold during the daytime.



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Galaxy Audio's IKON line of fully self-contained PA products offers both floor wedge and conventional box configurations. IKON employs wide dispersion horn tweeters and 10- or 12-inch woofers in ported enclosures. IKON's control panel (front on the wedges, rear on the boxes) includes a 3-band equalizer, phantom power, a foldback feature that allows the performer to adjust the level on an external monitor without effecting the volume or the overall mix, RCA jack, and Neutrik combination connectors that accept standard 1/4-inch phone plugs and XLR mic plugs. Two or more IKONs can be linked to form a front-of-house system. Each model is available with the built-in amplifier/mixer (reverb is optional) or as a passive speaker. For more information contact Galaxy Audio, 601 E. Pawnee, Wichita, KS 67211. Tel: 800-369-7768. Circle EQ free lit. #136.

TAKE THE STAGE

OAP Audio has introduced the SM-183 stage monitor in order to meet the demands of today's keyboard and percussion musicians. The SM-183 reproduces low frequencies through an 18-inch loudspeaker while the highs

and the mids are handled by a newly developed 12-inch coaxial with large format 2-inch throat compression driver. The SM-183 is available in a biamp or triamp configuration. For more information, contact OAP Audio, 310 Peachtree Industrial Blvd., Buford, GA 30518. Tel: 770-945-1033. Circle EQ free lit. #137.

LET'S GET SMALL

Denon's DN-80R portable MiniDisc player/recorder provides a maximum recording time in stereo of 74 minutes and 148 minutes in mono. The unit comes equipped with one standard video camera battery (NP-23dX0), which provides power for a maximum of 148 minutes recording time. Connections include a digital in/out active, balanced XLR conforming to AES/EBU and IEC-958 standards; analog input (mic/line switchable) with active, balanced XLR; analog out with unbalanced RCA jacks; and an RS-232C Serial port (nine-pin D-sub). To prevent dropouts, the system incorporates a 16-megabit RAM buffer

memory (equivalent to 40 sec. stereo signal). The DN-80R also features Denon's Pre-UTOC, which is capable of writing TOC at the beginning of the recording and creates a normal U-TOC at the end of the recording. For more information, con-

treble, and gain controls on each channel, and an assignable, removeable crossfader. The PS-747 also sports an assignable beat indicator, six drum sound effects, and an assignable send and receive effects circuitry for adding off-board



Denon's DN-80R Portable MiniDisc Player/Recorder

tact Denon Electronics, 222 New Road, Parsippany, NJ 07054. Tel: 201-575-7810. Circle EQ free lit. #138.

MIX IT UP

Gemini's PS-747 Platinum Series stereo preamp mixer for DJ applications features four stereo channels (two phono/six line), bass, mid,

sound enhancers such as digital samplers. Rounding off the unit is a DJ mic channel with Neutrik combo XLR or 1/4-inch jacks and a DJ mic loop, and an aux mic/line mono channel. For the inside scoop, contact Gemini Sound Products Corp., 1100 Milik St., Carteret, NJ 07008. Tel: 800-476-8633. Circle EQ free lit. #139.



Gemini PS-747

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The compact CS3 combines the classic "DDA Advantage" of sonic transparency with versatile, powerful features.

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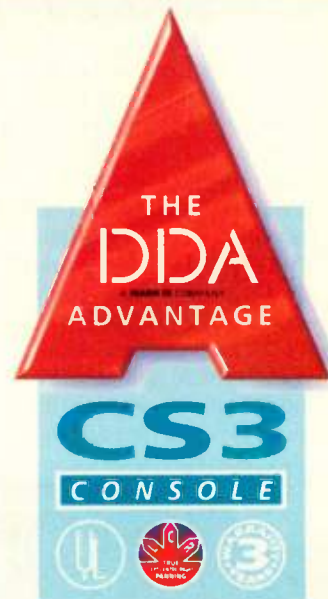
Flexible discrete group bus assignment is rare on compact consoles, but it's here on the CS3. Any signal can be routed to the four groups, L+R or stereo mix buses, and the mono or centre mix bus. A mono signal can be panned or spread across a pair of groups or the stereo mix or, in LCR mode,

between left centre and centre right. There's a full solo in place (SIP) system for truly flexible signal monitoring.

The master section includes four stereo inputs and four group outputs which can be routed directly to the PA inputs, the multitrack, or bused to the main outputs.

Inputs feature three band equalisation with a fully parametric mid-band, six internally configurable aux sends and a high-quality long-throw fader. Available in 16, 24, 32 and 40 input frame sizes, the semi-modular layout allows you to specify a configuration which meets your needs precisely.

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- ▶ Remote Mute Switch Access
- ▶ 4 Stereo Inputs on each Console



LEXICON PCM 90 DIGITAL REVERBERATOR

LEXICON DEVELOPS THE PERFECT COMPANION FOR ITS PCM 80 PROCESSOR

By TONY SAVONA

INVARIABLY, when you think of processors you are going to think of Lexicon. Its upscale 480L and Model 300 processors have been the standard by which all others are judged, and its PCM 70 has found its way into thousands of studio and touring racks. Last year's introduction of the PCM 80 brought a number of improvements to the popular PCM 70, including new effects algorithms, better MIDI control, and an easier to use interface. Now Lexicon has upped the ante even further with the release of the PCM 80's companion — the PCM 90 digital reverberator.

For starters, let us mention that the PCM 90 can operate independently of the PCM 80, but it is designed in such a way that the unit's full potential can be realized when the units work together. In fact, Lexicon states that the PCM 80/90 combination can rival the top-end 480L and 300. Time and test units will tell for sure, but the main difference between the two units are the DSP configurations.

The PCM 90 includes 250 brand new presets that are easily adjusted through

the PCM 90's interface — which is very similar to the one used on the PCM 80. Other aspects the two units share are true stereo capability with 18-bit A/D converters, digital inputs, a 24-bit internal digital bus, and a PC card slot to add presets and software upgrades. [For more information on the PCM 80, see the review in the April '95 issue. —Ed.]

The PCM 90 separates itself from past Lexicon processors in the way it has been designed to reproduce realistic small spaces. One of the coolest aspects of the new PCM 90 is the KeyWord search function. This search feature lets you find a group of programs designed for a given application. For example, key in "Live PA" KeyWord, and all the presets that are optimized for that application will automatically be located. There are 50 KeyWords in all, including four user-definable groups of effects.

CALL ME AL-GORITHM

Lexicon has also put some effort into several new or improved algorithms, including Random Hall, Rich Plate, and

Chamber/Room among others. What makes Random Hall special is the unique Size, Shape, and Spread parameters that can adjust the sound. Size is pretty self-evident — it determines how large the environment will be. The Shape parameter controls the attack and decay of the ambiance, while the Spread parameter determines the length of the Shape parameter, setting the buildup and sustain. At its highest settings, the Shape parameter provides an inverse envelope for effects and gating. Other parameters for Random Hall include Spin and Wander, which add random movement to the entire algorithm for smooth decays.

For all you fans of retro sounds, the Rich Plate algorithm simulates the plate reverb devices that were popular during the '70s and '80s. The algorithms can be adjusted with the stereo pre-echo that can be used to create soft-diffused or hard, nondiffused reflections.

Making its first appearance on a Lexicon processor is the Chamber/Room algorithm, which lets two independent stereo reverbs run simultaneously in the unit. It can be arranged as stereo, mono, or reverse mono. Chamber/room can also be used as an infinite reverb.

IN CONTROL

If you've had a chance to play with the PCM 80, then you are already familiar with the PCM 90's interface: load in the algorithm and use the Adjust knob to control the parameters. That's operation at its most basic level, but there are more advanced modes for the technically adventurous who wish to customize programs or use the modulation capabilities to edit the parameters.

The PCM 90 also provides up to four Custom Controllers, which are a combination of one or more parameters patched together — each with its own individual scaling values. This feature allows for extensive additional tweaking apart from the Adjust knob. For example, the preset Dream Hall has a Custom Controller named Reverb Density that controls mid and low reverb times simultaneously, with an Adjust knob control.

Another development on the PCM 90 (introduced in the PCM 80) is Dynamic Patching, which improves upon the concept introduced in the PCM 70 as Dynamic MIDI. Dynamic Patching allows you create different modulation effects using data from any of 143 possible control sources to any effect parameter. The sources

continued on page 133



Soundscape

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"Soundscape seems to be a remarkably stable system in that I didn't experience a single glitch, crash, or hiccup during the entire review period. It's a credit to the developers that every operation worked smoothly and as advertised.

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Dennis Miller. *Electronic Musician Nov '94*

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Jim Aikin. *Keyboard Nov '94*

"The quality of the converters seems particularly high; I couldn't detect any coloration when comparing recorded material with the original. A lot of effort and care has been devoted to this crucial side of the system."

Dennis Miller. *Electronic Musician Nov '94*

"Ever since the introduction of the DAT format, the world has looked for a replacement for the razorblade.

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Eddie Ciletti. *EQ Feb '95*

"Everybody reported that their system had never crashed and that they had never found any bugs, not even on preliminary alpha or beta versions ..."

Paul Tingin. *User review for Audio Media Dec '94*

"Soundscape does offer everything that you could want from a professional quality hard disk recording system ... it is cheaper, more powerful and more stable than many similar systems. But most of all it is so easy to use, allowing you to concentrate on the music."

Philip Moore. *Australian Digital Mar '95*

"Having used Soundscape for three months in post producing audio for corporate programmes mastered on Betacam SP, it is now unthinkable to return to the old way of working ... Soundscape is reliable, simple to learn, easy to use and produces very high quality results."

Nic Blinston. *Business Video Mar '95*

"Soundscape could well find it's way replacing the analog tape recorder up and down the country ... a welcome addition to any studio set up for the sheer freedom it offers when it comes to laying tracks down quickly and easily in order to make the most of that creative muse."

Bob Walder. *Music Technology Jul '93*

"I've been playing around with Soundscape's hard disk recorder this week and feel almost as though I've had a religious experience."

Brian Heywood. *MIDI Monitor Issue 11*

"I wanted to really check out the vari sync mode. I slowed the video down to a crawl, Cubase locked in and the sequenced music was playing slowly ... a bit faster ... and ... yes the Soundscape synced up and was recording. The SSHDR1 has lots of features, creative usage of available power, sounds great, syncs great, straightforward, easy to use and expandable."

John Zulaikha. *Connections Feb '95*

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Bob Walder. *Home and Studio Recording Jul '93*

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MIKING OPEN-BACK AMPS ON STAGE

TIPS AND TECHNIQUES ON MIKING OPEN-BACK FENDER GUITAR CABINETS FROM THE FRONT AND FROM THE BACK.

BY ROBERT "NITEBOB" CZAYKOWSKI



GET BACK: The Beatles used back-miking techniques in their live shows.

FENDER GUITAR amplifiers seem to be popping up everywhere, and since a lot of them are open-back, engineers need to learn how to deal with them. Miking an open-back amp requires a different approach from miking a closed-back amp, but before we get into the technical aspect, let's look at where these amplifiers came from.

Open-back Fender amplifiers go back to the late 1940s and early '50s when most players sat down and placed their amps either in front of them or next to them. That's why a lot of amps had the controls in the back or on top — they could be easily accessed from a sitting position. Also, the sound from the amp could project back to the musicians as well as forward for the audi-

ence to hear — combo or open-back amps basically spill sound everywhere. It wasn't really until the 1960s that amplifiers started moving towards the rear of the stage and formed a backline because musicians started to stand up while they played. Combo amps seem to sit into a mix perfectly because of the bass you lose. Fenders have a lower-midrange notch in their voicing that helps make them work in a band situation because they don't crowd the bass guitar or the drums too much (for more details on the history of Fender amplifiers, check out *Fender Amps — The First 50 Years* written by John Teagle and John Sprung).

THE FRONT

I like to mic the front of the

amp with multiple microphones such as the Shure SM57, Sennheiser 409, and AKG D112 (stop moaning that it's a kick-drum mic and try it anyway). I put these on individual channels so I can audition the sound of each mic quickly and also try different blends between the mics. You need to spend time moving the mics around because sometimes moving the mic an inch can make a tremendous difference. If you find a sweet spot on the amp, mark the grill with a piece of tape or a stick-on dot for future reference.

There is really no solid rule, especially with Fender amps. Some of them use 12-inch speakers and some use 10-inch speakers, and the 10's sound a whole lot different. The Fender Super Reverb and the Fender Bassman have four 10-inch speakers in an open-back cabinet, and sometimes miking close to get just one of those is not the best thing. Try to pull your mic back a little bit and get more of the combination of

speakers. The acoustic coupling and phase cancellation of multiple speakers has a lot to do with the sound, because you are hearing the combination of all four.

Lately I've been using an old Electro-Voice RE55 omnidirectional mic that looks like the ones they use on game shows. I place it about a foot and a half away from the amplifier so it picks up a blend of all the speakers and the ambiance of the room. On the Aerosmith tour in 1976 we used open-back Fender Bassman and Bandmaster amplifiers under the stage, miked them near and far, and then these sounds were blended in with the band's closed-back amps in the FOH mix. If you need more isolation you could even try miking an open-back Fender Champ inside a bass drum case.

THE BACK

The first time I became aware of miking the rear of a Fender amp was when I was doing a road show of



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Beatlemania as a replacement to another engineer. The backline crew set up the stage and put all of the mics into the backs of the amps. I was wondering, "What is this?" And they told me, "Hey — look at the pictures. The Beatles never had mics in front of their amps." In the '60s, amps had to be powerful enough to cover the room because

the PA was for vocals. To be consistent with the look of Beatles shows through the years, they put the mics back there for authenticity. When the band started to play and I brought the mics up on the board, it sounded pretty good. So it just shows that you shouldn't be afraid to try anything new because it might sound good.

I always put a mic in

the back of the cabinet because there is almost as much sound coming out of the back of one of these amps as there is coming out of the front. Of course, what is coming out of the back is out of phase with what's coming out of the front, so you can try reversing the phase on the console or moving the mic to a different distance from the

speaker. By blending in this rear mic, you can totally change the sound of the amp without using any EQ. You have to experiment and see how it works for you.

When miking the front and rear, I try to use the same mic so that the frequency response is the same — as close as two mics can be without having a matched pair. If you don't have two of the same, it is not a bad thing. Experimentation is the key — move the mics around and try different kinds of mics. Don't get locked in. Remember that Radio Shack PZM that you bought three years ago and haven't used since? Try taping it to the grill cloth or placing it inside the back of the amp. A Shure SM57 is a great starting point but it may not be the right mic for the job. You may need a Sennheiser 421 or an AKG 414 for a little more detail.

If you are a house engineer and doing different bands every night, you want to use something consistent that works for you because the amps are changing all the time. But if you are on a

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I ALWAYS PUT A MIC IN THE BACK OF THE CABINET BECAUSE THERE IS ALMOST AS MUCH SOUND COMING OUT OF THE BACK OF ONE OF THESE AMPS AS THERE IS COMING OUT OF THE FRONT.

tour where you have a consistent backline then you have more of a chance to experiment. I have recently seen some people using the '50s Shures — like the 55 — because the frequencies roll off around 4 or 5 kHz and lot of guitar amps don't go up that high anyway. We are not talking about really Hi-Fi reproduction here, we're talking about vibrating

paper cones. When using a mic like a '414 or Neumann U87, if the mic is really close, there's just not that much high-end detail to capture. When you pull the mic back, that is where the condensers come in really handy. The amp is reacting with the surroundings and there is more high-end detail than at the cone itself. You don't listen to an amp with your ear up against the speaker, and a typical problem is that the player comes into the control room and says, "That doesn't sound like my amplifier." That's because he is not hearing it the way your mic is.

All this technical stuff is great but another key to getting a good sound is that you have to get the player to be happy. A happy player plays great and makes it easy. If he is used to playing with his amp on a chair at a certain volume, the last thing you want to do is go over, put it on the floor, and turn it down. Then he is unhappy and will not play well. Guitar players especially, are kind of voodoo oriented: you know — the magic strings, the magic amp, the magic way of aiming the amp. It really comes down to using your ears because they are the most important tools that you have. **EQ**

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Robert Czaykowski, aka "Nitebob," has extensive experience working both as a live sound engineer and a recording engineer/producer. His credits include mixing front of house for acts such as Aerosmith, KISS, and Ted Nugent, as well as producing and engineering for bands such as Trick Babys, Action Swingers, and The Goops.



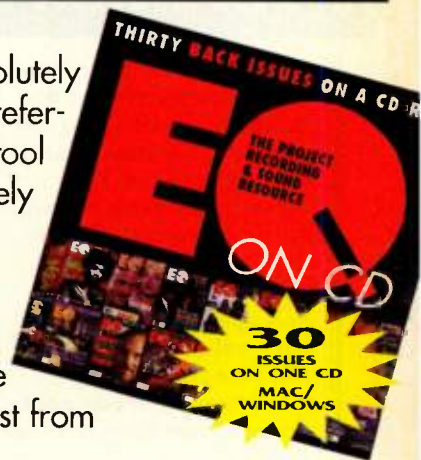
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different acoustical properties. (Hint: If the sound booth is so great, why don't they trade those seats with the people sitting where you want to mix the show?)

Against the Back Wall or In A Corner: The walls of a venue will usually be very reflective, so sound will be bouncing off these walls and interfering with the direct sound from the system. This causes comb-filtering and other frequency-response aberrations (see fig. 3). As you move away from the walls, the level of the reflections will diminish relative to the direct sound from the stage. This reduces the effect of the interference and also adds to the randomness of the interference to make it less noticeable. Low frequencies are most noticeably affected even where the wall is treat-

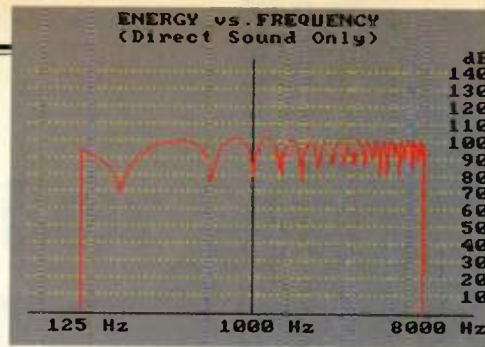


FIGURE 2: The Sound Booth

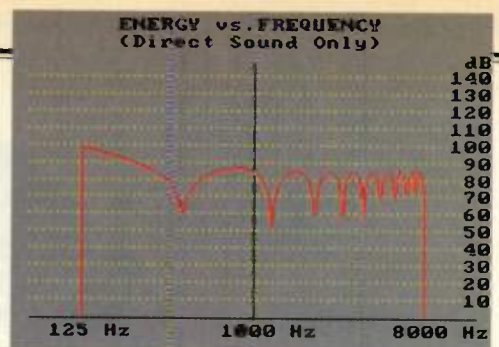


FIGURE 3: Against the Back Wall or In A Corner

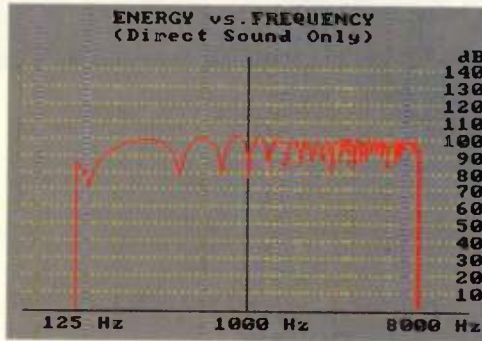


FIGURE 4: Under Balconies

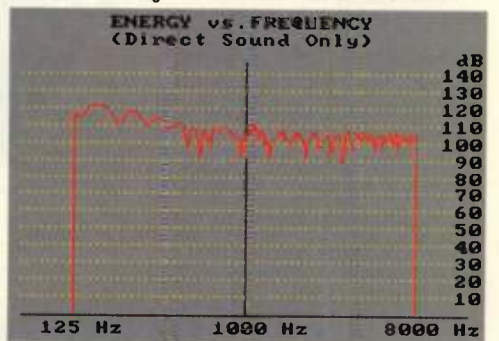


FIGURE 5: Close To or On The Stage

ed with sound-absorbing material. The most audible effect close to a wall is the change in bass level relative to the mid and high frequencies. This is because you are in the pressure zone

of frequencies below 100 Hz when you are within 10 feet of the wall (the same pressure zone that gives PZM mics 6 dB more output). The bass may also be boomy and indistinct —

definitely not qualities to mix by.

Under Balconies: This situation is similar to being in a corner, but with two significant additions: (1) The ceiling is also reflecting

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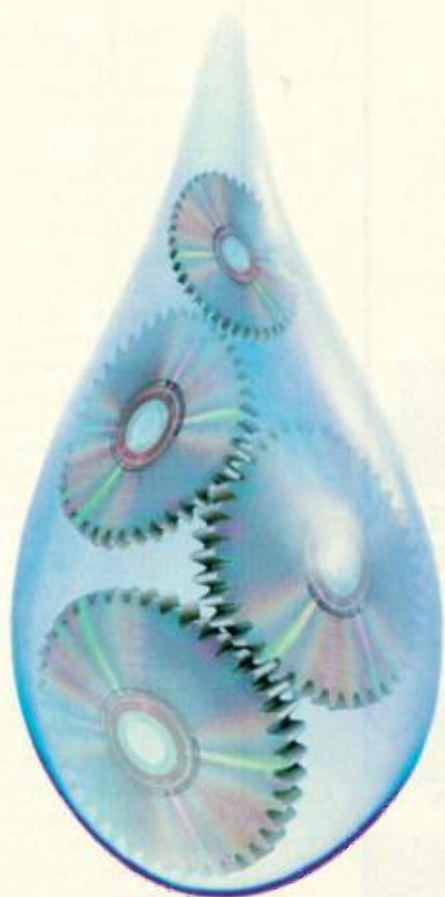
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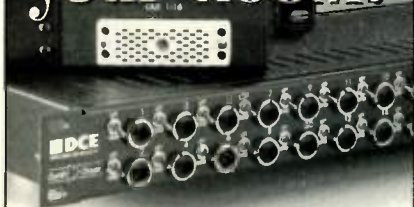
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EQ LIVE

interfering sound (see fig. 4); and (2) If the balcony is very deep, you may actually be in a different room (acoustically). Now, not only can't you differentiate the sound from the system from the sound bouncing off the walls and underbalcony ceiling, but you also can't get a sense of the overall contribution of the main part of the room to the qualities of the music. Some balconies overhang to the point of blocking the direct sound from the main loudspeakers, especially the central loudspeaker cluster in theaters. Question: Do you wanna mix this show or just babysit the buttons for a couple of hours?

Close To or On the Stage: This is a location that offers a few advantages of the monitor-mix position (e.g., proximity to the band's refreshments, quick exit if the audience gets rough), but very little advantage when judging the balance of sound heard throughout much of the audience. Listening a few feet from high-compression horns can only be appreciated by devoted (possibly deaf) fans. This is not the place to judge the sound heard by most of the audience (see fig. 5). Balancing the mix of stage sound with house system sound is nearly impossible from this location (unless you work with Philip Glass...).

ACCEPTABLE POSITIONS

Front of the Balcony: After those last two suggestions things are starting to look up. You have finally been offered a mix position you can work with, right? Well, even if we ignore the issues of lugging the equipment up those stairs and actually finding a way to make your mic snake reach this location, the problem of system coverage still remains. Is your sound system config-

ured to give the exact same quality and level of sound in the balcony as on the main floor? If not, why have you been cheating the listeners in the cheap seats? Reconsider your system layout or buy some more gear (see fig. 6). If your system does offer consistent sound throughout the venue (and why not?), then you can accept the front of the balcony as a reasonable compromise.

Off to the Side of the Room: This location has some of the deficiencies noted above in the discussion of corner locations (see fig. 7). Obviously, if you depend on stereo effects, then you should design a sound system that can produce these effects even in the worst seats — if you are going to mix the show from there. (You should have considered doing this before incorporating the stereo effects into the show anyway.) This is outside the scope of this article, but suffice it to say this is possible. It does, nonetheless, require additional loudspeakers and signal delays. If you are simply balancing an overall mix, then this location may work. Be wary, though, of any particularly loud and directional instruments (guitar amps, big keyboard rigs, etc.) that may not hit this location as much as the rest of the room.

LOCATIONS TO FIGHT FOR

Center of the Main Floor: This is perhaps the favorite location for most people that mix house sound. The best seat in the house — where not only is the balance of stage and system sound at its best, but the sight-line to the performers is also excellent. Of course, you now must be on your best behavior (or at least fit in with the audience) and try not to block the view of

those seated behind you. This will mean reconfiguring your effects racks to rise only to seat height instead of the six-foot tower you use in the back of the room. There is one other consideration. The center of the venue is often called "Power Alley" because of the build up of bass from the two loudspeaker stacks on each side of the stage. Unless you are mixing on a more esoteric system with left-center-right loudspeaker arrays and carefully placed mono subwoofers, the Power Alley problem can be significant. (See fig. 8.) Still, it's a location worth considering unless you are in the middle of a long row of continental-style (continuous) seating and want to be able to come and go after the audience has been seated.

Off Center of the Main

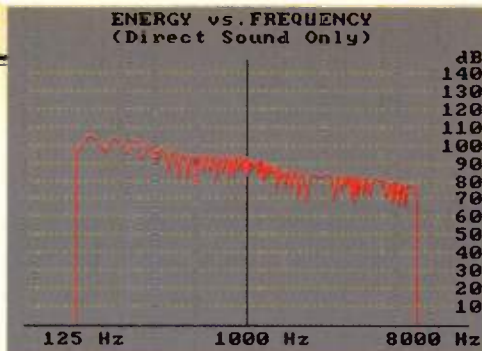


FIGURE 6: Front of the Balcony

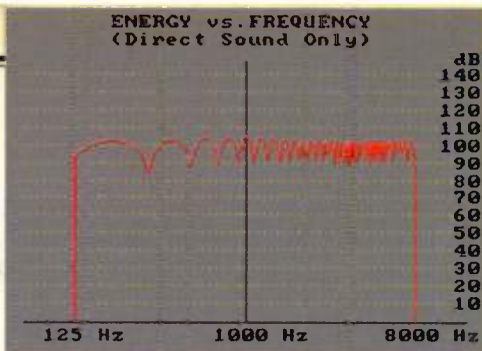


FIGURE 7: Off to the Side of the Room

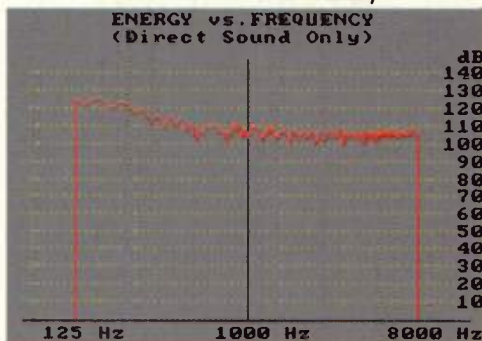


FIGURE 8: Center of the Main Floor

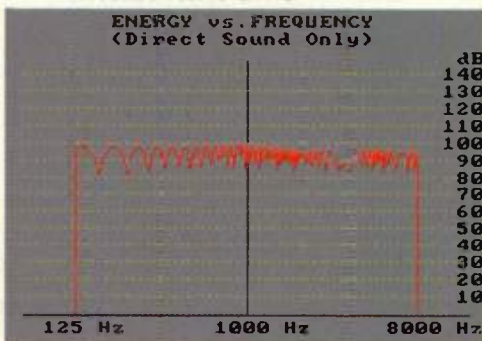


FIGURE 9: Off Center of the Main Floor

Floor: This is the second-most favorite mixing location. It has the advantage of not being in Power Alley (this is wavelength-dependent and therefore relative), but can be in an area of

bumpy frequency response (see fig. 9) due to the same effects that created Power Alley. Now you are in the area of destructive interference instead of summation. The sound from each loud-

speaker stack (again, we're just talking about the simple left/right stack) is arriving at slightly different times, and so sounds that are common to both stacks

continued on page 132

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YAMAHA QS300 SYNTHESIZER



AS YOU'VE probably figured out, a keyboard does not often get reviewed in *EQ* unless it somehow relates to the studio or live performance. The QS300 is definitely a different kinda creature: at heart it's reminiscent of a W-series workstation with its 5-octave keyboard and array of sampled sounds, but its soul traces back to the QY10/QY20/QY300, Yamaha's breakthrough family of "mini-sequencers" that came with a bunch of canned patterns you could use, modify, or ignore, as well as automatic accompaniment that transposed according to whatever chords you specify.

MULTIMEDIA MACHINE

While the QS300's "make your own music" theme is slanted toward the consumer, what's of interest here is that it doubles as a multimedia production machine. It can read and write standard MIDI files to/from disk, responds to General MIDI and Roland GS, and incorporates Yamaha's XG system (a

protocol that is more comprehensive than GM). There's even a bank of sound effects just in case you need some telephone rings, gunshots, or screams in your next corporate presentation.

You can treat the QS300's 16-track sequencer as a "string-a-bunch-of-patterns-together-into-a-song" type, or if you're more into linear track thinking, the QS300 accommodates that too (and if you straddle both worlds, it's easy to transfer parts back and forth between phrases and linear tracks). You can draw on a preprogrammed musical database of 100 patterns containing over 3000 "phrases" (the equivalent of a "track" in each pattern), or create your own patterns and phrases. You can also mix and match phrases — combine a drum part from one pattern with a flute part from a different one.

THE INTERFACE

Yamaha has learned a lot since the QY10's convoluted interface, resulting in

something that's pretty painless to get into. It actually looks more complicated than it is in practice, since the graphically oriented display (not just numbers and letters) is pretty self-explanatory, once you know what the various terms and abbreviations stand for. The basic paradigm doesn't stray much beyond the usual

up/down, left/right buttons with yes/no and enter. I was able to get very deeply into the machine when I first received it without ever cracking open the manual.

FINDING YOUR VOICE

The over 950 ROM instrument sounds (although you're limited to only 128 user sounds) are what

ROAD TEST

MANUFACTURER: Yamaha, P.O. Box 6600, Buena Park, CA 90622. Tel: 800-932-0001 ext. 720.

APPLICATION: Synthesizer/workstation with auto accompaniment for live performance and studio.

SUMMARY: It's a solid workstation, and the auto accompaniment features seem custom-designed for those who need to produce decent music rapidly.

STRENGTHS: Real-time editing; easy operating system; programmable effects; XG standard compatible; large library of riffs and phrases for constructing songs.

WEAKNESSES: Only two outputs; a few solo instrument sounds are weak; cost-effective only if you need all the features it provides.

PRICE: \$1895

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BY CRAIG ANDERTON

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APHEX 661 EXPRESSOR

APHEX SCORED with the Model 107 preamp (see *EQ*, June '95), which offers a sort of "high-definition" tube sound that Aphex calls "tubessence." Subjectively, I'd say this trades off a bit of the traditional tube "creaminess" for greater clarity and higher tube reliability, thus bridging the tube and solid state worlds.

Now Aphex has applied similar design techniques to the 661 Expressor, a single-channel, single-rack-space compressor/limiter. Although mainstream in many respects, there are some unusual — and useful — touches that put this further ahead of what you might expect.

Inputs and outputs offer both XLR (with pin 2 hot, thank you!) and 1/4-inch phone connections, which work in balanced or unbalanced modes (input impedance is 20k and 10k, respectively). A switch selects between +4 and -10 levels for both ins and outs.

Stereo applications require linking two 661's together. You patch each unit's Link jack together, then press one of three interlocking ("radio button") front-panel switches to select the desired link mode: dual mono, stereo, or master/slave. Master/slave is different from stereo in that the slave unit ignores its own control signal and listens only to the master. In stereo mode, the two units "share" control information.

There are also 1/4-inch sidechain connections for

patching in, for example, an equalizer to provide frequency-dependent compression (e.g., de-essing). A front-panel switch engages a sidechain low-cut filter that rolls off starting around 80 Hz. This can help reduce the pumping that occurs from having a strong bass component in program material (such as the kick drum in a techno tune).

So much for connections, let's twiddle some knobs. The compressor has the expected controls: input, output, threshold, ratio, attack, and release, as well as soft knee/hard knee and bypass switches. There are also two 20-stage LED VU meters. One switches between monitoring input or output (much better than just being able to monitor one or the other), and the other reads gain reduction (up to -30 dB). There are also three cool features you don't find on most units.

Cool Feature #1: A high-frequency expander boosts highs only when gain reduction occurs (up to 6 dB maximum high-frequency boost). This high-frequency emphasis can prevent some of the dullness that happens with standard compression. If the signal drops below the threshold, the boost goes away, neatly getting around the problem of boosting hiss unintentionally. The process is reminiscent of Dolby HX Pro, which also adds high frequencies only when needed. Regular *EQ* readers know I found a similar feature in the RSP Reanimator (see *EQ*,

ROAD TEST

MANUFACTURER: Aphex Systems, 11068 Randall St., Sun Valley, CA 91352. Tel. 818-767-2929.

APPLICATION: Restrict dynamic range of a single audio channel in studio or live work.

SUMMARY: Very smooth, very sweet, with some effective bells and whistles.

STRENGTHS: Clean, open sound; high-frequency expansion works wonders with guitars and some vocals; SPR option very helpful with bass and drums; excellent metering; easy to use; true bypass.

WEAKNESSES: Nonprogrammable; need two for stereo; no noise gate or noise reduction to compensate for hissy input signals.

PRICE: \$749

EQ FREE LIT. #: 141

BY CRAIG ANDERTON

March '95) extremely useful (especially for guitar); it's just as wonderful here.

One control sets the expansion amount (ratio), another the frequency at which expansion occurs (2 kHz to 20 kHz). I preferred low ratio and frequency settings, which produce a bit of boost over a broad range. If you want more "air," you'd use higher ratios and higher frequencies, but not so much as to bring up the signal's hiss.

Cool Feature #2: The SPR (Spectral Phase Refractor) switch adds some nice low-frequency definition by messing around with the phase to compensate for low-frequency phase delays. Forget the Buck Rogers terminology and enjoy it for what it is — a way to tighten up the bass in many applications.

Cool Feature #3: The bypass switch uses a relay

to connect the input directly to the output, so when you bypass the unit, there is no circuitry in the way. Also, if the power cuts out, the unit goes directly into bypass mode (no thumps).

For nontweakers, an auto mode (called Easyrider) places the knee switch and ratio, attack, and release controls on autopilot. Selecting auto mode enables a slow/fast switch that sets the automatic release time. If you've been skeptical of automatic control, the 661 will change your mind. It's like having an extra hand that speeds up the attack when there's a sharp transient, then slows things down as the signal dips closer to the threshold. The result is a more natural sound.

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Although it has some nice options and sound qualities, the 661 is at heart a compressor. Setup is particularly easy if you choose auto mode, otherwise just go ahead and tweak the controls, being (of course) careful not to over-compress. I obtained best results by setting the basic controls first, then dealing with the "options" like the high-frequency expansion,

SPR, and sidechain. Also, being able to switch the level meter between input and output is wonderful. You can make sure that you're hitting the unit as hard as possible at the input, then check the output to determine whether or not your tweaking has caused distortion within the unit.

The sound quality seems more "sweet" than "warm"; it has a very good high end, yet

exhibits no stridency. Like the Model 107 preamp, there are elements of both solid-state "definition" and tube "warmth," with neither side predominating. Also like the 107, the 12AT7 (ECC81) uses a low-plate voltage (under 50 volts). Although some tube purists insist that only high-plate voltages give the tube sound, that isn't true. The tubessence design is not the

usual "starved-plate" approach, but a rather different (and patented) design. Interestingly, it pretty much eliminates the "Miller effect," a dulling of highs caused by interelement capacitance. This is perhaps one reason why the high end is so well-defined, yet sweet. There are other benefits: the tube lasts longer, its characteristics remain more consistent, and microphonics become a nonissue.

When you need to replace the tube, you can do so yourself, but to ensure consistent sound quality from unit to unit, Aphex recommends doing a THD trim calibration with a distortion analyzer. Just putting in any 12AT7 sounds acceptable, but if you're running two devices in stereo and need to change the tube in one unit, you should probably send it back to Aphex for retubing and calibration if no decent service tech is available.

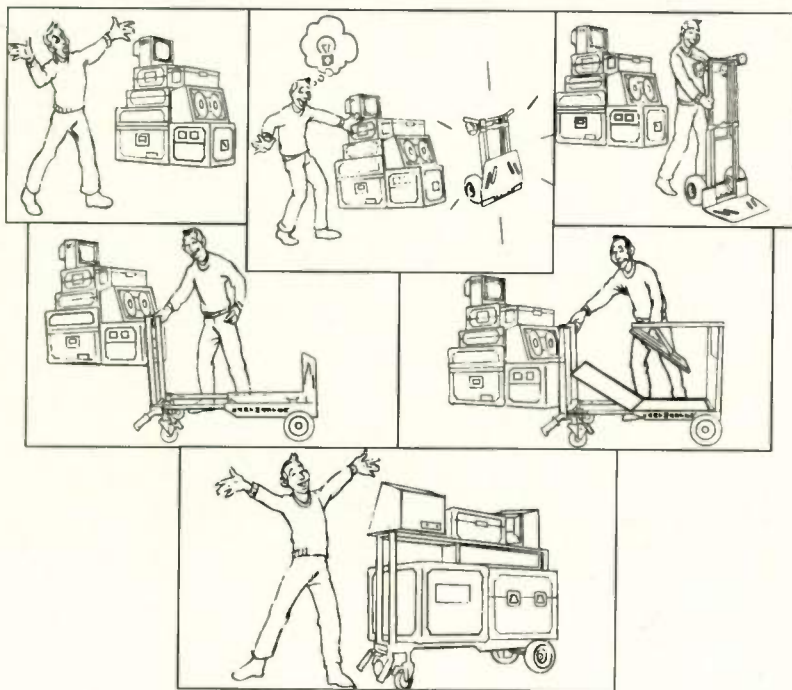
THE ENVELOPE, PLEASE

At \$749 the 661 is not exactly bargain-basement, but delivers exceptional value for money. It's not as "tubey" as some other units, but its somewhat more neutral sound makes it a versatile unit that works in a variety of contexts. Being a mono unit, I tried it mostly on instruments, but it also does a great job with program material. It would not surprise me at all if Aphex comes out with a stereo version next.

EQ

Note: A sample comparing a piece of music before and after compression with the 661 has been uploaded to my site on America On Line in both .WAV and .AIF formats. After signing on, enter keyword "SSS" then click on EQ online > Review unit demos > Aphex Expressor.

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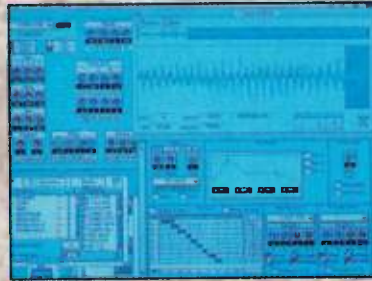
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CIRCLE 94 ON FREE INFO CARD

On The Level

Getting info on levels with a little help from audio's Internet friends

BY BRUCE BARTLETT
WITH JENNY BARTLETT

Is your mixer giving you all the performance you paid for? Are you hearing noise or distortion? Much depends on your input gain trim, which needs to be set correctly for the best compromise between low noise and low distortion.

To find out the right way to set gain trims, I logged onto the Internet and found a newsgroup called rec.audio.pro. It's a place to get help from our colleagues. Many contributors to this newsgroup are knowledgeable people, ready to give helpful advice. I asked them about level setting.

SETTING LEVELS WHILE TRACKING

Let's say you want to correctly set the input gain trim on a mixing console. You've already set the master faders and channel faders to design center (at 0, about 3/4 up). Before setting the gain trim, you ask the band you're recording to play the loudest part of the song.

Now, which of the following two trim methods is better, and why?

1. Starting with the trim set at minimum gain, turn it up until the clip light flashes, then back off a little. In other words, set the gain a little below clipping. Then set the recording level with the fader. This seems like a good idea, because you get the least noise by putting maximum gain up front.

2. Instead, adjust the gain trim

to get a 0 VU recording level on the output meters. The input signal will be about 15 dB below clipping.

The answer? Leave the faders at design center, and set the gain trim to get 0 VU. That way, the console is adjusted for the best tradeoff between headroom and noise.

Setting the gain trim just under clipping is wrong since you've created a situation where you have no headroom. How do you know that something louder won't come along later? Also, if you set the gain near clipping, the signal level is very high, which makes some consoles sound bad.

When you set the record level to 0 VU, that's just a ballpark figure. Actually, you adjust the gain trim to get the recording level you want for each source. For example, suppose you grouped three mics to one track. Set the gain so each instrument makes the meter read -5 VU. Summing the three will bring up the level near 0 VU. Also allow for about 3 dB of level increase during the actual performance, as

opposed to the soundcheck. Most performers play louder when the adrenaline starts to flow.

If your recorder is digital, leave a little more headroom. For example, when I record on the TASCAM DA-88, I set the gain trim so each meter peaks at -5 on the loudest notes. During the actual performance, peaks may reach -1 or so. (The meter is calibrated in dBFS, which means "decibels full scale." Zero dBFS is 16 bits on.)

SETTING LEVELS DURING MIXDOWN

Some consoles let you adjust trim during mixdown as well as recording. If you have such a console, try to keep all faders near design center. Set up a rough mix with the input gain trims.

Why? You run the faders near the 0 dB point, where the attenuation curve is most gentle and crosstalk is minimized. Each fader operates smoothly, so you'll get a better mix. And since all the faders are lined up, it's easy to see changes.

With this setup, you might reduce S/N a few tenths of a dB. But on a good console, the fader followers are



Illustration by Mike Browne

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SETTING DURING LIVE MIXING

If you're doing a live mix — either PA or to stereo tape — set the master and all the active-channel faders to design center. Then get a rough mix using the gain trims. Usually, that's pretty close to the optimum gain structure. It gives you a range of fader movement so you can maintain a

balanced mix as things change.

Here's another way to set a rough mix: If you can switch each channel's PFL or Solo to a meter, do so. Have the musicians play the loudest part. Adjust the gain trim so the level reads about 0 on a peak meter or -12 on a VU meter. Drums and other short-duration sounds will need to peak about 6 dB higher to sound equally loud.

Another way to set levels: If the clip light flashes, back off until it does not and then reduce the gain trim by 15

dB. Or you can set each trim where you normally use it, based on experience.

To see whether the Internet experts' advice was correct, I listened to the noise level of my mixer with two different settings:

1. Gain trim set just below clipping; fader set to get 0 VU.
2. Fader set to design center; gain trim set to get 0 VU.

Results: The audible noise was the same with either setting. But the headroom with method 2 was much higher, and the fader was in a more usable position. Looks like #2 is the best plan.

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HOW TO MATCH SONG LEVELS

I asked another question on the Net: Which method do you recommend to match the loudness from song to song on an album?

1. During mixdown, make the loudest part of each song peak at 0 VU on a VU meter.
2. During mixdown, set ballads a few dB quieter than rockers.
3. During mixdown, make the loudest part of each song peak at 0 on your DAT's peak meter. Then while mastering, go by ear when you set the level of each song.

Everyone agreed with option 3; just go by ear. Why? Meter readings — especially with peak meters — do not correlate well with perceived loudness. And they have nothing to do with the musicality required in sequencing an album. The “ideal level” for an individual track may depend on the track that precedes or follows it.

Setting a ballad's level compared to a rocker depends on the instrumentation. If the ballad has a brass fanfare in it, does that affect your choice? Go by ear, not by numbers.

SETTING SONG LEVELS WHILE MIXING

If you choose not to have a mastering engineer set the song levels, you'll need to do it yourself. You could copy the edited mixes to another tape deck while tweaking levels, but this may add noise. So you still might want to set the song levels while mixing. With this method, though, quieter songs will have poorer S/N than louder songs. And you might not get the levels just right.

If you're mixing to an analog deck, set the levels so the meters go to 0 on the “routine” peaks of each song. In other words, have the needles bounce

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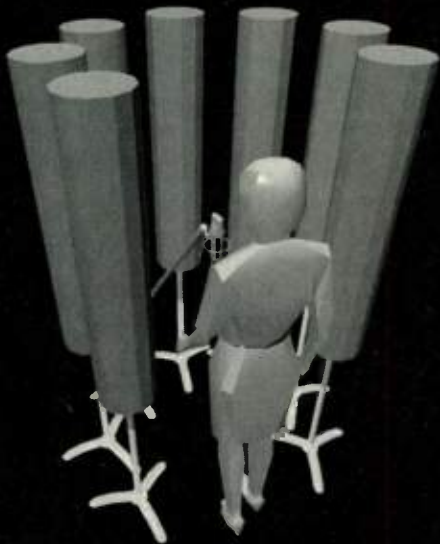
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WORKSHOP LEVELS

up to 0 on most of the peaks, except for that "whoop" in the third verse. If you set the loudest instant of all songs to 0, they won't match in average level.

If a quiet song has a wide dynamic range, let its peaks almost match the peaks of the raucous songs. Soft pieces with less range can have lower average levels.

SETTING SONG LEVELS: PREMASTERING

This is the preferred method. Try this procedure: 1. Set the mix the way you want it. 2. Adjust the master fader to get the maximum level on your mixdown medium (DAT or analog tape). This maximizes the dynamic range of the medium. If you're mastering for CD, the highest peaks on the album should reach 0 dBFS. 3. Sequence the mixes. That is, edit all your mixes together in the order that you want them to appear in the final product. 4. Play the sequenced mixes through your mixer. 5. With faders in hand, listen and take notes on the level changes that sound right. Lower the gain of songs that are too loud. Make notes for the mastering engineer to follow. He or she should know how gain changes will affect the perceived noise floor of the program material.

If you want to change the gain yourself, run through another pass and adjust fader levels according to your notes. Record the result on another DAT. Or do the gain changes on a digital audio workstation.

How do you listen for proper levels? Decide on one cut to be your reference. Compare the last ten seconds of that one with the first ten seconds of the next cut. Listen for any glaring level jumps. If a single instrument is constant level (an acoustic guitar for a folk singer, a kick drum for a band), then listen for constant volume of that instrument from song to song. Match vocal levels if possible.

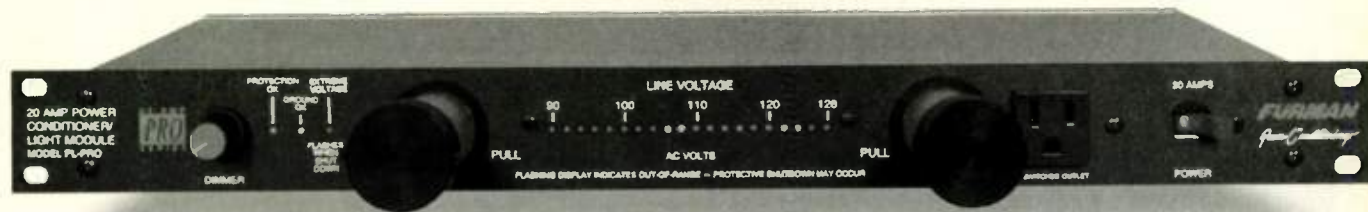
Some digital editors let you normalize the song levels. When your computer normalizes, it calculates a gain change for each song that brings its maximum peak level to 0 dBFS. However, this is a poor way to adjust levels on an album because peak level correlates poorly with loudness. So use your ears! Level matching is an art form — there's no formula.

Thanks to Monte McGuire, Dave Liquorice, Gabe Wiener, Mike Rivers, Pantelis Fotopoulos, Paul Stamler, Chris Christensen, John Bittner, Tony Lash, Jerry Tubbs, Bob Katz, Christopher Coleman, and Cleve Baker.

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CIRCLE 22 ON FREE INFO CARD

Groove Tubes Microphones

See if these modern-day
tube mics stack up
to their classic vintage
predecessors

BY STEVE LA CERRA

As its product range continues expanding to include other equipment such as equalizers and compressors, the Groove Tubes name is becoming more familiar in recording studios. Its growing line of microphones now includes the MD1 (their first mic), the MD2 (the first condenser mic with a variable sensitivity control), and the newly released MD3 (see sidebar). All Groove Tubes mics are vacuum tube condenser-types and require an external power supply. The company's PS2a is capable of supplying power to two com-

plete GT signal chains including two tube mics, two MP1 or DP1 mic pre-amps, and two EQ1 tube EQs. The PS2a unit has two ports; multiple units are powered by daisy-chaining the devices together via locking DB9 connectors. Groove Tubes mics may also be used with the DP1P self-powered DI/mic preamp that is intended to power a single GT device.

The MD1, MD2, and MD3 all mount to a mic stand using the ST1 "Shock Therapy" isolation system. I was at first a little hesitant about putting an expensive mic into this simple-looking holder, but simplicity turned out to be the ST1's strength: two padded steel bands tighten around the body of the mic, clamping it in place. The ST1 is the only shock mount I have ever used that is "tunable"—tension is changed by moving the bands along the mic body so that they are closer together or farther apart from each other. Groove Tubes has cleverly given the ST1's frame a flange for mounting a pop filter (also included) without any additional apparatus. The body of the MD1 is threaded for direct mounting to a stand, but be cautious about possibly stripping the threads.

Associated equipment used with the GT mics in this Audition included: Soundtracs and Mackie consoles, Demeter VTMP-2a mic preamps, T1Audio dual-channel tube compressor and equalizer, Valley Commander, and dbx 160X and Symetrix CL150 compressors. The first session involved using a matched pair of MD2's as overhead cymbal mics for a drum kit. I used the mics in spaced-pair and then X-Y configuration, which was a bit tricky — it requires that one mic be placed upside down over the other, with the tops facing each other.

My first impression of the MD2's was one of transparency; that is, cymbals sounded like live cymbals and not like cymbals through microphones. The top end of the mics was clean and extended, and I got the feeling that I was really hearing the cymbals for the first time. When patched through the dbx 160X's for a bit of compression, the MD2's required only a touch of high-frequency EQ to compensate for the loss due to the 160X's. Timbre and output



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GROOVE TUBES MD3

The MD3 (System 3 price: \$2195) is the only Groove Tubes microphone (as of this printing) with a changeable pickup pattern. A small set screw on the rear grill opens and closes a port, thus acoustically altering the pickup pattern from cardioid to omnidirectional with variations in between. Like the MD2, the MD3 has a sensitivity control with a range of 20 dB in 2-dB steps.

When I powered up the MD3, I noticed a hissy static-type of noise that read about -18 to -12 dB on the console meters. After the mic was on for about five minutes, the noise quieted down to about -20 dB, and after about 15 minutes it disappeared into the noise floor of the studio. The folks at Groove Tubes informed me that this may have been due to some moisture trapped within the capsule that dried as the tube heated the mic, and that the mic ordinarily should not require a warm-up period of more than a minute or two.

I used the MD3 with a Frank Sinatra-style "crooner," and the mic was perfect for this session. It sounded similar to my RCA 44 ribbon microphone, but without the noise I have come to expect from the RCA. The MD3 should be placed with care: moving it a mere two inches can make a world of difference in the high-frequency response. In general, the MD3 was big and fat in the lower midrange and really smooth in the high frequencies, a combination that gave it a mellow, round sound. The high-frequency response of the MD3 did not seem as extended as that of the MD2, and the MD3 exhibited a noticeable proximity effect but was very consistent in tone regardless of how the polar pattern was set. On rack toms the MD3 required careful placement (to keep it out of the way of flying drum sticks) but provided a fat, warm tone with plenty of attack. In this application, I strongly recommend setting the pick-up pattern to the full cardioid setting to avoid leakage that might result from using a wider pattern.

The MD3 joins the MD1 and MD2 as Groove Tubes' "retro" mic; fans of the vintage mic sound should definitely check out the MD3. The unit is available as part of the GT System 3, which includes a PS2a power supply, ST1 shock mount, EC1 cable, and an extremely slick foam-lined carry case that should protect your investment for years to come. —Steve La Cerra

level from these mics was quite consistent, making them a well-matched pair.

Close-miking a snare drum with the MD2 required the sensitivity control to be turned down all the way to prevent distortion, but this had no discernible effect on the mic's ability to reproduce an instrument's timbre — a quality that far too few mics share. The cardioid pattern of the MD2 was a bit wide, making placement to avoid leakage more critical than with other mics. The MD2 captured all of the crack you could want, but also had the lower-midrange "tonk" that too many other mics ignore. I attribute this to the size of the MD2's diaphragm, which was large enough to accurately reproduce the lower frequencies.

In an A-B comparison on a male voice with the MD1, the MD2 was flatter but not necessarily flattering. It generally behaved more like an instrumentation microphone, which worked well for percussion such as maracas and wind chimes. The MD1 has a more pronounced proximity effect (which I liked on most male vocalists) and slight bumps in the lower midrange and the region around 4 kHz (which helps lead vocals cut through a mix). When used on guitar amps, the MD1 definitely added some tube character, and it's no wonder that the MD1's claim to fame is amplifier miking. In spite of the fact that the MD1 does not have a pad, it easily handled the output of a Marshall 2x12 speaker cabi-

net. In a comparison of the MD1 and MD2 on female vocals, the vocalist and I preferred the MD1's tone, whereas we found the MD2 a bit thin.

The Groove Tubes MD1 and MD2 have distinct places in a studio's mic arsenal — the MD2 for uncolored translation and the MD1 for adding tonal character. At a suggested list of \$1195, the System One (which includes the MD1, PS2a, and EC1) is a steal and for those studios who can afford the extra bucks, the MD2 System 2 (\$1695) will become a "first-call" choice for many applications.

There was, however, one thing I didn't like about the Groove Tubes microphones—I had to send them back. **EQ**

GROOVE TUBES VITAL STATISTIC

MD1

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Frequency Response: 40 Hz–20 kHz, ± 2 dB
Maximum SPL: 132 dB
Maximum Output: 1 volt
Equivalent Noise: 28 dB
System One Price: \$1195
 (includes MD1, PS2a and EC1; ST1 is optional for \$150)

MD2

Pickup Pattern: Cardioid
Frequency Response: 40 Hz–20 kHz, ± 2 dB
Maximum SPL: 150 dB
Maximum Output: 1 volt
Equivalent Noise: 28 dB
System Two Price: \$1695
 (includes MD2, PS2a, EC1 and ST1)

MD3

Pickup Pattern: Switchable from cardioid to omnidirectional
Frequency Response: 20 Hz–20 kHz, ± 2 dB
Maximum SPL: 150 dB
Maximum Output: 1 volt
Equivalent Noise: 28 dB
System 3 Price: \$2195 (includes a PS2a, ST1, EC1 & carry case)

Note: all Groove Tubes microphones currently use the 12AT7 dual triode tube.

For more information: Groove Tubes Electronics, 12866 Foothill Blvd., Sylmar, CA 91342. Tel: 818-361-4500. Circle EQ free lit. #142.

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Novation BassStation Rack



MANUFACTURER: Novation, distributed by Music Industries Corp., 99 Tulip Ave., Floral Park, NY 11001. Tel: 800-431-6699; E-mail: basstation@aol.com.

APPLICATION: Create vintage analog bass sounds (some leads, too) under MIDI control.

SUMMARY Delivers a really good synth sound without forsaking contemporary advantages such as programmability and tuning stability.

STRENGTHS: Fast attack; excellent emulation of Minimoog and other vintage basses; physical control for each parameter; includes MIDI/CV and CV/MIDI conversion; good filter, with external audio option.

WEAKNESSES: Mono output; only one voice (you can add more voices by linking together more BassStations); only sawtooth/pulse/square waveforms; knobs wiggle and could feel sturdier.

PRICE: \$799.95

EQ FREE LIT. #: 143

THE ORIGINAL BassStation created somewhat of a stir among the dance crowd by re-creating the vintage bass sounds of yesteryear using — gasp — analog technology. However, it was never designed to be at home in a synth rack (certainly one of its most logical applications), which Novation has remedied with the BassStation Rack.

Versatility is not what this box is all about; you get analog sounds only, no sampled or FM synths. But for analog purists who don't want to forego the reliability of digital electronics, this is the ticket.

'70S CONTROLS

The architecture is Minimoog-based. There's the standard two oscillators, one with a 4-octave range switch, quantized semitone tuning control, and fine tuning. Each is limited to saw/pulse/square waves, but Osc 2 can hard sync to Osc 1 for those great "ripping" sounds of yore. A mix control pans continuously among Osc 1 only, Osc 2 only, both, or external

input (which substitutes for the onboard oscillators).

Although there is a control for each parameter, in a concession to size and cost, some modules have a switch to select what the knobs affect. For example, there are knobs for oscillator modulation options (LFO, envelope) and pulse width (with a switch that selects among LFO, envelope, or manual). With the module's select switch set to Osc 1, these knobs affect Osc 1. When set to Osc 2, they affect Osc 2. Each knob can apply positive or negative modulation.

The LFO offers random (with a stepped, not smoothed, waveform), triangle, and sawtooth waves. In addition to the expected speed and delay controls, there's a blinky light to indicate the LFO speed (good for syncing up LFO effects when playing live), and the LFO can sync to MIDI clocks.

The filter includes parameters for cutoff, resonance, mod depth, mod source (LFO or envelope), and choice of 12 dB/octave rolloff (Oberheim

sound) or 24 dB/octave (Moog sound).

There are two envelopes with parameters for attack, decay, sustain, release, and velocity modulation of envelope amplitude. Env 1 is dedicated to overall amplitude, while Env 2 is for modulation. You can also trigger envelopes three ways: single (i.e., legato mode — you must release a note before it can be retriggered), multi trigger (each note retriggers the envelope), and autoglide, where pitch glides from the note currently held to the next note played according to the portamento control setting, without retriggering the envelope.

Other features include a volume control, memory protect switch, and headphone jack.

'90S CONTROLS

In addition to the various front-panel controls, there's a programming section for choosing any of 100 programs, setting MIDI transmit and receive channels, auditioning sounds by triggering a single note, and tweaking various utility settings for MIDI control — pitch-bend range and depth, filter mod depth, aftertouch, master tuning, etc.

One very cool MIDI feature is that the filter frequency, resonance, and mod depth parameters are all set to MIDI controllers, as are the 10 envelope settings (five parameters for two envelopes). This lets you play with sounds live not just from the front panel, but by external MIDI footpedals, various MIDI control surfaces, and so on. It's also easy to record dynamic changes into a sequencer for later playback; team this with the external input option, and you can do some bitchin' processing (try filtering drum machines or guitars) as well as playing. As expected, you can also use MIDI to save and load bulk dumps of program info.



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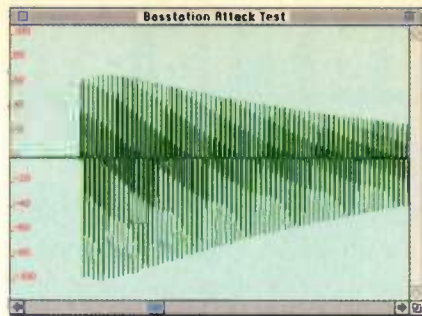


FIGURE 1: Note the fast attack and brief "sustain" (about 20 ms) at the note's beginning; this is one reason why the BassStation sounds authentic.

JURASSIC PORTS

There's even a CV/Gate-to-MIDI converter so you can not only control the BassStation from a MIDI device, but translate MIDI signals to CV and gates. And yes, it accommodates the ARP/Sequential, Yamaha/Korg, and Moog protocols. Extra credit: You can run the BassStation off one channel, while running the MIDI/CV conversion functions on another channel.

One of the Minimoog's characteristics is that it has a fast attack (some synths have attack times of a few milliseconds, even with the attack set to "0"); this is part of what gives it a punchy sound. Another factor is that even with a fast attack and decay, the sound doesn't decay immediately after hitting the peak, but remains on full for around 20-30 milliseconds. Interestingly, so does the BassStation (fig. 1).

Overall, the BassStation is designed to do one thing, yet it does that one thing very well. It indeed injects some "analog thinking" into the digital age, and adds several improvements along the way. The melding of analog and digital is well-done, and the sound quality is clean and warm.

The BassStation is also acceptable for single-note leads, although the unit lacks adjustable filter tracking, which is often essential for lead work. However, lead is not the point here, it's bass. The BassStation is certainly not the only collection of bass sounds you'll ever need (unless you work with a genre of music that dictates analog bass sounds only), but if you can't afford the luxury of a MIDified vintage Minimoog, then this looks downright cost-effective by comparison — and it stays in tune better, too. —Craig Anderton

Part of the BassStation demo has been uploaded to my site on America On Line in both .WAV and AIFF formats. After signing on, enter keyword SSS then click on EQ online > Review unit demos > BassStation.

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 Studio Sound, April 1995



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Philips Sound Enhancers



MANUFACTURER: Philips Key Modules, PO Box 80002, 5600 JB Eindhoven, The Netherlands. Tel: 31-407-33455. North American distributors: Mackenzie Labs, 1163 Nicole Court, Glendora, CA 91740. Tel: 800-423-4147; Superscope Technologies, 1000 Corporate Blvd., Aurora, IL 60504. Tel: 708-820-4800.

APPLICATION: Processor designed to improve sound quality of in-studio recordings.

SUMMARY: A good improvement to D/A converters found in CD players and DAT machines.

STRENGTHS: Uses different processes simultaneously; excellent analog section

WEAKNESSES: Nothing major, basically does what it says it can do.

PRICE: IS 5021 (consumer version), \$1500; 5022 (pro version), \$2400 **EQ FREE LIT. #:** 144

PHILIPS, as you know, are the guys who, along with Sony, invented the CD. Well, Philips has now introduced two versions of a product that may sell as many units as CD players. They call it simply the "Sound Enhancer." That seems pretty straightforward, but what does it really do? I'm glad you asked, 'cause I'm gonna tell you.

The Sound Enhancer provides the following functions and effects:

- high-end D/A converter for connection to CD players to improve audio quality;
- high-quality A/D converter for processing analog signals and recording analog signals into samplers or DAT recorders;

- sample-rate converter for interfacing between digital gear of different sample rates (e.g., copying DAT tapes at 48 kHz to CDR at 44.1 kHz);

- digital sound processor for declipping audio;
- digital-domain noise filtering;
- stereo enhancement;
- compression/expansion;
- bass and treble control;
- quantization Noise Imaging;
- jitter removal;
- digital volume control with auto fade-in and fade-out.

A great use for the Sound Enhancer is transferring phonograph records to DAT or CD-R. Just activate the scratch suppression and noise fil-

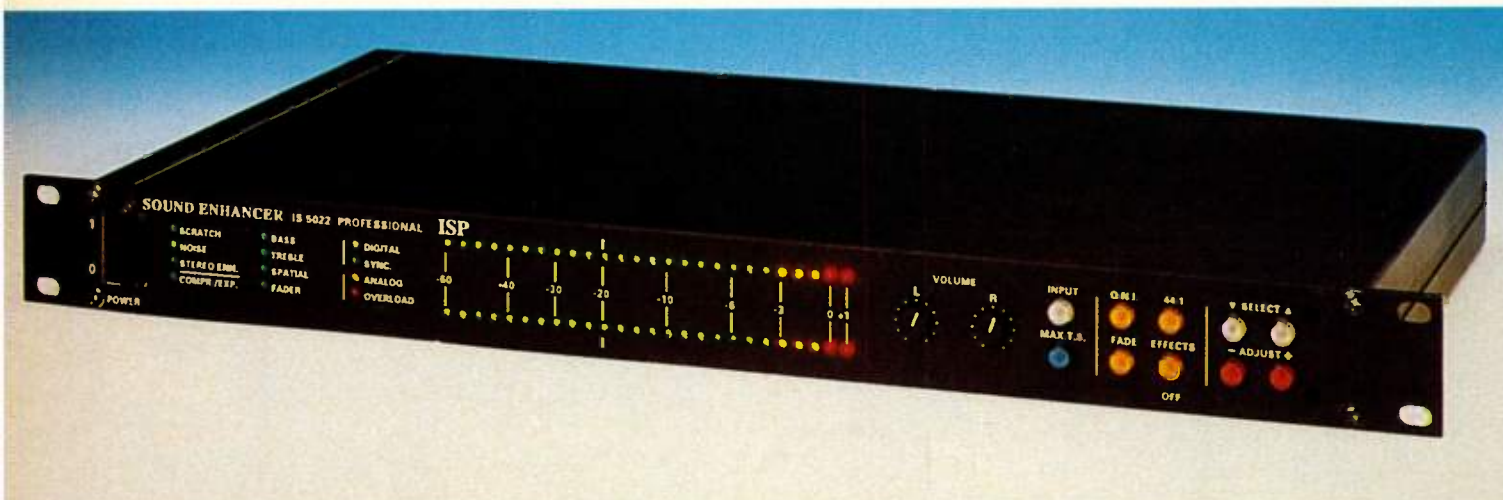
ter, punch up Record, and away you go. Keep in mind that this box does not do a good enough job to replace the CEDAR boxes or Sonic Solution No-Noise, but for home and production-studio use, there is nothing on the market like it.

Your mixes are finished and you want to master them yourself? Well, the Sound Enhancer gives you a big head start. You can brighten up the overall mix, add some bottom end on a couple of tunes, compress the whole mix a little to make it sound louder on the radio, and sample-rate convert from 48 kHz to 44.1 kHz — all at the same time.

Because of the DSP time necessary for some of the more complex tasks, you can't perform compression/expansion at the same time as scratch suppression, noise filtering, and stereo enhancement. You can, however, add EQ or any of the other functions at the same time.

SOUND QUALITY

I haven't thought about vinyl records for a long time. When I opened the Sound Enhancer owner's manual, the first picture I saw was of the Sound Enhancer set up for recording records to DAT. I figured that was what I was supposed to do, so I went to the garage and dug out my old Technics SL-110A



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turntable with SME 3009 tonearm, connected it to an SAE Mark 1B preamp, grabbed an unopened, never-been-played 1974 Steely Dan album, fed the analog output of the preamp into the Sound Enhancer, connected the digital out to my CD recorder, and Bingo!

The Sound Enhancer did a credible job of lowering the noise level from the LP without affecting the music. Not bad! I then cranked in some Spatial enhancement to improve the stereo image, added some low-end EQ, and brightened things up a smidgen. Now this is the way the record should have sounded 20 years ago.

The EQ is just two bands labeled Bass and Treble. They are meant to provide a nice broad overall effect of warming up the entire bottom-end and smoothly brightening the entire high-end. I personally like this type of EQ for playback because it doesn't change the mix the way narrower EQ often does. I took the finished CD out

to my car for a listen and it sounded pretty good.

I/O & RECAP

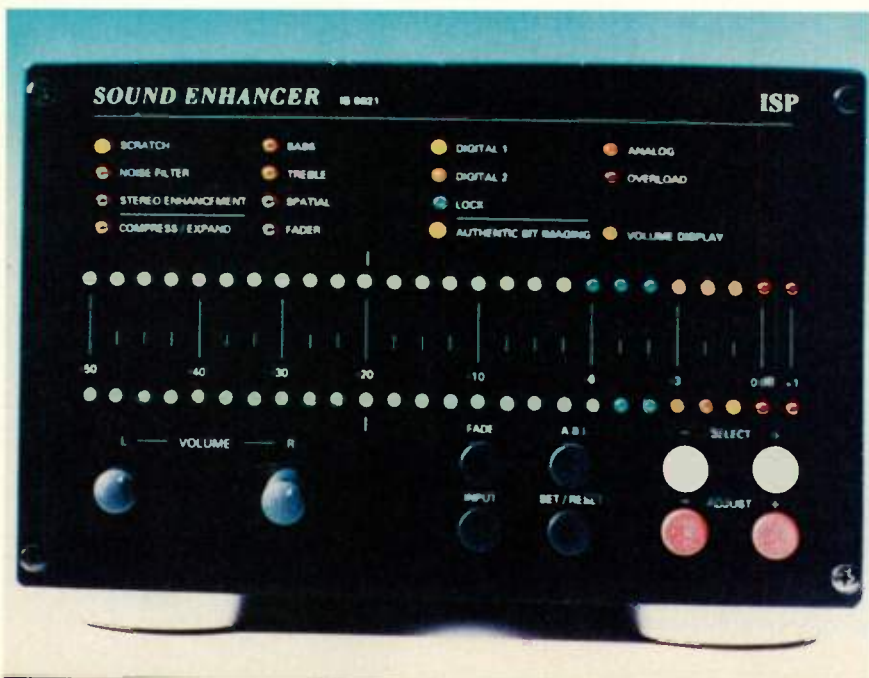
Both the professional (IS 5022) and the consumer (IS 5021) units have multiple digital inputs. The consumer version allows you to switch between the input pairs so that you can have two digital sources. The analog inputs and outputs can be connected to the loop through jacks of your preamp (for Hi-Fi installations) or connected to your patchbay (for studio setups).

As for the analog I/O, I said earlier that the analog section is excellent sounding. It will be a vast improvement over the D/A converters in all but the most expensive CD players and DAT machines,

and a must for playing back MiniDiscs.

The decision to buy a Sound Enhancer is a no brainer. Just do it. If your husband/wife or girlfriend/boyfriend complains, tell them to see me. I'll straighten them out. Let me know how it turns out. —Roger Nichols

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MI INSIDER

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white oak cuttings and range in length from 14 to 28 inches. Depending on where you live, "shorts" cost 90 cents to \$2 a sq. ft. The red and white are generally mixed, but it makes for a very beautiful floor with great reflective qualities — and you save a bundle.

9. Definitely Not Rough Trade: Run an ad in your local musician's mag or local music store two to three months before your build begins, and offer to trade studio time for labor (carpentry, electrical, foaming, surfacing, demolition, cleanup, gopher, etc.). One can save thousands of dollars in labor costs this way and generate your first projects by trading for studio time, which generates publicity in your community.

10. Double Your Pleasure, Double Your Budget: Whatever your budget and time constraints are, double it. Spencer figured with all the deals he was getting, the studio would be done for \$35,000–\$40,000 in three months; due to a variety of unplanned additions designed to enhance the studio even further, it ended up taking almost six months and costing \$85,000. Still, it looks and sounds like a \$200,000 room, mostly because of the deals cut on lumber, labor trades, and Spencer serving as his own gopher (which took three to five hours a day regularly). He recommends that the owner be the gopher since you need to build relationships with those in the area who have connections to deals.

11. Building Instant Karma For Building: Spencer plays a lot of benefit concerts in his area for nonprofit groups, which ended up giving him connections he would not have had otherwise. For example, he traded a complete set of his CDs (14 at the time) to a local lumber-yard owner for a 100-year-old 6" x 12" x 40' redwood beam for the main ceiling.

12. Construction Requires Pre-production: When you work with a studio designer, get up-front advice and do lots of work on paper. A program like Virtus Walkthrough (available for both Mac and PC; 118 MacKenan Dr., Ste. 250, Cary, NC 27511. Tel: 800-847-8871) lets you model the space in advance of construction and literally "walk" through it on your computer, which can be very helpful. As to the designer, listen to previously designed rooms and make sure

that the response is true. Just remember, the one thing all your recordings will have in common is the room, so don't skimp on it — even if your needs are not quite as complex as the ones described above. You can always upgrade your gear, but a good room is forever. **EQ**

RHINO DIY SERIES

continued from page 56

was another copy made. Sometimes if the guides on the machine are a little worn, they might grind the oxide off at some places. That is actually more of a problem than anything that I deal with from the '70s because for the most part you bake the tape and it's done. And if you need the tape six months later and it's shedding, bake it again. A lot of people think that once you bake a tape and transfer it it's useless. We have a test reel that we try to hurt, a little Rhino master from that era, and I have been able to bake the tape numerous times without signal degradation."

Inglot explains that the only way to really know if a tape needs baking is to put it on the machine. "That does not mean that you put the reel on the machine and put it on force nine rewind, but you check it out to see if you have a problem. We have even had six-month-old tapes that needed to be baked, and that is another issue that no one wants to cop to. I pulled a Tommy James remix that we did for a recent package and the thing is shedding. We used this a year ago, so what's going on? I don't feel that the shedding or binder issue is over with. It's a problem that may still be with us. The irony is that I rarely have problems with the Scotch 111 stock. The magnetic tape from the '50s is going to be around long after we're dead and buried."

Rhino's meticulous attention to detail in releasing reissues is summed up with Inglot's philosophy: "We try to do the best job with the materials we have, and I am willing to go as far as it takes to get the best generation for our sources. I am hell-bent that if you buy a Rhino various-artist, front-line CD, it will smoke anything out there on someone else's label, and I don't mean someone else's various-artist label. I pride myself on blowing the doors away on everybody else's CD of the same record. We're very dedicated to getting these things right." **EQ**

MIX POSITION

continued from page 105

(panned center) will interfere with one another (see fig. 3). In spite of that problem, this has always been my preferred mixing location. It is usually at the end of a seating row offering good access. Listening to the show from slightly off-center allows you to really hear the show the way most of the audience will. After all, wasn't that the whole point of mixing the show from the house?

There are many other subtle effects to consider when you have lots of time on your hands. Effects such as: listening fatigue; lack of sleep; fans who know more about how to mix the show than you do; "grazing" (where the sound bounces across the heads of the audience and changes its tone); reflections from the console and effects racks (a major problem in some recording studios, this is often swamped by more severe problems encountered in live-sound situations — the room, the system, audience members leaning over your shoulder); and so on.

You can't talk your way into a good mix position in every venue, so then you must walk through the room during soundcheck and listen to the difference between the sound you hear at the mix position and the sound in the majority of seats. As you mix the show you must try to compensate with this difference in mind.

If you can find yourself a reasonable place to twist the knobs during the show and get it all back into the truck in a condition that will get you through the rest of the tour, then everything is OK. Now, whenever you are offered a choice of mixing locations you'll be fully armed with reasons why you can't mix backstage or in a sound booth. Happy mixing. **EQ**

Wade McGregor is a senior consultant for Barron Kennedy Lyzun & Associates, an acoustical consulting firm in Vancouver, Canada. He has often had to convince venues to allow him to mix from a good seat in the house and now tries to convince architects to build one there permanently.

Thanks to Renkus-Heinz for providing the EASE acoustical modelling software used to create the figures shown in this article.

EQ&A

continued from page 14

based ProTools III system. All of the current ProTools III audio interface peripherals will continue to be the I/O peripherals for the PCI-based system.

We will be sending out information about a competitive NuBus-to-PCI Exchange program for all registered ProTools III owners. The target U.S. list price for a PCI-based ProTools III Core System will be approximately \$8000. Registered ProTools III owners will be able to exchange their current NuBus-based ProTools III Core System for a new PCI-based ProTools III Core System for \$1995. Provisions for expanded systems have also been made. This program will remain in effect for 12 months following Digidesign's first shipment of PCI-based ProTools III systems. Digidesign wants to ensure that its current customers have an aggressive and fair PCI exchange policy to protect their NuBus investment. Digidesign is the only company in the industry that offers exchange programs of this type.

While we recognize the importance of the new technology like PCI, we don't feel NuBus is a "dead fish." We plan to continue to support NuBus-based systems. There are a lot of powerful NuBus machines out there — a lot of our customers own them and are using them today.

NuBus CPU availability has been enhanced with the introduction of Mac-equivalent computers. At the time of this writing, we have qualified PowerComputing's Power 100 Mac-equivalent, and are in the midst of qualifying the Power 120. Other solutions such as PowerComputing's Power 120 PowerWave-series (which allow mixing of PCI- and NuBus-slots, with a switch-over to PCI-only), and Second Wave's PCI-to-NuBus Expansion Chassis are being tested. The results look promising.

While new Digidesign PCI cards may be compatible with the PC platform, software development for Windows-based systems (especially engine-ware like DAE (Digidesign Audio Engine) is a major undertaking. We are in the midst of the work, and should have exciting product announcements for Windows in the coming year. Stay tuned.

David Lebolt
Director, Pro Product Strategy
Digidesign

LEXICON PCM 90

continued from page 92

include 126 different MIDI controllers and external sources such as footswitches and foot pedals. Internal controllers can also be used and up to ten patches can be created per effect.

SEPARATED AT BIRTH

As mentioned earlier, the PCM 80 and PCM 90 can be operated independently of one another, but when used in tandem, you get the flexible effects capabilities of the PCM 80 and the abundant reverb programs of the PCM 90. And whether or not the combo can hold up to the traditions of the 480L and 300L, there's no doubt that this is indeed a very versatile team with a lot of possibilities. [Look for a full review of the PCM 90 by Rob "Cubby" Colby in a future issue. —Ed.]



The PCM 90 has a suggested retail price of \$2999.95. For more information, contact Lexicon, 100 Beaver St., Waltham, MA 02154. Tel: 617-736-0300. Circle EQ free lit. #145.

LETTERS TO EQ

continued from page 10

few years old now. As any company moves forward in product development and support, a time will come when a product's life-cycle must end. Making that choice is difficult, and involves tradeoffs. Digidesign wants to support as many customers as possible, as long as possible. But those concerns must be balanced against newer feature needs, which often demands more from the supporting hardware. Another big consideration are resources for testing and support. How long does a product remain? The original Sound Accelerator could not support many features that we now have in Sound Designer software. Sampler support in SD II was dropped because supporting samplers was diverting our engineering resources away from what has become Digidesign's core technology: hard disk recording, editing, mixing and processing. Lastly, let's keep in mind that the usefulness of a given product doesn't necessarily go away once support is discontinued. Upgrade paths offered by Digidesign may not work for some customers, but offering any

upgrade or trade-in in the audio products industry is fairly unique. Many people do choose to take advantage of these offers.

(3) Customer loyalty is very important to Digidesign. As we've grown as a company we've gone from being a small underdog to playing a larger role in our industry. We're trying to give our customers the tools that they need; along the way we try to avoid making people pay for pieces of the puzzle that they don't need by making them options, and we keep our platform open to third-party development to allow the talents of others to join the mix.

On a personal note, as I've mentioned, I've known Jon for many years. The only reason that Jon's letters were not answered is that they were verbally answered by me in a phone conversation.

Dave Lebolt
Director, Professional Product Strategy
Digidesign

GOLDEN BOY

As the proud owner of the gold-plated Telefunken U48 featured in your December Microphile, I am writing to shed a little light on its origin. The mic was plated and modified here in the U.S.A. It has a custom-built power supply and a more recent 12AY7 tube. Although these mods make the mic unattractive to collectors, it remains a powerful recording tool with increased output and frequency response. Besides, even if it didn't sound so good, it would make a great hood ornament.

Skip DeRupa
Senior Operations Manager
Windmark Recording
Virginia Beach, VA

"FAT" CHANCE

The article on Sun Records indicated that "Rocket 88" is "widely acknowledged" as the first rock 'n' roll record but didn't say when the song was recorded. Fats Domino's "The Fat Man" was recorded and released in 1949 and predates the Sun recordings.

Also, in regards to the "Legends of Rock" article and accompanying photo bearing the caption, "The Once and Future King," I am reminded of something Elvis said a couple of years before he died (and he is dead): "I guess the person who's made the biggest impression on me has been Buddy Holly."

An article on the work of Holly and his legendary producer Norman Petty would be in order.

J.V.
Nashville, TN

Upgrades, Error Messages & More

A veritable potpourri of
ADAT and DA-88 stuff

BY EDDIE CILETTI



- In fixed applications, always use a minimum of two screws on the bottom holes — never diagonally.

- In road applications, where gear is likely to be turned upside down, always use all four screws.

Pay close attention to devices that ground isolate your gear from the rack rail. A washer inserted between the device and the rail can turn the face plate into a "tunable device" not unlike a drum head or reverb plate. One solution (for gear that must be both ground isolated and minimally torqued) is to use a rack shelf; but remember to leave the feet on! This obviously means that either the device is in a fixed installation or that it must be packed separately for shipping.

EMPTY VEE

While spending the past two years in the video world, I discovered a rack-mounting technique that is well suited to digital 8-tracks. Video equipment is typically larger, heavier, and deeper than audio equipment, and, as such, requires support from both the front and the rear. In order to evenly distribute the weight and minimize the potential for chassis twisting, nearly all gear can be supported by the entire length of its side panels. Fixed rails would do the trick, but slide rails permit the device to be fully extended for service. (Of course, this means the rear of your rack must also be outfitted with a rail.) Once on slide rails, routine maintenance, such as head cleaning, is as simple as removing the cover. This could be a \$50 to \$100 option that would (hopefully) conform to an existing standard.

At the 1995 New York AES, I participated in the "Maintenance for the Project Studio" workshop. John Kayne, chief tech at The Toy Specialists (a New York City-based equipment rental company), pointed out that the original Alesis ADAT preferred being shipped in the cardboard container supplied by the factory rather than in a road-warrior-type rack-on-wheels.

With the new ADAT XT, Alesis has replaced the sheet-metal chassis with one that is die cast. This resolved the transport's vulnerability to being shipped and/or mounted in unfriendly environments. The XT tape trans-

port remains virtually unchanged from its predecessor, but it gained considerable stability from being mated to a strong foundation.

Improved transport reliability and fast wind tempo are the result of a modified reel motor sleeve. (Check out Bennet Spielvogel's do-it-yourself ADAT maintenance piece in the August '95 EQ.) The brass sleeve now has increased diameter and gnarled teeth for increased traction. All-weather performance is now independent of the rubber tire condition....

Alesis also set the standard for keeping service facilities informed of electro-mechanical updates, software upgrades, and the meaning of error messages. Their service manual — a three-ring binder the size of a phone book — documents ADAT progress from the dawn of time. In the early days, Alesis kept a tight rein on service by minimizing the number of authorized service stations. This improved communications to and from the field. TASCAM is doing the same with the DA-88. Authorized tweaks were almost exclusively limited to their own east and west coast service facilities, though now they are gearing up to expand service.

TASCAM DA-88

Firmware upgrades are provided free of charge whenever a machine is brought in for service. (To query, simultaneously press the Stop, Play, and Record keys on power-up.) The current version — at the time of this writing — is V3.10. Users can call 213-726-0303 and ask for Sandy at extension 617 or Kim at extension 809. Have your serial number on hand. To install, simply replace the IC (designation U156 on the SYSCON board). The SY-88 card, also firmware driven, is currently at version V3.19.

TASCAM has been hard at work improving the performance and reliability of its DA-88. Not surprisingly, the problems I have encountered to date are mostly related to head clogs. Unfortunately, the answer to the question you are about to ask — "How often should I clean the heads?" — is not simple because the threshold of the DA-88's error rate indicator is set pretty high. Numeric indication via front-panel display would facilitate the task. Currently

Anyone who has toured knows the importance of proper rack-mounting and shipping techniques. Warped face plates, broken controls, cracked circuit boards, the gig-crucial hard or floppy disk that won't drive, and shattered LCD screens are but a few of the horrors you'll likely encounter on the Heartbreak Highway.

But wait, this isn't just about road gear. Rack life in a fixed installation is also an accident waiting to happen. All electronic components can stand a little flexing, but with so many more tape machines in racks these days, from the lowly cassette deck to multiple digital 8-tracks, proper rack-mounting has become even more important. Careless rack-mounting habits can cause not only visible problems such as those mentioned above, but also hidden problems that can make your in-house apes less-than-compatible with the outside world. Even if you have been lucky so far, here are some tips:

- Never rely on mechanical support from neighboring gear.
- Support really heavy gear, such as power amps, from both the front and the rear panels.

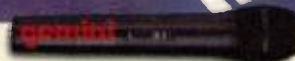


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even with one eye on the LED, the chances are good that an aural glitch will go by before the LED comes on.

The transport can differentiate between recording tape and cleaning tape (part # 5740008100), so there is no reason to be afraid of using the latter. TASCAM recommends cleaning the heads every 50 hours. The DA-88 automatically runs the cleaning tape for about five seconds and then ejects. Early machines were not shipped with a cleaning tape. One set of machines from this period went almost two years without service. By that time the heads were so clogged, the cleaning tape was powerless.

TASCAM has since added a self-cleaning mechanism (this, too, is replaced free of charge provided the machine is within warranty), the first half of which consists of a plastic "scraper" that actually catches debris before it can get on to the heads. There is also a cleaning roller that periodically dabs the head of oxide perspiration. The only drawback is that the dabbing mechanism is an obstacle to the right tape-path locking adjustment.

Craig Anderton always winds his S-VHS ADAT tapes back and forth before formatting them. The same applies to 8 mm tapes. You may even want to clean the heads after exercising the tape but before formatting. If you ever find that a section of tape plays intermittently, try playing through the funky zone several times in order to either remove or spread out the dirt. Use the Memo and the Auto Play feature to perform this operation several times — leaving plenty of room on either side of the problem area — then insert the cleaning tape to collect the trash.

Another problem that concerns all cassette machines is that bits and pieces of plastic from the cassette shell can break off and fall into the mechanism. Most mechanisms are intelligent enough to sense the obstacle and stop before doing major damage. The only preventive maintenance is to periodically inspect all tapes. Get familiar with the tape package design and be on the lookout for missing bits, especially if unusual things start to happen.

INTERPRETING ERROR MESSAGES

Perhaps the most frustrating scenario is that, when error messages occur, most machines are designed to stop. All functions are expected to occur within a specifically allotted time. If not, an error message is reported on the display and

functionality is inhibited until the machine is power cycled. If the error fails to repeat itself, the machine will then function as normal. I am in the habit of pressing the Eject button on power-up the first time a problem

occurs. Test with a noncritical tape before reinserting your precious master.

A comprehensive list of DA-88 error messages is detailed in below. It has been augmented, where possible, with first-hand experience. **EO**

ERROR NUMBERS AND THEIR DESCRIPTION.

Error	Description
S-Err-01	.....Mechanical Problem (tape path, guide, drum motor, etc.)
S-Err-02	.....Irregular head drum speed. The drum motor spin command is given, but no tachometer pulses from the frequency generator (FG) coil are received for 1.5 seconds. This can happen if the tape has come in contact with lubricant from the mechanism. The Bernoulli effect explains how a spinning drum creates a cushion of air between the tape and the heads. The lubricant, however, will stop the head dead in its tracks.
S-Err-03	.....Combo of Errors 1 & 2
S-Err-04	.....Capstan Motor Problem. The motor spin command is given but no FG signal is detected within 1.5 seconds.
S-Err-05	.....Combo of Errors 1 & 4
S-Err-06	.....Combo of Errors 2 & 4
S-Err-07	.....Combo of Errors 1, 2 & 4
S-Err-08	.....Reel (take-up or supply) problem. No FG received from either reel table for 1.5 seconds.
S-Err-09	.....Combo of Errors 1 & 8
S-Err-10	.....Combo of Errors 2 & 8
S-Err-11	.....Combo of Errors 1, 2 & 8 (a mechanical mode change is not completed within 5 seconds).
S-Err-12	.....Combo of Errors 4 & 8
S-Err-13	.....Combo of Errors 1, 4 & 8
S-Err-14	.....Combo of Errors 2, 4 & 8
S-Err-15	.....Combo of Errors 1, 2, 4 & 8
S-Err-21	.....The reel tables do not wind the tape in preparation for Eject.
S-Err-31	.....The tape is loose or caught. Tape width varies within a specified tolerance. If the tape path has been adjusted for a narrow or easily flexed tape, a wider or stiffer tape may get caught in the guides. System control monitors both reel table tachometers as well as the head and capstan tachs. Any conflicting information will halt the transport.
S-Err-41	.....The solenoid does not engage during FF/RW (100x speed).
S-Err-59	.....In Eject mode, the reels do not start to drive or do not lock for more than 1.5 seconds.
S-Err-68	.....In Play mode, the reels do not start to drive or do not lock for more than 1.5 seconds.
E.CLOC	.....No clock data or the incorrect setting of the clock switch. This could also indicate a mismatch in the machine ID numbers and/or the order in which the extra transports are connected.
E. t cut	.....The tape is broken.
E. d io	.....Digital I/O error. Check to see if the cable is properly connected.
E. dE	.....Dew sensor has detected condensation on the head drum. This occurs when any machine is brought from a cold to a warm area. Leave the machine powered so that the heat generated by the electronics will evaporate the moisture.
E.HI-8.tThe tape is not a Hi-8 (metal particle) formulation and is likely a standard 8mm oxide.
E.thin.tThe tape inserted is too thin. Use a 90- or 120-minute tape.

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Joan Osborne
William Wittman
Too Much Joy
Cyndi Lauper
Butch Vig
Soul Asylum
Garbage
John Siket
Sonic Youth
The Dave Matthews Band
Tom Jung
The Roches
Boonshoft Vintage Rentals
Mark Egan
John Scofield
Royaltone Studios
Stewart Lerman
Joe Chiccarelli
John Agnello

Ray Benson
Ray Kennedy
Steve Earle
Willy DeVille
The Steve Miller Band
Asleep At The Wheel
John Cale
Freedy Johnston
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CIRCLE 49 ON INFO CARD

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BY MARTIN POLON



It is a curious fact of personal and project studio life that what the boys in blue call burglary and theft has a much higher ratio in project facilities than for commercial studios. At first glance, the large-scale facilities seem to escape frequent involvement with "Amahl and the Night Visitors" due to the virtually continuous involvement of staff and customers around the clock and the inability of those with felonious designs on a studio to function in a busy and usually well-patrolled commercial area (by the police).

The flip side is the relative vulnerability of personal and project studios. They are frequently located in quiet residential neighborhoods where absent working individuals create virtual ghost towns during the day. Many personal and project studio owner/operators fall into the same absence category with their studio activities being a second job. Police patrols are seldom at a maximum to match the relative lack of human activity in these areas, because of the lack of traffic and violent crime.

Often, if a residence has an attached studio, it usually is isolated in a garage. Some audio practitioners

are so careless that they have been ripped off by thieves equipped with master garage door openers who literally waltzed in without opposition.

In fact, some personal and project studio owners have decided not to report their theft and burglary problems to law enforcement authorities since they were operating in violation of zoning laws in a residential neighborhood.

At any rate, whatever the size or scope of a studio — large or small — the following precautions will help to keep what is yours.

1. Secure your equipment to relatively theft-proof fixtures. Basically, this measure of establishing physical security takes three directions.

First, major items like mixing consoles and floor-standing tape recorders should be secured by using chains and large unbreakable padlocks with appropriate hasps and/or hardened steel bars with welded attachment "eyes" that are passed through or around major structural members inside the console or recorder. Shrink wrap plastic can be used to insulate the bars or chain from any incidental electronics contact inside the units. Consoles should be thusly secured to their table or base and tape recorders to the nearest wall surface. Computers have a vast array of security hardware available through dealers or via mail order. Such hardware should be purchased and used to permanently link the computer to the work surface that supports it.

If any audio component is designed for rack-mounting or has a rack-mount kit available, use it! Rack-mounting, coupled with the use of either forward- or reverse-slot head, dual-hole security screws, or Allen head screws, will make removal of components from a heavy-metal rack virtually impossible for thieves. Some studios have been known to have substantial weights welded or riveted to the bottom of racks to both prevent tipping and to increase the anti-theft tonnage!

Small components such as microphones and headphones should be stored in a locked office cabinet of substantial size and weight.

2. Use common sense in securing

the workspace structurally. Windows should be barred on the outside (or on the inside if neighborhood discretion is an issue). If a garage space is being used for the studio, disable the garage door opener, install locking bars and catches, and brace the door shut with major wooden structural pieces such as 2x4s. The small garage door should be strengthened or replaced with a more substantial door closure. In addition, the large garage door should probably be acoustically treated on the inside to improve the recording environment.

3. Install an illicit entry alarm utilizing either ultrasonic or infrared motion detection. Such ultrasonic or infrared alarms can be installed by the studio owner and increase the odds of deterring a successful forced entry. The cost of an alarm does not necessarily guarantee its effectiveness. The line of alarm hardware from Radio Shack provides a number of useful security options for the studio do-it-yourselfer.

4. Consider carefully how obvious you are about your studio location, operating schedule, and the times when no one will be on premises. Law enforcement officials tell us that many such studio break-ins are either "inside jobs" or are at the least committed by those who are in possession of inside information.

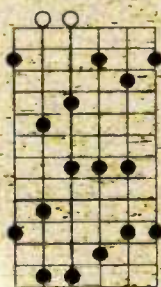
5. Engrave the studio's name on all your equipment and preferably the studio's address as well. This step will in theory decrease the resale value of the studio's gear. Many project studios like to trade up their equipment, and properly secured and marked studio gear will never be sold again "as new." On the other hand, such equipment is unlikely to be stolen, and the prevention of a loss of that magnitude far outweighs the loss of some trade-in value.

Bottom line is that a very small investment in security devices and a little elbow grease will turn any studio from an easy mark to a very hardened target. It is amazing how few people with \$50-\$100,000 or more invested in their personal and project studios will take the minimal time, effort, and expense to protect themselves — let alone to cut their insurance rates. **EQ**

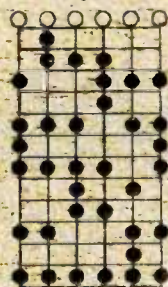
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Low distortion push-pull element, transformerless RF condenser, flat frequency response, diffuse/near-field response switch (6 dB boost at 10 kHz), switchable 10 dB pad to prevent overmodulation. Handles 142 dB SPL. High output level. Ideal for concert, Mid-Side (M-S), acoustic strings, brass and wind instrument recording.

MKH 40 P48U3 Cardioid

Highly versatile, low distortion push-pull element, transformerless RF condenser, high output level, transparent response, switchable proximity equalization (-4 dB at 50 Hz) and pre-attenuation of 10 dB to prevent overmodulation. In vocal applications excellent results have been achieved with the use of a pop screen. Recommended for most situations, including digital recording, overdubbing vocals, percussive sound, acoustic guitars, piano, brass and string instruments, Mid-Side (M-S) stereo, and conventional X-Y stereo.

MKH 60 P48U3 Short Shotgun

Short interference tube RF condenser, lightweight metal alloy, transformerless, low noise, symmetrical capsule design, smooth off-axis frequency response, switchable low cut filter (-5 dB at 100 Hz), high frequency boost (+5 dB at 10 kHz) and 10 dB attenuation. Handles extremely high SPL (135 dB), ideal for broadcasting, film, video, sports recording, interviewing in crowded or noisy environments. Excellent for studio voiceovers.

MKH 70 P48U3 Shotgun

Extremely lightweight RF condenser, rugged, long shotgun, low distortion push-pull element, transformerless, low noise, switchable presence (+5 dB at 10 kHz), low cut filter (-5 dB at 50 Hz), and 10 dB preattenuation. Handles 133 dB SPL with excellent sensitivity and high output level. Ideal for video/film studios, theater, sporting events, and nature recordings.

TASCAM

DA-88 Digital Multi-Track Recorder

The first thing you notice about the eight channel DA-88 is the size of the cassette — it's a small Hi-8mm video cassette. You'll also notice the recording time — up to 120 minutes. These are just two of the advantages of the DA-88's innovative use of 8mm technology.

- The ATF system ensures that there will be no tracking errors or loss of synchronization. The DA-88 doesn't even have (or need) a tracking adjustment. All eight tracks of audio are perfectly synchronized. What's more, this system guarantees perfect tracking and synchronization between all audio tracks on all cascaded decks — whether you have one deck or sixteen (up to 128 tracks).
- Incoming audio is digitized by the on-board 16-bit D/A at either 44.1 or 48kHz (user selectable). The frequency response is flat from 20Hz to 20kHz while the dynamic range exceeds 92dB. As you would expect from a CD-quality recorder, the wow and flutter is unmeasurable.



One of the best features of the DA-88 is the ability to execute seamless Punch-ins and Punch-outs. This feature offers programmable digital crossfades, as well as the ability to insert new material accurately into tight spots. You can even delay individual tracks, whether you want to generate special effects or compensate for poor timing. All of this can be performed easily on a deck that is simple and intuitive to use.

Fostex RD-8 Multi-Track Recorder

Fostex has long been a leader in synchronization, and the RD-8 redefines that commitment. With its built-in SMPTE / EBU reader/generator, the RD-8 can stripe, read and jam sync time code — even convert to MIDI time code. In a sync environment the RD-8 can be either Master or Slave. In a MIDI environment it will integrate seamlessly into the most complex project studio, allowing you complete transport control from within your MMC (MIDI Machine Control) compatible sequencer.



- Full transport control is available via the unit's industry-standard RS-422 port, providing full control right from your video bay. The RD-8 records at either 44.1 or 48kHz and will perform Pull-Up and Pull-Down functions for film/video transfers. The Track Slip feature helps maintain perfect sound-to-picture sync and the 8-Channel Optical Digital Interface keeps you in the digital domain.
- All of this contributes to the superb sound quality of the RD-8. The audio itself is pre-processed by 16-bit digital-to-analog (D/A) converters at either 44.1 or 48kHz (user selectable) sampling rates, with 64x oversampling. Playback is accomplished with 18 bit analog-to-digital (A/D's) and 64x oversampling, thus delivering CD-quality audio.
- The S-VHS transport in the RD-8 was selected because of its proven reliability, rugged construction and superb tape handling capabilities. Eight tracks on S-VHS tape allow much wider track widths than is possible on other digital tape recording formats.
- With its LCD and 10-digit display panel, the RD-8 is remarkably easy to control. You can readily access 100 locate points, and cross-fade time is fully controllable in machine to machine editing. Table of Contents data can be recorded on tape. When the next session begins, whether on your RD-8 or another, you just load the set up information from your tape and begin working. Since the RD-8 is fully ADAT compliant, your machine can play tapes made on other compatible machines, and can be controlled by other manufacturers ADAT controllers. Your tapes will also be playable on any other ADAT deck.

Roland DM-800

Digital Audio Workstation

The DM-800 is a compact, stand-alone multi-track disk recorder that provides an amazing array of features at an unbelievably low price. Whether for music production, post production or broadcast, the DM-800 will make your work simpler, faster, more productive and more profitable. A full function workstation, the DM-800 performs all digital mixing operations from audio recording, to editing, to track-bouncing, to final mixdown. It fully supports SMPTE and MIDI time codes and also features a built-in Sample Rate Resolver to synchronously lock to any time code.



POWERFUL EDITING

- Time Compression, Pitch Compression
- Completely Non-Destructive Cutting, Erasing, Copying
- Very Fast Preview for Music or Ambience Editing
- Scrub Looping and Preview to, from and thru
- Six Levels of Wavemform Zoom for Fast Editing
- Optional RS-422 Interface (D10-800D) for 9-pin Control from Video Editor

FLEXIBLE I/O STRUCTURE

- Full Digital Patch Bay
- Two Stereo Aux Returns
- Digital Stereo Input and Two Digital Stereo Outputs
- Four Balanced Analog Inputs with Gain Controls
- Four Balanced Analog Outputs with Option for 4 More

FULL AUTOMATION

- Dynamic and Snapshot Automation of Level, Pan 2-Band EQ, including Frequency Select, Boost and Cut
- Microscope Editing of Automation Data
- Phase Level Editing of Level, Crossfade and Fade In/Out

TRIGGER FEATURES:

- Trigger Mode to Play any Combination of 8 Tracks for Vocal Fly Ins or Sound Effects Placements
- Advanced Trigger Mode for Live Operation with Preset or Dial up Cue of Phrases to be Played One after Another

MIDI FEATURES:

- MIDI Machine Control — Final Tempo Maps
- Accurate Editing by Bars and Beats and Sub-Beats
- MIDI Clock and Song Position Pointer Output
- 8 MIDI Triggers for Instant Phrase Playback
- MIDI Trigger of Record and Punch In/Out
- Tempo Maps from External Sequencers, MIDI or Tap Input

ACCURATE SYNCHRONIZATION

- Frame Accurate Sync to any Time Code
- Locks to MTI:
- Generates and Reads all Types of SMPTE, including 24.25, 29.97/30 (Drop/non-drop) Frames per Second
- Incoming SMPTE Reshaped to Output Jack

RECORDING OPTIONS

- Records to Standard SCSI Drives
- Up to 24 Hours Recording Time Possible
- Uses Magneto Optical or Syquest Drives for Fast Project Changeovers
- Optional Internal 2.5" Drives for Portable Operation

PROJECT CATALOGING

- Up to 150 Projects on Line at Once
- Easy Cataloging of Sound Effects and Projects
- Easy Transfer of Sounds from One Project to Another
- File Compatible with DM-80

HIGH QUALITY SOUND

- Sampling Rates of 48, 44.1, 32 KHz
- 18 Bit A/D and D/A with 128 and 8 Times Oversampling
- 24 Bit Internal Processing
- Superb Converters

VIDEO OUT

- Composite, S-video, Digital RGB Output
- All Track Overview with Infinite Level of Project Zoom
- Views of Phrase and Waveform Editing
- Very Accurate Level Meters
- Track Status and Time Location

beyerdynamic

TG-X Dynamic Mic Series

The entire TG-X family of microphones is based on neodymium technology coupled with rugged construction and designed for optimum performance in a stage environment.

TG-X 5

- Clip-on gooseneck drum mic with high SPL capability.
- Acoustically coupled to capture shell sound as well as skin sound.
- Internally shock mounted for isolation from mechanical noise.
- Rugged construction with convenient clothes peg mounting.



TG-X 30/35

- Ultra-slim flexible gooseneck for easy positioning.
- Broadcast performance microphone with rugged construction.
- Lightweight, low profile adjustable neckband.
- Applications: Hands free vocals (drums/keyboards) and aerobics.
 - TGX 30 15 Omni neckwork with pre-amplifier
 - TGX 30 16 Omni neckwork for wireless transmitter
 - TGX 35 15 Cardioid neckwork with pre-amplifier
 - TGX 30 16 Cardioid neckwork for wireless transmitter

TG-X 40

- Hypercardioid polar pattern with excellent isolation from unwanted sound.
- Flat, wide range frequency response for uncolored sound reproduction.
- Rugged construction.
- Applications: Vocal piano, orchestral/recital recordings, strings and sampling.



TG-X 50

- Hypercardioid kick-drum with high SPL capability.
- Reduces shell ring in bass drum.
- Exceptional gain-before-feedback.
- Superb transient response and extended low frequency range.
- Applications: Kick drum, floor toms, congas and timpani.



TG-X 80

- High quality hypercardioid vocal mic.
- Full range frequency response.
- Studio quality accuracy.
- Excellent off-axis isolation.
- Shock absorbing rubber ring.
- Applications: Vocals, piano, strings, brass, percussion, woodwind, overheads sampling.

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TASCAM

103 Mastering Cassette Deck

Cost effective three head stereo mixdown cassette deck, appropriate for audio and video production facilities. With its

three head design you can hear what is actually on the tape as it is recorded. Auto Monitor Function switches from playback to input automatically while in record/pause mode, allowing you to set record levels or match tape levels. Dolby HX PRO circuitry provides extended high frequency performance while keeping distortion and noise to a minimum. Tape type is automatically sensed and adjusted for by the Auto Tape Selection feature.

102 Cassette Deck

Designed primarily for mixdown, the 102 provides solid performance and sound quality with durability and reliability. Although it is a two head unit, the 102 closely matches the performance and features of Tascam's 103 Mastering Deck.

202MKII

Dual Recording Cassette Deck

Dual record cassette deck offers dubbing and copying capabilities at a reasonable price. The deck is capable of simultaneously making two identical recordings from the same source, or making a single extended, recording first on one tape (both sides) then on the other (also both sides). Copying can be easily performed by using one side for playback and the other for record. Can also provide continuous background music, playing first both sides of one tape, then both of the other.

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SONY

TCD-D10 PRO II Portable DAT Recorder

Packed with features and functions, the compact TCD-D10PROII is everything professionals need in a portable DAT recorder. Measuring only 10" x 2 1/2" x 7 1/2", it provides high performance, reliability and flexibility. Among its many features are high speed 100x search, LCD multi-function display, 4-motor Direct Drive transport mechanism and absolute time recording capability. With absolute time code, tapes recorded by the TCD-D10 PRO II can be used immediately as source material for the PCM-7000 series DAT editing system. Offering maximum performance and capabilities in a minimum package, the TCD-D10 PRO II is the recorder of choice for any field application.



- Has balanced XLR input, switchable microphone (-60dB) or line (+48dB) inputs. A 12-pin digital connector provides interfacing with AES/EBU digital inputs of 32, 44.1, or 48.0 kHz sampling rate. This means that compatibility with other digital systems is assured. It also provides the convenience of digital dubbing and editing without any degradation.
- Equipped with a comprehensive self-diagnostics function that constantly monitors the rotation of the head drum, capstan and reels. The tape transport mode and load/unload time are continuously checked as well. Upon detection of trouble, the tape is brought to a forced stop and unloaded automatically to protect the tape and the recorder.
- Up to 99 start IDs can be recorded in the subcode area. When the record button is pressed, the start ID is recorded automatically for 9 seconds. During recording, it can also be added manually to any position of the tape. Search for these start IDs is performed in two modes at 100 times normal speed.
- Offers a maximum spooling time of 140 x normal speed. A two hour tape can be rewound or fast forwarded in under a minute.
- 20-segment digital peak level meters include overload indicators. Closely tracks input signal for accurate level indications.
- During playback, the date and time of recording is displayed.
- Has a 5-segment battery indicator. The last segment blinks on and off, notifying you to change batteries.
- To eliminate distortion caused by unexpected peaks, the TCD-D10 PRO II incorporates a record-level limiter with a fast attack time of 300ms. The microphone attenuator prevents distortion by suppressing the signal level 20 dB.
- Immediate playback is possible through a built-in speaker.
- A wired remote controller is supplied to control the record, play, stop, and pause functions of the recorder. The top end of the controller is designed to accept a microphone holder. Two microphone stand screw adapters are also supplied.
- The supplied NP-22H rechargeable battery pack provides 1.5 hours of continuous operation. The optional NPA-D10 battery adapter enables 1 hour of continuous operation on AA-size batteries. With the use of the supplied ACP-88 AC power adapter, it can also be operated on 100-240 VAC, 50-60 Hz.

AMPEX

PROFESSIONAL AUDIO TAPE



467 DAT Tapes

467-R015P	4.19	467-R030P	5.09
467-R046P	5.79	467-R050P	6.49
467-R090P	7.79	467-R120P	9.29

467 Digital Audio Mastering Tape

467-1731J	1/2" x 4600	100' NAB Reel	64.49
467-275J11	1/2" x 4600	100' Heavy Duty Precision Reel	79.95
467-57G111	1/2" x 4600	100' Heavy Duty Precision Reel	149.95

489 1/2" Digital Mastering Tape Audio

DM810AD	1/2" x 810	Gray Library Box	8.99
DM810CO	1/2" x 810	Clear Sleeve	8.09

456 Studio Mastering Tape

456-151111	1/2" x 1200	7' Plastic Reel	7.19
456-1731J	1/2" x 2500	100' NAB Reel	18.99
456-272111	1/2" x 2500	50' Plastic Hub	26.99
456-273111	1/2" x 2500	100' NAB Reel	33.99
456-572111	1/2" x 2500	100' Plastic Hub	52.99
456-573111	1/2" x 2500	100' NAB Reel	58.49
456-57G111	1/2" x 2500	100' PREC	125.99

499 Grand Master Gold Studio Mastering Tape

499-174111	1/2" x 2500	100' NAB Reel	20.49
499-274111	1/2" x 2500	100' NAB Reel	37.49
499-97M111	1/2" x 2500	100' PREC	134.99

SONY

PCM-2300/PCM-2700A DAT Recorders

The superb audio quality of digital recording and the convenience of DAT cassettes is not restricted to broadcasting and post-production applications. In fact, it is just as relevant to business and educational applications. To meet the requirements of all these sectors Sony offers the PCM-2300 and PCM-2700A DAT recorders. While both are perfect for simple recording and playback at recording studios, the PCM-2700A is also well suited for simple program transmission at broadcasting stations. Both feature exceptional sound quality, three sampling frequencies, absolute time recording, long record/playback time, alternative subcode recording and digital fader.

THREE SAMPLING FREQUENCIES

At normal tape speeds, either a 44.1 kHz or 48.0 kHz sampling frequency can be selected. When set to long play (LP) mode, they provide 12-bit non-linear digital recording at 32.0 kHz.

PROFESSIONAL PERFORMANCE

- The servo system is completely controlled by carefully programmed software. This features sophisticated, smooth transport control, which optimizes tape handling and increases the search speed to approximately 150 times normal.
- Absolute time can be recorded in the subcode area of the DAT tape. DAT tape with absolute time is ideal for editing with the Sony PCM-7000 Series Editing System, as it translates A-time into SMPTE time code.

DIGITAL FADER

A 64-step digital fader is incorporated in both units. Both fade-in and fade-out functions are available on the digital and analog inputs/outputs. The fade duration can be set over from 0.2 - 15 seconds, and can be controlled either locally or by the remote.

PCM-2300 AND PCM-2700A

- The PCM-2300 has unbalanced digital input/output, while the PCM-2700A has dual digital inputs/outputs (balanced and unbalanced), allowing most digital audio equipment to be directly connected. Both also have balanced analog line level inputs/outputs which can be adjusted over a range of -12 dBs to +8 dBs, for connection to many other types of audio equipment.
- The PCM-2300 has a reliable tape transport system driven by three servo-controlled motors, two direct-drive types for head drum and capstan, and a single DC motor for the reels.
- The PCM-2700A employs a four motor direct-drive tape transport with head drum, capstan and reels, all individually driven by servo-controlled motors. The four motor direct-drive mechanism gives even more precise and stable transport.
- PCM-2300 front panel display has a 20-segment peak level meter display with 0.5 dB step peak margin. The PCM-2700A has a 29-segment peak level meter with a 0.1 dB step peak margin indication.



SUBCODES

They record various subcodes separately from the audio data to provide tape search functions. The subcodes include the Start ID, Skip ID, End ID, Program Numbers, Absolute Time, and Date functions. Program numbers can be recorded sequentially as the Start IDs and are written (and can be renumbered) in the correct sequence whenever additional Start IDs are inserted.

OTHER FEATURES

- They operate in the Long Play (LP) mode, yielding twice the normal record/playback time. This also makes them compatible with the LP mode of consumer products. In LP mode, a maximum of four hours of recording and playback is possible.
- Built-in crystal clock generates a date function, which automatically indexes each recording with time and date info (minute/hour/day of the week/month/year). When tape is replayed it's easily checked for when the recording was made.
- Both units can be installed in a standard 19-inch rack.
- Both included a wireless remote control for remote operation.

PCM-2700A ONLY FEATURES

- Read After Write function allows you to monitor the recorded signal immediately after it has been stored on the tape. This saves you valuable time, as recorded signal can be checked monitored in real time.
- High-speed location, in either direction, to points on the tape with a resolution of 1 second by entering the absolute time address via keys on the front panel.
- Convenient remote operation is performed by the optional RM-D7100 Remote Controller. Connected via the 37-pin parallel remote connector, it allows basic tape transport control.
- Has 8-pin remote interface to give a fader start function, which is particularly useful for On-Air applications.
- When manually writing the Start, Skip, and End IDs, there is an enhanced rehearsal function which is available for accurate ID recording. While monitoring the ID recording, these can be recorded forwards or backwards in 0.3 second steps.

Panasonic

SV-3700/SV-4100 Professional DAT Player/Recorders



Panasonic's SV-3700 and SV-4100 are designed for professional applications. They have highly accurate and reliable transport systems with search speeds up to 400 times normal play speed. They also feature advanced, high-quality analog-to-digital (A-D) and digital-to-analog (D-A) converters and input/output circuitry designed to interface with the widest variety of devices.

SV-3700 Features:

- When recording via the analog inputs, a front panel switch permits selection of the sampling rate (44.1 kHz or 48 kHz). This avoids the need for a conversion of the sampling frequency in CD mastering applications. When recording through the digital inputs, the automatically clocks in recording frequencies of 32 kHz, 44.1 kHz or 48 kHz.
- Ramped record mute and unmute with three records fade-in and five seconds fade-out provides automatic level changes at the start and end of a recording.
- High speed transport enables searching up to 250x normal speed. High-speed search up to 400x normal speed is possible once the tape has been scanned in Play, Fast-Forward or Reverse mode. This ensures access to any point on a two-hour DAT in approximately 27 seconds.

SV-4100 Has All the Features of the SV-3700 PLUS:

- Offers enhanced performance required for professional production, broadcast and live-sound systems. Features such as instant start, external sync capability, enhanced system diagnostics, additional digital interfaces and exceptional 20-bit audio make the SV-4100 the DAT quality standard.
- **QUICK START WITH TRIM AND REHEARSAL**
With BMR of micro holding five seconds of audio data, the Quick Start function provides sound almost instantly after a play command is executed. Other DAT recorders lag about 7 seconds, making them unsuitable for professional applications.
- Easily adjust the Quick Start position and specify it by A-Time, Start ID or PNO. Recording via Quick Start is also possible, allowing two SV-4100s to be used for frame-accurate punch-in/out and assemble editing.
- You can adjust the Quick Start position with I-Frame resolution over a range of ±50 frames. Using the shuttle dial and Skip key for adjustment. Frame number is preceded by a + or - sign. A-Time, subcodes and peak level are displayed, to provide a general guide to positioning.
- Without playing the tape, you can monitor the level of stored data to check up on Quick Start motor. This preview capability is handy before actual editing or on-air play. Repeated play is also possible, using about 1.5 seconds of the data to create a kind of sampler effect.
- **FRAME ACCURATE INDEXING AND EDITING**
Using the trim and rehearsal functions, you can accurately determine points to write, start and skip IDs. These IDs can be written, rewritten or erased at any point in the recording and automatically renumbered.
- With two SV-4100s connected via the 8-pin parallel remote terminal, synchronized frame-accurate editing can be performed. Continuity of edit points can be checked by rehearsal playback. By entering and editing end position in one of the Locate buttons, you can determine a punch-out point as well.
- **FLEXIBLE SEARCH**
Easily and accurately access your A-Time. You can specify hour, minute, second and frame.
- In most modes, the currently displayed A-Time can be assigned to one of the Locate buttons. Then from Stop, Pause or Play you can rapidly cue to any of these four addresses by pressing its Locate key. In addition, Locate Last takes you to the most recent Quick Start A-Time position.
- Search is also possible by Start ID or program number.
- **5-MODE EXTERNAL SYNC**
Has 5 external sync modes. External sync is essential for applications such as video postproduction and stereo submix recording. It ensures uniformity of timing between different equipment so the audio data consistently matches up with the target media.
- Select from 3 video external sync modes (25, 29.97 and 30 frames per second) or use the word sync or Digital Data modes (which lock to the input sampling frequency).
- **ENHANCED SOUND**
The SV-4100 satisfies the highest professional expectations both in terms of sound and functionality. It features new 20-bit (equivalent resolution) digital-to-analog converters.
- Has XLR-balanced digital input and output plus unbalanced digital coaxial and optical inputs and outputs. Analog inputs/outputs are XLR-balanced and output level is switchable between +4dB and -10dB, providing compatibility with other equipment.
- **3-WAY REMOTE CONTROL**
GPI input allows simple triggering of Quick-Start Play. 8-pin parallel remote terminal connects to another DAT deck, computer or wired remote. Includes wireless remote control.

TASCAM

DA-P1 Portable DAT Recorder

- With rotary two head design and two direct drive motors the DA-P1 offers one of the best transport in its class.
- XLR-balanced mic/line inputs (with phantom power) accept a broad range of signal levels from -60dB to +48dB.
- Analog line inputs and outputs (unbalanced) plus S/PDIF (RCA) digital inputs and outputs enables direct digital transfers.
- Uses next generation A/D and D/A converters to deliver amazing sound quality.
- Supports multiple sample rates (48, 44.1 and 32 kHz) and SCMS-free recording.
- Included in its design is a MIC limiter and 20dB pad to achieve the best possible sound without outside disturbances.
- To monitor your sound there is a TRS jack and level control for use with any headphones.
- Built tough, the DA-P1 is housed in a solid, well-constructed hard case. The DA-P1 includes a shoulder belt, AC adapter and one battery.



SONY

TCD-D7 DAT Walkman Player/Recorder

- High-quality Standard Play (SP) mode provides up to two hours recording on 16-bit digital audio on a DT-120 DAT cassette. The SP mode is ideal for recording live music.
- Long Play (LP) mode allows up to 4 hours of playback of 12-bit audio on a single DAT cassette. The LP mode is ideal for meetings, conferences or other voice recordings.
- Equipped with digital coaxial and optical input connector.
- Maintains highest signal purity for recording and playback of digital sources with all information retained in digital format.
- Also has analog Mic and Line inputs for recording from analog sources without external adapters.
- High-speed Automatic Music Sensor (AMS) search function finds and plays tracks, skips forward or back up to 93 tracks, all at 100x normal speed.
- Has a Digital Volume Limiter System (DVLS) that increases listening comfort and sound quality by automatically adjusting for sudden level changes of the recording. It also helps prevent sound leaks through headphones.
- Two-speed cue-review lets you hear sound while player is in fast-wind modes, up to 3x or 25x normal speed.
- Compact and portable, it has an anti-shock mechanism that permits accurate recording and playback even while in motion.
- LCD display with backlight windows clearly shows recording level, track number, operating status and 4-segment battery indicator, even in low ambient light conditions.
- Optional RM-D3K System Adapter Kit for complete digital interface. The kit is equipped with the input/output connectors for both the optical cable and the coaxial cable. Therefore you can use it as a relay between the TCD-D7 and other digital equipment. Also includes a wireless remote control.



JVC

XD-P1 Pro Portable DAT Recorder

- An integrated package, the XD-P1 Pro combines a DAT recorder and a microphone with digital output in an unbelievably light package.
- Records and plays at all three standard sampling frequencies. Choose from 32kHz for long recording sessions, 44.1 kHz for mastering if CD production or 48kHz for highest fidelity.
- Operates without the restrictions of SCMS (Serial Copy Management System), permitting one generation of digital to digital copy, using 44.1 kHz sampling frequency. You can digitally dub or copy a recording made on the XD-P1 Pro as many times as necessary.
- The supplied detachable digital output microphone provides two pick-up patterns: "Telescopic" and "Stereo." A collapsible microphone stand is also supplied, allowing you to set the mic on a desktop for the interviews or conferences.
- Extensive use of aluminum and ultra-thin molding techniques make the XD-P1 Pro compact, lightweight and durable. The main module weighs under a pound (12.5 oz.) With microphone and battery it weighs only 22 oz.
- All basic controls are on one side of the unit and readily accessible. You can operate the recorder using one hand.
- Advanced power-saving design and low power-consumption circuits give the XD-P1 Pro long recording capability - on a single battery charge. Optional rechargeable batteries further extend recording time.
- Supplied AC adapter/charger works anywhere in the world regardless of voltage or frequency.



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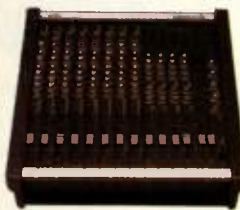
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- +48v phantom power

dorrough



With today's audio systems stretching the limits of program dynamics it's become critical for engineers to obtain maximum loudness with the minimum of distortion components, to fully utilize the dynamic range available. It is of equal importance that they have a method of monitoring and establishing the maximum safe level at which a system can operate.

That's why every Dorrough Audio Level Meter simultaneously shows 3 dimensions of program material content; Peak, Average Power and Compress on are displayed on a color-coded 40-segment LED scale. Meters are easily viewed while providing precision indications of program energy content.

Loudness Meter Model 40-A
The Model 40-A has a scale allowing 14dB of headroom in 1dB steps. A stand-alone unit, it measures 8" x 2" x 6" and has an internal power supply. Model 40-AP has a peak-hold option as well.

Loudness Meter Model 40-B
The Model 40-B provides metering of relative loudness to peak modulation. The 40-B is a scan differentiation of the 40-A and is calibrated in percent (%) modulation, with the lower scale in dB from +3 dB to -3 dB. The 40-BP also has a peak-hold option.

Symetrix

Signal Processing Products 601 Digital Voice Processor



- Accepts mic or line level analog signals, converts them to digital (18 bits) and then performs 24-bit digital domain signal processing

- Processing includes fully parametric EQ, shelving EQ, notch filtering, dynamic filtering (noise reduction), de-essing, gating, expansion, compression, AGC and DC removal.
- Combination of 128 factory presets and 128 user-selectable user programs guarantees predictable and repeatable effects from session to session, performance to performance.
- Has XLR-balanced (analog) monoaural mic and line inputs and XLR-balanced stereo output. XLR-balanced and S/PDIF (RCA) inputs and outputs. MIDI input/output supports connection to virtually any type of MIDI control device for programming or controlling the 501 in real time.
- Ideal for a variety of recording, broadcast, live sound, and post production applications.

488 Dyna-Squeeze 8-Channel Compressor/Interface

- Can easily increase average recording levels on your digital or analog tape recorder by 10dB with no side effects
- Tracks processed by Dyna-Squeeze have presence and increased articulation. Subtle-sounds become more up front.
- Many professional mixing consoles have output levels that are much hotter than digital recorder inputs. The 488 matches any console to most any digital recorder.

We are a full stocking dealer for the entire Symetrix line

TASCAM M-2600 Series 16/24/32 Channel Eight Channel Mixers

LOW NOISE CIRCUITRY

- Combining completely redesigned, low noise circuitry with Absolute Sound Transparency™, the M-2600 delivers high-quality extremely clean sound. No matter how many times your signal goes through the M-2600, it won't be colored or altered. The signal remains as close to the original as possible. The only coloring you hear is what you add with creative EQ and your onboard signal processing gear.

- Double reinforced grounding system eliminates any hum. World-class power supply provides higher voltage output for better headroom and higher S/N ratio.

PREMIUM QUALITY MIC PRE-AMPS

- The M-2600's mic pre-amps yield an extremely low noise floor, enormous headroom and an extremely flat frequency response. This lowers distortion and widens dynamic range. It also increases gain control to an amazing 51dB. Plus, you get phantom power on each channel.
- The M-2600 accepts balanced or unbalanced 1/4" inputs, and low-impedance XLR jacks. Better still, the TRIM controls operate over a 51dB input range. For the hottest incoming signals, all it takes is a press of the -20 dB PAD button atop each channel strip to bring any signal down to manageable levels. Plug anything into it - keyboards, guitars, basses, active or passive microphones, samplers and more. No matter what you put into it, you can be confident that signal can be placed at optimum levels without a lot of fuss.

THE BEST AUX SECTION IN THE BUSINESS

The most versatile AUX section in its class, rivaling expensive high-end consoles. 8 sends total, 2 in stereo. Send signal in stereo or mono, pre- or post-fader. Available all at once. Return signal through any of 6 stereo paths.



FLEXIBLE EQ SECTION

You'll find both shelving and split-EQ sections on some mid-level consoles. But that's where the similarities with the M-2600 end. The M-2600's bi-directional split EQ means you can use either or both EQ sections in the Monitor or Channel path... or defeat the effect altogether with one bypass button. Most other comparably-priced mixers will take the shelving mix into the Monitor path only, limiting your EQ application.

ADVANCED SIGNAL ROUTING OPTIONS

Direct channel input switching. Assign to one of eight buses, or direct to tape or disk, or to the master stereo bus. Because the group and direct-out jacks are one and the same, you can select either without repatching. You won't find this kind of speed or flexibility in a "one-size-fits-all" board.

ERGONOMIC DESIGN

The M-2600 has a big studio feel. All buttons are tightly spring loaded, lock into place with confidence and are large enough to accommodate even the biggest fingers. The faders and knobs have a light, smooth "expensive" feel and are easy to see, easy to reach and a pleasure to manipulate. Center detents assure zero positions for EQ and PAN knobs. Smooth long throw 100mm faders glide nicely yet still confidently allow you to position them securely without fear of accidentally slipping to another position.

ROGUE MICRO SERIES 1202

12-Channel Ultra-Compact Mic/Line Mixer

Usually the performance and durability of smaller mixers drops in direct proportion to their price. Fortunately, Mackie's fanatical approach to pro sound engineering has resulted in the Micro Series 1202, an affordable small mixer with studio specifications and rugged construction. The 1202 is a no-compromise, professional quality ultra-compact mixer designed for professional duty in broadcast studios, permanent PA applications and editing suites where nothing must ever go wrong.

BIG CONSOLE FEATURES

- Working S/N ratio of 90dB, distortion below 0.025% across the entire audio spectrum, switchable +48 volt phantom power and +28 dB balanced line drivers
- Real switchable phantom-powered mic inputs with discrete, balanced mic preamps as good as those found in big consoles
- Has 4 mono channels, each with discrete front end mic preamp line input and four stereo channels, each with separate left and right line inputs
- Every input channel has a gain control with unity at the center detent for easy setup. Also a pan pot, low frequency EQ at 80Hz, high frequency EQ at 12.5 KHz, and two aux sends with up to 20dB available gain
- Main outputs operate either balanced/unbalanced, as required
- Switchable three-way 12-LED peak meter displays

- Master section includes two stereo aux returns, a separate headphone level control, metering and two stereo aux returns
- Line inputs and outputs are designed to work with any line level, from instrument level, to semi-pro -10dB, to professional +4dB.

HEAVY DUTY CONSTRUCTION

- Designed for non-stop, 24-hour-a-day professional duty in permanent PA applications, TV and radio station, etc
- Sealed rotary controls instead of open frame phenolic potentiometers that suffer from dust and contamination
- Has steel chassis, rugged fiberglass circuit boards and a built-in power supply. Also has exceptional RF protection

MULTIPLE APPLICATIONS

- Ideal "entry level" mixer for those just starting a MIDI suite
- Ideal as headphone or cue mixer, level matching pro audio "tool kit", drum or effects sends submixer, 8-track monitor mixer

CR-1604 16-Channel Mic-Line Mixer

The hands-down choice for major touring groups and studio session players, as well as for broadcast, sound contracting and recording studio users, the Mackie CR-1604 is the industry standard for compact 16-channel mixers. The CR-1604 offers features, specs, and day-in-day-out reliability that rival far larger boards. It features 24 usable line inputs with special headroom/ultra-low noise. Untypical circuitry, seven AUX sends, 3-band equalization, constant power gain controls, 10-segment LED output metering, direct front end phantom-powered mic inputs and much more.

LOWEST NOISE, HIGHEST HEADROOM

- With the CR-1604, having the lowest noise and highest headroom (90 dB working S/N and 108 dB dynamic range) at the same time are not mutually exclusive. It is free of commonly encountered headroom restrictions, and is able to handle the occasional pegged input with ease. In fact, many drummers consider it the only mixer capable of handling the attack and transients of acoustic and electronic drums.

CONSTANT POWER PAN POTTS

- Only with constant power pan pots will a source panned hard left or hard right give the same loudness as when it is sitting dead center. While most small mixers pass simple balance controls for pan pots, the CR-1604's carefully optimized constant power pan circuitry make it a professional tool with the kind of performance necessary for CD mastering, video posting and other critical audio production.

IN-PLACE STEREO SOLO

- Stereo "in place" solo allows not only the monitoring of level and EQ, but also stereo perspective. Usually found in very expensive mixers, stereo solo allows you to critically scrutinize and carefully build a mix using all the channels with their respective sends and AUX returns.

UNITYPLUS GAIN STRUCTURE

- Proper gain settings are facilitated by proper gain labeling along with center-click detents on the faders, clearly understandable input trim controls and output meters that read channel levels in solo mode. With properly set levels you achieve very high headroom and low noise at the same time.

EFFECTS SEND WITH GAIN

- Unusual circuit design that provides two different "zones" that reflect real world use: send from each channel can vary in level from off to unity gain, which is the normal range of effects on other mixers. Since you also get another whole zone from the center detent to +15 dB of gain, the channel fader can be pulled down and the effects send can be boosted above unity when more effect is needed.



INTELLIGENT EQ POINTS

- Low frequency EQ is at 80 Hz where it has more depth and less hollow midbass "bark". Midrange is centered at 2.5 KHz, providing for most control of vocal and instrumental harmonics. A specially-shaped HF curve that shelves at 12 KHz creates more sizzle and less aural fatigue.

REAL MIC PREAMPS

- The CR-1604 has genuine studio-grade phantom powered, balanced input mic preamps on channels 1 through 6. All CR-1604 (and XLR10) discrete input mic preamp stages incorporate four conjugate-pair, large-emitter geometry transistors just like the big mixers use. So, when recording natural sound effects to heavy metal or mixing flutes or kick drums, you get the quietest, cleanest results possible.

BUILT TO LAST

- The CR-1604 is designed for non-stop, 24-hours-a-day professional duty - even for tours that log 100,000 miles in three months. It has spaced rotary potentiometers that are resistant to airborne contamination like dust, smoke, liquids, and even the oxidizing effects of air itself.

Optional Accessories

OTTO-1604

Add sophisticated computer controlled automation to your CR-1604. When connected to the MIDI port of your computer (PC, Mac, Amiga or Atari), each one of the 16 input channels can be programmed to change gain or to mute, just as you would program a sequencer. Master levels can be programmed as well, along with all buss channels.

XLR10

While the standard CR-1604 comes with 6 high performance mic inputs, there are limits when you need more. Enter the XLR10. This simple-to-install accessory adds 10 more (for a total of 16) mic inputs, with the same quality, performance and features as those in the CR-1604.

SENNHEISER

Incorporating state-of-the-art technology and decades of experience, Sennheiser headphones offer outstanding design, superb audio quality and luxurious comfort. From the ear padding to the O.F.C. (Oxygen Free Copper) cable, all materials are carefully selected and precision engineered to ensure incomparable quality.

HD414 Classic

A re-issue of the world's first open-Air dynamic headphone, the HD414 Classic offers maximum transparency, fidelity and comfort. A limited edition model, the HD414 Classic also features Professor Sennheiser's signature on the headband.

- Radial based diaphragms for more accurate reproduction.
- Field replaceable parts for long-term enjoyment.
- Neodymium-ferrous magnets for broad frequency response (18-21,000Hz)
- 10ft. Kevlar-reinforced oxygen-free copper signal cable with 1/8"-1/4" stereo phone plug



\$5995

HD25 SP Studio Monitor Headphone

Offering dramatic isolation from external sounds, the HD25SP is designed for professionals who rely on studio monitor headphones for work and pleasure.

- High-efficiency drivers for portable and field use.
- Modular parts for long term value and durability
- Neodymium-ferrous magnets for broad frequency response
- Frequency Response: 16-22,000Hz
- Sensitivity: 105dB
- Impedance: 70Ω



\$11995

HD265 Studio Monitor Sealed Headphone

Designed to meet the stringent demands of studio professional and audiophile alike, the HD265 breaks new ground in the sealed-chamber headphone format.

- Sealed-chamber headphone format
- Triple-aluminum dome voice coils for quiet transients
- Polycarbonate dome-damping minimizes distortion
- Oxygen-free copper signal cable with 1/8" to 1/4" stereo phone plug
- Frequency Response: 10-25,000Hz

\$19995

HD535 Dynamic Hi-Fi Stereo Headphone

The HD535's earcups surround your ears rather than resting on them, for a more natural listening experience.

- Open-back construction and classic design.
- Light aluminum coils in the transducer systems offers excellent transient and dynamic response.
- Supported by the open structure, tonal quality develops high dimensional sound qualities.
- Circumaural, oval earpads for good wearing comfort
- Can be connected to all digital and analogue Hi-Fi components

\$13995

HD545 Digitally Compatible Circumaural Headphone

The HD545 is the headphone to which all in its price category must be compared.

- Polycarbonate dome-damping materials for cleaner highs
- Triple-aluminum dome voice coils mean powerful bass, high output and greater durability
- Velvety soft, circumaural earpads and adjustable, padded headband for extended comfort and perfect fit
- Oxygen-free copper signal cable assures optimal signal transfer.
- Includes 1/8" to 1/4" stereo phone plug

\$16995

HD565 Digitally Compatible Circumaural Headphone

Offering natural sound reproduction without tonal distortion - the choice for use with the most sophisticated equipment.

- Silk dome-damping for brilliant highs and ultra-smooth midrange reproduction.
- Copper-coated aluminum voice coils for high linearity
- Bass-tube tuning for extended, powerful low frequencies
- Velvet ear cushions provide lavish comfort.
- Oxygen free copper signal cable with 1/8" to 1/4" stereo phone plug.

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- High frequency switch mode power supply fully charges 120,000 times per second (1000 times faster than conventional power supplies) requiring far less capacitance for filtering and storage.
- High speed recharging also reduces power supply "sagging" that afflicts other designs.
- Incredibly efficient, 5 PA-1000 or PA-1400's (4 PA-1800's) can be run on one standard 20 amp circuit. There is no need for staggered turn-on configurations or other preventive measures when using multiple amp set-ups, as current drawn during turn-on is only 6 amps per unit.
- They produce smooth and uncolored sound, while offering very full detailed low end response and tons of horsepower.
- They each carry a 5 year warranty on parts and labor.

PA-1000 weighs 9 lbs, is 15" deep and occupies one standard rack space. Delivers 1000 watts into 4Ω when bridged to mono.
PA-1400 weighs 16 lbs, is 15" deep and takes 2 standard rack spaces. Delivers 1400 watts into 4Ω when bridged to mono.
PA-1800 weighs 17 lbs, is 17" deep and takes two rack spaces. Delivers 1800 watts into 4Ω when bridged to mono.



Performance Series Amplifiers



Performance Series 1 300 Watt Power Amplifier

- Measuring only 3.5 inches high and weighing 26 pounds, the Series 1 delivers more than 150 watts per channel.
- Its welded steel chassis is unbelievably strong while a custom heat sink extension provides exceptional thermal capacity.
- An internal fan provides quiet background noise levels for critical monitoring applications and when pushed hard the cooling system insures continuous cool operation even in the most demanding situations.
- Active balanced inputs with both XLR and 1/4" phone jacks.
- Supplied with quality 5-way binding posts for highly reliable speaker connection.
- Front panel handles are reversible for either rack mount installation or easy handling.
- LEDs are provided for signal presence and clip indication; the detented gain controls have large knobs for easy front panel adjustments.

Performance Series 2 600-Watt Power Amplifier

- Same as above except the Series 2 weighs 32 pounds and delivers more than 300 watts per channel.

Performance Series 4 1200-Watt Power Amplifier

- Same as above except the Series 4 weighs 53 pounds and delivers more than 600 watts per channel.
- Has a switch selectable clipping eliminator that prevents damage to the speakers.

TANNOY

System 6 NFM II

A 6.5 inch Dual Concentric with Tulp HF wave guide forms the heart of the System 6 NFM II providing a reference single point source monitor in a more compact enclosure than ever before. Every aspect of design fully complements the drive unit's capability. The rigid cabinet with carefully contoured baffle and trim minimizes diffraction and the high quality minimalists: DMT crossover and gold-plated Bi-Wire terminal panel optimize the signal path. Pin-point stereo accuracy with wide frequency response, good power handling and sensitivity make this an ideal nearfield monitor.



PBM Series II Reference Monitors

The PBM II Series is the industry standard for reference monitors. They feature advanced technologies such as variable thickness, injection molded cones with nitrile rubber surrounds and the highest quality components including polypropylene capacitors and carefully selected inductors. With a Tannoy monitor system you are assured of absolute fidelity to the source, true dynamic capability and most important, real world accuracy.

PBM 5 II

- Custom 5" injection-molded bass driver with a nitrile rubber surround for extended linearity and accurate low frequency reproduction. They are better damped for reduced distortion and exhibit more naturally open and detailed midrange.
- Woofer blends seamlessly with the 1 1/2" polyimide soft dome ferro-fluid cooled tweeter providing extended bandwidth for extremely precise sonically-balanced monitoring.
- Designed for nearfield use, the PBM 5 II cabinets are produced from high density medite for minimal resonance and features an anti-diffraction radially front baffle design.

PBM 6.5 II

- Transportable and extremely powerful, the PBM 6.5 II is the ideal monitor for almost any project production environment.
- 6.5" lowfrequency driver and 3/4" tweeter are fed by a completely redesigned hardwired hand selected crossover providing uncompromised detail, precise spectral resolution and flat response.
- Fully radially and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.



PBM 8 II

- High tech 1" soft dome tweeter with unmatched pattern control and enormous dynamic capability. 8" driver is capable of powerful bass extension under extreme SPL demands.
- Hard wired crossover features true bi-wire capability and utilizes the finest high power polypropylene capacitors and components available.
- Full cross-braced matrix medite structure virtually eliminates cabinet resonance as a factor.
- Ensures precise low frequency tuning by incorporating a large diameter port featuring laminar air flow at higher port velocities.

TURTLE BEACH SYSTEMS



Turtle Beach audio cards bring true studio performance to the PC platform. Based on the technology used in their professional products, the performance of both their hardware and software has garnered accolades from users and press alike. Unlike other PC-based audio cards, Turtle Beach products are not designed for sound card game compatibility. Instead, the design philosophy is to give the best possible performance and quality, in the Windows operating environment, while bypassing traditional PC limitations.

MULTISOUND MONTEREY Multimedia Sound Card

The next generation of Turtle Beach's award winning Multisound board, Monterey offers high quality performance and features at a very reasonable price. Multisound's Hurricane technology provides very high speed audio data transfer between the card and the hard drive. This approach allows for data throughput up to eight times faster than the more common DMA designs, while putting minimum burden on the CPU (critical if you're recording audio and video simultaneously).

- The Motorola DSP-56001 Digital Signal Processor operates at 20MIPS and performs all digitalization functions with very low system overhead.
- High S/N (-89dB, A weighted), low distortion (<0.01% THD, <0.01% IM - both A weighted), flat frequency response (DC-19KHz @ 5dB).
- On-board real-time effects processor for a variety of effects, including reverb and echo.

- Professional quality MIDI synthesizer with wavetable playback (4MB of real instruments audio). Up to 4MB of standard SIMM-type memory can be added for sampling of new sounds.
- True 16-bit recording, using 64x oversampling and sigma-delta conversion technology.
- True 16-bit playback, with 64x oversampling and sigma-delta conversion utilizing 18-bit DACs, and an 8x interpolating filter.

WAVE 2.0

Professional Sound Editing for Windows 3.1 Compatible Sound Card

\$349⁰⁰

Wave is simply the best audio recording/editing/effects program available under Windows 3.1. With its logical layout, plethora of functions and wealth of effects, Wave will become an indispensable tool in your studio. Wave has the features (and interface) of a tape recorder. It supports stereo or mono recording/playback at 11,025, 22,050 or 44,1KHz sampling rates. Wave will work with any Windows 3.1 compatible audio board.

- Supports cut & paste editing (just like editing in a word processor) and has a full Undo function to eliminate fatal mistakes.
- Gain adjustment can be made to a whole file, or just the section you highlight.
- Wave can import and export a large variety of file formats, including SMP, SFL, WAV, 16, 8 and VOC. In addition, you can change the sample rate of previously stored files.
- EFX Clips function provides real professional effects like distortion, flange, digital delay, reverb, auto-stutter and others.

- A four band parametric equalizer function (WaveEQ) gives you the ability to touch up sections of your audio as well as the whole file. You can easily correct flaws in the sound or go for the special effects.
- Speed control lets you adjust the playback rate of your recorded audio (up to 200% faster or 50% slower).
- You can mix up to three sound files into a new fourth one, with control of volume and starting time of each file.
- Glitches in the recorded sound can be repaired by simply drawing the correction on the waveform with your mouse.

\$99⁰⁰

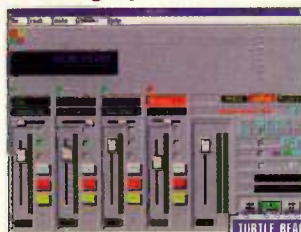
QUAD STUDIO

Professional 4-Track Recording System

Quad Studio is the first real-time four track recorder for the PC. Now you can record two tracks directly to your hard drive (16ms or faster), then record two more tracks while playing back the first two. With its high performance and ease of use, Quad Studio is the perfect replacement for 4 channel mixer/cassette decks.

- Graphics interface emulates all common mixer/tape deck controls.
- Record, overdub, mix and bounce tracks in real time with no loss of quality.
- Previously recorded audio can be effects processed (using the optional Wave program) and then mixed, in real time, with new audio.
- Includes Turtle Beach's high-performance Tahiti board.
- Software is also separately available for Monterey cards.

\$399⁰⁰



BEHRINGER

MDX 1000 Autocom Automatic Compressor/Limiter



- Incorporates an interactive auto processor for intelligent program detection. With the auto processor, the attack and release times are derived automatically from the respective program material - preventing common adjustment errors.
- The auto processor also allows you to compress the signal heavily and "musically" in dynamic range without any audible "pumping" or "breathing" or other side effects.
- Provides both Attack and Release controls allowing for deliberate and variable sound processing.
- Switchable soft knee/hard knee characteristics. Soft knee is the basis of the "inaudible" and "musical" compression of the material. Hard knee is a prerequisite for creative and effective dynamics processing and for limiting signal peaks reliably and precisely.

MDX2000 Compressor Interactive Dynamics Processor



- Powerful and versatile signal processing tool provides 4 most commonly dynamic control sections: fully automatic compressor, manually controlled compressor, expander and peak limiter.
- Innovative IKA (Interactive Knee Adaptation) circuit combines the "musicality" of the "soft knee" function with the precision of the "hard knee" characteristics. Provides subtle and "inaudible" compression of the sound allows creative dynamics processing.
- Auto processor provides fully automatic control of attack and release times. There is also manual control.
- Interactive Ratio Control (IRC) expander eliminates "chatter" on or around the threshold point.
- Interactive Gain Control (IGC) Peak Limiter combines a clipper and program limiter. This allows for "zero" attack, distortion-free limitation of signal peaks.
- IGC is invaluable in live applications. Servocontrolled inputs and outputs. Operating level switchable from -10dB to +4dB.

PEQ305 Studio Parametric The Musical Equalizer

- Five independent, switchable bands. The quality of each of the five frequency bands can be modified gradually from notch to broad-band characteristics. This offers more flexibility than any graphic equalizer can provide.
- Bands 1 and 5 are switchable between shelf and peak. This is extremely useful, since acoustic problems usually occur in the upper and lower frequencies.
- Utilizes the "Consistent Q" principle to eliminate interaction of the parametrics frequency, bandwidth and amplitude. The same applies to interaction between the individual frequency bands.
- Parallel arrangement of the individual filters reduces phase shifting and associated delays to a minimum.
- Potentiometer response follows human hearing characteristics.
- Relay-controlled hard bypass with auto-bypass function during power failure.

DEQ8000 Ultra-Curve 31-Band Digital Graphics Equalizer/Analyzer

- The DEQ8000 is an innovative programmable graphic equalizer/spectrum analyzer built with digital technology. A converter (unit), it features Burr-Brown 20-bit AD and DA converters for input and output. It achieves the dynamics and audio quality of analog equipment while avoiding the drawbacks of analog filters such as tolerances in components.
- Programmable two-channel equalizer with 31 graphic bands on digital basis.
- Filter settings are displayed either in the form of display slide controls or as a filter curve representing the actual frequency response and taking the influence of several adjacent filters into consideration.
- Shelving function makes the moving of groups of faders possible.
- Up to 3 additional notch filters can be used whose frequency and bandwidth is freely selectable.
- Search and Destroy function automatically detects resonant frequencies, thus acting as an automatic feedback suppressor.
- The integrated Real Time Analyzer features both peak and RMS weighting, a noise generator with a separate output and a broad selection of auxiliary functions such as variable integration time, peak hold, etc.
- In Analyzer mode, a cursor is used to poll the amplitude of the single bands with an accuracy of 25dB.
- The signal source (measuring microphone or equalizer input) fed into the analyzer input is freely selectable.
- Various analyzer measurements can be saved and recalled for reference purposes.
- Auto EQ mode combines the analyzer with the equalizer section and thus allows for the automatic equalization of acoustic environments. Within 0.5 seconds, the Ultra-Curve provides a linear frequency response based on the actual room acoustics.
- MIDI interface allows for selecting memory locations from and external MIDI controller. Remote control of all Ultra-Curve parameters can be realized via system exclusive information. Also, several units can be linked together via MIDI.

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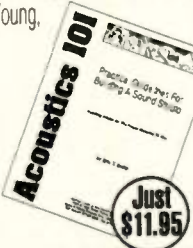
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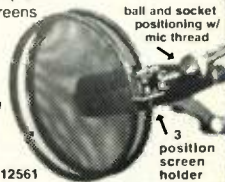
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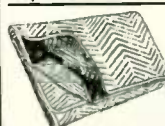
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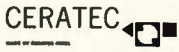
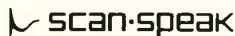
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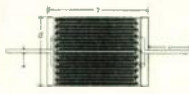
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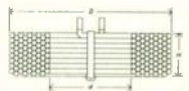
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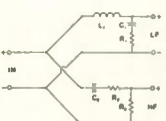
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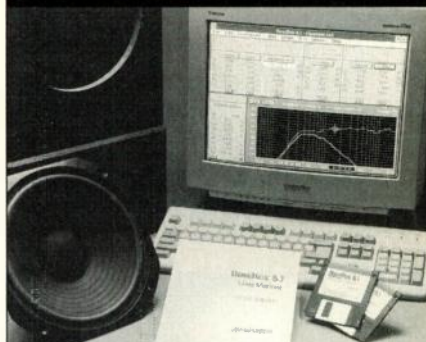
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ACROSS THE BOARD

continued from page 154

audio notches for copyguard. Last time they let the word out and the artists and producers stopped it cold. This time they are doing it on the Q.T. hoping that no one will notice. I know that there will be a CD-R version of the format. The recordable version may be one-sided for a while, but it will be available. Hide and watch.

PEOPLE WATCHING

In case you haven't noticed, there are more and more ads every month for time available at project studios and mastering services for pretty low rates. These places may do a good job, but just because they can afford a Sound Tools system and a CD-R recorder, doesn't mean they know what to do with it. There is a reason why people like Bob Ludwig, Bernie Grundman, Doug Sax, Scott Hull, Greg Calbi and other mastering engineers have achieved the reputation they have. It is because they have good ears and can tell what needs to

be done to the product before it goes to CD production, not just because they could afford to buy the equipment. When you select a place to do your recording, mixing or mastering, find a place that has the right person at the helm. A talented engineer can do wonders with marginal equip-

There is a reason why
Bob Ludwig, Bernie Grundman,
Doug Sax, Scott Hull, Greg Calbi
and other mastering engineers
have achieved the reputation
they have.

ment, but the best equipment in the world won't help the engineer who doesn't have a clue.

If you are going to a project studio or "project mastering" facility get a list of previous clients and talk to them. Just because there is a famous name on the client list doesn't mean that they did a good job. Maybe the artist threw it away and went somewhere else. Or, maybe

they were perfectly happy with the results. You have to make some phone calls.

On the recording studio end of things, make sure you find a place that wants to help "you" make "your" record. If the staff engineer or studio owner has a suggestion that helps, then fine, you can decide whether to act on it or not. If on the other hand, you are trying to do something and the studio owner says "Well, why would you want to do that?", then you are probably in the wrong studio. These guys are in the studio business and you are the most important person in the business, you are the CLIENT, and don't let them forget it.

ENDING

By the way, I now have my own World Wide Web site and a new e-mail address. The web site is <http://www.digital-atomics.com> and the e-mail address is rnichols@digital-atomics.com. The web site should be in pretty good shape by the time you read this. It also contains a link to the new Steely Dan web page. Check it out and let me know what you think. **EQ**

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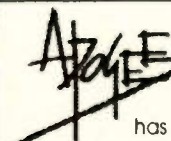
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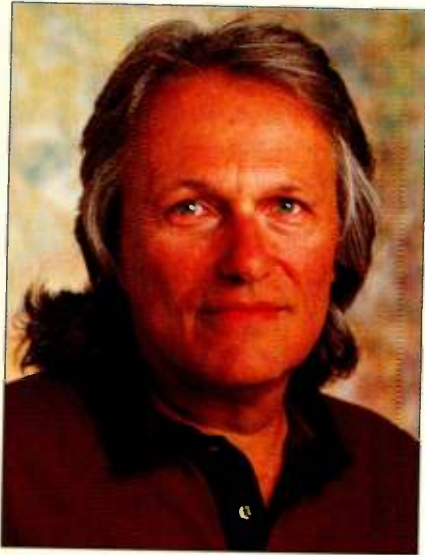
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Lame & More Lame



Cruisin' for a bruisin' on the internet

BY ROGER NICHOLS

I have been cruising the Internet. It is just like cruising the drive-in restaurants in the 60s. Up and down the boulevards with your windows rolled down and the radio blasting, hoping to be noticed by some cuties of the opposite sex doing the same thing.

I have noticed that there is a new way to ascertain if your opinion on a particular subject is valid or not. You post your opinion on the appropriate news group, and then wait to see how many respondents agree or disagree with you. If you post a note to the rec.audio.pro news group that hard disks sound better if they are in blue cabinets and you get no replies for awhile, it means that either everyone

thinks that you may have a valid argument, or that everyone is busy painting their hard disk cabinets blue to see for themselves.

I have been sucked into this mess myself. I remember buying blue Sharpies to coat the edge of my CDs to see if they actually sounded better. I won't admit it to anyone but you, but I bought one of those Radio Shack clocks that was supposed to improve the sound of your stereo if you plugged it in anywhere in your house. I won't tell you if it made any difference; you have to try it yourself.

It seems like there are tons of people (I'm not sure whether that means lots of skinny ones or just a few porkers) who look for meaningless factoids and try to turn them into a "cause." They lock onto them like a pit bull locks onto a mailman. I used to see pro nuclear activists in airports around the country proclaiming that "More people have been killed in Ted Kennedy's car than in all of the nuclear power plants." I guess Chernobyl ended that discussion.

It is funny how these activist types only seem to find enough facts to support their position and conveniently don't find any conflicting facts. In the case of the nuclear airport guys, they seem to have left out the SL-1 accident in the Western U.S. in the early '60s where some technician goosed the guy who was connecting the control rods to their drive motors. The guy holding the rods stood up quickly without letting go of the control rods. The reactor went critical, the water in the reactor boiled and the steam bubble blew the top off of the reactor (just like the Chernobyl accident). Because these guys were instantly killed, no one knew of the accident until the radiation alarm went off at a fire station many miles away. I guess in the eyes of the activists, this didn't count because not many people knew about it.

I see the same sort of blind rampages in dealing with all sorts of topics (I like lists because I don't have to complete my sentences):

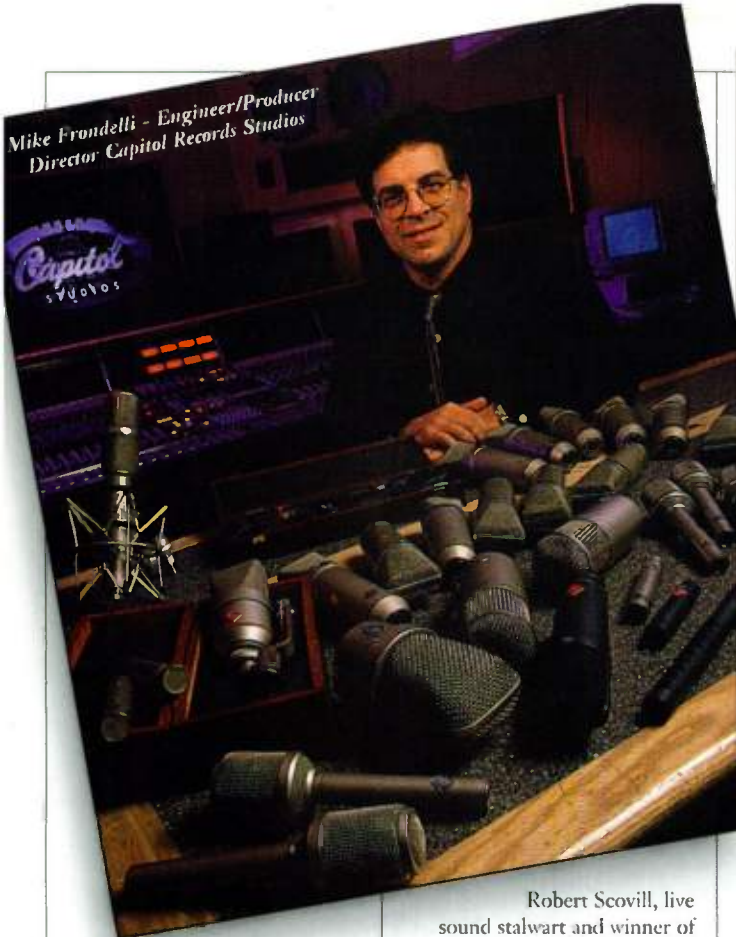
- Tube mics vs. solid state mics.
- Active DI boxes or passive DIs.
- Digital recording and analog recording.
- CDs against vinyl records.
- Project studios against professional recording studios.
- Good 16-bit recordings compared to bad 20-bit recordings.
- Baking old tapes as opposed to vacuum moisture removal.
- Tape recording or hard disk recording.
- SSI or Neve.
- Flying Faders or Ultimotion or GML console automation.
- 48KHz sample rates vs. 96KHz sample rates.
- DAT or analog for final mixes.
- DCC as opposed to MiniDisc.
- In-ear monitor systems or wedges.
- SPDIF or AES.
- Optical or coax.
- Mac or PC.
- Sony or everyone else.
- Buss, star or ring topology networks.
- Differential GPS approaches or ILS.
- Flying "VFR On Top" or IFR.
- Hang gliding or Base jumping.

In the above topics, decide which side you are on and find someone on the other side to argue with. They are all probably on rec.audio.pro. Let me know the winner in each case and I will tabulate the results. I don't have to find someone to argue with me because I can take up most of my time arguing with myself. I usually lose.

NEW CDS

I noticed recently that the decision was made to go with the two-sided CD for video, CD-ROM, and maybe audio. I still can't believe that they picked a format that leaves no room for a label. I am going to be the first person to misplace his CDs. The article I read stated that the new format does not allow for recording, and that is one of the reasons for its choice. The record companies try to get in the act again and just screw up everything for everybody. Some of the record companies are also looking at

continued on page 152



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Mike Frondelli, Director of Capitol Records Studios, has a connoisseur's mic locker, including more than 50 Neumann mics dating back to the 1940's. Newest in the collection? The mic Mike calls "the working man's Neumann," the TLM 193. Because it sounds so good in so many applications, Frondelli recommends the TLM 193 as "the one mic to have" for Capitol acts setting up project studios.

The TLM 193 is a stripped down, cardioid-only version of our famous TLM 170. It provides oodles of headroom, has virtually no self-noise, and can immediately give your project studio that professional sound (particularly on vocals) that you've been missing. (By the way, the TLM 193 has become our biggest seller.) It carries a retail price of less than \$1500.



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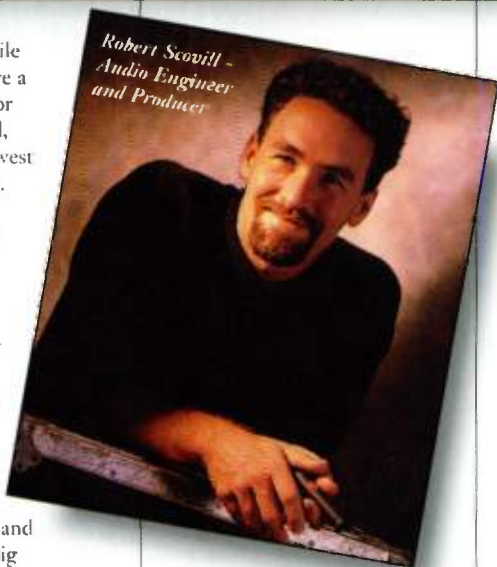
"I am using the new KM 184 both out on tour and at MusiCanvas." (Robert's studio in Scottsdale.)

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Let's face it. While Neumann mics have a stellar reputation for rich, opulent sound, they are not the lowest priced mics around. Why? Because we have to ensure that our microphones satisfy even the most demanding engineers in hyper-critical recording environments. But, we *have* found a way to take a few of the bells and whistles off a couple of our mics and still give you that big (HUG!) studio sound on a project studio budget.

The bottom line is this: before you go dropping big cash on outboard gear trying to make your studio sound good, consider the most important part of the signal path, your microphones. The only way to get great sound *out* of your studio is to *capture* great sound. And no other microphone captures sound as well as Neumann . . . not even close.



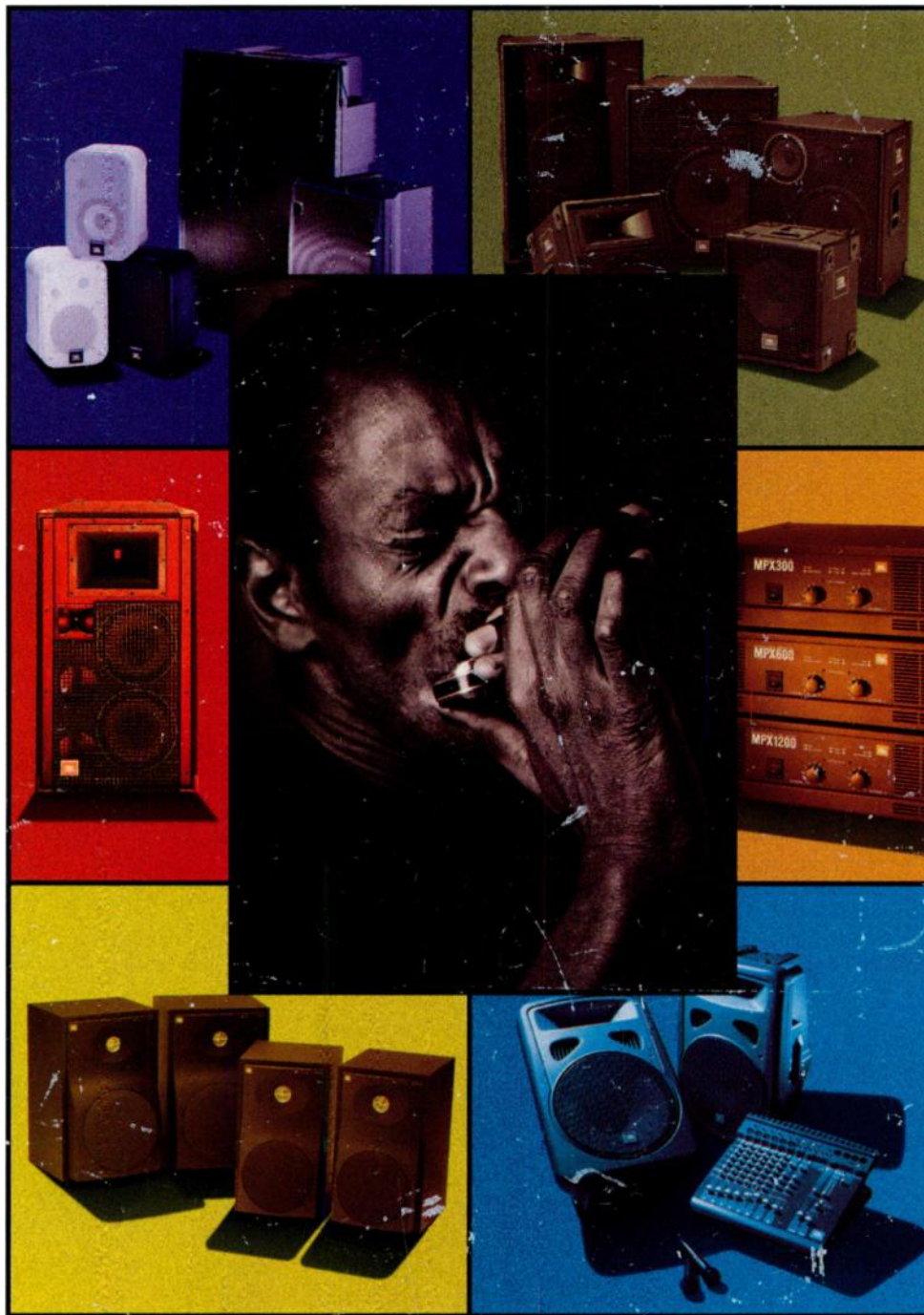
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