

FALL GEAR Preview

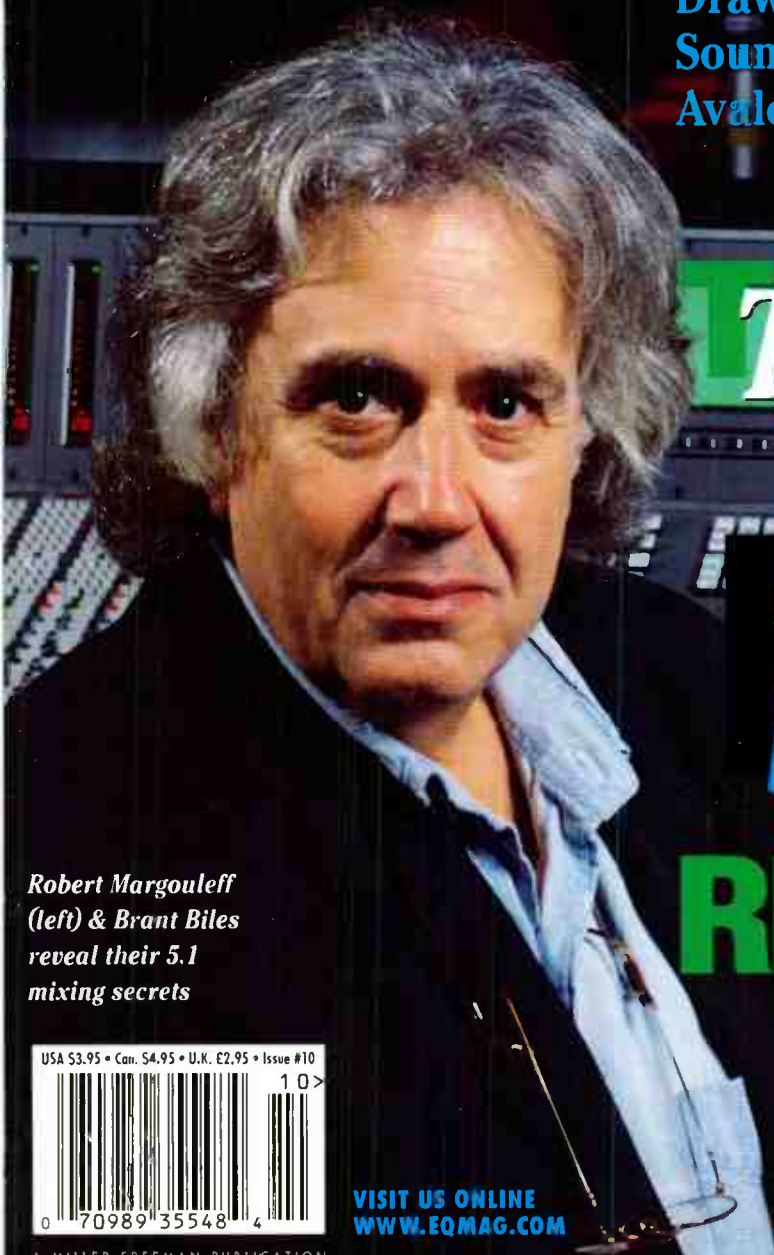
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THE PROJECT
RECORDING &
SOUND
MAGAZINE

OCTOBER • 1997

New & Reviewed:

Roland VS-840
Hafler Monitor
Steinberg ReBirth
Mackie Amp
Sabine FBX-2020
JBL Monitors
Lawson Mic
Shure Anti-Feedback EQ
Drawmer Gate
Soundscape AC-1
Avalon Pre



The 5.1 Revolution

*Robert Margouloff
(left) & Brant Biles
reveal their 5.1
mixing secrets*

**Robert Margouloff, Brant Biles,
Elliot Scheiner, Tom Jung,
Ed Cherney, David Tickle,
Bobby Owsinski**

USA \$3.95 • Can. \$4.95 • U.K. £2.95 • Issue #10



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"The Event 20/20s turned out to be damned fine monitors."—PAUL WHITE, SOUND ON SOUND

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the SR24•4 is equally at home in the recording studio or on the road.

■ **Solid, cold-rolled steel chassis.** Not aluminum or plastic. Monocoque design resists flexing and bending.

■ **Gold-plated internal interconnects** remain corrosion free for perfect electrical contact, even if used repeatedly in industrial sections of New Jersey.

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■ **Large, high-current internal power supply** lets us use VLZ® (Very Low Impedance) circuitry at critical points in the SR24•4 and SR32•4. VLZ® significantly reduces thermal noise and crosstalk by using extremely low resistor values in certain circuits. This innovative technique is normally only used in mega-expensive consoles, because it requires VERY high operating current. Which requires a robust, high-current power supply. Which is why we spent the extra money to build one into SR Series mixers. Live or in the studio, you'll hear the difference.

■ **All inputs and outputs are balanced*** to eliminate hum and allow extra-long cable runs (they can also be used with unbalanced connectors). Tight-gripping 1/4" jacks are solid metal; XLRs are genuine Neutrik®s with internal ferrite beads to reduce radio frequency interference. *except RCA-type tape jacks and channel inserts.



■ **Low-noise, high-headroom discrete mic preamps.** It can be argued that the preamps are the most important part of a mixer — whether you're recording in the studio or running a sound reinforcement system. They must be accurate and free from coloration...yet be able to handle screaming vocalists and close-miked kick drums without overloading. And, they have to be ultra-quiet. Nowadays, we're not the only ones to claim our mic preamps are "studio-grade." So we invite you to put us to the test. In the store, plug in a good, high-output microphone and a pair of



■ **Double tape outputs eliminate repatching during tracking.** Okay, we'll be the first to admit that eight buses are a nice feature. But if you're on a tight budget, the SR24•4's "double-bussing" feature is a great solution (and besides, in how many times do you REALLY track more than four channels to tape at a time?). Each of the SR24•4/SR32•4's four submix buses feed two different outputs. For example, Sub Bus 1 feeds Tracks 1 and 5; Sub Bus 2 feeds Tracks 2 and 6, etc. Instead of repatching, you route the bus' destination by what tape tracks you put into Record.



■ **Dual headphone outputs** with enough level to satisfy even most drummers. And a separate input for a talkback mic (so you don't tie up a mixer channel).

■ **Inserts on all mono channels.** Plus submix and main stereo mix inserts, separate control room outputs, extra RCA-type tape inputs and outputs, both 1/4" and XLR stereo outputs, and XLR mono output with its own rear panel level control.

■ The SR Series in a proverbial nutshell.

| | 24•4 | 32•4 |
|--------------------|----------------------------|-------------|
| Total Channels | 24 | 32 |
| Mono Channels | 20 | 28 |
| Stereo Line Inputs | 2 | 2 |
| Mic Preamps | 20 | 28 |
| Submix Buses | 4 | 4 |
| EQ (mono chs.) | 12kHz HF | 80Hz LF |
| | 100-8kHz Swept Mid | |
| | 18dB/octave low-cut filter | |
| EQ (stereo chs.) | 12kHz HF | 80Hz LF |
| | 800Hz Lo Mid | 3kHz Hi Mid |
| Aux Sends/Ch. | 6 | 6 |
| Stereo Aux Returns | 4 | 4 |
| Tape Outputs | 8 | 8 |
| Channel Inserts | 20 | 28 |
| Width (inches) | 31.0 | 39.25 |

■ **Below:** A few of the 500+ folks who build the SR Series, our other mixers, amps and studio monitors at Mackie Designs in Woodinville, Washington, 20 miles northeast of Seattle.

■ **Advanced surface mount technology** increases reliability and lets us stuff more stuff into less space.

■ **Extra-thick double-sided/thru-hole-plated fiberglass circuit boards.** This big mouthful of adjectives really DOES make a big difference...in terms of reliability AND sound quality. The expensive thru-hole plating process maximizes electrical conductivity and eliminates the possibility of intermittent contact. The SR Series' flexible fiberglass main board soaks up downward impacts that would shatter brittle phenolic circuit boards.

■ **Ultra-wear-resistant fader wiper surface** derived from automotive sensor technology won't develop "the scratches" even after years of use.

■ **100% genuine name brand electronic parts throughout.** Nuff said.

■ Mix amplifier headroom. The SR24•4's inside story.

Better mix amplifier design is why the SR24•4 can handle 24 simultaneous HOT inputs without distorting. The mix amplifier is where signals from all channels are combined. Some mixers sound OK with just a couple of inputs...but when you pour it on with lots of inputs — particularly signals from digital tape recorders, things start to sound pretty harsh. Backing off on the bus or main faders doesn't help, since the mix amp comes before these gain controls.

The SR24•4 and SR32•4 use Mackie's innovative negative

gain mix amplifier architecture. Instead of mixing at unity gain where headroom is quickly used up, our mix amps operate at -6dB. At this negative gain level, SR Series mixers are capable of summing **FOUR TIMES** the number of channels before clipping. That nets out at **DOUBLE** the amount of mix amplifier headroom compared to any competitive mixer. It's a critical difference that you can plainly hear.



The mix amp funnels multiple channel inputs into a single bus.

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World Radio History CIRCLE 51 ON FREE INFO CARD



EQ

PROJECT RECORDING
& SOUND TECHNIQUES
VOLUME 8, ISSUE 10
OCTOBER 1997



ON THE COVER:

Robert Margouleff (seated) and
Brant Biles. Photo by Edward Colver.

FEATURES

1998 PREVIEW 50

It's AES time again, which means tons of new product introductions that will affect the way you record. To keep you in the know, EQ presents its annual look at the latest and greatest, including First Looks at Roland's VS-840, Hafler's TRM8, Avalon Design's VT-737, and Shure's DFR11EQ Version 4.

SURROUND SOUND SPECIAL 70

All right, enough talk about surround sound. In this special section, the industry's 5.1 surround sound studio pioneers explain all the tips and techniques you need to know to start recording audio-only 5.1 surround. Stories include:

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I will play music

Nothing but music

*Way back then it was cool
to play the blues*

*When hip-hop was be-bop
you know, straight ahead.*

*When a young musician
had visions of Oscar an' McCoy
settin' it out so smoothly-
kind of like Jordan taking flight,
but in the key of B flat.*

*Dreaming of being a student
in the Miles Davis
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Get a Feel for Surround

Five-point-one audio is here, and it's no joke. Now, I know you're thinking (as I was at the outset of compiling this month's feature articles), "Haven't we been through this before with quadrasonic sound?" Well, yes, but this time it's different because (a) we now have the technology to successfully store six discrete channels of high-quality digital audio and (b) the hardware already exists in people's homes. Look into your neighbor's living room and you'll likely find a multichannel audio setup used to reproduce audio accompanying films and videos. There's no good reason that these speakers and amplifiers can't be used to reproduce 5.1 audio, and a DVD-audio standard is being written that will hopefully include a backwardly compatible stereo mix as well as a discrete six-channel mix (for the complete skinny on DVD, you should read the article by George Massenburg that appeared in the April 1997 issue).

So what's the point of mixing in 5.1? Visceral impact. If you really want to experience audio, park yourself in the center of a 5.1 system and let it rip. You'll hear an emotional intensity that's sorely lacking in most recorded music. And as artists and engineers, that's supposed to be the point of our exercise — to touch people. In talking with producers and engineers that participated in this month's EQ, the one thing that was mentioned time and again was that 5.1 makes the listener a participant in the experience, not just an observer. Robert Margouleff, Brant Biles, Elliot Scheiner, David Tickle, Ed Cherney, Tom Jung — these guys are pioneers of mixing in 5.1, and they all agree that the emotional intensity of the recording is tremendously increased in 5.1.

We are not talking about the future here, we're talking about the present. As of this writing, DTS® (Digital Theater Systems), whose 5.1 codec is quickly becoming the *de facto* 5.1 standard has (in conjunction with several major labels) already marketed more than 40 titles of 5.1 audio-only CDs. Some of these were mixed in consoles intended for surround and some were mixed on standard stereo mixing desks. As you'll learn this month in EQ, studios don't have to freak out over equipment considerations for 5.1 mixing because it can be done any console from a Yamaha 03D to a Euphonix CS2000 to a Capricorn.

If you're set to take the 5.1 plunge, here are some quick tips:

- Use the same brand and model speaker to monitor each of the five full-range channels.
- Drive those speakers with identical power amps.
- Make sure that monitor levels are accurately calibrated.
- Don't clutter the center channel with too much information.
- Use compression conservatively.
- Think three dimensionally and don't be afraid to place instruments discretely to a single channel.
- Don't go for the whiz-bang effect. It quickly becomes tiring to the listener.
- Edit reverb programs with respect to the environment in which the recording took place.
- Confirm that all of your mix busses are providing equal audio quality.
- Always remember that there are no rules.

For the first time since the development of stereo, our industry is being offered a new tool with which to deliver our message. Distinct creative opportunities are opened up in the 5.1 mix platform, not only for recording and mixing, but for composing as well. The possibilities are virtually endless, and, of course, EQ will be there to help you discover them.

—Steve "Woody" La Cerra

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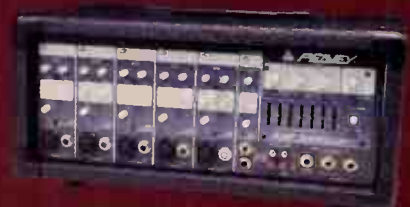


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PACKAGE DEALS

In response to Craig Anderton's article on "Solving Mac/Windows System Problems" from the August '97 issue, I would like to point out that switching drives in Wintel machines can be achieved as you described — but can also be dangerous if you don't have identical hard drives. If your BIOS is capable of auto-detecting your drive, and is set up to do so, you won't have any problems. But if not, you'd better be familiar with the procedures of changing these settings in the BIOS.

The best way to solve all of your problems would be to look into software packages such as System Commander from V Communications (www.v-com.com) or Partition Magic from Powerquest (www.powerquest.com). These packages will allow you to boot to multiple operating systems and you can have multiple partitions set up on your hard drives.

If you do a lot of software testing in Win95 and frequently need to start from a fresh install, you may want to look into making a batch setup INF file that will allow you to automate your setup. Use a utility like BATCH.EXE from Microsoft to setup your custom INF file, then use a command line like "SETUP /IW YOURINF.INF" to completely automate your setup (go out and have a couple of beers while the computer does the work for you). I hope this information is helpful.

Brian Naille
Columbus, OH

MORE PROBLEMS SOLVED

The article "Solving System Problems" (August '97) asks for a way to swap boot drives in software; here's a solution:

Any current Pentium class motherboard has two IDE interfaces. Whichever drive hooks up to the primary port will be assigned the logical letter "C" and will become your boot drive. The second port (or SCSI drive if you have one) will be assigned the next letter, with any additional partitions being incremented from there.

To boot off the secondary drive, boot your system but proceed directly into the CMOS settings. There should be a section for IDE interfaces. Turn off your primary drive, or set it to only use the secondary port. Save your CMOS settings and re-launch the computer. It will ignore your primary drive and boot off what was your D: drive (beware, as this

becomes your C: drive and will negate any path-dependent shortcuts). Although this method precludes access to your main drive, it seems easier than swapping cables around.

If your D: drive is SCSI, then there is an option either in CMOS or in the controller BIOS to make it a bootable drive; the same technique will work here as well.

Also, a cool trick to make a perfect mirror of your drive for safety purposes on another drive is to open up a DOS window in Win95 and type XCOPY C: D: /E /C /H /R /K. This will make an unattended perfect mirror of your current drive (C: in this case) to the target drive (D: in this case). Since this is a drive-to-drive copy and is unattended, it is tons faster than a reinstall of Win95 or a tape backup.

Jeff Mac
via Internet

SOCIETIES STRIKE BACK

In the August issue of EQ, the FezGuys talk about the people who "have a stake in the way music is made...on the Internet." They identify the delivery formats such as Liquid Audio, Shockwave, Progressive Networks, and others. They talk about record companies and their trade groups such as the RIAA. Then they talk about what they call the "collection societies," ASCAP, BMI, SESAC. They seem to have a true disdain for the societies, saying that their "business model" is based on a "distribution technology and arts culture that is half a century out of date."

Basically, what they are talking about is something called the "Blanket License Agreement." What this agreement does is grant a license to anyone who pays the fee the right to perform any piece of music in that society's catalog. Without the "Blanket License," every piece of music would have to be individually licensed with the owner of the copyright. This means to perform a piece of music someone would have to find out who owns the copyright and



CORRECTION

In the August issue's MI Insider column, we inadvertently ran fig. 2 twice instead of fig. 3. The actual fig. 3 is shown here. We apologize for any inconvenience this may have caused.

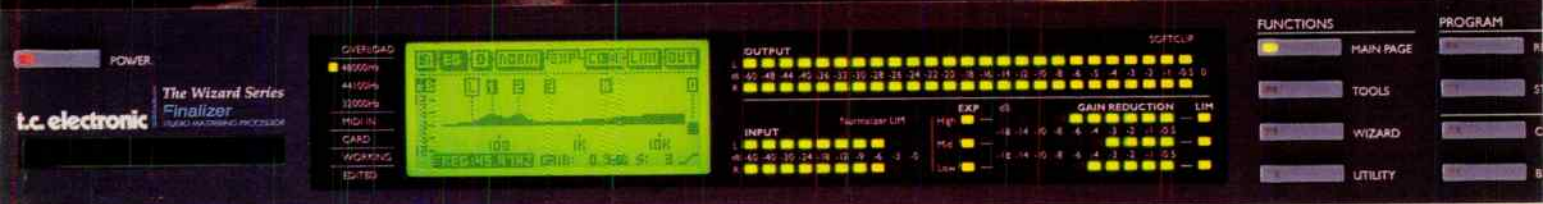
where they can be reached, contact them, and then negotiate a fee. The question for the songwriter becomes: Do you really want to negotiate a license for every piece of music you write with every person who wants to perform your music?

As far as the Internet is concerned, presently the only people for the societies to negotiate with would be the individual site operators. The phone companies don't want to get into the business of collecting royalties, and the online and Internet Service Providers have also declined to step up to the plate. At least one of the societies (ASCAP) has put together a three-tiered license that should address the musical needs of site operators. The agreement bases the license fees on the amount of the operating budget or total revenue generated by the site, whichever is greater, and also addresses the need for flexibility in the way sites are presented.

Finally, the FezGuys say that the societies are interested in "protecting their (own) interests," followed by "the collection society is where artistic expression comes to a grinding halt." The societies' interests are those of composers, lyricists, and publishers, and getting people paid for the art they create. Creating music is a truly wonderful thing, and the societies are one of the big reasons that people who create music can go on expressing themselves in a profession they love.

Gary Woods
Secretary/Treasurer
Society of Composers and Lyricists

Punch Knockout



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*Bernie Grundman, Bernie Grundman Mastering
Five Time TEC Award Winner*

"The Finalizer is capable of producing first-rate professional results. There's a lot of 'bang for the buck' in this single rackspace mastering tool."

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CIRCLE 79 ON FREE INFO CARD

A UNICORN IN THE FASTLANE

Q Is there a software driver that would enable MOTU FastLane to be used with Win95 as well as Mac? I own an Apple Power Mac 6100 with a DOS card. I would like to be able to use MIDI in both environments.

Randall Jackson
Newburyport, MA

A No. FastLane is a Mac-only MIDI interface. However, Mark of the Unicorn has four other MIDI interfaces that are cross-platform and work with Mac OS and Windows95. Some of them can even be used with a Mac and a Windows PC at the same time. We have not yet explored the use of these interfaces with DOS-based MIDI software running on a DOS card in a Power Mac. Our MIDI interfaces connect to the parallel port on a PC and the serial ports on a Mac. If the DOS card has a parallel port on it, it is likely that a MOTU interface would work just fine by connecting it directly to the card. You could then also connect the MOTU interface to the Mac's modem or printer serial port and freely use MIDI software under Mac OS and Windows95. If, however, the DOS card relies on the Mac serial ports for I/O to printers and other PC-compatible peripherals, I doubt that our interfaces would work (as is) with the card.

Jim Cooper
Mark of the
Unicorn

TANGLED WEB

Q I have been reading EQ for a couple of years now, and want to inform you that with your help, particularly Eddie Ciletti and Roger Nichols, I was able to put together a recording studio of my own — due to open this September in the Philippines.

We'll be using a Yamaha 02R

(what else?) and mainly TASCAM DA-88 and 38's, among other things. I recently stumbled upon an unofficial TASCAM web page, and what I read was pretty scary. Are these machines as bad as they are made out to be? Or are those users just careless or don't do proper maintenance?

Adios, and thanks to all at EQ.

Jim
via Internet

A The good news is that all digital tape machines are like cars — they require routine maintenance at regular intervals. For a vehicle, it might be every 5000 miles/kilometers. For helical scan tape machines it should be every 250 hours.

Unfortunately, there is more negative misinformation than positive information on the Internet. You can only go by your own experiences. Unofficial Web sites can often be sites for disgruntled folks who haven't taken the time to learn their gear or keep it properly maintained. Imagine how

much e-mail there'd be if every satisfied TASCAM customer took the time to say so! Yes, all machines occasionally have problems, and being in the repair business makes me an authority of sorts; but if you're nice to the gear, it will be nice to you.

It would be safer and more useful for you to keep in touch with EQ and TASCAM [Tel: 213-726-0303 (check out their FAXBACK system)], and find a Web site where nobody has an axe to grind.

Good luck with your new studio and newly acquired Internet access.

Eddie Ciletti
Contributing Editor
EQ magazine

AUTOELECTRONIC

Q I really appreciate Eddie Ciletti's DIY articles in EQ magazine. I'm going to build the phantom power supply in the next few months. I have a question: Have you ever done a DIY RIAA phono preamp? I really need a preamp, but can't afford a nice one like the Stanton I use to use when I worked at a recording studio (I'm a video editor now). If you haven't published a phono preamp article, could you suggest where I might go to look for plans for one to build?

Jeff Beaumont
via Internet

A Building a phono preamp is not difficult, but you may want to save time by finding some of the several available off-the-shelf options. Audio by Van Alstine (www.avahifi.com) is one of them. There are also \$30-ish preamps occasionally for sale in surplus and repair-oriented consumer electronics catalogs, or check the back of hi-fi publications such as *Audio*.

Signetics has a phono preamp circuit in its *Linear Data Manual* using a 5532 IC opamp. The

CIRCLE 223 ON FREE INFO CARD

OCTOBER 1997

World Radio History

James Taylor, on recording *Hourglass* using the Yamaha O2R Digital Mixer:

"The O2R allowed us to choose our most comfortable place for making the music and to stay digital the whole way and to do it at a very high level. We were really very happy."

James Taylor (R) Frank Filipetti (L) at the Yamaha O2R during the recording of *Hourglass*



When James Taylor and producer/engineer Frank Filipetti set out to record James' new CD, their determination to capture the strongest musical performance was paramount. "I think it's often the case in the recording studio that you sacrifice some sort of comfort level and vibe for sound quality," reflects Taylor. For this project, "we were willing to go in the other direction to make the performance the priority and not necessarily the technology. But, in fact, it turned out we didn't have to sacrifice anything to do that."

A summer home on Martha's Vineyard, MA, provided the environment.

The Yamaha O2R digital recording console provided the all the mixing power and sonic performance needed to make what was to become James Taylor's next hit album, *Hourglass*. Filipetti adds, "Being able to listen to playbacks as aurally satisfying as they were, allowed all of us to relax and just enjoy what I consider to be one of the most fulfilling recording sessions I've ever been on." To hear great performances and the sound of the Yamaha O2R digital recording console, pick up a copy of James Taylor's *Hourglass* on Columbia Records, available at music stores everywhere. To receive your copy of *Hourglass* Session Notes and learn more about the Yamaha O2R, O3D and ProMix 01 digital mixers, call 800-937-7171 x648.



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RCA tube manual also has a circuit. (Please note the capacitor, C4, which is listed in the parts table but not shown in the "schematic," goes from the base of Q1 to ground.) Thanks for reading.

Eddie Ciletti
Contributing Editor
EQ magazine

SPIRITED CONVERSATION

Q I recently switched mixers from a Mackie 1402VLZ to a Soundcraft Spirit Folio Rac Pac. I've been happy with the Rac Pac except for what seems to be an anemic headphone output. When monitoring through speakers (via the control room outputs), if I set the "C. Room & Phones" knob to about 1/3, I get acceptable levels. When I monitor through headphones, though, I have to turn the C. Room & Phones knob all the way up to maximum in order to get acceptable level in my phones.

I've tried a couple different headphones with the same results. Is this normal? Is there some sort of test I can perform to tell if there's something wrong with the headphone output? I especially like the feature of the monitors (speakers) being disconnected when the headphones are inserted, but this could be potentially dangerous if I happen to disconnect the headphones without turning the C. Room & Phones knob down. I'm in fear that the output is OK and that I'll have to buy an external headphone amp (which would make my decision to switch mixers a mistake...). Is there any kind of headphone output mod that could be done?

JD
via Internet

A I don't think there's anything wrong with your system, so my guess is that the gain structure between your mixer and power amp should be checked. Granted, the problem did not occur with the Mackie, but you said that running the Folio's C. Room & Phones level at 1/3 is enough to drive the speakers. I'll bet that you can't get enough headphone level until the control is at 75 percent rotation (7.5 out of a possible 10). Believe it or not, this is where the control should be.

First, check with Soundcraft to see if the Control Room output level can be switched from +4 (where it probably is now) to -10. If not, there are two options. If your power amp does have a gain con-

trol, turn it down. If not, you can build a simple voltage divider using a 600-ohm and a 150-ohm resistor in series to ground (one set per channel). The input is at the top of the 600-ohm resistor; the output is the junction between the two resistors.

Thanks for reading, and be sure to check out my web site: www.tangible-technology.com

Eddie Ciletti
Manhattan Sound Technicians
NYC, NY

[Spirit's Gary Lynn also responds: Eddie Ciletti probably correctly ascertains that you are using a -10 dB or hi-fi power amp, and Spirit mixers are all designed to drive the professional standard of +4 dB nominal. When we encounter this problem, rather than mod the board, we usually try to get the customer to take the extra leap to a professional power amp because these days there are several low-cost units available that do a great job — and will clean up your sound as well.

Only one thing to add that could also have contributed to the mismatched levels: low-impedance headphones. Spirit mixers generally don't like low-impedance headphones, so we suggest [impedances] above 600 ohms for best results. In some consoles (not just Spirit) low-impedance headphones can actually cause crosstalk. This is the result of effectively connecting the headphone power amp to the ground of the console through the headphone load.

What is happening, in a sense, is the ground of the console modulates with the headphone audio and, since all circuits are referenced to ground, this signal gets everywhere. It's a real demon to find when you're not aware it can happen. Therefore, use higher impedance headphones and check out a new studio amp.

Gary Lynn
General Manager
Spirit by Soundcraft, Inc.]

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CIRCLE 15 ON FREE INFO CARD
World Radio History

A Studio that Delivers

Carlos Castro offers a high-quality recording studio that comes to you

STUDIO NAME: Nomad Recording/Perfection in Audio

LOCATION: Based in Studio City, CA, although it can be set up anywhere in the U.S.

KEY CREW: Carlos Castro; Mitch Zelezny (Sonic Solutions). Tech Support: Steve Haselton, Mårtins Saulepurēns; Brent Averill, Cornell Tanassy, and Jim Albert

PROJECTS RECORDED: Local string ensembles, church choirs, and acoustic music groups

CONSOLE: Brent Averill-modified Neve BCM-10 with 1073 modules and 2254 E compressors [2]; Neve Lunch Box with 1272 [2] and 2074 [2]; 24x2 Brent Averill-modified passive line mixer with Neve Class "A" modules (used for monitoring)

MICROPHONES: Matched pairs of Telefunken/Blue M-49's, ELA M 250's, and Neumann/Blue UM57's. Three matched Telefunken/Blue U47's for Decca Tree Configuration. Oktava MC 012 [8]; Symphon BC-10 [3]; Shure SM57 and SM58; Sennheiser 421

MONITORS: JBL 4310; custom-made Exactas

AMPLIFIERS: McIntosh MC 2105 (for 4310's); Crown PS-400 (for headphones)

COMPUTERS: Apple Macintosh Quadra 650

DAW: Sonic Solutions digital audio workstation

RECORDERS: Heavily modified 3M-79 2-inch analog tape machine (with 16- and 24-track head stacks); Ampex 351 analog 1/4-inch 2-track tape machine; TASCAM DA-88 [2] running with Studer D-19 converter and Prism Sound MR-2024T Bit Mapper

DAT MACHINES: Panasonic SV-3900 [2] with MK 390 remote control; TASCAM DA-30 MkII

OUTBOARD GEAR: NTP/Neumann 182-100 EQ [2]; Manley stereo tube compressor; Fairchild Conax 602 broadcast compressor; Altec 436 C compressors [2]; TC Electronic M5000



CABLES: Canare Star-Quad; Monster M-Series

SYNCHRONIZATION: Timeline Micro-Lynx

POWER CONDITIONING: Equi-Tech ET-2R-F 20-amp units [2]

STUDIO NOTES: Carlos Castro states: The entire studio goes on location in Anvil Cases and is geared towards audiophile

recording, using the best vintage and modern equipment we can find. It's a nice niche to be in — we're not a huge truck, but we're also not someone with just a DAT recorder and a couple of mics. This is a niche that we believe has not really been targeted. We are now in the process of building a dedicated

studio, although we will continue doing mobile recordings as well.

EQUIPMENT NOTES: Castro continues: My most prized possession is my microphone collection. A mic is a lot like a camera lens — each mic has sonic traits that adapt according to the style of
continued on page 150



PHOTO BY EDWARD COLVER

AKG Acoustics D25

Now nearing 40,
there's plenty of
history behind
AKG's *Hard Day's*
microphone

MICROPHONE NAME: AKG D25

FROM THE COLLECTION OF: Klay Anderson/Klay Anderson Audio

STREET PRICE: Approximately \$300 in 1965

YEAR INTRODUCED: 1958

TYPE OF MIC: Dynamic

POLAR PATTERN: Cardioid

FREQUENCY RESPONSE: 30 Hz to 16,000 Hz,
±2.5 dB

FRONT TO REAR REJECTION: Better than
20 dB

RATED SOURCE IMPEDANCE: 200 ohms

SENSITIVITY: -77 dB (1 volt/dyne/square
cm)

DIMENSIONS: 7 7/8 x 3 1/16 x 2 1/8 inches

WEIGHT: 1 pound, 12.8 ounces

MIC NOTES: Along with AKG's D12 and D20, the D25 was one of the earliest mass-produced cardioid microphones. Intended for high-quality motion picture, television, and studio applications, the AKG D25 found its way into a multitude of uses for both indoor and outdoor audio. While the output impedance of 200 ohms was standard, the D25 could also be ordered with a 60-ohm or 250-ohm impedance. Even compared to modern-day designs, the D25's frequency response is within a very tight tolerance, essentially flat from 100 Hz up to 10,000 Hz. AKG's D20 was basically the same microphone without the shock-mount frame. Astute EQ readers might notice that the D25 appeared in many of the promotional shots for the Beatles's *Hard Day's Night*.

USER TIPS: Used on kick drum, the D25 offers a sound that might be considered the polar opposite to the response from a modern mic such as AKG's D112. When used up close, the D25 exhibits a slight rise in the low-frequency response at around 100 to 125 Hz, giving it a booming, "hip-hoppy" type of sound, with a relatively flat midrange. **EQ**



PHOTO BY EDWARD COLVER

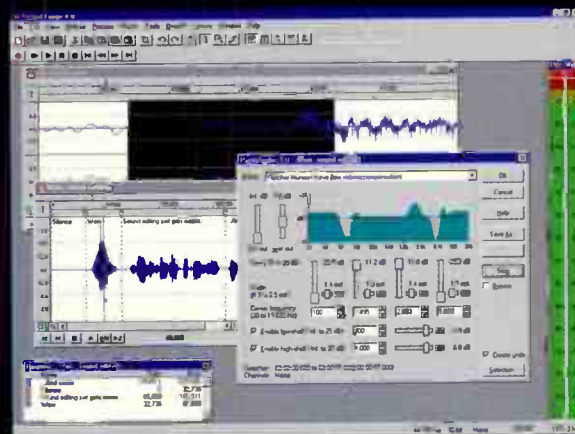
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World Radio History

There's lots of hype these days about PCI digital audio recording systems. Companies spend a ton of money on advertising, claiming future support by a myriad of different software companies. What are we supposed to do? We need instant solutions! Our projects are due now not "soon".

Emagic, known for its integrated professional MIDI, Digital audio and Scoring software has created a cross-platform, PCI busmaster digital audio recording card with 8 discrete outputs for less than \$800: Audiowerk8. Since the product's launch last Spring, thousands of users worldwide have attested to the incredible ease of installation and use and the warmest analog to digital conversion in the business. The Audiowerk8 works on both Windows and MacOS computers just like Logic Audio, the sequencing software it was designed to work with from the start.

Version 3.0 of this award winning music production tool now offers a rich complement of real-time DSP effects such as Equalizers, Filters, Reverbs, Chorus, Flangers and Delays with up to 8 inserts and sends per track, depending on your CPU.

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World Radio History

Needledrop In The '90s



Making quick musical soundtracks for fun and profit

BY CRAIG ANDERTON

Looking for new revenue sources? There may be businesses in your local area that need music, such as radio stations, theater groups, video producers, local access cable stations, convention organizers, advertising agencies, and so on. Unfortunately, these types of businesses usually operate under severe time and budget constraints, so they often opt for "canned" music when sound is a project's secondary, not primary, focus. However, there is a way you can try to tap in to this market.

For years, "needledrop" music — vinyl record libraries of generic pieces of music — provided instant soundtrack material for those short on time and money. The name came about because when you needed something, you just "dropped the record needle" where appropriate, and you had sounds. There was no need to deal with musicians, unions, overtime, or studios.

Still, vinyl wouldn't let you change the pitch, tempo, arrangement, or mix, and there was always the issue of surface noise. But now, thanks to MIDI and

hard-disk recording, you can put together background music that beats needledrop music hands-down — yet is inexpensive (and fast) enough to satisfy those writing the checks.

For example, I recently recorded a voice-over for a Web site. While the client expected that the final result would be just voice, it sounded pretty dull without some kind of music background. What to do? There was no time, nor budget, to fire up the studio and start composing.

So I did the next best thing (fig. 1): booted up a multitrack hard-disk recording program (in this case Digital Wings for Audio), recorded the voice, then reached for East-West's sampling CD *Trance Formation*, which contains WAV files just ripe for importing into a recording program. A few drones, phrases, and arpeggios later, I was ready to mix down and convert the file to 22 kHz/mono. The job was done in under three hours, from

setting up the mic to e-mailing the file.

There are three popular ways to create customized background music: MIDI, hard-disk recording, and a combination of the two. We'll investigate the pros and cons of each option. In any case, one universal consideration is that if you use any sampling CD, read the license agreement carefully to make sure the material is license-free — it takes just one lawsuit to ruin your day.

DOIN' IT WITH MIDI

A MIDI sequencer driving a General MIDI module makes a powerful musical team. MIDI sequences are commonly available: there are companies like Twiddly Bits and Beatboy that sell Standard MIDI Files on disk, online public domain files, and programs such as Jammer and Band-in-a-Box that algorithmically generate MIDI sequences (under your direction, of course).

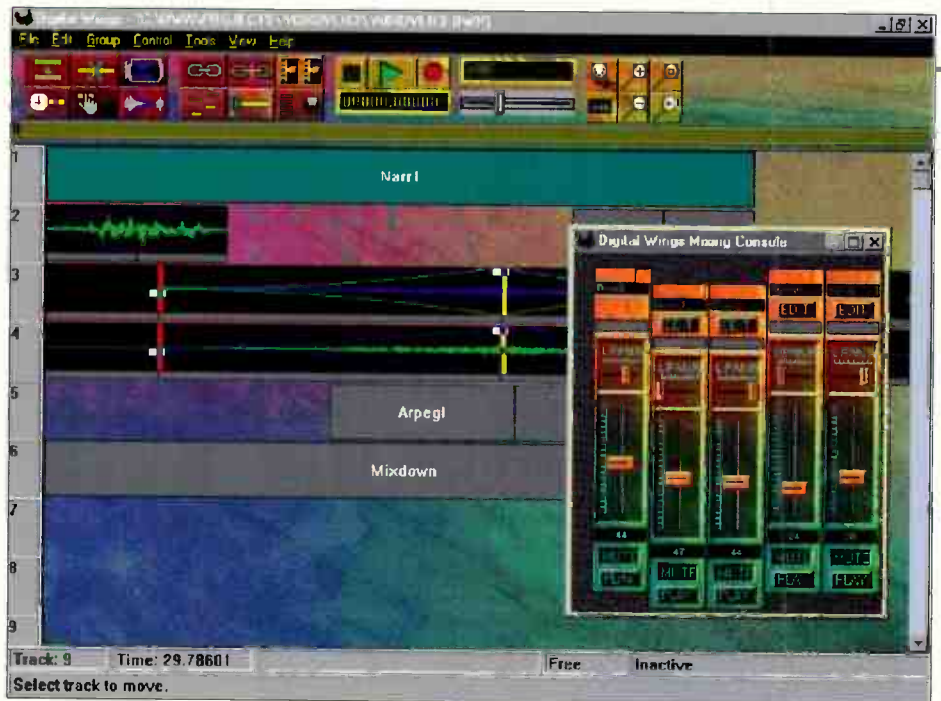


FIGURE 1: Sampling CDs can help you put together music fast, as evidenced by the simplicity of this project. The first track is narration, the second a sequenced phrase (note the fade in and out), the next track pair is a white noise drone (again, note the fades), and track 5 has a couple of arpeggiated figures. The faders set the levels of some selected pieces of digital audio; the Mixdown track is a mono mix of all the other tracks.

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Once an SMF is in a MIDI sequencer, you can change tempo, transpose pitch, and rearrange through cut-and-paste editing. This is a big improvement over traditional needle-drop music, but the tradeoff is that you're limited to the standard GM instrument set, which may or may not cover everything you need. Still, MIDI rules for many applications, especially when you need major pitch or tempo changes.

HARD-DISK RECORDING AND SAMPLING CDS

This is often the fastest and most convenient way to work. Source material includes sounds you record yourself (like narration), and other sounds from sampling CDs. These can be either regular audio (which you can probably "grab" with one of your computer's digital audio programs) or files in your computer's native format, namely AIFF for Mac and WAV for Windows. CD-ROMs with AIFF/WAV files are easier to work with, but less common than audio sampling CDs.

Sampling CDs open up a world of

material — for example, you can fake a pretty good orchestra with East-West's *Orchestral Adventures*, or put together Seinfeld-like bass licks with the Will Lee discs from Sampleheads. Throw a few overdubs in from Spectrasonics' *Distorted Reality* or David Torn's disc for Qup Arts, and *voilà!* — instant soundtrack.

Because many projects are short, don't involve many tracks, and are destined to play back over a limited-bandwidth medium (e.g., radio), the hard-disk recording program's requirements are fairly relaxed. Even some of the consumer-oriented programs bundled with sound cards are up to the task.

MIDI + DIGITAL AUDIO

This format (exemplified by programs such as StudioVision, Cakewalk Pro Audio, etc.) lets you handle anything — record the narration, lay in a MIDI rhythm track, then add some digital audio overdubs. Several programs exist for Windows and Mac that have the features needed to do quick MIDI/digital music inexpensively.

Another MIDI + digital audio option is to drive a sampler with the sequencer to combine MIDI and digital audio. Even a sampler with only 4 MB of RAM can record a 30-second voice-over, with room to spare.

DIGITAL TAPE

Digital 8-tracks can work, too. Suppose you're recording a voice-over with a single machine: record the voice on one or two tracks, then cue up sample CDs and record the bits of audio where appropriate. If the audio runs out before you want it to, fade it out toward the end and crossfade in from the beginning on another track. As long as the background is a pad or ambience, you'll be fine. And if something comes in a little late or early, you can always time-shift tracks to compensate.

ALL MIXED DOWN

In most cases you'll still need to deliver a final stereo or mono master (possibly at a couple of different sample rates if you're mastering for online or multimedia), so mixing becomes an issue, espe-

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CIRCLE 07 ON FREE INFO CARD

cially as you add various disparate elements (GM module, samplers, etc.). This is where the recording environment's degree of integration really matters. Mixing a GM module is no big deal — change volume with controller changes embedded in the sequence and patch the stereo outs where appropriate — but adding digital audio isn't always as simple.

A program like Cubase VST, which does MIDI and digital recording along with effects and automated mixing, is truly a "studio in a box" that works well for this kind of application. However, even Sound Forge XP can do a decent job of combining pieces of audio if you're not afraid of premixing as you go along. I also appreciate Digital Wings' mixdown feature and Samplitude's bounce feature, both of which mix the audio (less any muted tracks) into a standard WAV file.

With a digital 8-track, one mixdown trick is to record onto six of the eight tracks, then mix the six tracks down into the two unused tracks. You can then transfer these over to DAT for the final master. This also gives a type of "automated mixing." If there's a problem as you mix, simply rewind, reset levels, and punch where you want the new mix to come in. Because the "mixdown deck" and "multitrack deck" are located in the same physical machine, they are always in perfect sync, so you can punch with impunity.

IS IT REAL MUSIC?

I'll admit, I'm kind of a purist when it comes to creating music; I think it's best to have real musicians writing and playing real music. But for some applications, that's overkill, or out of the economic reach of those financing the project. I always thought using canned music was cheating, but as I do more projects that require background and not foreground music, my perspective is changing. Either you meet the time and budget requirements, or you're off the project. Needledrop music has always been a salvation under those circumstances, but now you can actually throw a little creativity into the process. In fact, you might even find it's fun.

Craig Anderton is a recording artist, lecturer, and author of the classic book Home Recording for Musicians, which was recently revised. He's gearing up for a new series of seminars called "Improve Your Demos 100%."

All through the audio industry people are talking. The big people. People like Humberto Gatica. They know what it means when a truly superior product comes along. It makes the job easier. It makes the client sound better. It gives the producer a little peace of mind. Humberto has been down the road once or twice; recent

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Photo taken at Westlake Studio D

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CIRCLE 24 ON FREE INFO CARD
World Radio History

| | VS-840 | Digital Tape | Mini Disk | Analog Tape |
|-----------------------------------|---------------|---------------------|------------------|--------------------|
| Virtual Tracks | Yes | No | No | No |
| Cut and Paste Song Editing | Yes | No | Limited | No |
| Digital Mixer | Yes | No | No | No |
| Digital Effects & EQ | Yes | No | No | No |
| Waveform Editing | Yes | No | No | No |
| 999 Levels of Undo | Yes | No | No | No |

Duh.

The fact that digital recording is the wave of the future is no longer a secret. Unfortunately, which format to go with can be. But not for long. Introducing the affordable VS-840, a complete 64 virtual track digital recording studio and the first to record directly to a built-in Zip drive.

For the producer in you, the VS-840's random access recording system allows you to record a great verse and chorus and then

simply cut and paste tracks to try out endless song structures and arrangements. Throw in a built-in 12-channel mixer with 20-bit A/D converters, a full-blown stereo multi-effects processor, 64 virtual tracks with scrubbing ability, and you've got an unbeatable package at an unbeatable price.

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VS-840 Digital
Studio Workstation

Circle 78 on Free Info Card



Mastering Mastering

When it comes to mastering, we've come a long way, baby...



PHOTO BY JIM HERRINGTON

BY AL KOOPER

I think it's instructive for you to know how I learned about mastering. It's also pretty unbelievable as well...

In 1968, I began work as a staff producer at Columbia Records in New York. I was an admitted rookie and had plenty to learn. At the time, Columbia was known to have some of the finest vinyl pressings on the street. I would mix my albums only to be disappointed with the sound once the LPs got pressed. What was wrong?

I asked Dave Rubinson, one of my colleagues, if he had any clues to my mystery. He asked me who mastered the albums. I said: "What's mastering?" He smiled and explained that the music had to get from the mixed tape to the lacquer that cut the LPs, and that was a process called mastering. He said the best guy at Columbia was Mike Ruschack, but that you had to request him, because he nor-

mally just did the classical line (the best pressings, natch). I went to see Mr. Ruschack and expressed my plight to him. He suggested that when I mixed my next project that I respect zero; that is, to keep the peaks of the mixes out of the red and keep a uniform level that *never* went in the red. I complied with his request, and on my next project I followed the mixes downstairs to the mastering rooms.

The house engineers for Columbia were all set up in a labyrinth of cubicles. Each of them, to a man, were sitting down with their feet up on tables and consoles, reading the morning papers, some smoking cigars, others drinking coffee while lacquers were being cut. This can't be right, I said to myself. I inquired of the gentleman who was responsible for mastering my project that morning why he wasn't monitoring the levels. "Oh, they've got clippers and compressors on there for that. It's the modern age. We don't have to do that anymore."

This did not sound right to me.

"Can't you take those clippers and compressors off?" I inquired.

"Nope. Against the rules. They're afraid if I blow a cutting head. Those puppies cost \$300 apiece!" he countered. I asked him to get his boss down there ASAP. Meanwhile, I dialed Mike Ruschack's extension. "Mike, are you sure we won't blow a cutting head if I respected zero in my mixes?" "I'm 95 percent sure, Al," he said. "That really shouldn't be a problem." I thanked him and turned around just in time to face the head of engineering for Columbia.

"I want to take out all the clipping and compressing on this record," I said.

"Can't do that, Al," he replied gruffly. "It's against company rules."

"Why is it against company rules?" I asked naively. He explained about the cutting heads, and as he did so I reached into my pocket and pulled out three crispy one-hundred dollar bills. "Okay, here's your insurance policy. If we blow a cutting head, I pay for it. Now there should be *no* reason to interrupt the signal path with all that crap." A brusque man, he reached down and grabbed the three bills. "It's your crap shoot, Kooper. I hope you know what you're doing.

Pull out all the compressors, Ed!" I hoped Mike Ruschack knew what he was doing, 'cause I worked *hard* for that money!

They cut the lacquer, the cutting head survived, I got my three hundred back, and the album sounded wonderful.

I bring this up today because the principles of analog mastering are still the same. If you have a flash peak in your mix, some limiting or compression has to be employed during the mastering of the entire song. This is one of the myriad reasons that digital mastering kicks analog's butt.

In the Sonic Solutions program, all peaks appear in red. One has only to approach them with the cursor and tap them down to zero without affecting any other part of the song or program.

That is reason enough to dump analog mastering if you make rock records. Every time Alan Tucker (my current mastering guy) taps one of those red guys down, I think back to those guys with their feet up on the lathes, drinking a cuppa Joe, smokin' a stogie, and reading *The New York Post*.

Ain't technology grand?

"If we blow a cutting head, I pay for it. Now there should be no reason to interrupt the signal path with all that crap."

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CIRCLE 32 ON FREE INFO CARD

Trina Shoemaker



PHOTO BY ED FREEMAN

Making music with this versatile, up-and-coming producer/engineer

BY MR. BONZAI

Why are you an engineer?

Because I wanted to make music, but I was afraid I wouldn't be able to make a living just as a musician. I always knew that I could record music because I was a smart little girl, took the stereo apart, looked inside the 8-track, and listened to records with my Dad's headphones. As a kid looking at album cover photos, I already had a concept of studio recording. At 19, I moved to California to be a

record producer and ended up at Capitol Records as a secretary. But I wanted to work in that studio and drive that console. Now that I know how to do it, I can make my own records. This has been a long road, but not only can I make the records myself now, I can finance them, too.

What was your first professional engineering gig?

I did a Cajun record for Jean Dubois, and he did pay me. Before that, I learned the initial grace of engineering from Hugh Harris, a London artist. I had quit Capitol in 1990,

and was working in a pub. I met a manager, Tarquin Gotch, who was managing Hugh Harris and XTC. He asked me to run his office, and in the basement was a TASCAM 1-inch 24-track. I walked in on the artist, Hugh Harris, and said I wanted to be an engineer. I started out punching in his vocals. I went back to L.A. and met up with Hugh again, who was working with the engineer Susan Rogers — which inspired me. I got a job as an assistant at Dominion Sound in Santa Monica and took some recording classes. Then I packed up my things and moved to New Orleans, where I didn't know a soul. I got a job cleaning up at

Ultrasonic, one of the old blues studios. I fibbed my way into some live-sound jobs with producer George Porter [of The Meters].

Suspect: Trina Shoemaker

Age: 32

Birthplace: Joliet, Illinois

Occupation: Engineer, Producer, Singer

Residence: New Orleans

Vehicle: 1994 purple Chevy F-10 pickup

Diet Highlights: Sushi and Taco Bell

Hobbie: Painting

Selected Credits (P=produced, R=recorded, M=mixed): Sheryl Crow (R, 1996); Amy Correira (RM, 1997); Victoria Williams (PRM, 1997); Midnight Oil (RM, 1996); Throwing Muses (R, 1996); Soul Asylum (M, 1996); Emmylou Harris (R, 1995); Iggy Pop (R, 1994)

What bumped you up to top projects?

I'd done some demo jobs as a first engineer and some work with Lisa Germano and Iggy Pop. I started to get the sense of a full-on session. A producer named Malcolm Burn asked me to record a group called Giant Sand. This was 1994, and I

was finally the official engineer.

Was progress tougher because you're a woman?

Not for me, because I have never perceived myself as all that womanly. I'm as feminine as they come, but I'm tall and extremely fit. I was raised by my father and I know how to operate in a world of men. It was easy for me to say, "I can lift that case." My physical strength matched most of the guys and my intellect was strong. I just moved straight on through.

But the thing that turned me into an engineer is my love for music. I can hear a person's song and memorize the form in one run through. Musicians like



PHOTOS BY MR. BONZAI

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that — when they play it once and I say, "Let's go back to that bridge section." I know what the chord changes are, and I'm able to talk musically. I can memorize their lyrics immediately and can sing them back and guide them through their tracks. I'm much more musical than I am technical. I don't even know how to demag heads.

How did you hook up with Sheryl Crow?

I had just left Kingsway as the house en-

gineer in July of '95 and she booked the studio. I walked in to pick up some of my DATs. Sheryl's producer had suddenly left and I could see that she was extremely upset. Karen Brady, the studio manager, introduced me and said I knew the studio better than anyone.

Sheryl said, "Will you just record me tonight?" and I said, "Sure." I set up a cozy little setup and ran the multitrack while they were jamming. The song "Home" was written that night and the

cut on the record is the very first take. Sheryl said, "We need to start rolling multitrack because this is turning into a song." I told her that I'd been rolling, played it back, and she was blown away. She asked me to continue to the end of the week, and then more in L.A. and New York.

But you didn't mix the record?

No, Tchad Blake mixed — and did an amazing job.

You're back with Sheryl again?



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World Radio History

Yes. Right now I'm going out on the road and capturing stuff for the next studio record. We start in October in New York. What are you doing here in L.A. now? A record with Victoria Williams — producing, recording, and mixing. Making this record is a very wonderful experience. Do you have a console preference? API. Analog vs. Digital? They're both absolutely necessary. If all I have is a DA-88, well, I love digital. I don't really care if it's analog or digital, because

my sounds are gonna be warm anyway. Favorite microphones? I love Sony C37A's, C12's, Coles ribbon mics, RCA DX-77, and the Sennheiser 421. But whatever works and is nearby is the one I like. How do you mic a ukulele? That's funny, I just recorded Amy Correira, an awesome ukelele player. I used a Shure SM81. What would you like Santa to bring you this year? A boyfriend.

If you were a musical instrument, which would you be? A set of vibraphones. What's wrong with the music industry? Nothing. What do you listen to while you're driving? Lost Goddesses of Country Music. If you could go back in time before the birth of recording, what would you like to hear? The songs of the slaves in the fields, the old spirituals of the South. What is the first record you remember hearing? "The Little Drummer Boy." What did you learn from Tchad Blake? How unevolved I am. Is there one album that inspired you to become an engineer? Yes, the first Jimi Hendrix album. Is there anyone you wish you could record? Of those that are gone? Billie Holiday. Alive, Willie Nelson. Do you have any good business tips? Return all phone calls promptly. What was your most absurd experience in a recording studio? Victoria Williams stuck her head in the bell of a Sousaphone and asked me to record her vocal that way, which I did. What animal do you identify with? The giraffe. What is the biggest mistake of your life? Blind faith. Any advice for getting a good start as an engineer? Decide that's what you really want and then just do it. Have you ever really pissed anyone off? Yes... Why? I'm not sure, but I'll tell you — they were mad.



TL Audio VP 2051



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STEPHEN CROES - Producer, Arranger, Engineer - Steve Wonder, Fleetwood Mac, Kenny Loggins, ...
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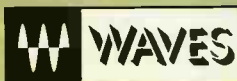
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CIRCLE 84 ON FREE INFO CARD

Taking the Hiss Out of Gass

LA-based mix expert Jon Gass tells how he strives for vocal perfection and reveals his admitted obsession with sibilance

BY RICHARD BUSKIN

"Mixing, to me, is so much more creative than recording," says Jon Gass. "You're actually doing the creating, as opposed to waiting for the artist to show up. In fact, I don't think you even know how to track music until you've done quite a bit of mixing."

How's that for a novel idea? Then again, Gass is a novel kind of mixer, and one who has forged a considerable reputation on the basis of behind-the-board heroics that fly in the face of straightforward balancing or dabbling with effects. For him, mixing is *the* most important part of the record-making process, and it therefore warrants more than the mention that it often gets in producer or engineer interviews.

Babyface, Whitney Houston, Paula Abdul, Jermaine Jackson and Bobby Brown are just some of the artists whose records were recorded and mixed by Gass between 1985 and 1990, while Houston and Babyface are also among those who have since benefited from his skills as a full-time mixer. The others? Toni Braxton, Madonna, Boyz II Men, Vanessa Williams, The Bee Gees, Kenny Loggins, Maxi Priest, Aretha Franklin, David Bowie, Earth, Wind & Fire, Robbie Neville, Natalie Cole, The Gap Band, and Smokey Robinson, to name but a few.

THE CHAIN OF HISS

Greatly influenced by the music of The Beatles as a youth, Jon Gass got his first guitar at the age of ten and spent most of his teenage years playing in a variety of bands around his native Oregon. At the same time, he was always interested in recording technology, even if his personal assets in those days only

stretched to financing a "home studio" consisting of three cassette decks. "Those machines helped me to figure out how to double parts and do overdubs," he now says. "You know, the 'chain of hiss'! Still, it was just cool to have stuff doubled and tripled..."

Eventually the cassette decks were augmented by slightly more upmarket gear, and then in 1980 Gass relocated to Los Angeles where he started working at a small 24-track studio. "That place charged like \$35 an hour for the room, and I was included in the price," he recalls. "Basically, it was a cheap mix joint for R&B — they'd cut the tracks at an even worse studio!"

Over the course of about three-and-a-half years, Gass learned the ropes of both recording and mixing, prior to branching out on his own in 1984 and working on R&B assignments for Solar Records. Among the label's clients were LA Reid and Babyface (real names An-

tonio Reid and Kenneth Edmonds), who moved to Los Angeles in December of 1985, and for whom Gass immediately began engineering. This would be the beginning of a beautiful friendship between JG and the two producers, and one that continues with "Face" until this day, in spite of the fact that he and Reid — once codirectors of LaFace Records — have now gone their separate ways.

We'll get to the working relationship with Babyface in a minute, but first we should take a look at Jon Gass's modus operandi as a mixer. After all, don't forget his assertion that, for him, this affords more creativity than the actual recording process.

"You can make everything sit in a different space," Gass explains. "It's just so important. For instance, when Babyface comes in to listen to a mix that I've done or I'm working on, he doesn't say, 'Wow, that sounds good!' He's not that concerned with each sound, but with



THE "S" MAN COMETH: Jon Gass explains how he gets the right vocals during mixing and how he kills nasty sibilance problems.

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how the mix actually feels. As long as it feels really good and he wants to hear it again, that's what's important to me. It doesn't matter if maybe one little part that he heard was louder on the demo. What's that got to do with it? No one else has heard the demo. It's just got to feel good; it's got to build the right way and to have emotion around the singer. Not every singer has perfect emotion all of the time. So, if you can build the mix and create these textures around the vocal, that's really what it's about. It helps sales.

"For me, the main objective is to keep the lead vocal natural and crystal clear without destroying the band. A lot of mixers just seem to head for the 'telephone' lead vocal sound, and, sure, that makes the job really quick, but it won't fly with some of the caliber singers who I work with. Try that with Whitney or Madonna, and it's going to be, 'Have a nice day. See ya!'"

"I therefore start a lot of mixes with the vocal. If it doesn't already sound pretty natural, I'll try to correct that, and then I'll bring the instruments in around it. A lot of other people will work on a mix for hours and not even listen to the lead vocal, and that amazes me, because sooner or later it's got to be there, so you might as well get used to it."

CORNERING THE ENGINEER

While Babyface's engineers vary from project to project, Jon Gass takes care of about 90 percent of his mixes. The usual process is for the men behind the board to decide on the technological approach and equipment that are required in order to realize the artist and producer's objectives. However, when Gass is involved with the project, he doesn't hesitate to chip in with how he thinks things should be done.

"I often corner the engineer and say, 'Hey, back down a little bit with the attack time of the compressor on the vocal. You're clipping it off a bit too much, so try this...'. The producer may be concerned with the performance and not thinking about compression attack time and all that, and the same often goes for the engineer who isn't thinking about the mix that he'll have no part in."

Does this attitude lead on from that line at the top of this interview, stating that you first need to mix before you can really know how to record? "Yeah, it was after I'd been mixing for a year or two that I started to recognize the frequen-

cies that make things work better on tape," comes the reply. "Especially vocals. It's so important to get it right during the tracking, rather than just set up a microphone, hack it onto tape, and think, 'Ah, I'm not mixing it anyway. Who cares?' I have certain microphones and I'll only record with those; highly modified Steven Paul mics that sound beautiful. The top end is the secret. They're very smooth, very silky, very breathy, and, any time that you have the right kind of breath on the mic, you're half-way home in the mix."

So, what we have here is the mix engineer telling the recording engineer what vocal mic he wants him to use? "That's right. I mean, with a lot of the outside projects I don't know what mics they use — I've certainly learned from them what not to use! For instance, I hate [AKG] C414's on vocals, and I can usually hear if one has been used even before the tape has been put on the machine... I can hear it as the tapes walk by! 'There's a 414 on that vocal! Oh no!' The problem with that mic is that the really sibilant area is right in the mid-range — the 2 and 3k range — and the only way that you can cut out the 's' sounds, which are like knives cutting through the tweeters, is to take out part of that range. That, however, is where all of the clarity is. It's just brutal and there's no hope. You've got a long day ahead of you."

OBSESSED WITH 'S'

This brings us to a topic that has virtually turned into an obsession for Gass — sibilance! Basically, he can't stand it, regarding it as nothing less than a curse on a good record, yet it stalks him. He hears it in people's speech, in their singing...even his own name can be horribly abused — "Er, excuse me, is your name Jon Gasssssss?"

"You know, I'll be sitting on a plane and be able to hear the S's of a guy who's sitting six rows back," he groans. "I just want to go back there and hand him some real-time vocal de-esser! I can't sleep, I cannot even relax when I hear that sound. There was one partic-

ular flight back from Atlanta where all I could hear was this guy's sibilance. It was brutal!"

When, where, and why, I ask, did this whole obsession start? The answer: At a mastering session back in 1987, for a record by a minor artist whose name Gass no longer recalls, some sibilance had crept into the recording that Gass himself had no involvement with. He was the mixer and didn't consider the problem to be all that bad, yet during the mastering the entire track had to be de-essed, and in the process that also managed to destroy the sound of the percussion.

"I've been obsessed ever since," Gass now admits. "I know most listeners couldn't care less about this whole thing, but it drives me insane. Basically, the rule is to keep the S's at about the same level as the vocal air, but the hard part is that you have to achieve that without making the artist sound like he's just been punched in the mouth! I hear records all the time where people clearly haven't got the hang of it; you can't make out what the singer is saying. There's so much compression or whatever that it almost sounds distorted. So, there are other people who obviously don't like S's either, but they don't quite know how to get rid of them yet!"

"On the other hand, I do remember working on a song way back where an 'S' hit right at the same time as a snare. Now, without the 'S' on the word, it changed the meaning of the song, but I couldn't get the 'S' loud enough because the rattle of the snare just wiped it out. There was nothing I could do, and it was kind of tragic actually. The only thing that really could be done was to just roll the top end off of the snare..."

In this particular case, maybe Gass could have done with a re-esser instead of a de-esser. "At this point I'm really into sidechain de-essing, where I just run a compressor in the sidechain mode with an EQ on it and pump up the frequencies that are bad. There's a way of doing that on the SSL that is really excellent."

Gass also happens to think that the

"I don't think you even know how to track music until you've done quite a bit of mixing."



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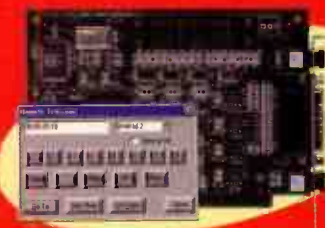
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SSL itself is really excellent, having utilized it as his mixing console of choice for the past 11 years. "Back in '90 somebody gave me a hard time and said that he really wanted me to do a certain mix on a Neve," he recalls. "I asked why and he said, 'Because you can't get any bottom out of an SSL.' Well, just a couple of months before that I think there were 22 songs that I had mixed on the R&B charts all at once, and so when this guy made that statement I got so mad that I raised my rates to everybody! 'You can't get bottom out of it, right? Okay!' It really doesn't have anything to do with the board as to whether or not you can get bottom. What would even possess somebody to think such a thing?"

I'VE GOT YOU, BABE

Jon Gass often does his mixing at Brandon's Way in Los Angeles, where he sits behind an 80-channel SSL 4080 G Plus board with Ultimotion, and likes to mix very quietly on JBL monitors and Yamaha NS10's.

One of the more recent tracks that Babyface and Gass have worked together on as producer and mix engineer is "Mama," a ballad from the soundtrack to the movie *Soul Food*, featuring the harmonizing vocal talents of Boyz II Men, together with drums, acoustic piano, Fender Rhodes, synth strings, and electric guitar. A fairly straightforward song to work on, it nevertheless points up the way to how Gass likes to focus on vocals, which, in this particular case, took up a total of ten tracks: four leads and six harmonies.

"I was chiefly concerned with getting the vocals to feel as full as possible while still being able to hear the instruments," he says. "The first thing that I did was push up the lead vocals and check what the main problems were going to be. These amounted to a lot of different sound changes and vibe changes, being that certain parts of each section had been recorded at different times. So, one line might be kind of a warm, close-miked sound, and then the next one may be a more distant, much thinner sound.

"The other thing is that the lead vocal on this track switches between three of the singers, so once I found the key to one lead vocalist, my work wasn't over in that respect. I had to figure out how to smooth out the sound between three people. Splitting to different tracks and re-EQ'ing each of the sections so that they still sounded really warm was the hardest part, and for that I used a ton of outboard gear.

"My favorite EQ gear is the Avalon 2055. It's untouchable, and I can say that while pointing out that I'm not sponsored by them! Even hardcore users of other kinds of EQ that have used the Avalon have said how much they like it. Basically, you can get inside of any instrument, no matter how it has been recorded, and you can fix it or pull out what you don't need. It's just extremely accurate and has a very fine Q. You can go extremely narrow with the EQ band when you're searching for things. For instance, I like to go either +20 or -20, and then search with the frequency device and maybe try to find what I'm looking for. Well, you can be adding or taking out a lot, and these EQs are still very, very musical. Very expensive, but worth every penny.

"In terms of the other outboard gear, I used 30 different channels of compression — insane! These included Avalon, Summit, Tube Tech, Teletronics, and UREI 1176's and 1178's. All installed in the room here [at Brandon's Way] — along with a bunch of dbx's that I don't use. I'm really spoiled here, especially having 1176's and 1178's for instruments, and then the Avalons and Summits for the vocals. Sometimes I might revert to tube compressors instead of the Avalons, which are pure Class A, and on one of the guy's vocals on "Mama" I couldn't get the EQ that I was looking for without going to a tube.

"This room is packed with gear, and my poor assistant, Kyle Bess, has to write a book at the end of every song for all of the recalls! I use tons of outboard gear and sometimes it doesn't sound like I'm using any. I might use 10 or 15 different reverb delays in the mix, but I don't really use 'long hall' or any of those types of 'verbs. They're all either real short or a chorus, and I use them to create space without destroying the track with EQ. That would be the last thing I'd do. I'd rather create a little vibe, and that's not down to training, but just a musical way of mixing. That way it'll sound good at home, because I'm not trying to squeeze things so hard."

THE PERFECT BOTTOM

Gass likes to start introducing the instrumentation fairly soon after he has played around with the vocals in order to see how far he will have to go to make everything fit together. In a practical sense this means ascertaining what is

continued on page 150

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The Artist as Studio Owner

To fight rising production costs, record companies are looking to set up artists with studios of their own

BY SCOTT RUBIN

Any artist, producer, or writer who has ever spent time in a commercial recording studio knows how difficult it is to be creative under constraints. Stumbling blocks could be in the form of time, money, or anything else that could hinder the creative process. Frequent checks of the clock as the engineer rewinds the tape for a 37th pass at a vocal overdub make most people involved with the project panic. Although some artists in the industry thrive under such conditions, most would rather orchestrate their ideas in a different manner; in more familiar surroundings.

With budget trends in the music industry spiraling downward due to diminishing record sales, labels have started to find a way to control studio costs without hindering the creative process of their artists: Production setups for artists. Of course, for readers of this magazine, this is no surprise, but for some record company execs, this came as eye-opening news.

Taking a look at how the purchases of equipment are laid out in their contracts, artists usually have equipment purchases built in as part of their recording budget that are fully recoupable by the label. In other cases, some artists are getting the labels to purchase the gear outright for them. Though fully recoupable, the purchases don't affect the traditional recording budget.

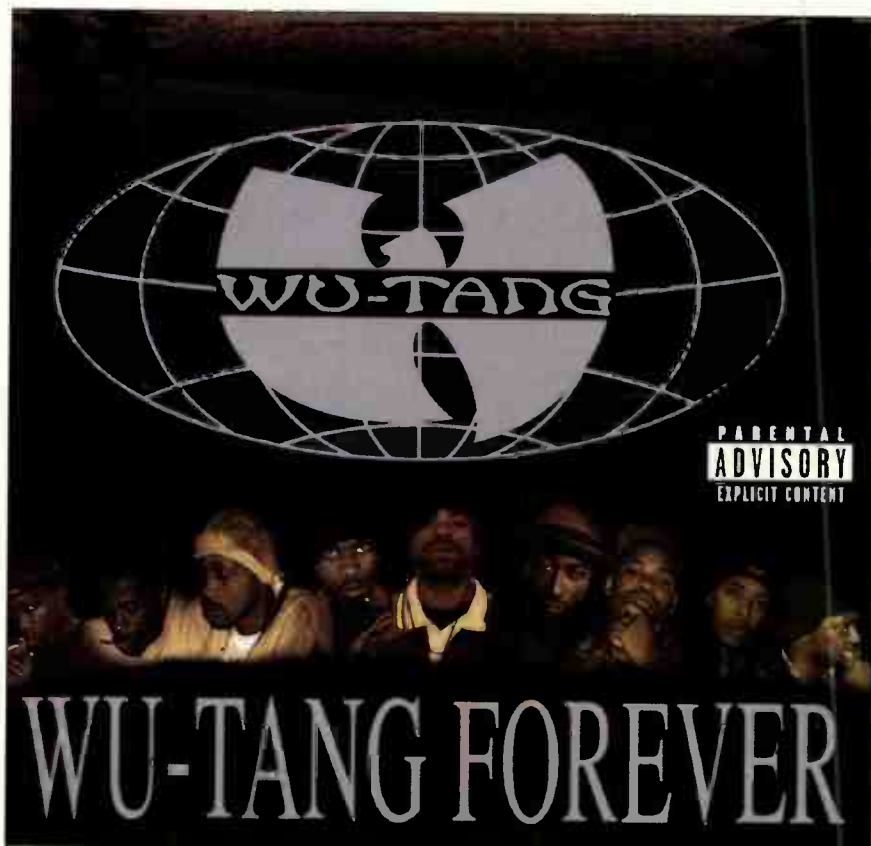
When a portion of the recording budget goes to the artist for purchasing equipment, they can then spend countless hours on a seemingly simple chord change in the comfort of their home or rehearsal hall. It's not a new concept, but with more frequency, labels are signing artists who have the ability to not only write material in the tradition-

al sense, but artists who can record and organize it as well. Of course, being a great writer doesn't mean you can record the guitar part you've written. With that, a delicate balance has risen out of the ashes from demo tape hell. While some artists strive to record as much as possible at home via hard disk or digital multitrack, others are just looking to draw a picture of the song and have it as together as possible by the time the studio clock is running.

A current case in which labels are getting more involved in guiding their artists through project studio set-up is taking place at the Universal Music Group. A few newly signed artists at the label have had portions of their deals structured to include equipment purchases. It seems as though most purchases run between \$3000 and \$25,000. Yet, that is not always the case. "We are currently doing a deal with a band from the U.K., who are looking for

\$50,000-\$75,000 [for equipment]," says senior VP Jocelyn Cooper-Gilstrap. The idea in such a case would be for the band to do as much recording in-house as possible, then go out to do overdubs and mix. "If you've got your own equipment, you can sit home and write without constraints. It's very important for the artists that I work with to have that ability," states Cooper-Gilstrap.

Of course, good gear alone does not make a great recording. "Anybody can afford a decent mic and a preamp, but it's more a factor of the environment while creating," says producer Bob Power. A huge proponent of preproduction, Power makes it a rule when taking on projects. "My artists never create their records fully in a commercial studio. It can tend to be a waste of money and I try to have them realize that money spent foolishly on exorbitant studio fees comes out of their pocket in one way or another," Power comments.



WHAT'S NEW WITH WU?: Loud Records, Wu-Tang Clan's label, helped the group finance their new project studio.

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With access to the Age of Information, some artists and writers are quite versed in the area of recording technology. With the use of video, the Internet, and an overall need to "do things myself," some artists today know more about the recording process than certain producers. Where once creating the perfect guitar riff was the highest level of achievement, nowadays artists like to record that part on tape as well.

Caleb, an artist on Universal Records, finds the whole process of recording and creating to be invigorating. "The demos from which I got signed were basically done at home. In my case, I will try to do as much recording at home as possible," says Caleb. Unless there is a magnificent vocal performance, Caleb plans to dump as much material from home at the studio, then cut vocals and mix. "I would imagine that most writers or artists would want to have a certain amount of gear. If you get an idea at four in the morning, you can just hit the switch and be off from there," says Caleb.

It is widely known around the in-

dustry that Alanis Morissette producer Glen Ballard recorded most of her debut LP, *Jagged Little Pill*, in his own apartment. Though armed with plenty of today's top equipment, Ballard worked off the creativity that he and Morissette formulated while writing together. Some 15 million records later, one can see that studio time is not always a necessity for creativity. In some cases, the preproduction setup for an artist can be as little as \$2500. Many hip-hop and R&B tracks can be done mostly in-house, since the basis of the genre is keyboards, drum machines, and/or sampling.

At Loud Records, home of The Wu-Tang Clan and Mobb Deep, Matt Life, director of A&R, wants his artists to put their songs together before they hit the studio. "My feeling [of preproduction] is that it's best for just the track. It should be a sketch of the song," says Life. Citing a balance between writing/recording at home and in the studio, Life states, "The more time you spend on something, the better you get. If an artist isn't all that knowledgeable about equipment, the best way to learn is by doing it over and over."

Making reference to successful records done at home, Life says, "RZA did the whole *Raekwon* record for [Loud Records] in his project studio."

As technology brings new and easier-to-use products, advances in recording will continue to allow artists to create more in their own project studios and eventually use that material in the final mix. Those artists who wish only to use the project studio for creativity eagerly do so, most often with their labels' consent and encouragement. Record companies are forever on a search for new and more effective ways to cut costs, and having an artist hand in material before spending time in a costly commercial studio is such a way. Spending less time in those studios is another. Labels love artists that are self-contained; who don't require a big-name producer. Hiring a name producer costs money and takes away from profits. An artist who has a production setup can look forward to many hours of uninterrupted creativity. In addition, it probably will make the recording process easier, with less jagged pills to swallow. **EQ**

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EQ Preview

The AES Convention always brings with it a herd of new product introductions that set the tone for the upcoming year. Here are some highlights...

IT'S IN THE CARDS

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The second offering in Allen & Heath's MixWizard Series, the WZ20:8:2, is a dedicated 8-track recording mixer complete with 8-bus routing and eight tape return inputs with stereo cue and effects routing. The WZ20:8:2's unique "mixdown" switch instantly configures the inputs, giving multitrack signals the benefit of full-channel EQ, effects, and inserts. The console's tape return paths are available as additional inputs, providing a total of 28 inputs for mixdown. The console also offers eight mic/line inputs on balanced XLRs and jacks with individual channel inserts, and each mono channel features six auxes on six dedicated knobs (the first four pre/post selectable and last two post-EQ) and 4-band, two-sweep British EQ with EQ in/out. Six stereo line inputs feature 2-band EQ and access to all six auxes. For more information, contact Allen & Heath U.S., 8760 South Sandy Parkway, Sandy, UT 84070. Tel: 801-568-7660. Circle EQ free lit. #101.



HIP TO BE TRAP

Ramsa's new WS-AT300 15-inch 2-way loudspeaker system incorporates original "Square Contour" waveguide (SCWG) technology, enabling retention of the smooth dispersion characteristics of a spherical waveguide while dramatically improving long throw. This 400-watt continuous handling system incorporates 45mm high-frequency drivers in a six-sided trapezoidal design. The cabinet's integral stand and fly mounting points allow hanging versatility, array setup, or stage monitor positioning. The system also features a high-impact molded resin enclosure that allows easy stacking and Neutrik Speakon and 1/4-inch connections. For more information contact Panasonic/Ramsa, 6550 Katella Ave., 17A-7, Cypress, CA 90630-5102. Tel: 714-373-7277. Circle EQ free lit. #103.

KEEP IT DIGITAL

The dCS 972 DDC digital-to-digital converter is dCS, Ltd.'s newest sample-rate and format converter. The unit features input and output frequencies from 11.025 to 96 kHz, as well as 1st, 3rd, and 9th order noise-shaping options. The dCS 972 is capable of audio conversions between the four principle digital interface formats: AES, dual AES, S/PDIF (on RCA, BNC, and Toslink connectors), and SDIF-2. The unit utilizes DSP circuitry and proprietary algorithms to carry out conversions in real time, while achieving a low noise floor. For more information, contact Canorus, Inc., 240 Great Circle Road, Suite 326, Nashville, TN 37228. Tel: 615-252-8778. Web: www.canorus.com. Circle EQ free lit. #104.



PORTA POWER

About the size of a lunchbox and light enough to carry in one hand, the Far Outlet Personal Power Station from Galaxy Audio is a fully self-contained portable source of 110 volt, 60 Hz, household current. The Far Outlet is designed to provide up to 250 watts continuous and 400 watts peak power. Exclusive Digi-Scrub digital filtering circuitry helps to produce extremely low-noise AC power that will not introduce distortion into computers or audio devices. The Far Outlet's built-in charger allows it to be used as an uninterruptible power source, and also allows it to be charged via a wall socket or (with the optional converter) a car's cigarette lighter. The unit requires no fuel, makes no noise, and emits no fumes. For more details, contact Galaxy-Valley Audio, 601 E. Pawnee, Wichita, KS 67211. Tel: 316-265-9500. Web: www.galaxyaudio.com. Circle EQ free lit. #105.

DISC DOUBLER

The MediaFORM CD-4003 CD2CD copier is a standalone system that houses the MediaFORM smart controller, which identifies and copies complex formats (ISO, CD-Audio, Hybrid, Mixed Mode, and HFS) on the fly, without the use of an internal drive. The CD2CD copier also features a unique track-extraction feature that allows users to mix tracks from various discs and record at 4X speed for specific jobs. The unit also offers support for up to three 4X recorders and the CD-2600 Autoloader. The CD2CD base model carries a suggested retail price of \$3195. For more details, contact MediaFORM, 400 Eagleview Boulevard, Suite 104, Exton, PA 19341. Tel: 610-458-9200. Web: www.mediaform.com. Circle EQ free lit. #106.



MONITOR MAVEN

Created as a result of customer requests, Carvin's new HT760M stage monitor amp is a 2-space, rackmountable unit that houses two power amps, defeatable dual 9-band graphic EQs, and unique opto-isolator limiting circuits. The amplifier's 30mm EQ sliders feature frequencies of 60, 120, 250, 500, 1k, 2k, 4k, 8k, and 16k at ± 15 dB for optimum control of feedback. Both inputs and outputs can be bridged and a ground lift feature eliminates hum and noise. The HT760M delivers a full 750 watts into a 4-ohm bridged

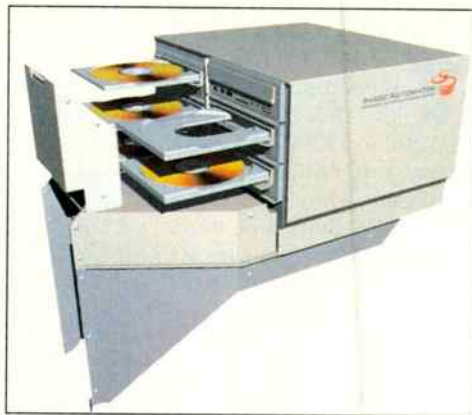


load and sells for \$479. For further details, contact Carvin, 12340 World Trade Drive, San Diego, CA 92128. Tel: 1-800-854-2235. Web: www.carvin.com. Circle EQ free lit. #107.

1998 EQ Preview

GET LOADED WITH A 6 PACK

MicroTech Conversion Systems' "6-Pack" is a set of six tray-loading drives that uses only one of the five modular bays of MicroTech's automatic, multi-job ImageAutomator. Users can mount up to two 6-Packs on one ImageAutomator, which still leaves three bays open for printing, media handling, and disc analysis devices. For more information, contact MicroTech Conversion Systems, 2 Davis Drive, Belmont, CA 94002-3002. Tel: 800-223-3693. Web: www.microtech.com. Circle EQ free lit. #108.



SOUND'S GREAT...LESS FILLING

QSC Audio Products' PowerLight 2.4 mono block amplifier delivers up to 2400 watts at 2 ohms and is equipped with a standard NEMA 15-ampere line cord and connector (120 VAC models). This configuration allows users 600 watts per speaker when powering four 8-ohm speakers in parallel while operating on a 15-amp AC service. The 18-pound, 2U PowerLight 2.4 utilizes QSC's PowerWave switching technology for high power and enhanced bass response. Standard features include a defeatable clip limiter, detented calibrated gain control, Neutrik "Combo" connector with both XLR and 1/4-inch inputs, and an LED meter that indicates signal level and amplifier status. The PowerLight 2.4 also offers an HD15 "dataport" connector that allows interface to QSC's CM16 MultiSignal Processor. For more information, contact QSC Audio Products, Inc., 1675 MacArthur Boulevard, Costa Mesa, CA 92626. Tel: 714-754-6175. Web: www.qscaudio.com. Circle EQ free lit. #109.



...AND THE PITCH

PurePitch from Wave Mechanics is the world's first real-time, formant-corrected pitch shift program for Digidesign's Pro Tools platform. Using state-of-the-art DSP techniques, PurePitch preserves the spectral character of the original source material, even when shifting the pitch by large amounts, allowing for natural sounding pitch shift. PurePitch fully supports the automation features of Pro Tools 4.0. A full working demo version of PurePitch is available for downloading from the Wave Mechanics Web site. PurePitch is currently available for the Pro Tools TDM platform, and will be available for the TC Electronic M5000 effects processor later this year. PurePitch costs \$595. For more details, contact Wave Distribution, P.O. Box 657, West Milford, NJ 07480. Tel: 973-728-2425. Web: www.wavemechanics.com. Circle EQ free lit. #110.

FEELIN' A LITTLE BLUE

Focusrite's Blue 300 mastering controller offers analog and digital source selection, precision monitor control with speaker and headphone selection, recording path routing with inserts, and high-quality precision stereo peak metering. The Blue 300 has eight stereo analog inputs that can be selected onto two independent stereo signal paths — the record path and the monitor path. In addition to the analog inputs, six digital inputs can be added to the Blue 300 using the Focusrite Blue 260 digital-to-analog converter. The oval-shaped Remote panel is divided into four sections — Source Selection, Meter Selection, Monitor Selection, and Master Selection. The Blue 300's remote panel connects to a 2U master module. For more information, contact Focusrite, Group One Ltd., 80 Sea Lane, Farmingdale, NY 11735. Tel: 516-249-1399. Web: www.g1ltd.com. Circle EQ free lit. #111.



Take the Classic Cure.

Get over those digital chills!

Freedman Electronics of Australia has created the RØDE Classic Valve (Tube) Studio Microphone.

For richness, warmth, and a remedy for the sonic blahs, seek out the RØDE Classic!

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The RØDE CLASSIC Features:

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- **Nine polar response patterns** and **two Frequency selections for high-pass filter**, selected at the supplied external power supply. (30 feet away from the performer)
- **-10dB and -20dB pads**, selected at the power supply, allowing optimum performance at different sound pressure levels.
- **Gold Plated Tuchel connectors** to insure accurate noise-free signal transitions.
- Australian-made **10m (30') high-grade multi-core cable**, helping to eliminate RF and other unwanted signal contaminants.
- High quality **Jensen™ transformer**, for added cleanliness and accurate bass response.
- **Internal shock mounting system** for Capsule and Tube, helping eliminate low frequency rumbles and vibrations.
- **Custom Flight Case**
- **Hand-crafted solid brass body**, textured with fine glass bead blasting. A nickel finish provides lifelong durability.

RØDE is a trademark of Freedman Electronics.

Jensen is a registered trademark of Jensen Transformer Inc.



GOING STEDDY

Featuring a German-manufactured, ultra lightweight (3-4 micron), gold-sputtered membrane, dual-capsule assembly, and an efficient, low noise, EMF toroid power supply transformer, Stedman's 1100B large diaphragm condenser microphone offers 11 selectable patterns. The 1100B's hand-wired preamp utilizes a "burn in" tested 12AY twin triode tube, high-voltage metal film capacitors, and 1 percent precision film resistors. The 1100B offers a frequency response from 40 Hz-18 kHz, an impedance of 150 ohms, and a maximum output level of +2 dBm. For more details, contact Stedman Corporation, 4167 Stedman Drive, Richland, MI 49083. Tel: 616-629-5930. Fax: 616-629-4149. Circle EQ free lit. #112.

AN ENGINEER'S BEST FRIEND

Designed for the studio market, Hafler's P4000 Trans•nova DIAMOND (Dynamic Invariant AMplification Optimized Nodal Drive) convection-cooled amplifier offers 200 watts per channel @ 8 ohms. The P4000 also features full LED display, gain controls, balanced inputs, and lateral MOSFET output devices. The P4000 Trans•nova DIAMOND lists for \$1199 and includes a full 5-year warranty. For further information, contact Hafler Professional, 546 South Rockford Drive, Tempe, AZ 85821. Tel: 602-967-3565. Circle EQ free lit. #113.



THE FOSTEX D-90 IS THE PERFECT DIGITAL EDITOR FOR YOUR ADAT™



Full random access editing.
Non-degenerative sound quality.
These are the strengths of digital audio. The limitations of tape, however, make random access editing impossible. Fostex has the solution.

For about the price of another ADAT, you can get the Fostex D-90, a full-featured 8-track hard disk recorder that can digitally grab all 8 tracks from any of your ADATs, let you edit them using cut, copy, paste, and move, until your takes are perfect, and then send them all back to the ADAT. All completely in the digital domain.

By the way, the D-90 functions perfectly as a stand-alone 8-track digital recorder too...

Standard!
2.55 gb
HARD DISK

REMOVABLE 2.55 GB HARD DISK (STORES 60 MINUTES OF 8-TRACK RECORDING)

Standard!
adat
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ADAT™ DIGITAL LIGHTPIPE™ INTERFACE LETS D-90 FUNCTION AS AN ADAT DIGITAL EDITOR

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Optional
Balanced
INPUT/OUTPUT

OPTIONAL BALANCED I/O INTERFACE FOR +40dBV LEVEL OPERATION

ALL TRADEMARKS ACKNOWLEDGED

SUMMIT UP

Boasting an innovative vacuum tube and solid-state design, Summit Audio's TMX-420 line-level mixer offers vacuum tube sound quality coupled with expandability. The TMX-420 offers four line-level inputs, A/B pan control, and channel input level control, as well as a per channel in/out switch, a phase switch, and send level control with a pre or post level switch. The master section offers a master level control for the two outputs, two VU meters with peak indicators, and separate channel A and B trim controls. Four



TMX-420's can be linked together to create a 16-channel mixer. For more information, contact Summit Audio Inc., P.O. Box 1678, Los Gatos, CA 95031. Tel: 408-464-2448. Fax: 408-464-7659. Circle EQ free lit. #114.

COMMUNITY SERVICE

Community's XLT/E Series of loudspeakers are high-performance loudspeakers designed and engineered for heavy-duty portable use. The series is comprised of the two-way XLT43E with a 15-inch LF and 1-inch HF; the three-way XLT46E with a 15-inch LF, 6.5-inch MF, and 1-inch HF; and the two-way XLT47E with dual 15-inch LF and 1-inch HF. The series also offers the two-way CPL48E monitor that features a 15-inch LF and 1-inch HF, as well as the dual 15-inch XLT55E subwoofer. For more details, contact Community, 333 East 5th Street, Chester, PA 19013-4511. Tel: 610-876-3400. Web: www.community.chester.pa.us. Circle EQ free lit. #115.



THE FOSTEX D-90 IS THE PERFECT MULTITRACK DIGITAL RECORDER

Of course, you don't need an ADAT to use a Fostex D-90. The D-90 functions perfectly well as a stand-alone 8-track digital recorder, providing CD-quality sound and a full suite of random-access editing capabilities. Jog shuttle and vari-speed controls make locating takes and punch points, as well as performing time correction, a breeze.

And then there is the sound – absolutely no compression means absolutely no degradation of your audio. It's perfect, from start to finish. Need to expand? Daisy chain the D-90 to add as many tracks as you like. Or install an optional SCSI-2 or Balanced I/O card. See your Fostex dealer or give us a call. We've got the D-90 that's perfect for you.



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TRACKS

Standard!
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NO**
COMPRESSION

Standard!
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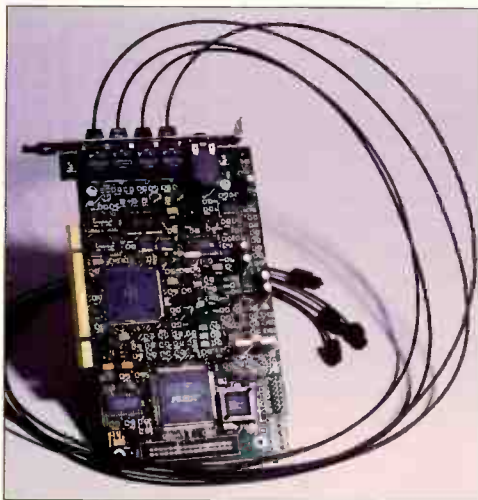
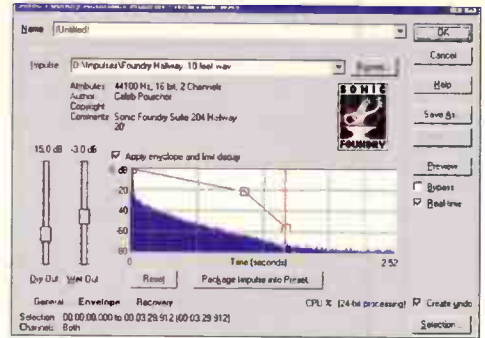
Fostex

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1998 EQ Preview

THE SHAPE OF THINGS TO COME

Acoustics Modeler software from Sonic Foundry adds the acoustical coloration of real environments and sound alteration devices to recorded audio. Developed for use with any editor that supports DirectX Audio plug-ins, including Sonic Foundry's Sound Forge 4.0, Acoustics Modeler actually incorporates the acoustical responses of a given environment onto a sound file. The program offers an extensive library of acoustic signatures, including recording studios, concert halls, warehouses, tunnels, bridges, and woods. For further information, contact Sonic Foundry, 754 Williamson Street, Madison, WI 53703. Tel: 608-256-3133. Web: www.sonicfoundry.com. Circle EQ free lit. #123.



STUDI/O SMARTS

Studi/o from Sonorus allows users to input/output 16 channels of audio in parallel from PC or Mac to a pair of Alesis ADATs using standard fiber-optic cables. Sonorus has supplied software drivers that are compatible with existing Windows audio devices, so

Studi/o is compatible with most Windows-based DAW-editing software including SAW Plus, Sound Forge, Samplitude, Cubase, WaveLab, CoolEdit, GoldWave, and more. Studi/o includes two 8-channel, 24-bit Alesis ADAT optical interfaces and an 18-bit stereo analog monitor output. For mastering applications, one or both ADAT interfaces can be software-configured for optical S/PDIF input and/or output, including sample-rate conversion, for connection to DAT machines, or high-performance converters. For further details, contact Sonorus, Inc., 111 East 12th Street, #2, New York, NY 10003. Tel: 212-253-7700. Web: sonorus.com. Circle EQ free lit. #124.

GET TO THE POINT

The latest addition to the AMS (Active Monitor Series) family of "perspective" studio monitor products from Tannoy is the bi-amplified AMS8A. The AMS8A utilizes an 8-inch dual concentric, point source, drive unit for enhanced linear amplitude and phase response, both on and off axis. Independent high- and low-frequency high-current MOSFET amplifier modules produce a total of 280 watts (140 x 2) of continuous power to each AMS8A. Frequency response of the AMS8A is 38 Hz-25 kHz ± 2 dB, and each unit weighs in at 38 pounds. For more details, contact TGI North America, Inc., 300 Gage Ave., Unit #1, Kitchener, Ontario, Canada N2M 2C8. Tel: 519-745-1158. Circle EQ free lit. #125.



If you're looking for power, **Carvin** (Tel: 800-854-2235) introduced the DCM (Direct Current Millennium) Series of heavy-duty power amplifiers, available in 1500- and 2000-watt models. Each three-space rackmount amp utilizes a lightweight, low-noise "Toroid" transformer design, and feature both XLR and 1/4-inch inputs and Speakon, 1/4-inch phone jack and binding post output options... **Denon** (Tel: 201-575-7810) offers the best of both worlds with their DN-T620, which combines a professional-quality cassette deck and CD player in a single 3U, rackmountable chassis... **Eventide** (Tel: 201-641-1200) has added two new preset libraries (PCMCIA cards) to the 4000 series Ultra-Harmonizer models. The GTR II Preset Library contains 166 new presets designed for musical instrument applications including electric guitar, acoustic guitar, keyboards, and bass guitar. The GTR II Preset Library includes studio-quality emulations of popular stomp box effects. For the DSP4000B Ultra-Harmonizer, the Broadcast Extension Library adds all the presets found in both the DSP4000 and GTR4000 Ultra-Harmonizer effects processors... Designed for small sound reinforcement and desktop audio/video applications, the MM-3 three-input mic mixer from **Furman** (Tel: 707-763-1010) accepts up to three microphones and one line-level stereo source. Mic inputs are via balanced (tip-ring-sleeve) 1/4-inch phone jacks (XLR inputs and outputs are available as an option)... **Focusrite** (distributed by Group One, Ltd., Tel: 516-249-1399) has launched the Green 6 quad compressor limiter. Each channel of the Green 6 contains a separate compressor and limiter with independent threshold control... (more)

The Incredible Impulse™ 200



Hear them at some familiar places.



The Impulse 200 can be wall-mounted from the bottom or wall/ceiling mounted from the top with the Peavey Versamount™ 76 bracket. The speaker can be used free-standing with the S-1 tripod stand.

Addressing the need for a high-performance molded speaker system at a reasonable price Peavey Electronics presents the Impulse 200. Competitors have tried to match us, but they always seem to come up short (under-powered) or past the mark (over-priced).

The 12" Black Widow™ woofer, with specially treated cone and field-replaceable basket, provides superior resistance to outdoor elements, while the 22XT™ titanium compression driver, coupled with a 90° x 45° horn, handles the highs with precision and ease. Add to that our new Sound Guard™ high-frequency driver-protection circuit, which combines the industry-standard light-bulb method and an innovative resistor network. This new method is much more audibly pleasing and transparent.

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

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



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

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



The MONITOR Magazine is a publication filled with the latest information you need to know. To receive 4 issues for only \$5 (price good in U.S. only) send check or money order to: Monitor Magazine, Peavey Electronics Corporation, 711 A Street, Meriden, MS 39361 • (601) 483-5355 • FAX (601) 483-1278 <http://www.peavey.com> • AOL Keyword: Peavey • CompuServe: Go Peavey • © 1997

CIRCLE 66 ON FREE INFO CARD

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THE BIG SQUEEZE

Featuring Peavey's exclusive Opto-Dynamics system, the VC/L-2 Valve Compressor/Limiter contains absolutely no solid-state devices in the audio chain. The "heart" of the design features an EL84 tube and a custom electro-luminescent panel that provides a faster response than bulbs with a smooth and more musical gain control. Peavey has provided each channel with two 12AX7 (four stages) tubes to provide warmth. The output stage of each channel is a "power amp" design that uses a two-stage 12AT7 tube, which results in a +20 dBm output capability. To ensure optimum gain, the VC/L-2 XLR inputs and outputs are transformer balanced. The suggested retail price of the two-channel, two-rackspace unit is \$1299.99. For more details, contact Peavey Electronics Corporation, 711 A Street, Meridian, MS 39301. Tel: 601-483-5365. Web: www.peavey.com. Circle EQ free lit. #126.



DON'T INTERRUPT ME

Furman's BP-1000 uninterruptible power supply is a microprocessor-controlled, true online power system. The unit provides clean, regulated 115V, 60 Hz AC power during times when normal AC service is available and unavailable, providing users the time to properly save data and shut down if there is a loss of power. There is no switch-over time from direct line power because the output power is continuously derived from the battery supply. Front-panel LED bargraph meters indicate the percentage of the unit's full power capacity (1000 volt-amps, or 700 watts) in use (from 0-150% in steps of 25%), and the percentage of full battery energy remaining (also in steps of 25%). With its complement of internal maintenance-free sealed lead-acid batteries, the BP-1000 gives a minimum of six minutes of battery-sourced power at full load during line failures, while smaller loads will last longer. The suggested list price of the BP-1000 is \$1479. For further details, contact Furman Sound, Inc., 1997 South McDowell Boulevard, Petaluma, CA 94954-6919. Tel: 707-763-1010. Web: www.furmansound.com. Circle EQ free lit. #127.



A FEW BITS MORE

Powered by the Crystal Semiconductor CS 5396 chip, Mytek Digital's ADAC 9624 high-performance A/D and D/A converter offers 24-bit resolution and a 96 kHz sampling rate for a suggested retail price of \$4000. The ADAC 9624's feature list includes selectable sampling rates, noise shaping, a headphone amplifier, optional external synchronization, and several optional digital input/output interfaces for cost-effective storage on existing digital equipment. The ADAC 9624 also offers the MRX data format, which allows for 6 channels of 20-bit, 4 channels of 24-bit, or stereo 24-bit/96 kHz signal to be stored on 16-bit machines, including DA-88 and ADAT formats. For more information, contact Mytek Inc., 142 East 27th Street, New York, NY 10016. Tel: 212-388-2677. Web: www.mytekdigital.com. Circle EQ free lit. #128.

Power Technology (Tel: 415-467-7886), makers of the DSP•FX PC-based effects processing system, has introduced the DSP•FX Virtual product line, PA DAW-compatible software versions of its effects algorithms. DSP•FX Virtual utilizes the same 32-bit floating point algorithms and the same easy-to-use graphical interface used in its hardware-based systems, and packages them in a pure software form for use with all DAW systems, including Cakewalk Pro Audio, Sound Forge, Cubase VST, and SAW +32...**Miles Technology** (Tel: 616-683-4400) is offering two new versions of the MPR-450 six-channel power amplifier: the MPR-450X and MPR-450T. Both models include six fourth-order Linwitz-Riley crossover filters and balanced input connectors. The MPR-450X features six balanced "combo" connectors, which accommodate either XLR-type or 1/4-inch connectors. The MPR-450T features six balanced plug-in screws-terminal connectors. The MPR-450 power amplifiers, also available with barrier-strip or gold RCA connections, provide 450 watts total continuous power in six channels, and mount in two rack spaces...**Patchman Music** (Tel: 216-221-8282) announced the release of two all-new soundbanks for Roland XP-50 and XP-80 synthesizers. Volume 1, "Acoustic & Analog Essentials" offers 128 patches and 32 performances, while Volume 2, "Wind Controller," offers 128 patches and 32 performances specially designed for use with a MIDI wind or breath controller...**Peavey** (Tel: 601-483-5365) debuted their PVM 22 diamond-coated diaphragm microphone, a dynamic, cardioid, hand-held, vocal/instrument mic offering their exclusive diamond-coated diaphragm technology.

HARMONIES SIMPLIFIED

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- INTELLIGENT NATURAL-SOUNDING HARMONIES
- BALANCED MIC INPUT WITH STEREO OUTPUT
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- 3 REVERB PRESETS
- 2 ASSIGNABLE VOICES + YOU
- AUTO DOUBLING EFFECT

The Digitech VOCALIST PERFORMER is the perfect vocal companion when you need simple solutions for harmonies. You'll enjoy the compact table-top design and the simple push button user interface that allows you to access up to two harmonies, multiple reverbs and store up to 50 custom presets. You'll get professional features, and studio quality sound at an affordable price. The Vocalist Performer is simply your ideal performance partner.



optional microphone stand mount shown

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FIRST LOOK: IMPORTANT NEW PRODUCTS

ROLAND VS-840 DIGITAL STUDIO WORKSTATION

Roland debuts a new lower-priced, musician-friendly version of its widely used VS-880 workstation

BY CRAIG ANDERTON

By any standards, the Roland VS-880 hard-disk system has been a major success. Not only has Roland sold over 50,000 of the critters, but VS-880 owners tend to have the same kind of evangelistic enthusiasm as Macintosh fans.

So what about an encore? Rather than compete with the VS-880, whose market has been project studios and upscale musicians, the new VS-840 targets the M1 (music industry) market with an extremely competitive price and a subset of VS-880 features. Slightly smaller than the VS-880, the VS-840 is aimed primarily at markets no hard-disk recording system has ever fully captured, such as guitarists.

KEEPING TRACK

The VS-840 retains the VS-880 format of 8-track playback, four simultaneous tracks for recording, and 64 virtual tracks. All recording writes to a

built-in Zip drive — an inherently removable and relatively inexpensive storage medium. The Zip drive also provides a convenient back door for software updates, and since the '840 is track-compatible with the '880, you can transfer tracks between the two using a Zip disk.

Unlike the VS-880, there is no way to record non-data compressed audio. To satisfy digital audio's craving for storage, four compression schemes provide anywhere from 2:1 data compression ("MT1 mode") up to 6:1 ("Live 2"). However, because the data compression works in the time (not frequency) domain, you don't hear the same filtering coloration associated with MiniDisc's ATRAC compression.

ALL MIXED UP

The digital mixer has two stereo and

four mono phone jack inputs, one of which is paralleled with a special high-impedance/low-level input for guitar. During mixdown, when the mixer's six channel faders control the hard disk tracks, the four mono inputs can accept effects returns, sequenced parts sync'd to MTC (the '840 can be a sync master but not slave), or live inputs, for 12 channels total. Unlike the VS-880, there's no dynamic automation, although eight programmable "scenes" store not only control settings, but routings.

There are eight 3-band EQs (bass, treble, and true parametric mid), stereo mix bus, stereo/dual mono aux send bus, master out FX inset, and onboard effects. While limited to one FX board instead of two like the '880, there are still 25 algorithms (including the nifty COSM guitar amp simulators, lush re-





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The C 12 VR vintage twin diaphragm, vacuum tube microphone assures that even the most discriminating users will enjoy the trademark warmth, clarity and presence that characterized the original C 12 model which became a sought after collector's item. The legendary C 12 VR recording microphone acclaimed worldwide for its exquisite sound.

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100 dB and frequency response is 20 Hz to 20,000 Hz at 1% THD. These internal Transnova amps have a slew rate of 100 volts per microsecond. Input sensitivity of the amps may be set between 275 millivolts and 1.5 volts (per phase), allowing the TRM8 to be interfaced with consoles that have either a -10 dB or +4 dB output. To make sure that you don't overdrive the transducers, individual clipping indicators monitor output levels.

Priced at a suggested retail of \$2400 per pair, the TRM8 will be available by the end of this year. For more information, contact Hafler Professional, 546 S. Rockford Dr., Tempe, AZ 85281. Tel: 602-967-3565/800-366-1619. Circle EQ free lit. #130.

AVALON DESIGN VT-737 PREAMP

Avalon provides a new way to keep it clean and direct

BY STEVE LA CERRA

Avalon, well-known for its discrete, Class-A solid-state electronics has now introduced its first unit incorporating tubes, the VT-737. This two-space rack unit is designed to provide the ultimate direct signal path to tape for recordists who like to keep the path clean by by-

passing the console. Combining a full-featured preamplifier, compressor, and equalizer (each of which may be individually bypassed), the single-channel VT-737 employs a discrete signal path and high-voltage circuitry for headroom of +30 dB and an unweighted noise spec claimed to be -92 dB. Frequency response of the unit is spec'd as 10 Hz to 120 kHz, ± 0.5 dB (input filter included).

Differing from typical preamplifiers, the VT-737's preamp has three inputs: a transformer-balanced mic input with +48-volt phantom power, a high-impedance instrument input with a front-panel, 1/4-inch jack, and a rear-panel balanced (Class-A) XLR line input. Gain is achieved with two cascaded dual-tube triodes; a "High Gain" switch allows up to 58 dB of microphone amplification. Phase

reverse and a variable high-pass filter (40 Hz to 200 Hz) function on all of these inputs. Bypass is via hard-wired relay.

Realizing that the next likely step on the way to the tape machine would be a compressor, Avalon has designed the VT-737 with an opto-compressor built around



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twin, Class-A tube triodes. Full dynamic control from soft compression to hard limiting can be achieved, and the front-panel controls for this section include (fully adjustable) threshold, ratio, attack, and release. Avalon has cleverly included a switch to connect the EQ pre- or post-compressor, as well as a switch (actually located in the EQ section) that places the EQ into the compressor sidechain.

Speaking of EQ, the VT-737 also has an all-discrete, high-voltage, Class-A equalizer. Four EQ bands are available: two shelving-type and two sweep-type. The low- and high-shelf filters are passive to improve smoothness and are variable ± 20 dB from 15 Hz to 150 Hz (low-shelf) and 10 kHz to 32 kHz (high-shelf). Mid bands are active and apply ± 16 dB from 30 Hz to 450 Hz (low-mid) or 200 Hz to 2.8 kHz (high-mid). An "X10" switch extends the reach of both mid bands, while a "Hi-Q" switch selects bandwidth (high or low). Switching the EQ into the sidechain leaves the high and low bands in the *audio* path so that you still have tone control. An output level control allows adjustment of the overall level hitting the tape machine.

Available now, Avalon's VT-737 has a suggested retail price of \$2195. For more information, contact Avalon Design, P.O. Box 5976, San Clemente, CA 92673. Tel: 714-492-2000. Web: www.avalonde-sign.com. Circle EQ free lit. #131.

SHURE DFR11EQ VERSION 4

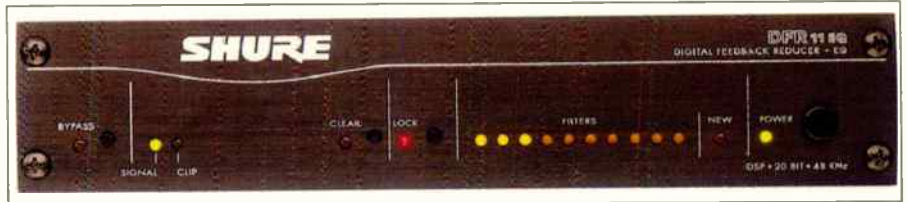
Shure upgrades its digital feedback reducer/equalizer

BY STEVE LA CERRA

Originally introduced in early 1997 as a combination digital feedback reducer/equalizer, Shure's DFR11EQ has now been upgraded to include Version 4 software. A half-rack-space, single-channel unit, the DFR11EQ has a built-in circuit that automatically identifies frequencies that are feeding back. Once identified, the unit's DSP automatically assigns a 1/10-octave notch filter to that frequency, thus bringing the feedback under control. There are ten such filters in the DFR11EQ,

enabling the unit to control multimode feedback. A front-panel LED shows you which of the 10 filters are active, as well as providing signal-present, bypass, lock, and power and clipping indicators.

Accommodating balanced or unbalanced I/O, the DFR11EQ has a rear-panel Neutrik Combo input connector, and both XLR and 1/4-inch output connectors (which are independently driven). A/D and D/A con-



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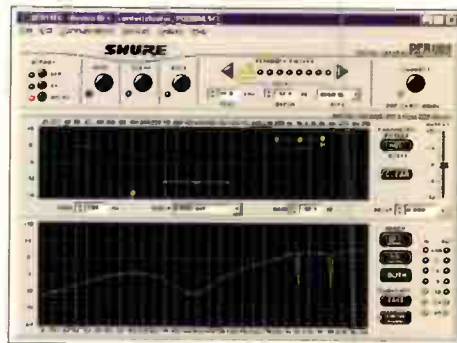
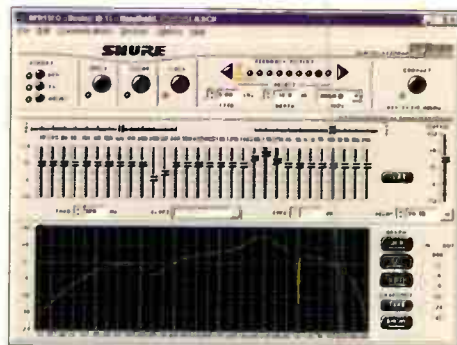
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version is 20-bit, while internal signal path is 24-bit. A sample rate of 48 kHz provides an audio operating range of 20 Hz to 20,000 Hz.

An RS-232 port on the rear panel interfaces the DFR11EQ with a PC for programming and control of the EQ section. Users now have a choice of either a 30-band, 1/3-octave, constant-Q graphic, or a 10-band parametric — both of which also feature adjustable high- and low-pass filters. A graphic display shows the actual modified frequency response of the unit, including interaction of the adjacent filters. After the EQ section is tuned, the PC can be discon-



SHURE FIGURES: Top: Parametric EQ. Bottom: Graphic EQ.

nected to prevent “tweakers” from making unwanted adjustments. ShureLink™ input and output connectors allow up to 16 DFR11EQ's to be daisy-chained and controlled by one PC. A series of recessed switches on the rear panel independently select ShureLink channel ID, I/O level (–10 or +4), high Q or low Q for the graphic EQ, EQ bypass, and front-panel lockout.

Version 4 software also includes a digital delay intended for time-alignment purposes, with a maximum delay time of 100 milliseconds (adjustable in 20 microsecond increments).

Shure's DFR11EQ with Version 4 software costs \$735. For more information contact Shure Brothers, Inc., 222 Hartrey Ave., Evanston, IL 60202-3696. Tel: 847-866-2200. Circle EQ free lit. #132.

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5.1 REVOLUTION

SURROUND



SOUND

You've heard the talk about surround sound. Now it's time to do it. Here, the industry's 5.1 studio pioneers reveal all the tips and techniques you need to take your mixes to the next dimension.

ILLUSTRATION BY NIKOLAI PUNIN



Creating Surround Sound Mixes

Enough theorizing — here's how to get into surround sound mixing and, more important, why

BY ROBERT MARGOULEFF AND BRANT BILES WITH STEVE LA CERRA

Since its introduction in the 1960s, stereo (2-channel sound) has dominated our industry. During the early 1970s, the record industry marketed recordings in quadraphonic (4-channel sound), but quad never really caught on for several reasons. One: groove geometry couldn't support four discrete channels of sound on a vinyl record. Two: the music business didn't involve the artist enough. Three: there were too many encoding schemes and no one could agree on a standard. While the various companies involved argued, the whole thing fell by the wayside.

Well, it's more than 20 years later and audio technology has grown by leaps and bounds. Motion pictures are routinely mixed in surround sound and encoded into film soundtracks using formats such as Dolby Pro Logic Surround, Dolby Digital, DTS (Digital Theater Systems), and SDDS (Sony Digital Dynamic Sound). Anytime that you start mentioning something with three initials — whether it's DTS, AC-3, THX (which is *not* a codec), DVD, or the like — people tend to get a glazed look in their eyes due to the information overload caused by all this new technology. Since we are professionals working in the audio industry, we think it's a very good idea to define the parameters of what's going on in surround, and why it's important.

WHY SURROUND?

The first thing you're probably asking yourself is, "Why would I want to mix a record in surround sound?" And given the checkered history of surround audio, it's a legitimate question. Here's a story to help you understand why: Last summer, we were mixing the *Pavarotti and Friends for War Child* concert in 5.1 surround, for release by HDS Records in DTS (we'll get to what "5.1" means later). Originally produced by Phil Ramone and recorded by John Pellowe, it had been recorded live with a full orchestra. We were given only six stereo pairs of premixed stems, thus

making our job kind of a cross between mixing and mastering.

There were a few problems initially, but when we dug into it and got it sounding good, a few people came in for a listen. Upon doing so, they would slip out of the control room in tears because they were so struck with emotion. It happened to us as well, and we had to actually stop, step back for a minute and then continue mixing. Surround greatly intensifies the emotional energy of the music — that is the bottom line.

Over the course of the last few years, people have left music behind for



WELL (SUR)ROUNDED: Robert Margouleff (seated) and Brant Biles reveal their secrets for great surround sound mixes.

PHOTOS BY EDWARD COLVER

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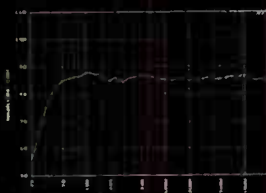
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other electronic stimuli. Our industry needs to bring them back through the true power of music. Millions of people already have surround systems installed in their homes to play back movies on video and laserdisc, so why not share the same platform for music reproduction. It seems we're at the beginning of a convergence of new technologies, where music, film/video, and computing will all come from (and be accessed by) the same system. Surround allows us to communicate in a whole new way (with a much larger canvas) and with many new colors of paint for our creative palette.

FIRST THING'S FIRST

For starters, let's make clear what we're talking about — *discrete* multi-channel audio. We're not talking about psychoacoustic surround systems, which all use two speakers to create the illusion of sound coming from all around you. This technology is called transaural audio, an example of which is QSound. Transaural audio is now being developed for the de-

livery of surround for multimedia computers. Sometimes referred to as "Fifty-Yard-Line" surround, it's good for only one person, and you have to be positioned on the center line of the two speakers to be able to hear the phantom surround images. If you're at exactly the right angle and the listening geometry is perfect, then one person will get 3D audio. What we are concerned with is digital, discrete, 5.1 surround sound. Some people in the industry refer to an audio-only surround mix as a "six-channel mix" to distinguish it from multichannel audio-for-video. For this article, we'll refer to it as "5.1."

In and of itself, 5.1 is *not* a specific surround format owing its allegiance to

any particular company or codec. It is a listening platform and hardware concept for a surround monitoring system. If you want to listen to music in 5.1, you need six discrete audio channels in your listening room. These channels are Left Front, Center, Right Front, Left Surround, Right Surround, and Subwoofer — that's the ".1." Since the Subwoofer, or LFE (Low Frequency Effect in the film industry/Low Frequency Enhancement in the music industry), channel isn't full frequency, the powers that be didn't feel it was worthy of its own number when naming this format "5.1." It's important, though, to note that 5.1 audio-only mixes can be played using the same amps and loudspeakers used for home theater surround.

As audio professionals, it's also important to remember that the philosophies of mixing audio-only surround and surround for video, are com-

bitstream from the six channels of digital information comprising the mix. This encoded bitstream is then burned onto a CD, laserdisc, DVD, or other storage medium. Upon playback, the listener needs a complementary decoder to translate data from within that new bitstream back into the six channels of digital audio. This process of encode-decode is called a codec.

Now you're probably thinking, "Here we go again with different decoders and no standard," but the truth is that the 5.1 setup and hardware are the same for these systems except for the codec. Fortunately for the consumer market, the same DSP chip from one of several manufacturers can decode both the DTS and Dolby Digital formats. Soon, the discs themselves will have an ID flag to let the decoder know which codec was used. Once this is known, the decoder will automatically



pletely different. Video requires a "front-loaded" mix to support a picture. In audio-only mixing, the constraints of film/video mixing can be broken. By regarding all channels as equals, the possibilities become endless. In the motion-picture world, the two most popular 5.1 formats are Dolby Digital and DTS, with Sony's SDDS trailing as a distant third. All three store data digitally and are delivered by varying methodologies. (It's worth mentioning that the recently approved HDTV standard also includes 5.1 audio.)

SIX MIX

Within the 5.1 platform are several formats that use encoders to form a new

switch modes and process the incoming signal appropriately. This will overcome the main reason that quad failed, because it will be possible to have a single decoder unit that recognizes all incoming bit streams.

As previously mentioned, there are two major 5.1 surround formats already in the marketplace. Both call for five full-range speakers (preferably all the same) plus a subwoofer. Let's take a brief look at them:

DOLBY DIGITAL

Previously known as AC-3, Dolby Digital is well-entrenched in the motion picture industry with roughly 10,700 Dolby Digital-equipped screens worldwide.



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For home use, Dolby has developed a data compression ratio of (typically) 11:1, originally developed to fit 5.1 audio onto the same disc with the video data for movies on DVD. The data rates for 5.1-channel Dolby Digital are designated as 320 kilobits per second (kbps) for film, 384 kbps for laserdisc, and 384 or 448 kbps for DVD. Dolby's current encoder can accept incoming data at 32-, 44.1-, or 48-kHz sample

rates, with word lengths of 16, 18, or 20 bits (this can be extended to 24-bit word length in the future).

As of this writing, Delos has released the first and only audio-only DVD in the Dolby Digital format (*DVD Spectacular*, featuring a complete performance of Tchaikovsky's "1812 Overture."). In addition to this audio-only disc, there are several music video DVDs available with Dolby Digital soundtracks, with 60 music video releases expected by year end.

DTS
In 1993, *Jurassic Park* became the first motion picture to be released in DTS. Since that time, DTS has become firmly established in the motion-picture industry. DTS is now currently installed in over 12,000 theaters worldwide. For home video, the DTS codec is scalable from 256 kbps to 1536 kbps, and DTS is

focusing on 1411 kbps as the optimum for transparent sound quality. Even though DTS began exclusively in the movie business, its emphasis on optimum sound quality stems from a corporate commitment to bring 5.1 to the forefront of the music industry.

Over the past year, DTS has been responsible for releasing over 40 titles on CD in 5.1 surround, including *Boyz II Men II* and the Eagles' *Hell Freezes Over*. In fact, DTS is the only company currently releasing product in the 5.1 audio-only market on labels such as Telarc, High Definition Sound, and Digital Music Products.

A DTS compact disc carries six

channels of digital audio (5.1) in 20-bit words at a 44.1 kHz sample rate. To fit this information onto a CD, DTS compresses the data at a ratio of about 3:1. As of this writing, there are around 10,000 DTS decoders in homes across the U.S., and that number is expected to grow to 50,000 by the end of this year. DTS was the first company to jump into the 5.1 CD and DVD-audio-only pool. Right now, only DTS-encoded 5.1 mixes are being released on standard CD. Although an additional decoder is needed, you can play a DTS CD on a standard CD or laserdisc combination player (and DVD player as well), provided that the player has a digital output for connecting to the decoder.

JUMPING IN

Artistically speaking, mixing in surround opens up a whole new world of creativity to an artist. Surround interacts

with listeners by putting them in the performance. Instead of being observers, they are participants. For example, if you listen to a CD, the music sits in front of you as an object. One can then choose to regard it or not — sort of like looking at a painting hung on the wall. In surround though, the listener moves from that objective experience into a subjective experience, where the music and listener occupy the same space — you are now an element in the painting and not just an outside observer. This is a very different world, which will determine how people write, perform, and record music in the future. It's not just, "Let's take a stereo recording and make it into surround." We're talking about many new artistic production decisions like, "Are we going to put the congas in the rear and the rhythm guitar in the left front? Should the lead vocal move to the center channel while the background vocals move in rhythm around the room?"

In traditional mixing, we use all kinds of devices, such as reverb, echo, doubling, spatial processing, compression, and pitch-shifting — every trick in the book — to create the illusion of space and depth. In conventional stereo recordings, a person might double a part and pan one left and one right. In surround, artists might think along the lines of recording four (or five) different performances or orchestrations of the same part, and have one come from each loudspeaker. It's the same part, but you'd get this overwhelming immersion in the sound because it's being delivered from multiple locations instead of just two.

A lot of recorded performances (especially in pop music) are not documentary reports of reality. For example, most symphony orchestra recordings are made in the documentary style. You put a dummy microphone head in an auditorium, the orchestra plays, and that's the whole recording (which is totally valid). This is not to say that orchestral recordings in surround aren't phenomenal, because they are! A pop



record (on the other hand) is done in a more serial way, with lots of overdubs. Many pop records will never be (and never were intended to be) performed live. It's not a real-time event. So what happens is that you move into this realm where the medium is part of the performance. When you suddenly have six channels of audio to put the performance into (instead of two), the listening experience is incredible.

As producers and engineers, we can now think in terms of six busses. Earlier this past year, we remixed *Boyz II Men II* for DTS. This was a major project that had been recorded on 24-track analog. Some songs had multiple slave reels for ganging up background vocal and percussion performances into sub-mixed stereo pairs for the final stereo mix. One particular song, "Water Runs Dry" (originally produced by Babyface), had a total of 18 individual tracks of background vocals. Instead of using the available stereo submix, we set them up so that you sit in the center of the room and get this massive blend of the quartet. If you want to hear a little more of Nate you can move over to the left rear speaker. If you want to hear a little more of Sean, you can walk over to the right front. In this way, the mix becomes interactive and you actually change the mix depending upon your position in the room. The mix takes place in the room — not in the loudspeakers.

Also worth mentioning is that there seems to be a lack of hearing fatigue when mixing in surround. We're all familiar with the fact that when mixing in stereo, the ears get fatigued over the course of the day. But to our surprise, with surround mixing, fatigue seems greatly reduced. We believe this is due to the nature of human hearing. When a sound is generated from two locations, there are phase peaks and valleys at different frequencies, at different places in a room. This phenomenon is more apparent if the two sources are located front and rear as opposed to left and right. So, as you move while working (nobody keeps perfectly still with their teeth on a bite bar), your ears get more of a variance in SPL at different frequencies. Also, with music in 5.1, the ratio of average SPL to perceived loudness is lower than that of stereo.

THE POLITICS OF SURROUND

In the past, surround has not been a

LOGIC 7 IN BRIEF

By Steve La Cerra

Differing significantly from the discrete 5.1 surround formats mentioned elsewhere in this month's *EQ*, Logic 7 is a matrix-surround format with full-bandwidth surround channels. Developed by David Griesinger at Lexicon (and currently available in the Lexicon DC-1 decoder), Logic 7 uses a proprietary encoding algorithm to combine data from a discrete five-channel digital mix into two channels (thus Logic 7 is known as a 5-2-5 matrix). Additionally, the matrix can decode to seven channels instead of just five — in which case the matrix creates two side loudspeaker channels while the "rear" channels are moved truly to the rear of the listening area.

During the playback of matrix-encoded data, cues are derived from within the data that tell the decoder where the sound should come from. If, for example, there's a sound in the left front channel and nothing happening anywhere else, the decoder will recognize this and steer the audio to the correct location.

According to Dr. Floyd Toole of Harman International, "Logic 7 is an adaptive, intelligent matrix. Logic 7-encoded material can be played through conventional stereos, as well as Dolby Pro Logic systems, though, of course, Logic 7-encoded material will sound best when played through a Logic 7 decoding system. Logic 7 can also decode Dolby Surround-encoded material and — perhaps most importantly — it's extremely kind to stereo material when doing 2-channel-to-multichannel conversion. Of course, one will find some recordings that are not compatible for a variety of reasons when decoded, because these recordings themselves were never intended to be played back through a multichannel system."

very democratic medium because it has been expensive for both pros and consumers. But as audio professionals, we have to recognize two important things: First: 5.1 lives in what is now known as the home theater — which is

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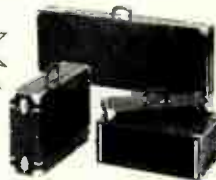


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TOOLS OF THE TRADE

We have been mixing and mastering projects digitally at The Enterprise (Los Angeles, CA) using a Neve Capricorn that has an all-digital signal path and dynamic memory. Other producers and engineers have been using consoles such as those from Euphonix (digital control of an analog signal path with dynamic memory), SSL, and older Neve's. Though the older analog desks lack dynamic memory, it is still possible to do surround mixes on them. So where

the largest selling segment of the hi-fi business. In fact, it's the only area of home entertainment that isn't depressed. Second: Technological advances in recording equipment are making surround attainable in any home studio (there's the democracy).

does this surround mix end up?

Mostly on a TASCAM DA-88. In the case of mixing for the DTS codec, all six output busses must be digital (AES), 20-bit, and at 44.1 kHz. In the case of an analog console, the analog busses must go to six A/D converters, which can put out a 20-bit word length. Once in the digital domain, all six channels get routed to a Prism MR-2024T. The Prism unit takes these six 20-bit channels and converts them to eight channels of 16-bit TDIF (TASCAM Digital InterFace) information. The MR-2024T achieves this by storing the upper 16 bits of all six channels on the first six tracks of the DA-88, respectively. The remaining 4 bits per channel are then combined and stored on tracks 7 and 8. On playback, the Prism recombines the first six tracks of 16-bit information with its respective bottom 4 bits and spits back out the original 20-bit information sent to it. Thus, we store a 20-bit, 5.1 mix on a 16-bit DA-88 tape.

Although we use a Neve Capricorn, there is great news for you, the thrifty audio equipment buyer: the Yamaha 03D and revised 02R can output six digital busses. Both have dynamic memory and panning — just like the Capricorn and Euphonix — but cost under 12 grand (under five for the 03D). That, combined with the DA-88, means that a project studio can mix in discrete six-channel surround with automated faders, panning, equalization, and dynamics (though the mix would still have to be mastered and encoded). As a matter of fact, you can set up a standard 8-bus analog mixer for 5.1. We recently mastered The Eagles' *Hell Freezes Over*, which was mixed by Elliot Scheiner at Capitol on a Neve VR with an analog film bus (see the accompanying discussion with Elliot on page 80). The point is, with a little forethought and creativity, it can be done.

To maximize panning flexibility, you might want a joystick panner, but the Capricorn doesn't have one, and we've used that console to do many surround mixes (the tips of our fingers have calluses on them from twisting the knobs all over the place). If not a joystick, then certainly a console that can memorize panning moves in automation. If you were using an analog console and needed to move a sound from the left front to the rear right, you might try returning the track to two faders. Then

continued on page 152

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World Radio History

CIRCLE 20 ON FREE INFO CARD



Surround is Hell

How I recorded and mixed the Eagles' *Hell Freezes Over* audio-only surround CD

BY ELLIOT SCHEINER

Grammy-Award winning engineer Elliot Scheiner has worked on albums by Steely Dan, Fleetwood Mac, and Bruce Horns-

by. *The Eagles' Hell Freezes Over (DTS)* was the first 5.1 audio-only surround mix engineered by Scheiner, and here he discusses some of the techniques he developed during the process.

Although I had worked on a couple of movies, the Eagles' *Hell Freezes Over* was the first time I had mixed 5.1 surround for audio-only. I coproduced and engineered the stereo version of the CD, so I was already familiar with what had been recorded on the tracks, but I wasn't a veteran at mixing for surround.

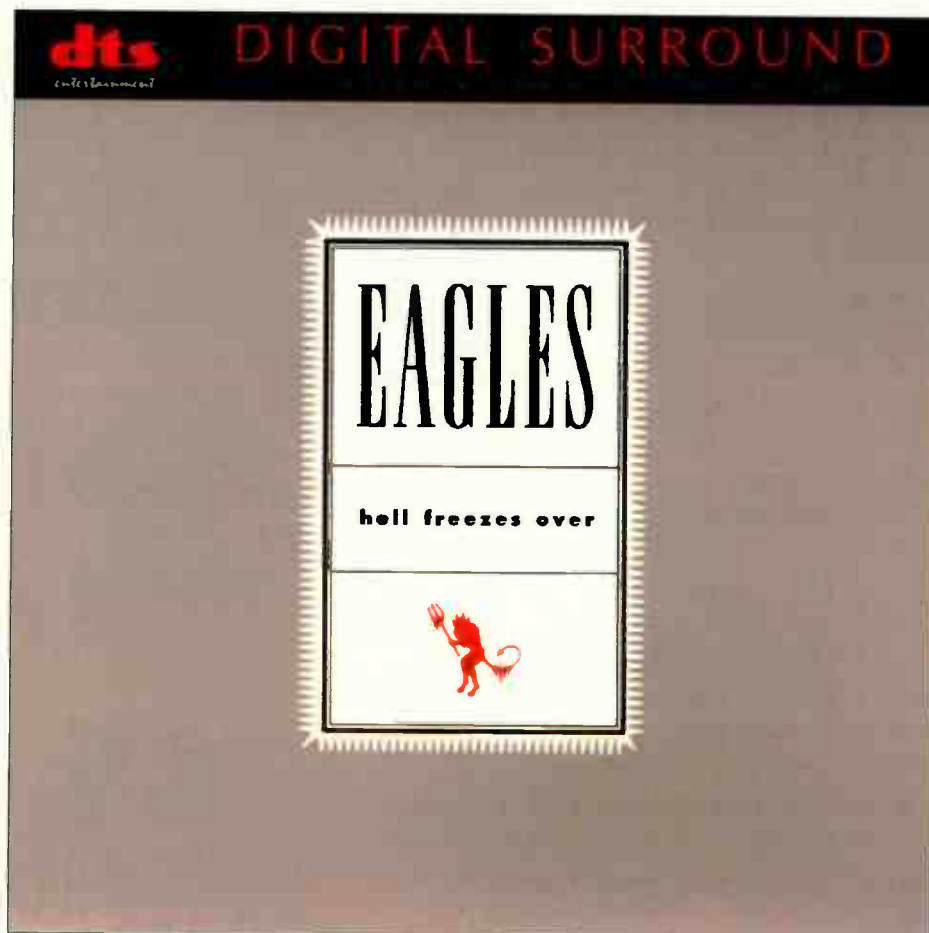
As a starting point, I used the Ea-

gles' MTV special, where the show starts off with just the guys playing acoustic guitars. I didn't want to experiment with that aspect, so I basically kept things pretty straightforward at the beginning of the concert. For that section of the show, I had the acoustics and all the voices up front. The only thing that I put in the rear was the audience, some ambient mics, and the percussionist (who wasn't a member of the band). When I started to think about it, that's what my basic setup became — I decided to keep the band mainly up front and put all the side players in the rear.

The project was tracked with the Le Mobile truck using two Studer A800's running 2-inch at 15 ips, +3, with Dolby SR. I had no idea during the recording process that this concert would be remixed for surround, so there were only two tracks of audience mics. Had I known, I'd have put more thought into my placement of the ambient mics and recorded different points of view from the room — like maybe miking various areas and keeping them separate so that I could possibly place those mics at different locations in the surround mix. In any case, the audience tracks were routed to the rear, but I also brought them up front a bit to make it feel as if you were sitting in the first row when the audience reacted. Yet when the band was playing, I tried to give you the feeling that you were on stage surrounded by the band.

MR. BIG

The whole center-channel concept can be pretty confusing and takes a bit of experience to fully understand. Many people think that the center channel is supposed to be primarily for the vocals, snare drum, bass drum, and bass — things that might normally be panned to the center in a



FLY LIKE AN EAGLE: The Eagles' *Hell Freezes Over* album was the first album Elliot Scheiner mixed in surround sound. He is currently mixing Fleetwood Mac in surround.

Our customers' comments

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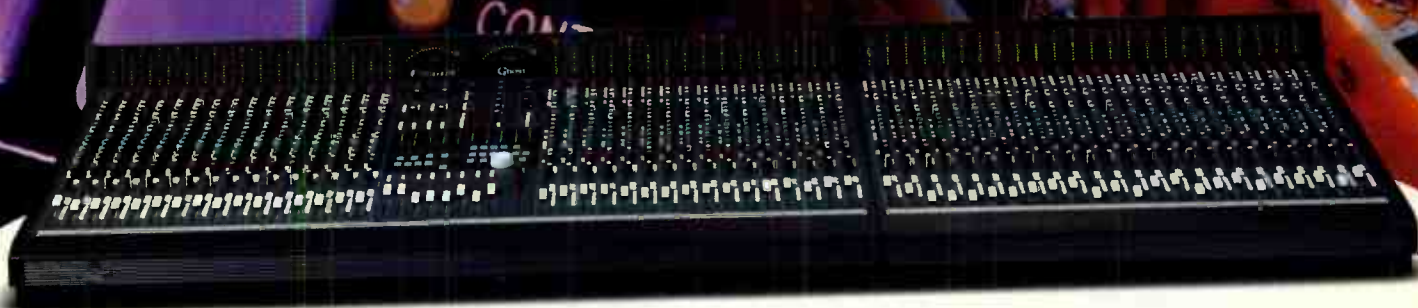
Johnathan Moffett, Drummer with Michael Jackson and Madonna

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stereo mix. But you cannot dedicate the center to information like that. You have to bring those sounds over to the left and right as well as the center or the mix will be too focused and begin to sound small. To alleviate this problem, many of the sounds on *Hell* that were routed to the center were also routed to the front left and right, even if only minimally.

ADVERBS

Employing reverb in the mix was a bit of a learning procedure. At the start, I primarily had the reverbs set up so that whatever sounds were placed up front also had their reverbs sitting up front; sounds routed to the rear had their reverbs sitting in the rear. Then I began to think, "I don't have to do this," so I ended up moving the reverbs a little bit. For sounds in the front, I pulled the reverbs slightly towards the rear and for sounds in the rear, I pulled the reverbs slightly forward. This gave the mix a nice ambient feel. To maintain the feeling that you are in the room, I programmed my reverbs while keeping in mind the confines of the actual room.

WOOFING IT UP

At the time I was mixing *Hell Freezes Over*, I EQ'd much the same as I would have for a stereo mix. Now, however, I am working on a Fleetwood Mac project (*The Dance*) for surround and I am EQ'ing differently for the stereo mix and the surround mix. The reason for this is that there tends to be a lot more low end in the stereo mix, and when you add the subwoofer to it, it can be too much. I'm not boosting as much low end on instruments that go to the subwoofer. You have to keep in mind

that a 5.1 mix is not going to be heard in any other format — it's going to be heard in surround, hopefully with a subwoofer. Also, there's no worry about mono compatibility or any of that stuff that we normally worry about with a stereo mix. It's a reasonable assumption that anybody

buying a DVD or a surround player is equipped to handle it.

SUMMARY

Looking back on my surround experience, one of the biggest concerns is placement of the audience mics. For example, with the Fleetwood Mac project, I used ambient mics placed strategically around the room; in the positions where the surround speakers might be in the listening room. But when those mics were added to the mix, I wasn't happy with the way they sounded (even though I liked the way they sounded during the recording process). They didn't create what I expected them to create — they really just created a lot of noise and it got to be a little bit ugly-sounding. It's not like being in the studio where you can place a couple of ambient mics in the rear of the room for your surround, and then move

I think that surround is definitely here and it's definitely the future. When you listen to it for the first time you think, "This is really the way to listen to music."

mics up on the sides to create a sideline effect. When you have to deal with house PA, it changes the perspective and it's something that has to be a little more carefully planned out.

I think that surround is definitely here and it's definitely the future. It's so interesting for me, and I really enjoy the format. When you listen to it for the first time you think, "This is really the way to listen to music."

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Mixing with the Big Bands

Capturing the music of Duke Ellington in surround requires some creative thinking and a really big shell

BY TOM JUNG

I just completed a discrete 5.1 mix of the *DMP Big Band Salutes Duke Ellington*, and the artistic goal of the process was, for me, to try and put the listener in the room with the band, to re-create the room in which the performance took place. What that meant is that in addition to miking the band differently, we also miked the room differently.

At the recording session, we monitored in stereo, but experimented with different room recording techniques. This particular project was recorded live in the studio and I actually had an RPG Performance Shell inside the studio. This is an acoustic shell that one might put over a stage area to form a conventional bandshell. It's quite large, and I set up the band so that they were at the opposite end of the room, blowing towards the shell — the reverse of its conventional purpose. I used a hot-rodded Shure VP88 stereo microphone pointed towards the inside of the shell to record the very diffusive reflections from it. I didn't want hard or early reflections, and the inside of the shell is full of RPG diffusers, so it produces a very diffuse soundfield. To capture as much of that aspect as possible, I pointed the microphone towards the inside middle of the shell.

While we were recording for 5.1, we were simultaneously recording the session for a matrix surround release in Circle Surround, and one of the main reasons that I used the Shure stereo mic was that it creates an almost perfect mono — no worry about phasing problems in the matrix. (A quick side note: people with regular CD players can play the disc in the normal manner. If they have a Circle Surround decoder, they have the option to decode the surround information that is embedded in the data stream.)

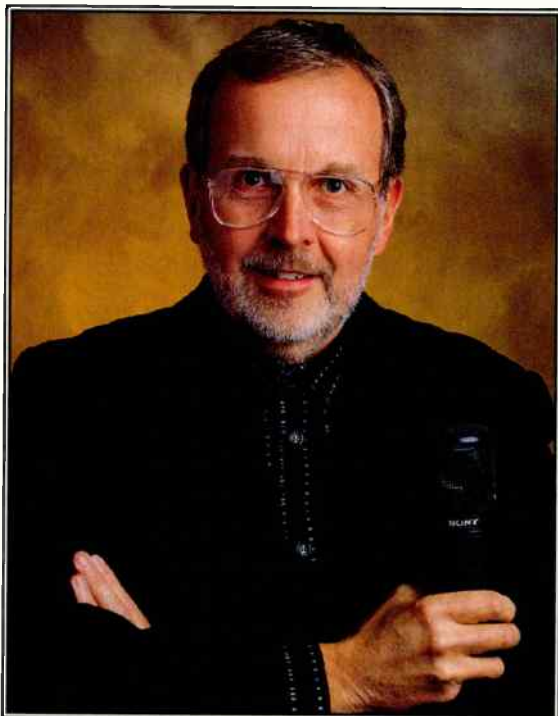
NOW HEAR THIS

I use the same monitor system for both discrete and matrix surround mixes; recently, the new powered Paradigm monitors. I have three Active 20 two-way monitors for the front left, center, and front right. I had been using the

same monitors for the rear channels and was adamant about having five matched speakers — and I think that for some types of music that's a necessity. But my artistic goal is to put the listener in the room with the performance, rather than have the performance surrounding the listener. I am not against having the instruments behind the listener because, when it's appropriate, it can be very effective, such as on Alan Parsons's *On Air*, where it is tastefully done. [Editor's note: Parsons has released both stereo and DTS 5.1 surround versions of *On Air*.] But since I'm doing mostly acoustic music, it makes more sense to get the listener involved by building the venue around the listener as opposed to building the *band* around the listener.

Because of that, I went to another powered speaker from Paradigm, called the Active 450-ADP, which is an interesting speaker. It is dipolar (out-of-phase) down to about 200 Hz, and then becomes bipolar below 200 Hz. The mids and highs are more diffusive than with a conventional loudspeaker, and the sweet spot tends to be wider. I do feel it's important for the front and rear speakers to have at least a family resemblance.

For a subwoofer, I'm using the Paradigm Servo 15, though I'm not totally convinced a subwoofer is necessary for acoustic music. For pop and synth-type music and cinema purposes it is. But when used on recordings containing acoustic bass, it gives the instrument an unnatural color and can exaggerate it. I have used it in the past and regretted it. And you don't know if people at home have their subwoofers set too loud, so there's a danger of possible errors in the listening environment. For example, what if there's *no* center channel? That's why I use the subwoofer and center channel



DUKE IT OUT: Tom Jung placed a band shell inside the studio to capture Duke Ellington's music.

PHOTO BY JULIAN JAMES

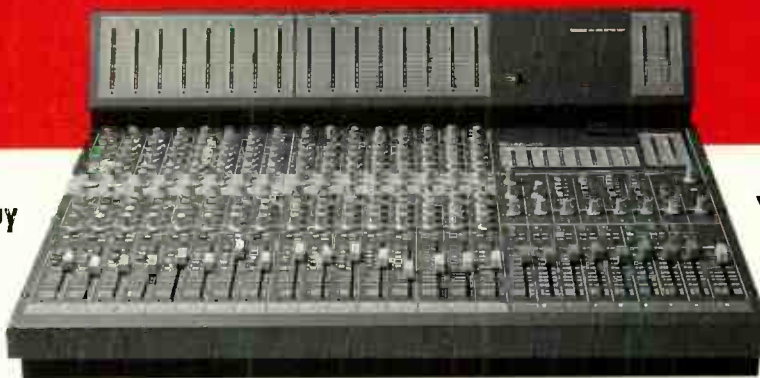
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sparingly. (I learned this the hard way with a recording of the Glenn Miller Orchestra that I heard at a trade show in Las Vegas. Their system had no center speaker, and when they played my disc there was no bass).

I also have been experimenting with an extra microphone to add the height factor into recordings. At one point I had an overhead monitor speaker, but then I came back to reality and recognized that no one has an overhead speaker in their listening room! However, I do use a height mic as a signal send into a pair of stereo digital reverbs. I use two Sony DPS-V77's, one of which is used for the front left and front right, the other is returned to the rear left and rear right. This helps me approach the height goal, but does not totally accomplish it. What I really want is a five-channel reverb...

TREE MICS

The DMP Big Band Salutes Duke Ellington was recorded onto a Yamaha (20-bit) DRU8. When it came to miking, we had the horns miked with a quasi-Decca "tree" arrangement. This mic technique was (and, I believe, still is) used by Decca [Records] to make orchestral recordings. Three mics are arranged into a triangle, separated equally by a few feet. The distance between the mics can vary depending on the width of what you want to record (e.g., for a symphony orchestra, you'd space them further apart). There's a left mic, a center mic, and a right mic all set to cardioid, though I believe Decca engineers used Neumann M50's, which become more omnidirectional in the low frequencies. The center mic is placed slightly closer to the performers than the left and right mics. For 5.1, these mics go to the left, center, and right (front) channels. In this case, I used two Soundelux U95's and an AKG C12VR to capture the overall sound of the band.

There were also a few "spot" mics on certain instruments. Drums were

recorded with two mics: a beyerdynamic M160 ribbon for overhead and a Shure Beta 52 on the kick drum. Both were bussed to one track of the DRU8. We also used two Shure SM80's (no longer manufactured, the SM80 was an omniversion of the SM81). One was placed on the bass and another was placed on the piano — just for highlighting the sound. To maintain phase integrity between the spot mics and the tree mics, we tweaked the delays on the SM80's via our Yamaha 02R console. As mentioned, the Shure VP88 was used for the RPG Performance Shell surround signal.

POTS AND PANS

For the discrete 5.1 mix, I used a Yamaha 02R-V2, which has the ability to pan across five busses. The Decca tree mics were panned to the left, center, and right, and then I moved them slightly towards the listener, which placed the horns slightly up front and created the depth of the live orchestra. Drums were panned between the center and the right front; piano was panned between the left front and the center.

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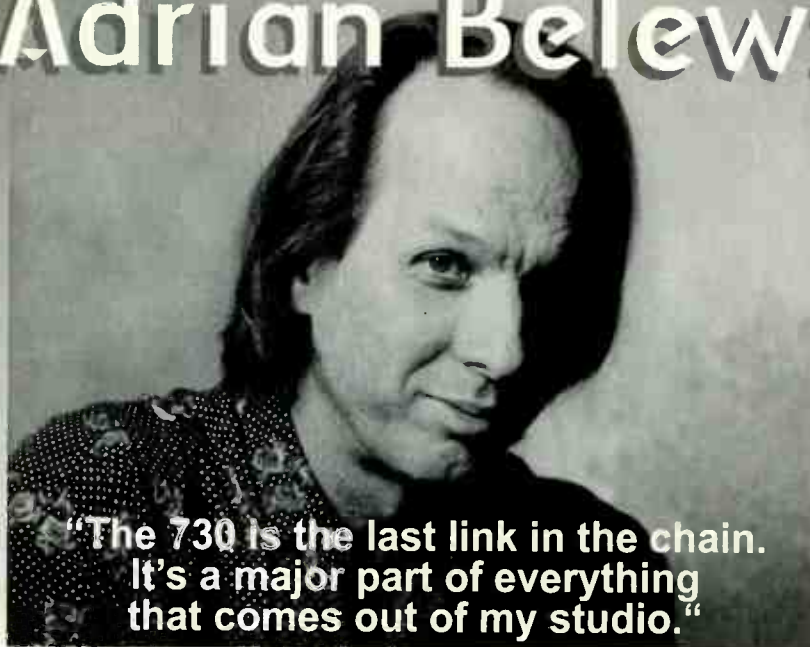
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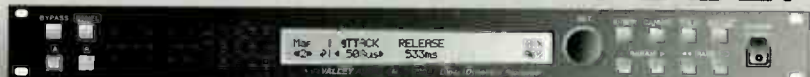
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Panning on the bass was rather interesting. The 02R-V2 allows you to vary the center pan between two sort of modes. In one mode, the control sends the signal to the phantom center channel derived from the left and right channels — just like a conventional stereo mix. At the other extreme, the control discretely feeds the center channel. I didn't want to route the bass exclusively to the center channel because of the previously mentioned reasons. So this control allowed me to bleed a bit of bass into the discrete center channel and the phantom center channel — just in case.

Don't underestimate the power of the center channel because as you move around the listening room, the center channel really helps to maintain a solid image. Also, having a center channel with the bass is constructive, acoustically speaking. Most front speakers are in corners that can excite ugly room modes; a center speaker is usually not in a corner and, as such, is not subject to severe acoustic problems. So I try to strike a balance between the discrete center channel and the phantom center. Or you can shoot for an average between the center and the subwoofer channel.

The signal from the VP88 was panned to the rear channels and pulled in toward the listener a bit. That information was also sent to the rear Sony 'V77. Over half of the information going to the rear was just that mic. Stereo 'verbs front and rear help add a sense of spaciousness and I have even experimented with a mono reverb routed to the center channel.

This discrete 5.1 mix was sent to a Prism MR-2024T converter that arranges the six channels of 20-bit data across eight tracks of 16-bit, which were then recorded on a DA-88. This DA-88 tape was then sent to DTS for encoding, so that the 20-bit data stream could be transferred to disc and mastered for release — keeping the signal 20-bit from the DRU8 through the 02R, and down to the final product.

Tom Jung is the engineer, producer, and president of Digital Music Products, Inc. For more information on surround sound and other DMP projects, you can visit their Web site at www.dmprecords.com.

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ambience for her voice went to the rears.

In terms of clearing out space, the ability to pan reverbs to the surround channels was a definite help. We used longer-than-normal reverb times for the plate and room programs we had going. A lot of times when you try to put reverbs

into a stereo mix, it just gets muddy, but by putting them in the rear channels you could hear them decay more clearly. We also sent some slightly delayed signals from the instruments (like solos) to the rear to emulate the slap in the hall.

In the stereo mix, the balances were often a moving target. In the surround mix, we established a level for an instrument and pretty much stayed with it. A lot of the automated moves from the stereo mix weren't needed. Take for example, the rhythm guitar. In the stereo mix, it would

be moved around to accommodate a keyboard part coming in, or a solo, or background vocals. We didn't have to do much of that in surround. There was more space, and the parts were easier to hear.

As you might notice from reading other 5.1-related articles in this month's issue, the amount of compression required in a 5.1 mix is usually much less than that for a stereo mix. I often play the compression game in stereo mixing, but I didn't have to do that this time around. Although there were compressors warmed-up and ready to go, we ended up not compressing any of the six busses. I also backed off the compression on individual instruments. When instruments have to be "there" and you're packing them into two channels, sometimes you have to limit the dynamics just to make them appear loud. It's tough to place the vocal on top of that, and sometimes you can run out of headroom in a stereo mix. With 5.1 you can clear things out of the way and place the vocal more easily.

In the control room, we matched the levels for all of the speakers using pink noise and an SPL meter. Measurements were made at the listening position and each speaker was adjusted to produce an SPL of 85 dB. Then we could mix accordingly. Bus outs from the console went into three 20-bit Prism A/D converters, then off to a Prism MR-2024T 20-bit TDIF converter that sent a bit stream to the DA-88 (the MR-2024T maintains 20-bit resolution on a DA-88 by printing six channels of 20-bit data across eight tracks). The output from the DA-88 was routed back through the MR-2024T and to three D/A-converters. Analog outputs from the converters went to six patchable GML faders in a roll around side-cart, which then fed the individual speakers. (We didn't need amps because we had Genelecs).

By monitoring through the converters and the DA-88 for the entire time, playing back a mix was as easy as rewinding the DA-88 and hitting "Play." Using a group master, we were able to set levels on the six channels and then use the group master for the control room level. Setting all of this up took about a day and a half, but once the system was up and running, everything worked fine.

In addition to Bonnie Raitt, engineer/producer Ed Cherney has also worked with Little Feat, Eric Clapton, Bob Dylan, Jackson Browne, Jann Arden, The Manhattan Transfer, and the Rolling Stones. If you haven't heard any of his recordings, smarten up!!

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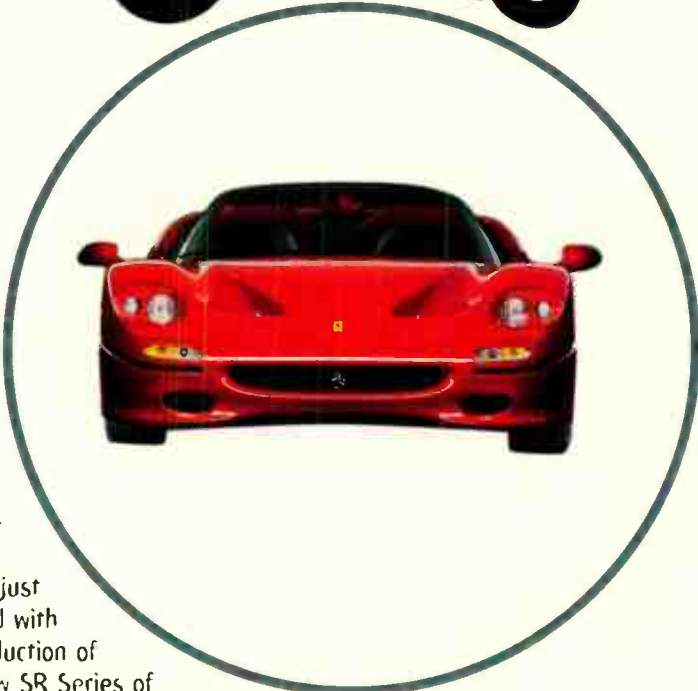
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The Joy of Six

Proper mixing in 6-channel surround sound can bring out parts of the music you barely heard before

BY DAVID TICKLE

When you set up a 5.1 system for mixing, there are many variables, so it's critical to ensure that your monitor system is balanced. It's very difficult to second-guess what kind of system a person might have in their home and then compensate for that. They might have a good set of (left and right) stereo speakers, but the center channel or the surround speakers might be inferior. Due to that, my approach to mixing 5.1 for audio (which is different from my approach to mixing 5.1 for film) is that every speaker should be identical except for the subwoofer.

While you first experiment with mixing in 5.1, choose a speaker system that you're really comfortable with, because you'll find variables that never existed before in stereo and it's best to at least have a grounding with familiar monitors. I often use Yamaha NS10M's for mixing in stereo and — after trying many different types of

The distance from the monitors to the listening position will depend upon the size of your control room and the size of the monitors. Using the NS10M's as an example, I would typically place the monitors approximately 5 feet from my ears. If I was using larger monitors, I'd place them about 8 feet from the listening position. It is very important that all of the speakers are at equal distances from the listening position; this forms an arc between the three front speakers. You can use a piece of string (or a tape measure) from the center of the listening position to each speaker to make certain that they are equidistant. The subwoofer can be located approximately the same distance from the listening position as the other monitors, though its placement is less critical than that of the other five monitors. I have actually

been using two subwoofers, one placed to either side of the center speaker.

TUNING UP

Once you have established the type of speaker, the next important aspect is calibration. It is imperative that you have the exact same sonic quality coming from each individual speaker and, using a dB meter, you need to make sure that the amplifiers are balanced to produce the same SPL from each speaker. I tend to place the meter only a foot in front of the nearfield monitor, rather than at the listening position. I set up a tone, white noise or pink noise (whatever seems most relevant at the time), and get my SPL to 85 dB. But whatever the dB level you decide upon, make sure that every speaker produces that same level.

Once that is done, you must check your phase. When you go to 5.1 (as opposed to stereo), the possibilities for phase error increase exponentially. I'm amazed that almost every time I set up



MAGIC'S IN THE MIX: David Tickle explains how to use surround to bring out different elements of your mixes.

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a 5.1 rig to do a mix, when I test phase coherence through the system, I'll find a few faults — even though everything looks like it's plugged in correctly. There's a lot of wiring involved (between the console, converters, recording medium, and back again) and it's six cables for every stage. That creates many possibilities for mis-wiring. When you think you have everything in phase (which includes making sure that each speaker is in phase with every other speaker in the system) then you can be certain that your signals will be phase coherent.

Next, choose a "main" instrument for the mix. It could be anything: a vocal or a classical guitar, etc. I'll use a vocal for my analogy here. I'll put a simple processing chain on the voice — whatever I need to make it sound the way I normally want it to sound — maybe a Pultec or Neve EQ, or a little bit of compression. The point is to achieve a quality timbre on the main instrument. I take that instrument and place it so that it's coming out of the left-front and right-front speakers.

At this stage, I'm just monitoring in stereo and I've got a sound that I'd be familiar with if I was mixing stereo (check it in mono as well). I pan that to the right side and then swivel my chair so that I'm facing the front-right and rear-right speakers, as if *that* was now my mix plane. I check to be sure that I have the exact same quality of the vocal coming from that plane as I would coming from the front plane.

WHICH BUS?

Depending on what console you're using, discrepancies may show up in your mix busses. I use the Euphonix CS2000 with Hyper-Surround™ because I am really fond of what it can do as a computer, as well as the sonic quality. Every single output on this console is of the highest-quality, master-grade. Echo sends all have the same electronics as the master stereo bus, so you can actually use an echo send to get exactly the same sonic quality and characteristics as your main stereo bus.

If you go to other consoles, you might run into problems when mixing records for 5.1 because they are not de-

signed with that kind of output quality on six busses. Your stereo bus sounds great, but to get signal to the center, subwoofer and rear surround channels, you'll need a combination of either additional busses and/or echo sends. If the electronics on an echo send are different from that of the stereo master bus, the sonic quality of the echo send is not going to be the same (though it may be good). That's why you want to listen to the lead vocal in these various stereo planes — so that you can hear any sonic inconsistencies in the console.

I try to make sure that when I place my main instrument in any of the four stereo planes I have now created, the sonic quality is identical. After that's been done, you can be confident that the system is playing back coherently.

GETTING TO THE BOTTOM OF IT ALL

One of the things I find exciting about 5.1 is the discrete subwoofer channel. Subwoofers vary tremendously in quality — some producing an analytical quality where you can actually hear the shape and defining line of the bass, some sounding woolly and fuzzy. In any case, you will have to decide upon a crossover point. If (for instance) you use Genelec speakers, the crossover requirements are different from NS10M's because the Genelecs actually do produce some low frequencies on their own. If you crossover at 100 cycles between the Genelecs and a subwoofer, you may get a buildup of bass. To prevent that, some people using Genelecs are setting a crossover point of 85 Hz. For my system, I cross over at 100 cycles because from that point down, the NS10M's drop off pretty rapidly. I find that by placing it there (rather than 85 Hz), the transition from the subwoofer to the NS10M's is pretty smooth. (As a quick side note, there's a lot of discussion going on right now about setting a standard for the crossover point. But because this is so new, it's still subject to experimentation.) More about the subwoofer later...

THE FINAL FRONTIER

Because you have so much space to explore when presenting a 5.1 mix, a bit of careful planning is required. Depending on what tracks you have throughout the album, I think you have to create some kind of dynamic. In some tracks, you'll have a lot of information coming from all of the speakers, and it's going to be

a busy, exciting kind of mix. There will be other tracks where you may use the surround channels for more ambient sounds and less of the "whiz-bang" stuff. You'll find that when you end up with an album of 10 or more tracks mixed in 5.1, and sounds shoot all over the place, it can be very wearing to the listener if it's not done gracefully. It's a dynamic tool presented in 5.1 that we didn't have for a stereo record.

Having said that, you can proceed by putting up the faders and getting a basic stereo rough mix of the program material — just like for a regular mix — no subwoofer, center, or surrounds. Get familiar with the music. It's very important to maintain the feel and emotional values of the music when you go to 5.1 because sometimes the whiz-bang elements can produce an effect that might not be the original emotional intent for the material. I prefer to use 5.1 to *enhance* whatever that emotional quality was, to actually exaggerate it more and pull it out, rather than just to change it.

With a basic stereo balance done, now you can go through individual channels of the mix and see where they work best, placement-wise, in the surround field. Get the bass, drums, and rhythm section happening. You'll find that there's certain things you like in the center, such as the bass guitar, bass drum, snare drum, and vocal — the main things that generally appear in the center of a stereo mix. In the 5.1 front stereo plane you have two different ways of creating mono (since I'm most familiar with the Euphonix console, I'll use that as an example).

A bass drum can be in mono by coming from the left and right speaker equally (that's what we're used to), or just from the center. The CS2000 has a completely variable "focus" control where you can send an instrument into the center channel. As it feeds the center channel, the focus control also starts to take the signal away from the (front) left and right channels at the same rate. When it's fully assigned to the center, that signal is removed from the left and right. So you could make the drum a lot wider and bigger by having it coming from the front three speakers.

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have too many signals coming from only the center, there's a good chance of overloading your center channel before you've even got most of your mix going (because you're not dividing that energy between two channels). I might push the center signal into the left- and right-front a little, not so much to get the width of the instrument, but to share the energy of the instrument across the three channels, so that I don't overload the center channel.

In regards to the snare drum, once I have set the amount of snare energy going to the center (as well as the left-front and right-front), I can actually bring the snare in front of the center speaker by introducing it slightly into the surround plane.

STEP TO THE REAR

From that point I continue to build my mix while maintaining the feel of the music. Certain sounds seem more appropriate for the surround channels, others for the front. If a sound is too percussive, it can be a real distraction in the rear — where you're always turning your head. That's the "exit-syndrome" — you're looking for the exit sign, which can be quite distracting. But at the same time I think that everyone should thoroughly explore using the surround channels because who says you can't have a sound coming from over there anyway?

Other instruments lend themselves more to being placed in the surround plane. I love placing keyboard pads to the rear and also harmony vocals that enter during certain sections of a song. Here's a really creative use of the surround channels, where I think it works best of all: Take a song that has a verse, chorus, verse, chorus, bridge structure. In the production of the song, you may have some kind of dynamic shift in the bridge, where the bridge becomes more airy, spacey or bigger-sounding, and then goes back to a more driving thing when it returns to the verse or chorus. That's a normal thing for a lot of records. In 5.1, when you get to the bridge you can suddenly make the surround channels a lot fuller than they have been for the other sections of the song. This takes you into a larger di-

mension and gives you an incredible dynamic tool.

One of the problems we deal with when mixing in stereo is fitting everything into those two VUs, so that the mix jumps out at you. In our stereo mixes, we use compression and filtering to make the bass drum and bass fit together, and the sum of the two becomes the impact. We then filter and compress the vocal and piano so that they don't step on each other and so on, until all of the instruments are jumping towards you.

In 5.1, you have six channels to put these instruments into, instead of two. You don't need to compress in the same way that you would in a stereo mix because there's so much more room and you don't have to force everything through two channels. Also you have to do very minimal filtering. Consequently, a drum kit sounds *way* more like a drum kit than ever before — like it's in the room with you. I still use compression and filtering, but I tend to use the compression just on individual instruments (e.g., I might put a compressor on a guitar and then place that sound in the mix). I probably wouldn't use overall compression on the entire mix, whereas on a stereo mix I typically *would* use overall compression to make it dance and jump out at you (of course, it depends on the program material).

BIG BOTTOM?

There are some interesting, unusual things you can do with the subwoofer. On the Freddy Revel record that I mixed, *Sol To Soul*, I put the low end of the piano into the subwoofer and the left speaker. All of a sudden, you could hear the foot pedal, the resonance of the sound board, and the hammers letting go of the strings — very high-definition. On another project, I put some of the lead vocal into the subwoofer, which made the voice enormous without being bassy and produced a distinct aura around the voice. It's not the type of thing where you'd recognize that the voice is coming from the sub, it's more a feeling of increased presence and size.

COMPRESSING THE BUDGET

I've been mixing in 5.1 for DTS, which employ 20-bit resolution on its CDs. To me, 20-bit certainly sounds way more advanced than 16-bit stereo. But there's going to be another big jump when we go to 96 kHz/24-bit, and that's coming

continued on page 152

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World Radio History





Setting Up Your Surround Sound Studio

How to equip and design your studio's control room to listen to surround sound mixes

BY BOBBY OWSINSKI

Surround Sound. Everybody wants to hear it. Everybody wants to do it. But while setting up a normal stereo studio is pretty straightforward because there's lots of experience to draw from, setting up a surround system can be quite a different challenge. Well, we're here to cut through some of the mystery, explain just how to do it and, most importantly, make it fit into almost any budget.

We're going to refer to the near-standard six-channel "5.1" surround setup in this article (see fig. 1), which means three speakers across the front (Left, Center, Right), stereo rear (or side) surround speakers, and a subwoofer (the ".1" of the system). Unless you're specifically planning on doing some work in the 4-channel Dolby Pro Logic (popular in broadcast and home theater, but quickly being overtaken by 5.1) or the eight-channel (7.1) Sony SDDS film format, there's little reason to go to these formats since there's an additional cost of equipment (encoder/decoders and speaker/amplifiers) that's not required

in 5.1. So by and large, 5.1 seems to be the most popular surround configuration now and in the future so that's what we'll refer to in this article. (See Robert Margouleff's story on page 72 for more information on 5.1.)

When we're setting up a surround system, we have to address the issues of monitors, level control, panning, outboard gear, and acoustics. Let's examine each one.

be used in choosing the one best suited for your needs.

Direct Radiator: This is a speaker where the sound shoots directly from the front of the cabinet, as in the majority of stereo monitors (see fig. 2). The advantages in using these as surround speakers is that you get a fair amount of efficiency and level, which is necessary if you're going to be sending a lot of source material to the rear speakers. In

many cases, these speakers are smaller than the front speakers, but in a perfect world, these should be identical to your front speakers since you may be sending some full-range source material there.

Bipoles: In this case, the sound emanates from the sides of the monitors (see fig. 2 again). You get the advantage of additional coverage area here, which works well for ambience material, but not so well for source material.

Tripoles: This is a trademark held by M&K which incor-

porates the best of both worlds, combining direct radiators and bipoles in the same cabinet (see fig. 2 — last time, promise).

For anything other than jazz or classical (meaning rock, techno, R&B, etc.), I like all speakers to be identical and direct radiators. Classical and jazz comes from a different place where mostly ambience is panned to the surrounds with very little source material. The same applies to film sound, with

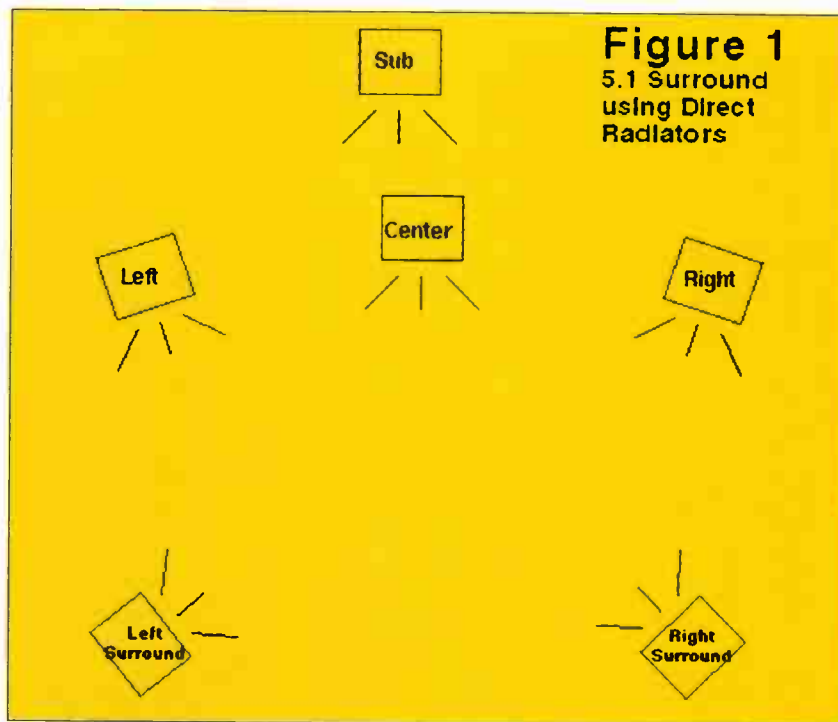


Figure 1
5.1 Surround using Direct Radiators

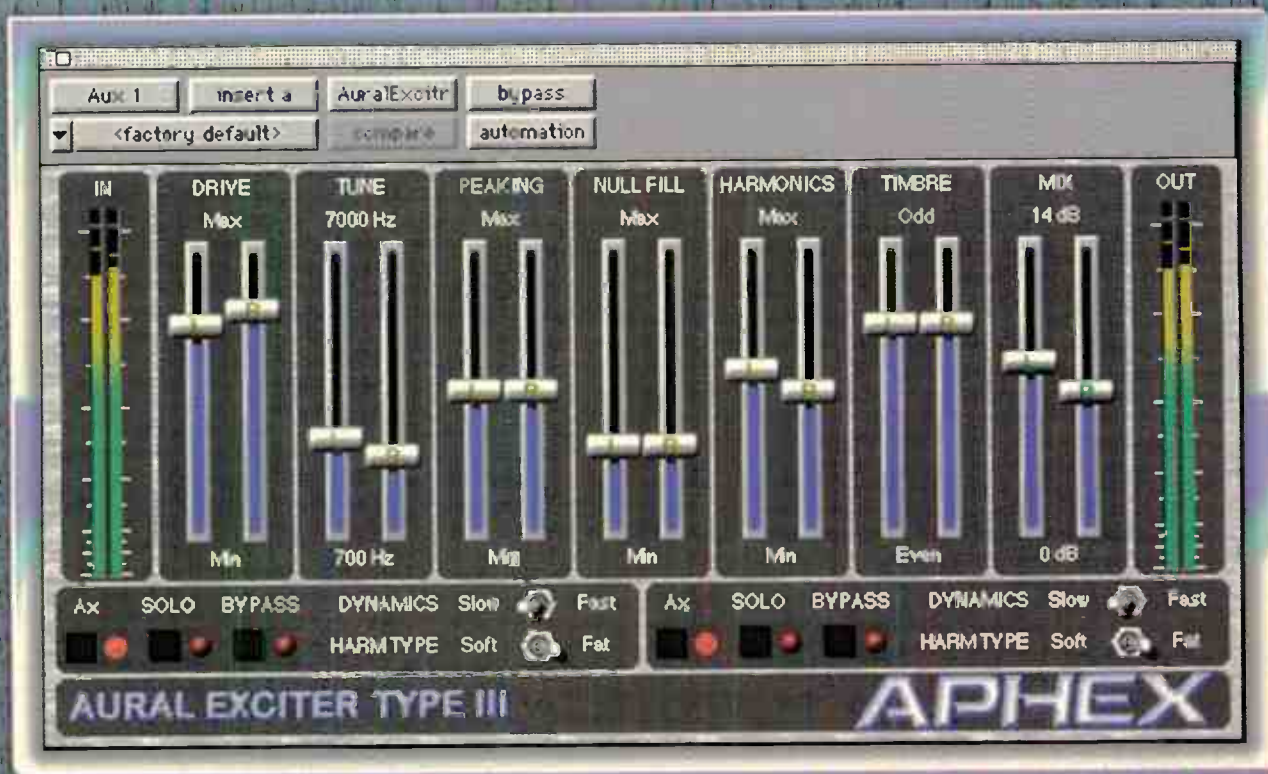
MONITORS

More so than with stereo monitors, all surround monitors are not created equally, which means there's a fair number of things to consider before installing speaker components for a system.

TYPES OF SURROUND SPEAKERS

There's three distinct types of speakers available to be used as the rear surround monitors and great care should

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only ambience and effects in the rears. With most other music, however, the mixers I've known have liked to use the surrounds for some heavy-hitting source material — and with very good results, I might add. I've had good luck with the one time I used Tripoles, and this seems to be the best combination, especially if you do a wide variety of music. Although I've seen some people just slap up whatever extra speakers they had laying around in order to get a poor man's surround system, just as in stereo, it probably won't translate well to the consumer.

CENTER CHANNEL

The center channel is important in that it anchors the sound and decreases the "phantom images" that we have with 2-channel stereo. It's most important that the center channel

speaker be identical to the left and right front speakers in order to get smooth panning across the front. That being said, many home theater systems actually use a center speaker different from the front right and left that sits horizontally on top of the television. Theaters, however, have identical center speakers. Play it safe and make it identical.

SUBWOOFER

The subwoofer in a 5.1 system receives a special audio channel called an LFE (for Low Frequency Effects) channel. The LFE, as the name implies, was originally designed specifically for special effects like earthquakes and explosions in the movies and has an additional 10 dB of headroom built in. Although some of the low-frequency information from the main system can be automatically folded into the LFE, most music engineers take advantage of the channel and use it for additional kick and bass information.

During playback of a 5.1 program, a special "bass management" circuit is

employed to route the proper frequencies to the subwoofer. This is part of the hardware that comes after the AC-3 decoder in a consumer receiver that will do one of three things:

1. Send the LFE channel only to the subwoofer.
2. Sum the low end (from 80 Hz down) from the five main channels and send it to the subwoofer.
3. Both of the above at the same time.

There is only one box on the market designed for bass management in a professional environment: the M&K HP80LFE, which is rack mountable and retails for \$300. It is possible to use a consumer receiver to do the job, but then you must put up with all of the attendant hassles that come with using a semi-pro device such as RCA connectors and lack of rack mounting.

This means that you have three choices when it comes to bass management:

- A. Do nothing. Just send your LFE info to the subwoofer.
- B. Use the M&K box.
- C. Use a consumer receiver.

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This is a tough call because the consumer ultimately decides what signal will be sent to the subwoofer. The majority of the projects I've done have used the LFE to sub-only method with good results, but only because the M&K box was not available at the time. I'd personally get a bass-management box if only to be able to check the low end in all situations.

PANNING AND LEVEL CONTROL

The biggest problem with surround sound is controlling the level and panning, which go hand-in-hand. In stereo, when we want to change the volume, we're used to just grabbing the control room level control, but when we're dealing with six channels instead of just two, it's just not that easy. The same goes for panning, which we take for granted in stereo but becomes far more complicated in any surround scenario.

As in most aspects of life, level and panning can be done cheaply with limited success, or expensively and done well. I've broken this down into four financial categories:

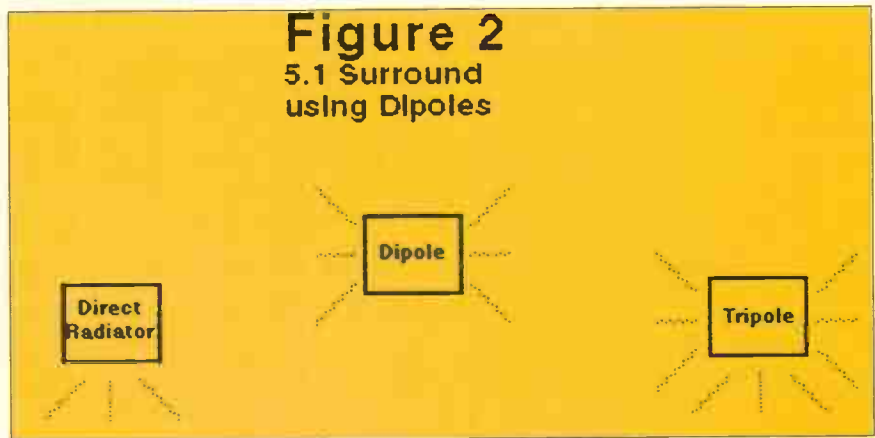
HI-PRICED

Buy a new console with surround panning and monitoring built-in. Although a few years ago that would have meant a film-dubbing console, there's now a proliferation of consoles on the market in a very wide variety of price ranges (from \$6K to more than \$600K) that come equipped with surround panning/monitoring as standard. These include consoles by Neve, SSL, Euphonix, D&R, LaFont, Otari, and more,

right down to the relatively inexpensive Yamaha 03D. This is the fastest and easiest way to get surround panning and monitoring, although you've got to lay out some cash to do so.

MEDIUM-HI PRICED

But let's say that you just can't afford a new console and you just want to add on a product to your existing console to give you surround panning/monitoring capabilities. Otari has a brilliant two-



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piece add-on called the PicMix that will give you both monitoring and panning in any of the previously mentioned surround formats. The Monitor Controller gives you multichannel monitoring in any of the popular formats, as well as preset and calibrated level control for \$5225. The PicMix Panner gives you four channels of panning control (two on joysticks) for \$3600.

LO-PRICED

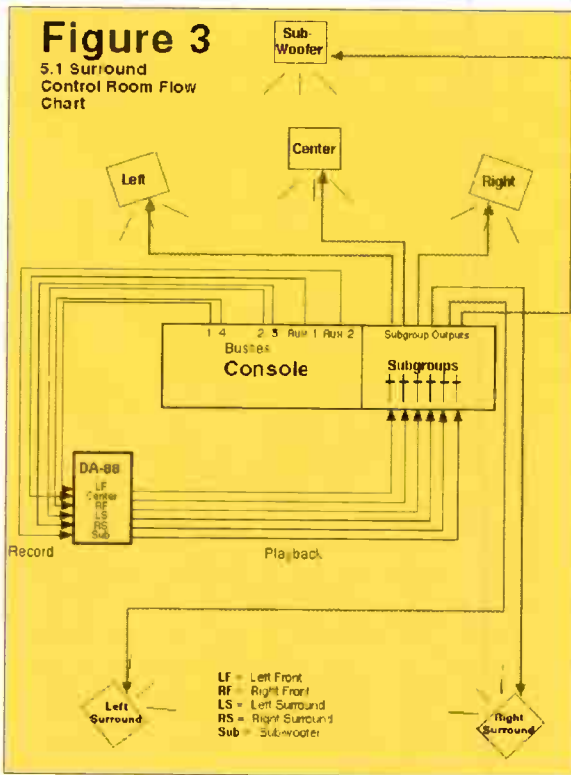
An even cheaper alternative is the soon to be available TMH Panner: a true 5.1 add-on panner available for less than \$500 per channel designed by the father of the format, Tom Holman.

NO-PRICED

OK, so you're poor or you just don't want to commit to any investment until there's a ready market for your efforts,

but you still want to play around with surround. There's a poor man's way to do surround panning and monitoring utilizing the busses on your current desk, only in an unusual way. This requires an English-style split desk with the input channels on one side and the subgroups and monitor section on the other to do it well.

Here's how we do it. First, set up busses 1 and 4 to go to the front left and right speakers and busses 2 and 3 to go to the left and right rear (see fig. 3). As you pan from 1 to 4 you will be panning from left to right. When you pan from 1 to 2, you'll be panning from left front to back and 4 to 3 from right front to back. Now set up an aux send to your center channel and another aux



SONY DYNAMIC DIGITAL SOUND

By Steve La Cerra

Taking the surround-sound concept a step further (actually two steps further) than the 5.1 platform is Sony's SDDS®. Introduced a little more than three years ago, Sony Dynamic Digital Sound operates on a 7.1 system, unique in that it employs two channels at the front of the soundstage. In addition to the more-familiar left, center, right, left-surround, right-surround, and sub-woofer channels, there are also discrete left-center and right-center channels. Currently there are more than 4300 SDDS decoders in use internationally. An important aspect of the SDDS format is that it can be decoded to four, six, or eight channels, for playback on a wide variety of audio systems.

Thus far, the thrust of Sony's efforts for SDDS are in the theater market, where screen widths of up to 60 feet are not uncommon. While a screen this size can, of course, be visually stunning, there are sonic problems when movies are experienced on such large screens. Primarily, there will be audio "holes" at audience seats that happen to be positioned between the left, center, and right front speakers. Also, a person listening from the far left may find a left-panned sound way too loud, while an audience member sitting at the far right might not hear that sound at all. By adding the extra two front channels, SDDS effectively avoids this dilemma by allowing mixing engineers to assign sounds "between the cracks" (i.e., to the left-center and right-center). It is worth noting that proponents of SDDS say

that — even on much smaller screens — the extra front channels make a marked difference in the amount of depth, fullness, and natural-ness of the audio.

Regardless of whether SDDS becomes a major player in the audio-only surround field, it offers important creative benefits for film mixers and composers. As mentioned, the left-center and right-center channels can be used to help prevent the audience from experiencing an unbalanced mix. And, of course, having eight channels within which to fit a mix avoids clutter by allowing assignment of different elements into the various channels. As an example, consider the audio for the opening scene of *Immortal Beloved*, mixed by re-recording mixer Chris Carpenter. This narrated scene is an accounting of Beethoven's funeral, where a choir and two soloists are providing music. The overall choir was panned left and right, but the soloists were placed in the left-center and the right-center channels, giving them a discrete location in the soundstage. Beside making the soloists' parts easily discernible from the choir voices, this arrangement kept the center channel open for the narration. By placing the narrator's voice in the center channel (as well as bleeding a bit of it into the left-center and right-center channels), detail and intelligibility of the voice was maintained without stepping on the musical activity of the choir and soloists.

to your subwoofer (LFE). Although not perfect, this method allows you to do at least some limited surround panning.

Now take the output of bus 1 into track 1 of your DA-88, aux 1 (or center channel) into track 2, bus 4 into track 3, bus 2 into track 4, bus 3 into track 5, and aux 2 into track 6 (see fig. 3). This is the *de facto* standard track configuration (but not the only one — DTS uses LF, RF, LR, RR, C, S). Now take the six outputs of the DA-88 into the insert returns of six subgroups and the outputs of those groups into your amps/speakers. Your busses and auxes control the level to tape, and the groups control the control room level. It's complicated, but it works!

OTHER GEAR

Mixdown Machine: The *de facto* standard mixdown machine is the TASCAM DA-88, although any format with six channels will do. In many cases, the addition of a Rane PacRat allows for 20-bit recording (while taking up the additional two channels), and additional outboard A/D and D/A converters would be nice, depending on the budget.

Effects Processors: Since a great deal of the material that you mix may be encoded in Dolby AC-3 (in which 5.1 is standard), the question always comes up about listening through an encoder/decoder. Surprisingly enough, it's not necessary, or even practical to do so (due to the high cost) since you can't actually change anything on the encoder anyway, and AC-3 is already pretty benevolent with the mix. This is not true with Pro Logic (a 4-channel playback format encoded on two channels), which does some pretty serious signal steering and absolutely requires a codec on hand to listen through.

Surround mixing will also require a new generation of multichannel effects processors. Unfortunately, none are available yet, but they may be on the way soon. I've heard the value of such a device. In some of the surround mixes that we did, we used three Lexicons (two PCM90's and an 80) for the five channels (utilizing a custom program for a decorrelated center channel), and the results were far deeper, wider, and much more usable in the surround format than a normal stereo 'verb.

ACOUSTICS

No discussion of surround sound setup would be complete without presenting at least a couple of acoustic considerations. Without getting too deeply into a subject that's worth an article all its own, here's

a couple of things to think about. In stereo, you can have an asymmetrical room with asymmetrically diffusion (such as Live End Dead End), but in surround, diffusion must be used symmetrical. In other words, once you start to spread speakers around the room, then some traditional stereo acoustic concepts (like LEDE™) might be rendered not only ineffective, but counterproductive.

Also, in surround you must keep in mind the old Inverse Square Law. Since your level changes by 6 dB as you dou-

ble the distance, it doesn't take much of a position change to change your system balance. This is why side speakers sometimes work better than rear ones because the level doesn't change as much as you move backwards.

Surround sound is a brave new world, and many of the concepts that we've lived with for so many years must now be rethought. The only way forward is to get in there and do it, make some mistakes and some discoveries, and be sure to tell the rest of us!

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BY BOBBY OWSINSKI

tems don't supply them. A further problem is that most of these systems are best suited to the home theater, with skimpy consumer interfacing and drivers not capable of taking the day-to-day punishment dealt out by professionals.

Yet another problem is that, even though the THX standard is supposed to apply to all THX-certified systems, they do

MPS-150THX MAIN mirror-image right and left front speakers and a MPS-150THX MAIN AC center channel speaker, each consisting of three 1-inch soft domed tweeters and two 5 1/4-inch drivers. These front speakers measure only 12 1/2" H x 10 1/2" W x 12" D and weigh only 24 lbs. They are available in various colors and are magnetically shielded.

The SS-150THX surround speakers are unique in that they feature a tripole™ design that combines the best of the dipole and direct radiator and can be configured in eight different ratios (by means of an external jumper) of direct/diffuse sound to suit just about any need or taste. These speakers consist of a single 1-inch soft-dome tweeter and a single 5 1/4-inch driver (identical to the



There are still a lot of unanswered questions regarding surround sound, the most basic among them being about monitoring. After listening to quite a few systems supposedly designed for surround, I've found a variety of problems with most.

Many systems exhibit a lack of front-to-rear cohesion (dead spots and lack of punch) due to the use of dipoles instead of direct radiators as rear speakers. This might work fine for sound-for-picture and classical recording where there's mainly ambience information in the rear, but if you want some strong source info coming out of the surrounds (as in a lot of music-only surround mixes), then direct radiators are the way to go, and many surround sys-

tems don't supply them. A further problem is that most of these systems are best suited to the home theater, with skimpy consumer interfacing and drivers not capable of taking the day-to-day punishment dealt out by professionals.

Now the good news: After listening to the new Miller & Kreisel MPS-150THX Reference System in Studio A of the wonderful The Enterprise studios (featuring a Neve Capricorn) in Burbank, CA, I've finally found a 5.1 surround system intended for professional use.

Fully THX certified and, according to the manufacturer, virtually flat (for a speaker system...) from 18 Hz to 20 kHz (± 2 dB), the M&K MPS-150THX system is definitely the answer for anyone getting into 5.1 (or 7.1) surround sound mixing. The system we auditioned consisted of the

drivers used in the front speakers) configured on the front of the cabinet as a direct radiator, and a 3 1/2-inch cone driver on either side of the cabinet for the diffuse output. The tripoles are slightly smaller than the front speakers, measuring 10 1/2" H x 8" W x 6 1/2" D and weighing 11 lbs.

The real key to the system is the MPS-350 SUB powered subwoofer. Featuring a unique dual push-pull 12-inch driver array and a built-in 350-watt RMS power amplifier, this powerhouse reproduces frequencies to below 20 Hz! The push-pull configuration is said to eliminate even-order harmonic distortion and gives an additional 6 dB of output. Measuring at 23" H x 15 1/4" W x 19 5/8" D, this unit

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plenty of level (up to ear-splitting) with nary a trace of the speaker distortion or bottoming out. Another very noticeable and very positive trait was that the tripole

configuration of the surrounds made the entire room a virtual sweet spot, allowing the listener to go almost anywhere in the room without encountering a null point.

Yet another revelation was that whenever the level was changed up or down, the relative balance between the front and rear speakers stayed much more balanced than any system I've heard to date. In the past if someone had asked to change the level a bit, the front-to-rear balance would go out the window. Such was not the case with the M&Ks. There was only a slight difference in the front-to-back balance that was not nearly as exaggerated as I had previously experienced. According to M&K co-founder and designer Ken Kreisel, one of the reasons for this phenomena is that ported systems actually change their low-end response and directivity at different levels, and this is further compounded in a multichannel setup. The M&K front and rear satellite speakers are sealed enclosures so they don't suffer from this effect. This is an extremely important point because most of the great music mixers I know tend to monitor at different levels with the majority of the listening done mostly on the quiet side. Film mixers, on the other hand, calibrate their system for 85 dB SPL and stay there.

I can honestly say that I've never heard a surround system sound as good. I heard things on the M&K's that I wished I had heard during my original mixing sessions. I believe my end product would have come up a notch or two had I mixed with them. For a professional surround sound system, I think the M&K MPS-150THX is the one the beat.

Many thanks to Thom Brown and the crew of The Enterprise for their gracious help with this audition.

MANUFACTURER: Miller & Kreisel Sound Corp., 10391 Jefferson Blvd., Culver City, CA 90232. Tel. 310-204-2854. Web site: <http://www.mk-sound.com>. Faxback system information: 800-414-7744. Circle EQ free lit. #133.

PRICE: MPS-150THX MAIN, \$795 each; MPS-150THX MAIN AC center channel speaker, \$795 each; SS-150THX surround speakers, \$1095 per pair; MPS-350 powered subwoofer, \$1795 each.

gives the system a low-frequency wallop that can only be described as larger than life. Unlike other subwoofer systems I've used that seem to be out of balance with the main speakers or add a hole to the frequency response in the 100-120 Hz range, the MPS-350 SUB crosses over seamlessly with the satellites in such a way that you never know it's there other than the earthshaking power that it contributes.

The system also includes the HP 80-3-channel and HP 80-2-channel filter boxes, as well as the LF1 6-channel Bass Management summing box in order to incorporate the 80 Hz, 24-dB-per-octave Linkwitz-Riley crossover specified for THX installation. As individual units, these three boxes don't make it in a pro setting, but M&K says that they will soon be combined into a much-needed balanced input, single rack-mounted chassis.

Of special note are the unique M&K speaker stands, which offer a truly elegant solution to the dual problem of holding and aiming a set of nearfield monitors. The stands can be customized to any height from 3 inches to over 6 feet by using either precut lengths available from M&K, or by buying a custom length of 3/4-inch pipe with a standard NPT plumbing thread from your local hardware store. Absolutely brilliant!

Since the control room at The Enterprise is so large (25' W x 30' L x 15' H), the standard 5.1 system was augmented with two additional surround speakers for the sides and an additional powered subwoofer. This upped the price of the auditioned system to \$10,230. A standard system with one powered subwoofer and one set of surrounds would cost about \$7000 — a bit pricey for a music-only project studio, but not perhaps for one involved in commercials and film work. Incidentally, the front speakers in our audition were powered by Yamaha 4002 power amplifiers and the rear speakers by Yamaha 2002's. M&K plans to make these speakers self-powered in the near future.

We listened to a variety of 5.1 mixes that I had done ranging from blues to R&B to dance to new age, as well as some current DVDs (*The Mask*, *The Bodyguard*) and laserdiscs (*The Rolling Stones to the Max*). The first thing I noticed was how big and powerful the sound was. Despite the enormity of the control room, there was

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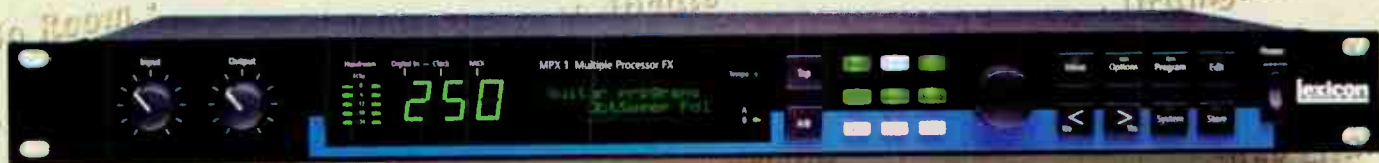
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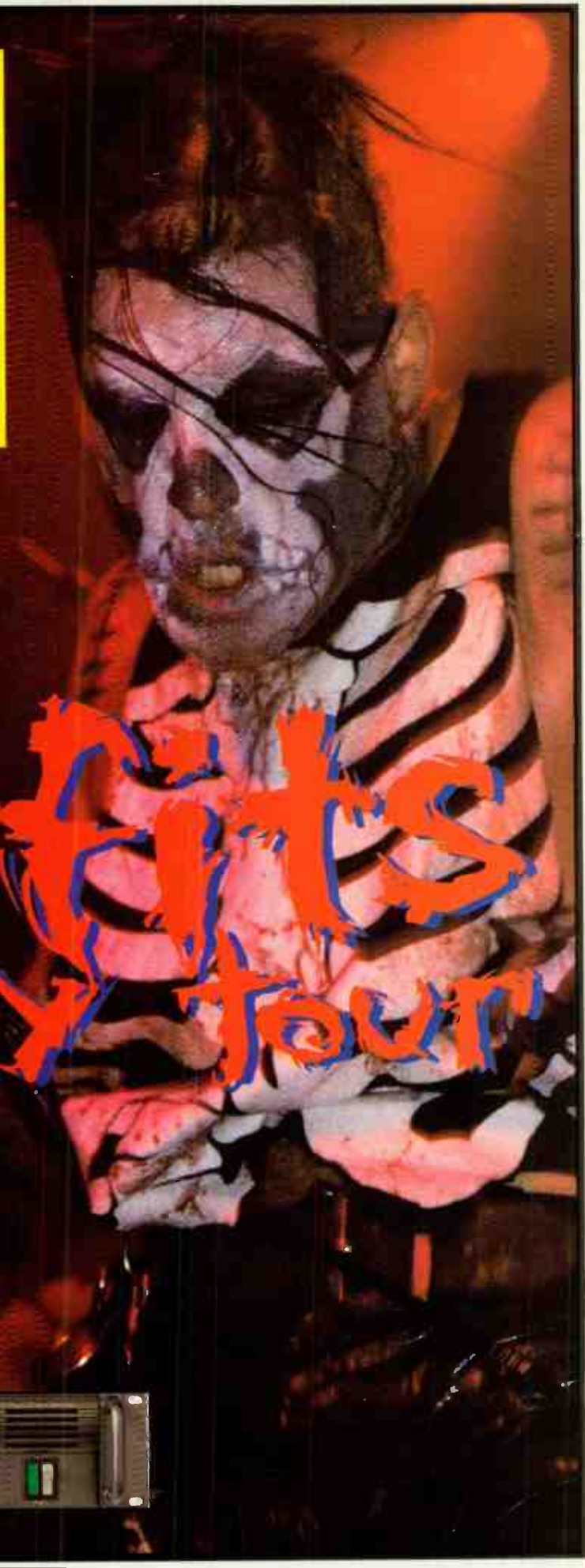
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MISFITS DIY TOUR

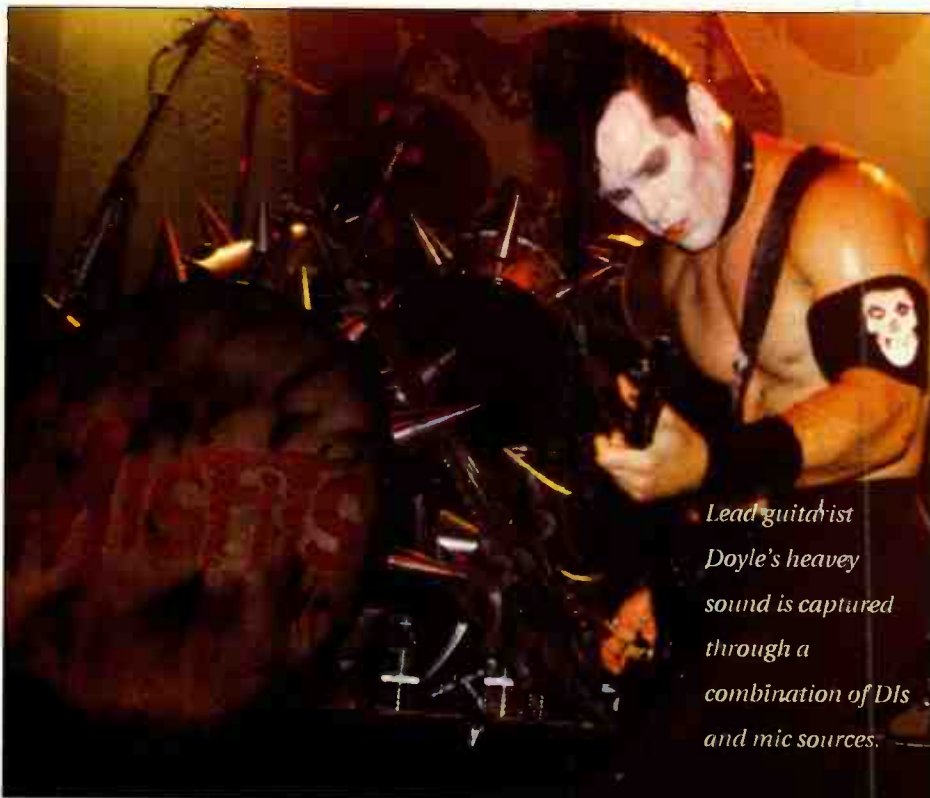
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PAGE 126



THE MISFITS DO IT THEMSELVES

HOW PUNK
ICONS THE MISFITS
CREATE, AND
FRONT-OF-HOUSE
ENGINEER DYLAN
MCLAREN CAPTURES,
THEIR MONSTROUS
LIVE SOUND

By Robert
Granger



Lead guitarist Doyle's heavy sound is captured through a combination of DIs and mic sources.

Since they hit the punk scene in the late '70s, the Misfits have been purveyors of punk's DIY attitude. From their self-produced first singles, to the creation of their own record label, Plan 9, to their merchandising, their spooked-out stage personas, the Misfits were a self-made band — all the way down to their instruments. Currently on tour with a new lineup — original members Jerry Only on bass and Doyle on guitar, Dr. Chud on drums, and Michale Graves on vocals — and a brand new album, *American Psycho* (Geffen), the Misfits are still treating crowds to their over-the-top showmanship. Not much has changed in terms of the Misfit's live shows, except for the fact that their instruments have gotten bigger and they've cranked their amps up even louder.

So does this pose a problem to the modern-day engineer? It may shake, or even break, the average soundperson, but Misfits front-of-house engineer Dylan McLaren has found several interesting ways to combat the band's love of big toys and big volume.

THE BIGGER, THE BETTER

When it comes to the Misfits, bigger is definitely better in their eyes. Take, for example, the drum kit that drummer Dr. Chud sits behind. For both aesthetic and sonic reasons Chud and Only believed that if they had a kit that was twice as big as a normal kit, it would be twice as loud and have twice the visual impact.

"When I designed the drum kit I was really going for assembly speed and overall size," states Only. "I built the floor toms out of two 22-inch bass drums — we've got a double rack on each side. Our bass drum is a 28-inch fitted with a 30-inch out in front of it — it sounds like a cannon. The two racks were garment racks that Doc saw on the street and brought into practice one day. I grabbed a saw and we put together this monster drum rack. I designed a bracing system, similar to a weight-bench holder, to hang the rack toms on so we can as-

semble the kit in about 15 minutes."

"Everything's really high and big, so it takes longer to get around the thing," explains Chud. "I also put Remo mufflers on most of the toms to give them a big boomy sound, so I literally have to pull the stick back up after a hit — there's no snap. When I go home and play my regular kit there's a huge difference because it's physically smaller and the sticks feel like they're bouncing all over the place!"

To compensate for the overall deadness of the kit, Chud and Only make their own sticks out of dowels they purchase from their local Home Depot. "We get about three drum sticks from one dowel for a grand total of about \$.90 a pair, as opposed to \$6 a pair," exclaims Chud.

While the kit does pose some problems in a live situation, front-of-house engineer Dylan McLaren has found several ways to tame the beast. In addition to the AKG D112 that

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World Radio History

CIRCLE 76 ON FREE INFO CARD



Chud built into the 28-inch kick drum, the Shure SM57 that captures the snare, and the club-supplied tom and overhead mics, McLaren and Chud are utilizing ddrum drum triggers and an Alesis D5 head to add some more power to the kit. McLaren states, "Since they built the kit themselves acoustically, it can be quite a nightmare when it's not tweaked out. Right now we are using the triggered sounds from the D5 and blending it with the mic

eliminate it. So I equate it to double tracking in the studio; we're doubling up on channels as opposed

to trying to get more volume out of each channel and picking up everything else on the stage."

In addition to some gating to stop any sonic overspill, the only other processing that McLaren does on the drums is some compression on the kick and the snare. But McLaren doesn't compress the kick and the snare channels direct, instead he has

ence between the live sound and the triggered sounds because they're actually coming out as one sound."

ONLY BASS

Bassist Jerry Only's trademark overdriven bass sound is derived from a combination of a miked source and a custom-built DI. "Right now I'm using four modified SVT 8x10 cabinets powered by four separate Acoustic 370 heads — two heads are generating the highs and two heads are generating the mids," explains Only. "For my sub system I'm using a separate SVT head through a 15-inch sub. I've found that you really don't want to try and have a cabinet handle the high, mid-rangey stuff as well as the low, boomy stuff because a speaker's a speaker, and it's going to throw a wave for you no matter what. So if you have one speaker throwing a high and a low wave simultaneously, you're going to get a lot of mud. So I figured if I had a separate rig for each separate frequency, it would sound a hell of a lot better."

To capture all the sonic nuances of Only's rig, McLaren is running a compressed DI straight from the SVT sub head and miking the dirtiest 8x10 with either a D112 or a Sennheiser 421. "The low-end isn't so important through the cabinets because we're getting that with the DI," offers McLaren. "We're actually looking for the crunch, fizz, and the big compression that a bass drum mic can offer because they're well

continued on page 150



LOUD AND PROUD: Front-of-house soundman Dylan McLaren has to contend with The Misfits' monster sound.

sound, so we can still capture the overall warmth of the kit. Because the band plays so loud live, sonically, I was picking up so many different things through the drum channels that we had to find a way to

chosen to compress the subgroups. "When I compress the subgroups I'm actually compressing the triggered sound and the acoustic sound together. This helps to blend the sounds better and you don't get the differ-

MAKING AN AXE TO GRIND

By Jerry Only

When the band first started out in the '70s, I would go out and buy Rickenbacker basses, pay anywhere from \$250 to \$400 for them, bring them home, and hack them up with a sabre saw, sand them out, and do a lot of custom work on them. Technically, I was taking a \$400 instrument and hacking the shit out of it. So I thought about it for a while after the original band broke up and I came to the conclusion that I was going to go through a lot of guitars that way. I figured that if I could build my own guitar from scratch out of the same \$400, it'd be a better alternative

Doyle and I started building guitars in '84 or '85, and we went through a lot of different design flaws. We originally tried to make the necks out of solid wood, but after we'd sand and shape the necks the wood would eventually warp. After about four or five years of experimenting with different woods — mahogany, maple, ebony — we finally came to the conclusion that wood is really not the way to go and we started making graphite necks. Right now, we've got necks that are

supposedly indestructible. I haven't been able to mass produce enough of them to really give it a shot and see what they can really take, but they seem really solid and they're impervious to weather and all different kinds of elements.

With the graphite being so superior to wood, we're actually bolting the body shapes, or the wings, of our guitars right to the sides of the neck. This way if anything happens to them we can just pull off the busted wing and bolt another one on. We just made some molds and we're going to try to mold the guitar bodies as well, rather than sit there and cut, sand, and paint them. The hardest part of the whole process is getting a really good finish — you have to sand the wood really good, then you have to prime it, then you have to sand it again. I spent about three weeks sanding and painting just one set of wings. So we're trying to make them out of a rubber type of epoxy. It has a little bit of give to it. I can't really report to you on that yet because I haven't got a set back yet. If I can pour the bodies, my main goal is to mass-produce them for sale.



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AUDIO ALCHEMISTS
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 THEMSELVES IN
 AFFORDABLE
 LOCATION RECORDING

By Alan
 di Perna



MAKING MAGIC: The Audio Alchemists with the heart of their truck — 48 channels of ART Dual MP preamps and TASCAM DA-88's.

A project studio on wheels? That's one way to describe the Audio Alchemists mobile recording truck. The operation is run by veteran live-sound engineers Frank Papitto and Steve Lettie out of Ho-Ho-Kus, New Jersey, just over the river from Manhattan, where the Audio Alchemists truck is often seen parked outside the city's top clubs.

"Our basic angle is that we're really the first affordable remote truck," says Steve Lettie. "We don't seek to compete with the big remote trucks like Effanel that are typically getting \$6000 a day doing things like the Grammys and Music Video Awards. There are also one or two trucks in our area that are at \$2500 to \$3000 a day. But we tend to come in under that, at about \$1740 a day. That's the market niche we're going for."

There's a lot of action in that niche, judging from Audio Alchemists' resume. The truck made its debut in August of '96, recording Kiss live on the Brooklyn Bridge for the MTV Video Music Awards. One of Audio Alchemists' specialties is recording club concerts for syndicated radio broadcast. They've recently captured alternative rockers like Beck, Dishwalla, Sponge, Tonic, and the Refreshments live at various Manhattan venues for Media America/Microsoft Network's *On Air* and *All Access* Series.

(Parent company Paradigm Entertainment also owns the granddaddy of all radio concert series, *The King Biscuit Flower Hour*.) And for the California based Album Network, Audio Alchemists recently recorded Big Head Todd & the Monsters and Matchbox 20 at Manhattan's Le Bar Bat.

All this work has been done out of a 24-ft. Grumman "bread truck" purchased from Effanel Audio. The recording chain is based around six TASCAM DA-88's providing 48 channels of digital recording. Signals are routed into the DA-88's via 48 channels of ART Dual MP tube mic preamps. "Everybody really likes the combination," says Lettie, "the vintage warmth of tubes with the cleanliness of digital. It really sounds great."

The console on the truck is a 32•4 Mackie board with a 24-channel sidecar. Three racks hold a selection of outboard gear that includes Drawmer compressors and gates, a Summit Audio Stereo Program EQ, Lexicon LXP-5 and LXP-1's, Eventide H3000E, and DigiTech DSP 128+. The aforementioned DA-88's and ART mic pres fit into four road cases, which can be taken off the truck, if necessary.

"Like when we go into Tramps in New York City," Lettie elaborates. "They have problems where we can't park in the street outside the club without a lot of hassles. So we bring our racks of preamps and decks, our Mackie 32•4 board, headphones, and a portable DAT into the venue. We go into the mic pres and straight to tape. Then we take the tape returns out of the board and do a live 2-track mix as well."

But wherever possible, Lettie and Papitto prefer to work inside their truck, where they can mix on their Klipsch nearfields (driven by Hafler amps) in a monitoring environment that's far quieter and acoustically advantageous than a noisy rock 'n' roll club. Being inside the truck also gives them ready access to their compressors and other outboard gear. So they go to great lengths to secure good parking — much as anyone who brings a vehicle into Manhattan does, only more so. Lettie says it is standard procedure to scope out the parking situation at the venue days in advance and then to arrive early on the day of the show in order to bag that coveted parking spot.

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Once the engine is cut and the parking brake engaged, the next order of business, says Lettie, is power. Powering a mobile project studio like Audio Alchemists is a trickier proposition than



powering a home project studio. When you pull up to a club, you never know what you're going to find for a power source.

"Most venues have a separate power box for lighting and stuff," says Lettie. "Some of the clubs, like the 9:30 Club in Washington D.C., have separate power boxes for sound, for lights, and for a remote truck. The industry standard connector for power boxes like these is the camlok. In the back of our truck, we have a breaker box that lets us tie into a number of different situations. Our truck is based on what's called a mini-camlok connector, which is like a smaller version



of a camlok. So we had some adapters made to go from mini to regular. And if, at the venue, they just point to a box and say, 'There's a 60-amp breaker for you; go nuts,' we have adapters with camlok connectors on one end and bare wire on the other. We pull the panel off the box, insert the bare wires, and tie in that way.

"If necessary, as a worst case scenario, our truck will run on two ordinary wall sockets. We did it that way for our first few shows at [venerable Manhattan nightclub] Irving Plaza, where they had big light shows and didn't have spare power distribution. We literally ended up running two extension cords out the window and to the truck."

Along with power, Audio Alchemists need to run just a single audio snake from their truck to the venue. They used to have to run a separate video line for the closed-circuit TV camera they position near the stage for visual contact between the venue and the truck, but they've since added that video line to their audio snake. Minimal clutter counts big in a club setting, according to Lettie, who cites the Big Head Todd/Matchbox 20 session at Le Bar Bat as a prime example: "The bands were playing at a high-profile radio industry party in a high-profile venue. All the production had to be low-key and behind the scenes." Even with their minimal setup, Lettie and Papitto were asked by the apprehensive club manager to move their lines three different times, only to have them end up where they'd positioned them in the first place.

The duo are just as flexible in their approach to splitting off the audio signals from the stage so they can be routed to the Audio Alchemists recording rig. "On the bigger shows we do, like this Le Bar Bat show, they usually bring in a big sound company. And the sound company brings their own splitter, because they're running a full front-of-house board plus a full monitor board. And most of the time, when they spend the money to build a splitter, they'll build in a third split for a recording truck or second monitor output. So a lot of times we'll take that split, as long as it's clean. If there's a problem with the sound company's splitter, or the house splitter, we'll use our own.

In routing the signals to their ART tube mic pres, the duo fine-tune levels to make optimal use of the tubes. "There's an input and output [level control] on each mic pre," Lettie explains. "What's going in determines

continued on page 168

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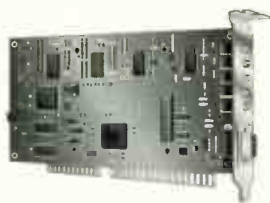
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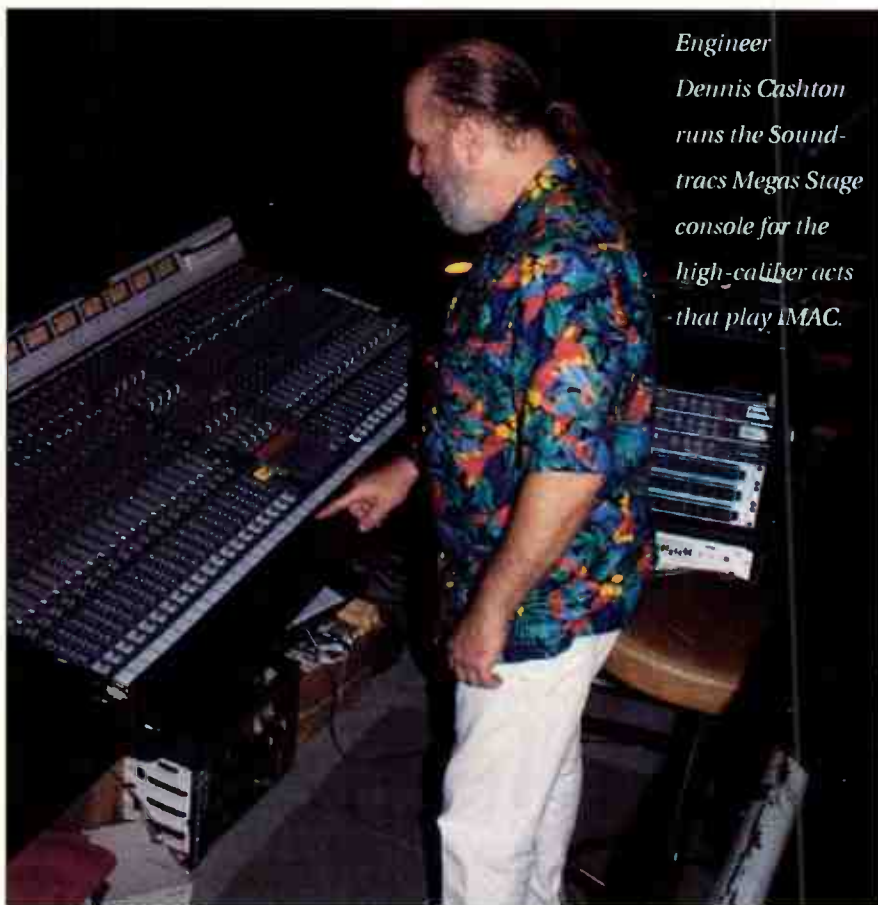
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**By Steve
La Cerra**

Located in Huntington, NY, the Inter-Media Arts Center (IMAC) theater may well be one of the tri-state area's best-kept musical secrets. After all, where else could you go to see performances by well-established artists such as Chick Corea, Steve Morse, Bruce Cockburn, Spyrogyra, and Keiko Matsui in such an intimate, comfortable setting? Not "just" a theater, IMAC is also home to a full-blown television production studio (with audio and video ties from the stage) and even supports local artists such as Jeff Pullen and Frank Latorre with gallery-style displays.

IMAC executive director Michael Rothbard explains the interesting lineage of the venue: "This room was originally a 1700-seat vaudeville theater until the 1930s when talkies were developed. At that time it became a movie theater and remained so until it went into foreclosure in the mid-1970s. In the late 1970s, the building was purchased by someone that wanted to turn it into retail space. He had the orchestra gutted and filled in with concrete, but the retail idea never hap-



*Engineer
Dennis Cashton
runs the Sound-
tracs Megas Stage
console for the
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that play IMAC.*

pened. Then the Orlando Dance Company moved in, built a floating, flexible steel base above the concrete, and laid in a dance floor built upon neoprene and wood lattice — actually one of the best dance floors in the country. They never actually held any performances here, and, eventually, the theater went out of business."

In the winter of 1983, IMAC moved in, and within three months, turned the theater into a functioning performing arts center. With the stage now located on top of what used to be the orchestra, the first row of the balcony became the first row from the stage (which explains why one must enter the theater from the second floor).

House mix position is situated in the center of the room, six rows up, giving the engineer an excellent vantage point to mix from. IMAC's house engineers in-

clude Dennis Cashton, Peter Romandetti, and Rick Krahn, all of whom — Rothbard notes — "are terrific engineers and can either mix a show or act as an assistant to an artist's engineer. There's tremendous pressure for us to meet artists' requirements and provide 'state-of-the-art' sound. Given a reasonable stage volume, we can accomplish that."

Operating as a not-for-profit organization placed IMAC in a financially touchy position when it came to selecting gear for the house PA. Rothbard explains that several audio companies have gone beyond the call of duty to help out. "We've always had a good relationship with beyerdynamic, and they even helped us in finding a console. Through a series of phone calls from beyer US to beyer Germany, to Soundtracs in the UK, we were able to get our console: a 40-input Soundtracs Megas



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Stage." In addition to the Megas Stage (which has eight audio groups and six mute groups), front-of-house gear includes an Alesis Quadraverb, Lexicon LXP-1, LXP-5, and MRC, three Symetrix 522 compressor/expanders, two Behringer Quad Gates and a Composer, Nakamichi cassette deck, and Klark-Teknik 31-band, 1/3-octave graphic equalizers. IMAC also receives equipment support from JBL, Azden, Pearl Drums, D'Addario Strings, and Baldwin Pianos.

House mains are JBL SR4732's (two 15's, a midrange horn, and a biradial tweeter) and SR4718's (one 18-inch subwoofer) arrayed two per side. These cabinets are sitting on the stage floor, approximately five feet from the front edge of the stage. The SR4732's are stacked atop the SR4718's and tilted backwards slightly to provide coverage for the upper rows. According to Cash-ton, the stereo system is "tramped using JBL 6290's for the lows and low-mids and Carver PM 1.5's for the high end. We're using JBL 5235's for the active part of the crossover, and then the SR4732's have a passive crossover in the cabinet for the highs." A snake with a

built-in, four-way split provides 32 channels from the stage to the house and monitor-land desks, as well as an auxiliary direct out and a transformer-isolated split. Arlo Guthrie recently used this split to record his IMAC performance onto ADAT.

Monitors are mixed from a Soundcraft Delta 24x10, but Cash-ton maintains that they "don't always run monitors from the monitor console, especially if it's a one-engineer show. Since the Soundtracs house console has six aux sends, we can run up to four monitor mixes from house and still have two sends for effects." In such cases, the monitor EQ rack — containing Rane and XTA 1/3-octave graphics — can be brought out to FOH for single-engineer control of both systems.

IMAC is currently equipped to run anywhere from one to eight monitor mixes, with a speaker/power amp upgrade forthcoming. By the time you read this, the monitor rig will have been modified to a biamped system with JBL MPA750's for the low frequencies, 6290's for the high frequencies, and ASC 24's for active crossover. Cabinets will be JBL Array Series, with eight 4891's and two

4890's (both utilizing a 14-inch woofer and a 1.5-inch-exit compression horn).

Engineer Peter Romandetti offers some advice for mixing in the IMAC theater: "You do hear a lot of direct sound from the stage, but with a reasonable stage volume, it's a great position to mix from. Bass can be a bit hot behind the console, so you do have to walk the room to check it out. There's not much of a change in tone when the room fills up, due to the fact that the floor is carpeted and the seats are covered with velvet. It's important to keep the band downstage for two reasons, one being lighting coverage. If an artist comes too far forward, they'll be in the dark. The other reason is that occasionally the band might hear a bit of a slap echo coming off of the side walls."

Perhaps Mike Rothbard best summarizes the IMAC philosophy: "Artists and their managers have commented to us that they like the quality of sound here. Recently when Spyrogyra came in, most of the band was using personal monitors, which kept the stage level down. As a result, the house mix was excellent. When we can deliver a show like that, it's very exciting and leaves people uplifted. That's our job." **EQ**



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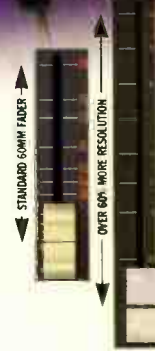
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World Radio History

MACKIE M•1400 POWER AMPLIFIER

BY WADE MCGREGOR

The Mackie M•1400 power amplifier follows closely on the heels of its first FR Series sound-reinforcement power amp, the M•1200, released last year. The difference in the capabilities between the two models is subtle and might most easily be described as an update to the original design to allow the unit to better drive low im-

pedance loads. The features and format of the FR Series amplifiers are clearly focused on sound-reinforcement applications, where output power, connectors, and agile load handling are important.

pedance loads. The features and format of the FR Series amplifiers are clearly focused on sound-reinforcement applications, where output power, connectors, and agile load handling are important.

The M•1400 is good sounding, well-constructed, and cleanly finished. The relatively conventional design offers an amplifier that can power many common sound-reinforcement systems (630 W/ch. into a 2-ohm load — a mere 63 cents per watt) while occupying only two rack spaces. The amp design features Mackie's "Fast Recovery" circuit that offers some benefits to users who drive their amplifiers routinely into clipping. The large toroidal power transformer is mounted on the right side near the front panel to keep the weight near the front rack rail. The front handles and rear support bracket make the unit easy to manage before it is installed in the rack and secure for travel thereafter.

The M•1400 offers a fraction of a dB more output power (see specs sidebar) than the M•1200. The M•1400 includes features specific to

driving multiple drivers in parallel (loads down to two ohms in stereo or 2-channel mono modes) and larger voltage swings (bridged-mono mode) for high-excursion drivers. Primary to this is the larger cooling fan that should protect the amp even in very high ambient temperatures.

The rear-input panel has a number of controls that permit users to configure the amp for their applica-

few users, many crossovers and loudspeaker processors already include this type of filter. Therefore, the unwary user risks the potential destruction of his or her high-frequency drivers in an attempt to get even more sparkle to the back of the room. This can occur if the user cascades this filter with other similar types of filters elsewhere in the signal chain. The same result can

tion. In addition to the usual stereo, mono, and bridged-mono modes, there are three filters and a protection limiter. A very useful high-pass filter (see fig. 1) provides variable filtering of low frequencies from 10 Hz (off) to 175 Hz. This is a great way to prevent over-excitation and other nasty low-frequency artifacts in loudspeakers and can be trimmed to suit your devices. A switchable high-frequency boost (see fig. 2), referred to as "Air" EQ by Mackie, compensates for the natural roll-off of constant-directivity (CD) horns.

I have both technical and philosophical objections to the implementation of the "Air" EQ feature. Although this may be useful to a

occur with excessive use of high-frequency boost at the mixing console or system equalizer, although those signals would be caught by a system protection limiter or an active crossover's limiter.

Mackie provides this feature for



ROAD TEST

MANUFACTURER: Mackie Designs, Inc., 16220 Wood-Red Rd., Woodinville, WA 98072. Tel. 800-898-3211. Web: <http://www.mackie.com>

APPLICATIONS: Sound-reinforcement power amplifier for touring and installed sound systems.

SUMMARY: A feature-packed amplifier that can drive subs or full-range systems right out of the box.

STRENGTHS: Switchable configurations for driver protection and a simple subwoofer crossover; chatty manual packed with sound-reinforcement hints; lots of flashing LEDs.

WEAKNESSES: Protection modes are too audible in some circumstances; noisy cooling fan; chatty manual includes some arguable technical information.

PRICE: \$799.

EQ FREE LIT. #: 134

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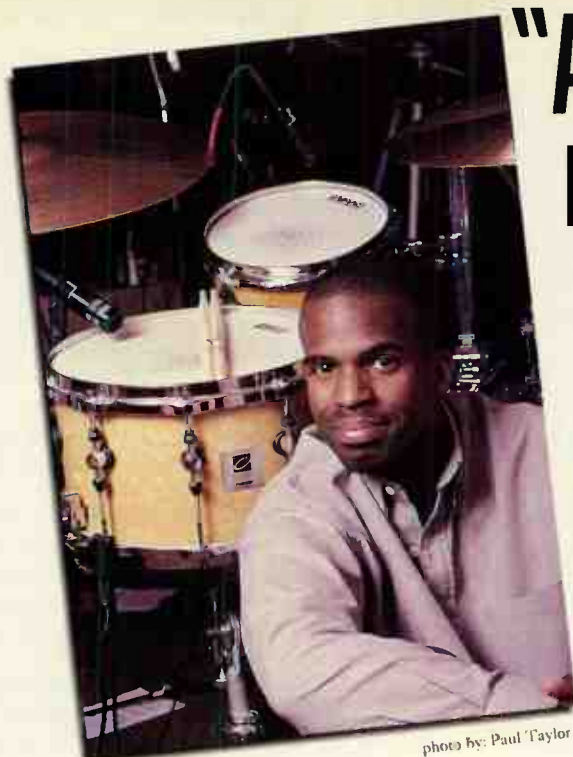
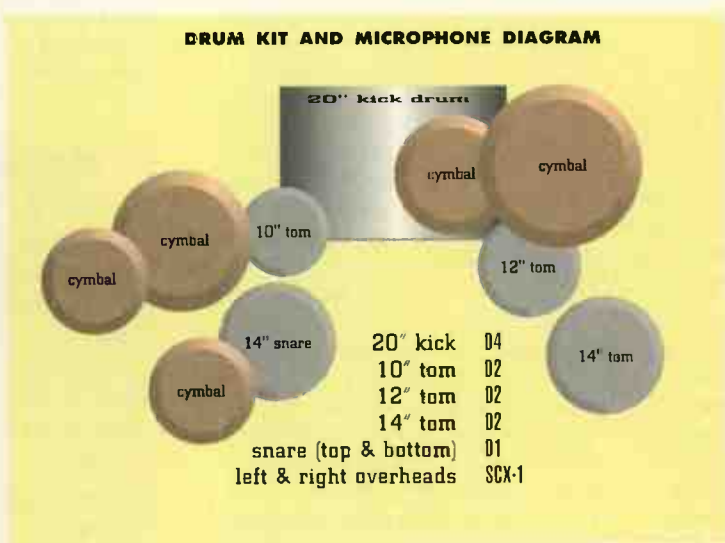


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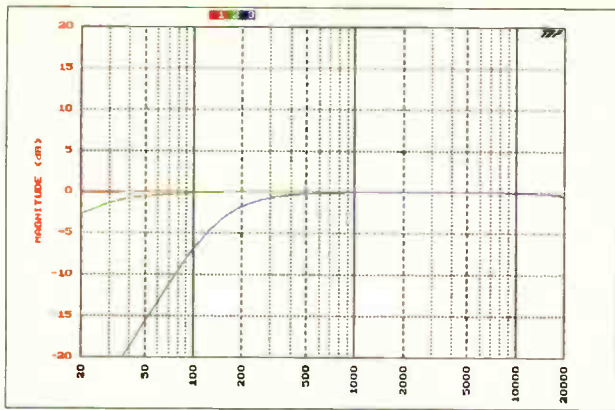


FIGURE 1: The Mackie M•1400 features variable frequency high-pass filters, shown here set to Off (10 Hz) in red, 35 Hz in green and 170 Hz in blue.

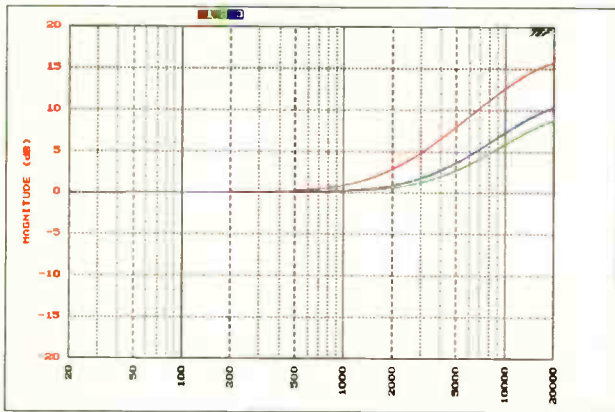


FIGURE 2: The Constant Directivity Horn EQ on the M•1400 is also variable. Shown here at the lowest setting of 2 kHz (red), the middle of range at 4.5 kHz (blue) and the highest setting of 5.6 kHz (green).

those who do not have a crossover that readily offers this feature, but beware: the air absorption in the venue will remove very high-frequencies at the mix position (80 feet away from the loudspeakers) that may be curling fans' wigs in the front rows. A protection limiter is also provided to reduce the effects of overdriving the amp; however, it did not prevent the audio from being noticeably degraded when the amp was overdriven.

Another unusual feature of the M•1400 is the subwoofer mode, which switches the amp into parallel mono mode (summing the two input channels) and adds a 3rd-order Bessel filter that can be set for 63 or 125 Hz (see fig. 3). There is no indication on the amp that the two input channels are summed, although it is clearly described in the manual. This does, however, allow the user to simply plug a stereo feed into the amp and drive the (typically more efficient — mono) subwoofers at the maximum voltage capability of the

(from the Prosonus Studio Reference disc, available from Syn-Aud-Con at 800-796-2831) to create a smooth transition between the subwoofer and full-range system. Ensure that you are listening/measuring in the direct sound field of the system and not in the reverberant field (where the reverberation is louder than the direct sound) and listen in as many different seating locations as possible before finalizing the settings. After all, it is the acoustical performance of the loudspeakers that is important and not simply the output voltage from the power amp.

The M•1400's front panel is decked out in lots of colored LEDs, including, a four-segment level indicator, signal-presence indicators, overload indicators, protection-mode indicators, shorted-output indicators, temperature indicators, and a bright green power indicator. All of these, except for the temp LEDs, are duplicated for each channel. The temp

amp. Many people prefer to let the full-range loudspeakers run without high-pass filtering and simply add in the subwoofer to get the additional thump required. In these applications, the M•1400 has made the task much easier.

For those who want to optimize their system capabilities, the full-range loudspeakers can use a second M•1400 with the high-pass filters set to achieve the desired rolloff. Although Mackie suggests the use of an oscillator and voltmeter, I prefer to match the acoustic response with a measurement system [such as the Crown TEF or JBL-Smaart (re-viewed in *EQ*'s 12/96 issue)] or by listening to stepped low-frequency tones

LEDs are quirkily marked Cold and Hot, with Cold being "normal" and Hot indicating trouble. In testing the amp for protection behavior, I found that a short-circuit on the output illuminated the protection indicator with only brief flashes of the short indicator. This would have been somewhat misleading to troubleshoot for a bad cable or voice coil. However, the extremely distorted output would be my first clue. The overload indicator did not provide much warning before you and your audience noticed that you had crossed the line into high-fidelity. Even with the limiter engaged, percussive instruments (such as a piano) were audibly torn up by the clipping artifacts of the amp.

The input connectors on the unit are actively balanced XLR and 1/4-inch phone jack connectors. An additional XLR connector is provided as a pass-through to allow amps to be run in parallel without Y-cables. The output connectors are both Neutrik Speakon and dual-binding posts. Loudspeakers driven from the amp in bridged-mono mode must be connected to the binding posts (the usual trick of using both hot connectors) and not to the Speakons.

MANUFACTURER'S SPECIFICATIONS

Maximum Power at 1% Total Harmonic Distortion:

Bridged-mono mode

960 W at 8 ohms

1400 W at 4 ohms

Stereo-mode with both channels driven

700 W/ch. at 2 ohms

480 W/ch. at 4 ohms

Continuous Average Output Power:

Bridged-mono mode

850 W < 0.025% THD at 8 ohms

1260 W < 0.050% THD at 4 ohms

Stereo-mode with both channels driven

30 W/ch. < 0.050% THD at 2 ohms

425 W/ch. < 0.025% THD at 4 ohms

Power Bandwidth: 20 Hz–70 kHz (+0, –3 dB)

Noise: 107 dB below rated output at 4 ohms

Damping Factor: >350 up to 400 Hz

Size: 3.5" (H) X 19" (W) X 16.25" (D) or 89 mm (H) X 483 mm (W) X 413 mm (D)

Weight: 36 lb. (16.3 kg.)



In typical Mackie fashion, the owner's manual is detailed and helpful, offering a wealth of tips on using the amp, as well as general information on sound-reinforcement system configuration. There are, though, a number of technical points — from the attachment of cable shields to the optimization of gain structure — where I disagree with advice offered in the manual. For example, the input level of an amplifier should be adjusted to allow the best use of the dynamic range of the preceding equipment. This usually requires that the amp reach full power at 6 dB to 10 dB below the clipping level of the previous device (often +14 to +20 dBv). The manual suggests that the amp should reach full power at +4 dBv to prevent loss of headroom. What good, though, is that headroom if the power amplifier is clipping all signals above nominal operating level and thereby degrading the system dynamic range by 6 dB (if you are using really inexpensive processing gear) or 20 dB (if you're using the best processing gear)? A compromise between system dynamic range and the dynamic headroom of the

amp should be made to suit the equipment and application. Users should be especially sensitive to the nature of their mixer's metering, because true peak meters will allow you to manage the system headroom much more effectively, and are rarely just peaking at 0 dB (+4 dBv).

The noise of the internal cooling fan will preclude the use of the M•1400 in most recording studio applications and may be a noise consideration in some live sound applications if your racks are within ear-shot of the audience. (Mackie notes that the fan is different in later production models and is designed for worst-case cooling requirements.) The range of input filtering available offer significant cost-savings for those with simple applications and

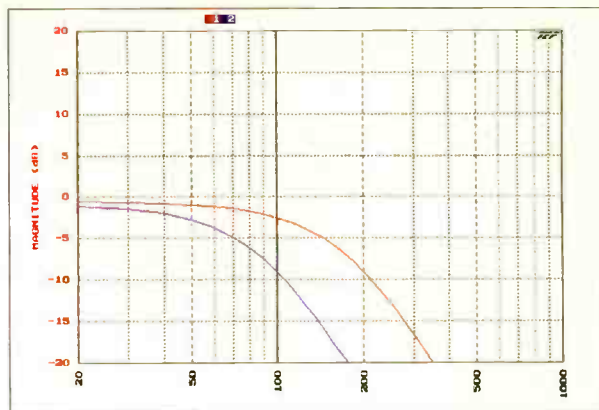


FIGURE 3: The subwoofer mode provides a 3rd-order Bessel low-pass filter for the addition of subwoofers to simple loudspeaker systems without the need for an additional crossover. The two subwoofer crossover settings are 63 Hz (blue) and 125 Hz (red).

a limited budget. Mackie has aimed this amp towards the cost-conscious sector of the sound-reinforcement industry and provided a unit with the output capability and features that suit the small-scale rental company, house of worship, or weekend warrior.

Wade McGregor is a sound system design consultant based in Vancouver, BC.

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SABINE FBX-2020 FEEDBACK EXTERMINATOR

BY WADE MCGREGOR

Feedback may be the sound most closely associated with the sound-reinforcement industry. For example, if a film or television program wishes to indicate that a character is using a PA system, there will always be a howl of feedback before the first

tem equalization. A sound system designer/user must consider each of these areas in turn, and in that order.

Once you've selected the most appropriate microphones and loudspeakers available to you and placed them in the best possible location (for instance, loudspeakers closer to the audience than to the microphones),

equalization should not be lumped into the system equalization. The feedback equalization should be focused, wherever possible, on just the microphones that are in danger of feeding back (such as the lead vocals) and not on the entire sound system. The feedback equalization should not be done with a 1/3-



word. This painful image of sound-reinforcement systems has been hard to overcome. There are three primary areas to check when you want to ensure that a system will not cause feedback: [1] selection of transducers (microphones and loudspeakers); [2] implementation of transducers (where the microphones and loudspeakers are placed in relation to each other and between like devices); and [3] the sys-

it's time to consider the equalization. First, try to get the sound system response as linear as possible, because bumps in the frequency response of the microphones and loudspeakers are the areas most prone to feedback. This is accomplished with the system equalizer, commonly a 1/3-octave 30-band unit, but it may also be done more precisely with a parametric EQ and a high-resolution time-domain

analyzer (such as the Crown TEF 20, DRA labs MLSSA, JBL-Smaart, or Meyer SIM System II). Unfortunately, even a very carefully tweaked system can still feedback due to sound reflections from nearby surfaces, monitor wedges, or unrealistic expectations (sorry, but a wireless lapel microphone can *not* provide as much gain as a vocal microphone touching the lips of the performer...).

Feedback
Feedback

octave wide filter, as this will make too large a hole in the overall frequency response, and feedback is usually a narrow-band phenomena. This has been the basis of the development of the Sabine FBX Feedback Exterminator products. The same level of filtering can be accomplished by a good quality parametric/notch EQ, but you may find the parametric has too many controls to adjust when trying to stop feedback during a show.

Sabine's FBX units can find the frequency of the feedback ring in very short order and tune the narrow-band notch filter to reduce the feedback without any tweaking by the system operator. The latest in this successful series is the two-channel FBX-2020 and single-channel FBX-1020.

I tested the FBX-2020 in a number of situations — with hypercardioid vocal microphones and omnidirectional lapel microphones, in addition to omni and cardioid instrument microphones. Automatic filter setting was quick and accurate, reducing the length of the ringing to less than a second. [The FBX-2020 cannot detect the early onset of feedback (audible as a lengthening of the reverberation time or hollow quality at the feedback frequency) that an experienced sound

ROAD TEST

MANUFACTURER: Sabine, 13301 Highway 441, Alachua, FL 32615-8544. Tel: 904-418-2000. Web: www.sabineinc.com.

APPLICATIONS: Sound reinforcement

SUMMARY: Finds the frequency of the feedback ring in very short order and tunes the narrow-band notch filter to reduce the feedback without any tweaking by the system operator.

STRENGTHS: Easy to use; ten filters per channel; 20-bit D/A and A/D converters.

WEAKNESSES: Cannot detect the early onset of feedback.

PRICE: \$1199.95 **EQ FREE LIT. #: 135**



tech would catch before the audience ever notices.] The unit will, however, certainly catch those unexpected screeches that can occur when something radically changes (e.g., a microphone pointed into a stage monitor), and then nail the howl with a notch filter faster than any operator could.

The ten filters in each channel of the FBX-2020 allow a problematic system to be set-up with six or seven filters locked on the most prominent feedback frequencies and yet still have enough filters available to catch the unexpected howls that result from unforeseen combinations of microphones or changes in a microphone's location. The dynamic filter mode allows the filter to be set and reset as new feedback rings are encountered. The filters may also change depth if ringing reoccurs at the same frequency. The user can set the number of fixed filters from the front-panel controls.

I often specify a feedback eliminator in installed sound systems and have had long discussions with people who find the (supposed) invasiveness of automatic filtering objectionable. Their concerns are valid. There are some situations where musical instruments, such as flutes, flute stops on pipe organs or synths, guitar notes (the undistorted ones), intentional guitar feedback, and so on can cause the FBX-2020 to falsely trigger a notch filter. However, this unit has the best feedback sensing algorithm of any Sabine product I have tested and is

less prone to false triggering than its predecessors.

If the primary feedback microphones are fixed in location (such as a gooseneck microphone on a lectern) or have common feedback modes (such as a lapel microphone regularly worn by the same person), then the filters of the FBX-2020 can be set-up prior to an event and then locked. The locking feature of the unit allows the feedback filtering to take advantage of the very narrow selectable 1/5-octave or 1/10-octave wide filters in the unit. After all, the unit is less expensive than any 20-band parametric EQ, and has the added advantage of being quicker to set-up.

The filter locking function is engaged on the front panel and, if no further dynamic filters are desired, then the total number of filters can be reduced to match the number of fixed filters. All the set-up controls are on the front panel; the pushbuttons must be held for four seconds (while the filter LEDs flash) to prevent accidental adjustment. A brief press of the Set Total Number and Set Fixed buttons will display the number of filters set for each on the front-panel filter LEDs. The Bypass, Lock Fixed, and Fifth Octave pushbuttons include small LED indicators to show when these switches have been engaged.

The Fifth Octave switch (on each channel) alternates the channel filters between 1/5th-octave wide and

continued on page 152

MANUFACTURER'S SPECIFICATIONS

Filters Per Channel: 10

Filter Range: 35 Hz to 20 kHz (adjusted automatically)

Filter Width: Constant "Q" and switchable between 1/10 or 1/5 octave (above 200 Hz)

Adjustment Resolution: 1 Hz from 35 Hz to 20 kHz

Feedback Response Time: 0.4 seconds, typical @ 1 kHz

Maximum Input and Output Signal Levels: +27 dBV peak (balanced), +21 dBV peak (unbalanced)

Bypass: True power off bypass

Headroom: +23 dB peak @ 4 dBV nominal input (balanced)

Input: 10 kohms impedance on XLR-3 and 1/4-inch TRS connectors (balanced)

Output: 10 kohms impedance on XLR-3 and 1/4-inch TRS connectors (balanced)

Frequency Response Variation: <.25 dB, 20 Hz to 20 kHz with filters set to flat

Signal-To-Noise Ratio: 100 dB, typical, "A" weighted

THD: <0.02% @ 23 dBV sine wave at 1 kHz

Dynamic Range: 110 dB with automatic clip level active

Dimensions: 19 x 1.75 x 8.5 ins. nominal (rack mountable); 48.3 x 4.5 x 21.6 cm. nominal (rack mountable)

Weight: 8.0 lb. (3.6 kg.) nominal

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CIRCLE 16 ON FREE INFO CARD

JBL LSR 32 Monitor Speaker

JBL is back in studio monitoring — right where they belong

BY BOBBY OWSINSKI

Although JBL has long been a significant developer of popular studio monitors, the last decade or so has found the offerings of the company slowing, drifting out of favor, and supplanted by competitors. Now, with the introduction of the new LSR 32 studio monitors, a new dawn is at hand for the company that bears founder James B. Lansing's initials.

The LSR 32 is a 3-way, midfield monitor featuring a 12-inch woofer (based on JBL's patented Dual Coil Driver technology), a 5-inch woven Kevlar® cone midrange driver, and a 1-inch composite, high-frequency diaphragm integrated with an "Elliptical Oblate Spheroidal" waveguide. These three drivers are newly designed from the ground up specifically for this new product line. Both the high and mid drivers are mounted on a cast aluminum sub-baffle that can be rotated for either horizontal or vertical placement. The whole front baffle is made of a carbon fiber composite to reduce resonances

and box losses, and which gives the speaker a slightly futuristic look.

The drivers are crossed over at 250 Hz and 2.2 kHz, with a single, rear-panel, high-frequency adjustment (a simple link on a barrier strip) for either nearfield or midfield operation. JBL claims the frequency response is accurate to ± 1.5 dB on-axis from 38 Hz-20 kHz, which is outstanding. Power handling is substantial, ranging from 250 to 1000 watts, and efficiency is high: 93 dB @ 1W @ 1 meter.

The mirror-imaged 24 3/4" x 15 1/2" x 11 1/2" cabinets are solidly made of a high-density wood fiber and contain an unusual-looking elliptical port that has flared inner and outer sections to, says JBL, eliminate air noise and improve low-frequency response. Indeed, the LSR 32's, which retail for \$2000 a pair, are built to last and will take a beating and come back for more.

The snappy design- and tech-speak is all well and good, but what really counts



THE HISTORY OF JBL STUDIO MONITORS BY DECADES

1920s: Lansing Manufacturing develops small transducers for radios. Movie studio MGM selects Lansing drivers for use on all movies.

1930s: The Lansing Iconic, manufactured for projection rooms, becomes the first studio monitor.

1940s: James B. Lansing sells Lansing Manufacturing to Western Electric, takes a 5-year contract with Altec and forms the Altec-Lansing Company. Develops the famous — and still used — 604 coaxial. When the contract with Altec terminates (1946), Lansing starts JBL and designs the D130, the first efficient 15-inch speaker that's still coveted today.

1950s: JBL develops famous acoustic lenses to increase high-frequency dispersion. First hi-fi systems (Hartsfields and Paragons) developed.

1960s: In conjunction with Capitol records, 4320's and classic 4310 bookshelf speakers become the first studio monitors as we know them today.

1970s: 4311 (a revision of the 4310) becomes the most popular monitor in the world. Huge 4-way 4350 developed specifically for loud music.

1980s: New technology (diamond surround, constant directivity bi-radial horns) and materials (Titanium) employed to extend frequency response and reduce distortion. The 4430 and 4435 become popular.

1990s: Transducer technology, such as the use of Neodymium, dual-coil drives and digital processing for EQ and filtering, changes the rules of driver manufacturing. LSR establishes new direction for JBL.

is the way the LSR 32's sound. This can be best summed up by a comment my partner made the first day I put up the LSR 32's. After listening for about 15 minutes, intent on the music and not even noticing the new additions, he exclaimed, "Why does it sound so much better today?"

Well, because the LSR 32's are just about the perfect project studio monitors. You get real low end, but the cabinets aren't too large. They positively roar with clean efficient level when cranked, and yet sound great when played softly. This last point I find especially significant. During the three weeks I spent auditioning these monitors I found myself listening at lower levels than usual because they sounded so good quiet. Usually, just about any monitor requires a minimum level to "light them up" to where all the frequencies are equally represented (especially in the bass area), but the LSR 32's consistently sounded great at extremely soft levels (quiet conversation) and the sound stayed consistent as the level was increased. When you do crank them, they just sound bigger, not louder — a trait they happily share with the large, soffit-mounted systems that I find in most of the major studios that I use. No groaning distortion or bottoming out; just clean big, accurate sound.

I used these speakers while recording and mixing a song for the *Mortal Kombat* movie sequel. The song was a hard-edged techno track, which, generally, is some of the hardest source material on audio equipment since most of the rules for good reproduction are thrown away. In this case there was a mixture of subbass, screaming treble, distorted vocals, and samples and synths galore.

I later also mixed some Gospel-flavored show tunes that contained piano, vocal, acoustic bass, and shaker tracks, and the results were never less than musical, pleasing, and accurate. When the time came to master, things were right on the money with .5 dB pushes at 30 Hz, 90 Hz, and 16 kHz, which is about what I expected.

The LSR 32's represent a significant effort by JBL to recapture the heart and ears of the professional studio market. Welcome back JBL. Where have you been for so long?

Price is \$995 per speaker. For more information, contact JBL Professional, 8500 Balboa Blvd., Northridge, CA 91329. Tel: 818-894-8850. Circle EQ free lit. #136.

MEASURE THE SAME, BUT SOUND REAL DIFFERENT?

The LSR 32's are based on a new technology called "Linear Spatial Response" (or LSR) — a combination of multi-axis measurement techniques and psychoacoustic principles that allows for calculation and optimization of the entire sound field heard by the listener, not just the on-axis response. This technology attempts to answer the question, "Why do monitors that measure the same sound so different?" LSR measures a monitor over a sphere that encompasses all energy radiated into the listening room at every direction so the designer can easily see what's happening to the sound off-axis. By employing LSR into the monitor design, JBL claims that the system can give improved performance in a wider variety of acoustic spaces while providing a more stable stereo image and less off-axis coloration. —Bobby Owsinski

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CIRCLE 26 ON FREE INFO CARD

Lawson L-47MP *Gold Microphone*

It may not be an Olympic year, but you can still go for the Gold

BY STEVE LA CERRA

Produced by a relative newcomer to the pro audio market, the Lawson L-47MP Gold microphone is not your average bear. Housed in a 24-karat-gold, machined-brass body, the L-47MP's 1-inch capsule is a reproduction of the famous M7 capsule used in the Neumann U47 and M49 microphones. Designer Gene Lawson uses a 3-micron diaphragm instead of the M7's original 7-micron diaphragm to improve resolution of transients and to extend the high-frequency response.

Pattern selection for the L-47MP is made from the outboard power unit. Lawson provides this unit, AC cable, 6-pin Mogami mic cable, and mic holder in a Pelican® case — which feels like it can easily protect the mic from just about any kind of impact. Workmanship of the mic and power unit is absolutely first-rate: premium components include MIT Multicaps and Jensen transformers, controls are high quality, and you'll even find Gene Lawson's signature inside the capsule. Obviously, Lawson takes huge pride in its product.

Our first session using the L-47MP was with a Roy Orbison-style crooner, and it didn't take long to fall in love with the mic. Set to cardioid, the top end was open, effortless, and dynamics were unconstrained. The lowest octave occasionally got a bit "floppy" from breath pops, so we added a windscreen and backed the pattern control toward 11 o'clock (slightly wider cardioid) to tame the proximity effect. In spite of the fact that the mic does not use an external shock mount, the L-47MP's capsule is internally shock-mounted and well-isolated from stand-transmitted vibration.

The L-47MP's response may be continuously varied by using the pattern control. We placed the power supply in the control room and varied it while the vocalist worked out. With the control at

about 10 o'clock, the mic seemed to be flattest; moved towards 12 o'clock (cardioid), the bottom-end and high-mids bumped up a bit. In general, varying the pattern control from 10 o'clock (wide cardioid) to 2 o'clock (super-cardioid) yielded an increase in presence. The power supply takes a few seconds to stabilize the new pattern, so the change is not instantaneously audible. A startling difference in timbre was noticeable when the pattern was moved to the 1 to 2 o'clock area: the mic was considerably brighter, as if someone had opened up an EQ control by a few dB in the 4- to 5-kHz region. Gene Lawson confirmed our findings: in the 4-6 kHz range, there's a 4-5 dB dip in omni, a 4-dB

rise in cardioid, and a 7-8 dB rise in figure eight. Depending on the pattern setting, the L-47MP's character could say "tube" or not say much at all. We found this "tune-ability" a valuable feature.



MANUFACTURER'S SPECIFICATIONS:

Frequency Range: 20 Hz to 20,000 Hz

Sensitivity @ 1 kHz: 11.7 millivolts@ 1 Pascal

Maximum SPL (1 kHz, 3% distortion): 127 dB

Tube: 6072 select

Rated Impedance: 150 ohms

We then tried the L-47MP for a series of finger-picked and strummed acoustic guitar overdubs. On the finger-picked Martin D-28 we got a nice balance of attack and resonance. Tone on this instrument was excellent, and a three o'clock pattern control setting seemed to be where "presence" was greatest. At figure-eight, we could add a bit of room tone — by using the pattern control and close miking the instrument, we could vary the amount of ambience.

After a while, it seems we tried miking everything on the L-47MP and there wasn't much we didn't like. For an electric guitar solo, we placed the L-47MP close-in on one of the 12-inch speakers and tuned the pattern to beef up the amp's timbre. Used as a drum overhead, we set the mic to cardioid and placed it 18 inches above the rack toms, pointing down toward the snare. The results were wonderful. Toms were full and round with a fast attack, cymbals were well-articulated, pattern control was good.

With the assistance of engineers Joe Conoscenti and Tony Ungaro of Tube Bar Studios (Brooklyn, NY), we A/B'd the L-47MP to a stock Neumann tube U47. As expected, the L-47MP is much more quiet (and more sensitive) than the 50-year old tube U47. Lawson's 3-micron diaphragm does audibly improve resolution of transients and extend the high-frequency response over the original M7 capsule. In cardioid, the U47 was more colored in the lower mids (some might say "fatter"), and the L-47MP was brighter. In omni, timbre of the two mics was much closer, but the U47 was still fatter in the lower-mids. On drums, we felt that the L-47MP had better stick definition. (Readers should consider the sonic inconsistencies of vintage mics, and factor that in with the above comments.)

The Lawson L-47MP is a heavy-weight contender in the ring of multi-pattern tube mics. It's well-designed, well-constructed, and sounds great. It ain't cheap, but considering what Lawson gives you, it's a bargain. Most definitely recommended.

Price is \$1995 (manufacturer-direct). For more information, contact Lawson, Inc., 2741 Larmon Drive, Nashville, TN 37204. Tel: 615-269-5542. Web: www.lawsonmicrophones.com. Circle EQ free lit. #137.

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CIRCLE 02 ON FREE INFO CARD

Drawmer MX30 Gated Comp/Limiter

Drawmer quality is now within the reach of the project studio owner

BY ZENON SCHOEPE

Anything Drawmer builds is worth investigating. So when they issue a truly affordable box (the LX20 expander-compressor notwithstanding...), EQ had to be all over it. The new MX30 gated compressor/limiter represents the beginnings of an all-new Drawmer approach to servicing the more cost-effective end of the market.



The price of the MX30 may be low, but the quality is still high. The LEDs are bright, the switches are long-throw and positive, and the tidy pot caps have the usual clear position-pointer built into their seats — and, of course, the pots line up perfectly with the legending throughout their full travel. The device is also very quiet.

Billed as a “dual-channel, stereo-linkable, gated compressor-limiter,” the MX30 does indeed perform all those functions. Interestingly, though, the device offers only five pots and one switch per channel with which to perform those functions. Gating is program adaptive (that is, its settings are adaptable to entire mixes as well as individual tracks), and on close-to-threshold signals it is expander-like (that is, the output signal’s dynamic range is *greater* than that of the input signal — or the opposite effect of a compressor) and low ratio in behavior. It is controlled by a single Threshold pot covering -70 to $+20$ dB. There are LED indicators for above and below threshold signal levels and the section is defeated by turning the pot fully clockwise. Fast and slow release times can be selected on a switch, again with an LED.

The compressor section combines ratio and soft-knee characteristics that

manifest themselves as a softish front-end becoming harder as more compression is added. To control this you get a Threshold pot variable from -40 to $+20$ dB and a Ratio pot that kicks in at 1.2:1 and then moves on to an unspecified hard limiting value very much greater than 20:1.

Limiting is handled by a single output Level setting pot that drives a circuit that resorts to additional gain reduction should the threshold value be exceeded for more than a few milliseconds. Limiter activity is signaled by a LED and is preceded by a gain make-up pot for the compressor section, offering ± 20 dB of attenuation.

You also get some typically good Drawmer LED metering of gain reduction and output level — the latter being switched to read a channel’s input level when its Bypass is selected. A stereo link switch throws total control of both channels over to channel 1 for stereo processing (the only exception to this is each channel’s individual Bypass). Back panel connectors are supplied on unbalanced jack and balanced XLRs for inputs and outputs. There is no sidechain access.


I was skeptical about the one-pot gate, so when I encountered some undulating program that was giving the fast release setting a bit of trouble, I

immediately presumed that I had hit on a fundamental limitation. Not so. Pressing in the Slow Release switch cured the problem.

It’s the compressor and limiter sections, however, that are likely to take most people’s fancy. This is because their versatility and results belie what some may consider a relatively limited degree of control. You’d expect a brand box like this to do the job, but you’d only hope that it also sounded good. The MX30 is as happy at gently smoothing out dialogue as it is beefing up

drums and whole mixes. The extreme settings are delightful, abusing the limiter on its own produces a fabulous “*phwaatt*” to the leading edge, which is very reminiscent of more expensive units in the company’s range. And the MX30 just will not overshoot.

Dual-channel operation for individual signals is flexible, but I particularly appreciated the complete handing over of control to one channel for stereo processing without having to muck around with such things as separate gain make-up pots.

This is an amazing box that represents an excellent value for the money. The Drawmer MX30 is a quality performer and highly recommended. 



LAB REPORT

MANUFACTURER: Drawmer, Charlotte Street Business Center, Wakefield, W. Yorkshire WF1 1UH. Distributed by Transamerica Audio Group, Inc., 2721 Calle Olivo, Thousand Oaks, CA 91360. Tel: 805-241-4443. E-mail: TransamAG@aol.com

APPLICATION: Project and commercial studios, post, broadcast and live sound.

SUMMARY: Dual-channel, gated compressor-limiter with stereo linking.

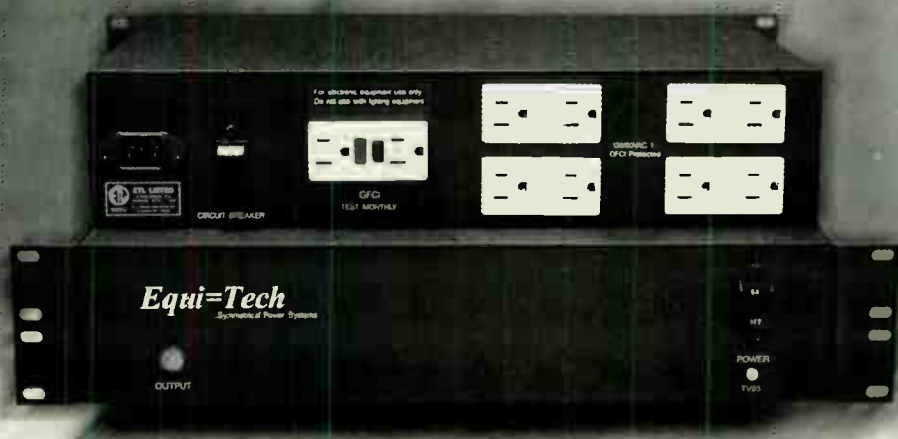
STRENGTHS: Dead easy to use; instant gratification; great Drawmer compression sound.

WEAKNESSES: Not totally foolproof, but for the money, what the hell.

PRICE: \$449

EQ FREE LIT. #: 138

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U.S Patent No. 5,640,314 (other patents pending)

Suggested List Price \$879

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CIRCLE 30 ON FREE INFO CARD
World Radio History

Soundscape AC-1 Accelerator

Soundscape "freshens up" its popular program with more processing power

BY EDDIE CILETTI

power was icing on the cake. Want more tracks? Just add another chassis. (The ISA card supports two units and the software supports multiple systems.)

One of the reasons I originally chose Soundscape was that it never crashed. I'd try to antagonize it by going online or opening Photoshop while playing a mix, but it always ran without a glitch. First time out of the box it only took six hours to complete a ma-

real-time tracks to 12 with equally real-time EQ, chorus, flanging, and delay. All of the tools stayed the same. The track record-enable and monitor-assignment tools have been greatly improved.

There are also (finally) real-time plug-ins including reverb and (under beta test) dynamics. Time and pitch manipulation plug-ins run on either version. Version 2 can restore backups from previous versions. In addition to



FIGURE 1: The Menu and Tool Bar

Three years ago, I reviewed the Soundscape SSHDR1 digital audio workstation in these pages. At the time, there were few affordable options for the Windows/Intel (Wintel) minority or personal computers in general. That was then: with sound cards and PCs multiplying like rabbits, the choices are now overwhelming.

Soundscape is not a sound card. It is an expandable workstation in 2U rack chassis. The case and the built-in power supplies increase the cost, but, since the SSHDR1 talks directly to its own (optionally removable) IDE drives, you don't have to worry about sharing disk space with the host computer. If your head isn't spinning yet, you should join the space program, or take a second look at Soundscape AC-1 Accelerator.

THE EGG

A year after that first review, I bought it. I preferred the dedicated external hardware — controlled by a computer — rather than a sound card competing for interrupts or physical space. (Soundscape's ISA interface card requires only a hex address. Even a friend who is computer illiterate did it.)

By doing all the dirty work, like talking directly to the drives, the original Soundscape happily ran on a 486 with 8 MB of RAM. Any additional

major editing project. (I'm much faster now!) The original hardware runs on Version 1.18 (the final rev) for which there is a very nice CD-writer plug-in that takes advantage of Soundscape's power and one's familiarity with same.

THE ROAD RUNNER (MEEP! MEEP!)

Soundscape's new hardware is the AC-1 accelerator which, along with Version 2.0 software, takes advantage of Windows 95. (Original users can upgrade existing units.) The accelerator is equipped with Motorola's 56301 processor, increasing the number of

the stereo inputs and 4-channel outputs of the original hardware (analog and digital), there is now a TASCAM-compliant TDIF port that speaks directly with a DA-38 or DA-88. There is an 8-channel analog I/O option that also converts TDIF to ADAT optical, plus an expansion port for future enhancements.

I DID IT MY WAY

Before acceleration, my two SSHDR1's were linked for 16 real-time tracks. Submixing multiple drum tracks to a stereo pair, for example, allowed me to mix a

EQ LAB REPORT

MANUFACTURER: Soundscape Digital Technology LTD, 4478 Market Street, Suite 704, Ventura, CA 93003. Tel: 805-658-7375.

APPLICATION: Accelerated digital audio workstation.

SUMMARY: A digital workstation with powerful yet easy-to-use software that doesn't crash.

STRENGTHS: Twelve channels in real time; TASCAM TDIF (8-channel digital) interface; time/pitch and new TC Electronic reverb plug-ins.

WEAKNESSES: Can improvements ever be fast enough?

PRICE: SSHDR1 Plus (V2 firmware, base unit and accelerator), \$4250; SSHDR1 (V1.18 firmware and base unit with removable drive option), \$3250; AC-1 (accelerator upgrade), \$1000.

EQ FREE LIT. #: 139

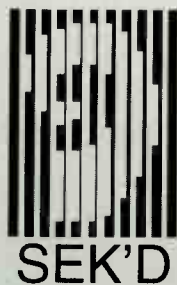
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CIRCLE 44 ON FREE INFO CARD

EQ IN REVIEW

24-track session. Two accelerated systems yield 24 tracks (from hard disk), so I won't be submixing nearly as much!

Fig. 1 shows the Menu and Tool Bar. There are no "nested" menus to get lost in and eight blank tool pages for you to customize. Tracks are graphically displayed in the Arrange Window (fig. 2). Mix and soundfile details are displayed as text in the Sound File Manager.

Soundscape won't have "moving fader" automation until Version 2.02, but nondestructive level changes have always been possible as demonstrated in fig. 2. In addition to a "linear" fade, there are seven additional "fade" curves.

CONTROLLING PERSONALITY

Unlike augmenting a 30- or 60-second MIDI spot with a few audio tracks, mixing 24+ (sometimes sloppy) band tracks requires the power of a dedicated processor. No sound card alone can do that unless directly connected to a hard disk, and even then the DSP and the Pentium processor will be constantly interrupting each other.

One of the beauties of a digital mixer — whether workstation virtual or hardware dedicated — is its ability to completely save a mix. It is no longer necessary to slave for hours. Now you can maximize mix time by putting in

fewer hours per session and by inserting a day or two between sessions. Fresh ears will always discover what numb ears completely miss.

OK, it is not likely that in the near future the "best" of the vintage analog signal processing gear will be "ported over" to the digital domain, but a great effect can always be captured and played back as a track.

I know what you're saying: "Gimme a board with faders and a patchbay!" Yes, using a mouse is a "drag" compared to an infinitely tactile recording console. (Because of the increased risk of repetitive stress, I take breaks even when using a Wacom pen and tablet.) Soundscape has always supported external hardware controllers such as those made by P&G and JL Cooper. I'm as anxious as anyone to test any new or improved controller, any time!

NEW MIXER

The most obvious change is Soundscape's mixer. Formerly a fixed, eight-input device, it is now "virtually" wide. Up to 12 tracks can be played back from the hard drive, plus there's live mixing of the external audio via the digital inputs (TDIF plus AES/S/PDIF). As an example, fig. 3 shows a mixer configured for two stereo and four mono inputs. Fader one

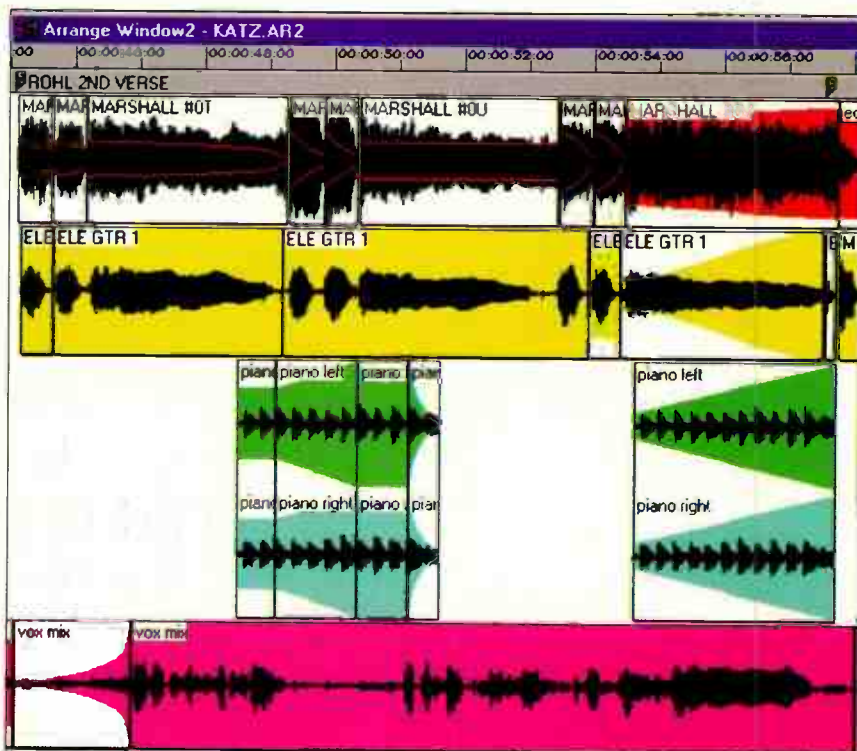


FIGURE 2: Soundscape's Arrange Window displaying track assignment and level automation.

(tracks 1 & 2 on the left) has four bands of EQ; Fader two (tracks 3 & 4) has two bands, while tracks 5 thru 8 have no EQ, but each has a chorus/flanger module. At the top of the Mix window is an indication that 78 percent of the processing power has been used. (Remember that effects and EQ can be committed to hard disk to free up processing power.)

IS SOUNDSCAPE FOR ME?

Soundscape will lock to picture via MIDI — I'm using the MIDI Timepiece AV by Mark of the Unicorn — or directly to a DA-88 or an ADAT BRC. Other options include running Soundscape over a network. I haven't tried this yet, but it is a major consideration for broadcast-oriented productions.

Like most workstations, Soundscape's full potential is realized by the creativity of its users. I'm not blind to the assortment of workstation alternatives, but I am committed to the Wintel platform. Soundscape is for people who want to reliably play back many tracks on a workstation with an easy-to-use interface.

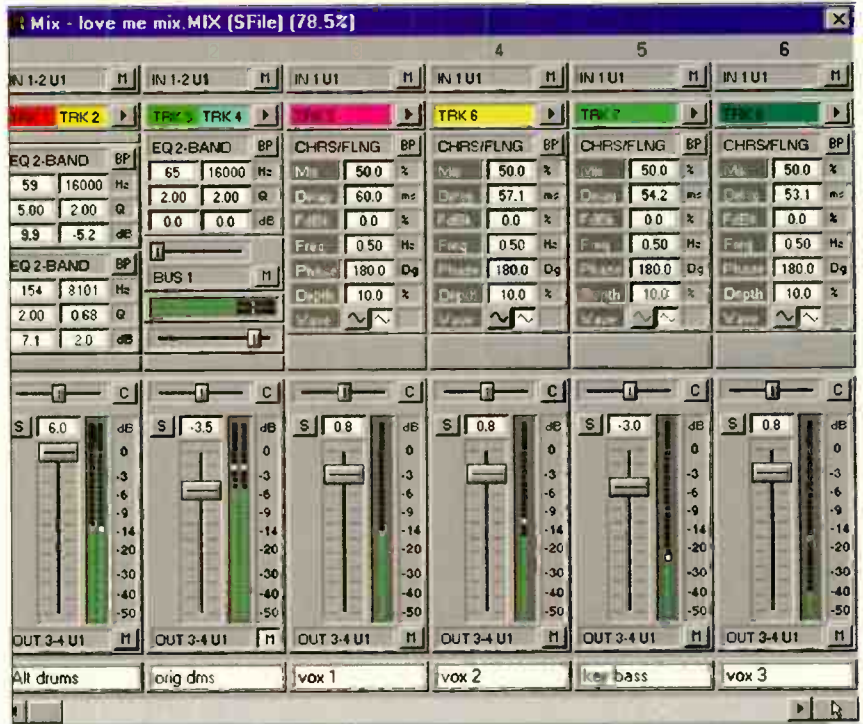


FIGURE 3: The new Soundscape mix can be completely customized.

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CIRCLE 237 ON FREE INFO CARD

CIRCLE 18 ON FREE INFO CARD

Steinberg/Propellerhead Software ReBirth



Head for the future with
a new way to get
sounds from the past

BY CRAIG ANDERTON

Although Roland's TR-808 drum machine and TB-303 groove-making bass line were relatively popular in their day, today's techno musicians have *really* bonded with these vintage boxes — not only turning them into a signature electronica sound, but also driving up the price of second-hand units to astronomical levels.

Now Steinberg/Propellerhead Software's ReBirth, a Mac OS/Windows-compatible software synthesizer, emulates the sound of two TB-303's and a TR-808 — and even has an interface that mimics the front panels. Real-time knobs and switches work like the original units, and the sound is just like "the real thing." What's more, you can *play* it like an instrument with the mouse, which is perhaps the most appealing part of all. (Perhaps a future update could allow MIDI control for selected

parameters, so you could use something like a Peavey PC-1600 to control multiple parameters in real time.)

The distribution CD-ROM (required to launch the program) contains Mac and Windows versions, along with Adobe Acrobat for reading the online manual

(printed documentation consists solely of a quickstart/installation-type guide). Online manuals are environmentally friendly and offer the convenience of hyperlinked text. And if you're into the habit of writing notes in your manuals, you can always print out the 210 pages.

In any event, the manual is well-written and clear. Installation was easy on both platforms tested (a Pentium 166 and Power Computing Mac OS system), and the performance was virtually identical.

LET'S GET REAL (TIME)

Like drum machines, ReBirth uses the pattern/song model. You create parts in Pattern mode and use a mouse to tweak the controls manually. Everything works in real time: change control settings, select patterns — even save to disk. The Song mode strings patterns together and records automation moves (like level or filter changes). However, you can no longer make manual adjustments in Song mode unless you're recording them.

Each bass line and drum machine module allows four banks of eight patterns (32 total) which you select via mouse or QWERTY keyboard,

EQ LAB REPORT

MANUFACTURER: Steinberg, 9312 Deering Ave., Chatsworth, CA 91311. Tel: 818-993-4161. Web: <http://www.steinberg.net>

APPLICATION: Create techno-/dance-oriented drum and bass patterns with either real-time playing or automation.

SUMMARY: The software emulation of the classic Roland TR-808 drum and TB-303 bass line boxes is uncannily accurate.

STRENGTHS: Very high fun factor; easy to use; excellent sound modeling; real-time operation; can sync internally to other programs.

WEAKNESSES: No keyboard equivalent to mute the various modules; can't undo randomization edit; some latency (response delay) with typical computers.

MINIMUM SYSTEM REQUIREMENTS: Both versions — 256 colors, 640 X 480 display, CD-ROM drive, MIDI interface for external sync. Mac — Power Mac or compatible with 601, 603, 603e, 604, or 604e processor (66 MHz), 16 MB RAM, System 7.5.3 or later, 16-bit audio, (OMS 2.2 and Apple Sound Manager 3.2.1 are included). Windows — 75 MHz or faster Pentium (Cyril not recommended due to performance limitations), 16 MB RAM, Windows 95 or NT 4.0, 16-bit sound card (DirectX driver preferred; DirectX is included).

PRICE: \$199 **EQ FREE LIT. #:** 140

and which take effect on the downbeat. Each pattern has 16 "slots," which are typically 1-measure patterns with 16th-note resolution. You can, however, change the pattern length (in real time, too) for unusual time signatures.

The TB-303 section includes the original's pitch slide and accent features. Other pattern editing goodies include selective randomization (not undoable, so work on a copy of the pattern) and shift patterns (or drum sounds) left or right by any number of steps.

There are even effects: distortion (for any one module), delay (with individual sends for each module), and panning. Delay time can be any number of 16th notes, but it also handles triplets.

SONG MODE

A transport section takes you to any part of the song. Typically, you start off by recording the pattern changes in Step mode or real time, then record level, timbre, effects, or other changes. Later, you can "punch" over mistakes. Individual song sections can be looped, deleted, copied, pasted, and inserted.

SYNC

With the Mac, ReBirth can sync to Cubase VST via OMS (non-OMS programs work, too, but you need two MIDI interfaces). Windows requires a utility included with ReBirth. (Hey Microsoft — so when are you going to implement OMS?) There can be some latency on slower machines, which you can tweak with a delay/advance parameter, but which also might be problematic with abrupt tempo changes, as ReBirth can take up to a measure to "catch up."

Getting these programs to sync and getting them to share audio are two different subjects. Apple's Sound Manager can play back ReBirth and sequenced digital audio; assigning Cubase to a card (e.g., the Korg 1212) with an ASIO driver and running ReBirth through the Mac's internal audio also works. With Windows, the easiest approach is to use two sound cards (or a card like the Terratec, which emulates dual-card operation) and assign one to each program. (Programs that can access a card via DirectX Version 3 can use the same card simultaneously.)

Another option is to save the Re-

Birth song as a WAV or AIFF file. You can then import this into any MIDI + digital audio sequencer, although since you're not in a sync situation, you may need to create a tempo map based on the ReBirth track (or tweak the sequencer's tempo until the timing is just right).

If you distribute ReBirth files over the 'Net, you can insert your URL so that anyone opening up the file can go to your home page. In fact, the whole program is Web-savvy — dial in and get free songs, order the program, or contact tech support.

Files are cross-platform compatible: play back PC ReBirth files on the Mac by editing the file type and creator, or play back Mac files on the PC by adding the .RBS suffix.

This is the kind of program that once you get started, it's hard to stop...those techno rhythms are so addictive (check out the demos). If you don't "get" electronica, ReBirth probably won't do it for you. But if you'd give anything for a couple of TB-303's and a TR-808, yet want to go further, ReBirth is your ticket. It's about as future retro as you can get.

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First Anniversary Column



PHOTO BY STEVE JENNINGS

A look at where we've
been and where we are
going

BY JON LUINI & ALLEN WHITMAN

Since the beginning of time (which for our purposes here is measured from our first column), we FezGuys have strived to bring you, to the best of our passionate musical appreciation, simple truths, forthright common sense, and an understanding of The Internet Way. Luckily, this "Way" has no "right way." Benevolent anarchy (doesn't) rules! We're all FezGuys, OK? We've all made it through the last twelve months and here we are at our Big Bang Anniversary Column! *Woo!* Congratulations to you for sticking with us, and to misquote Bill Cosby in *Fat Albert*, "You might have even learned something along the way!" We know we have.

Over the past year we've covered a sometimes bewildering array of subjects, hovering around the central theme of audio on the Internet. Some of the topics we've looked at include: the history of audio on the Internet; how to configure RealAudio; how to encode and place your music online; optimizing tips to im-

prove the quality of your soundfiles; connectivity and codec resources; an on-line distribution critique, brief explanations of current publishing, and copyright issues; financial transfer using the Internet; netcasting; a short description of the cast of characters; and the too-often underestimated importance of your involvement in the medium. All of the past year's columns are available for reading and downloading at www.fezguys.com.

Last year we perceived a general unawareness of what the Internet meant to the project recording studio. Perhaps some of you hadn't realized the possibility of being able to sidestep the existing oligarchy of the music business. Most of the organizations involved in this medium at the start were not necessarily money-makers, and the big companies hadn't made common use of the Web a priority. There were some standard codecs (MPEG, to name one), but no standard technological protocols. With the exception of a few online CD stores, the major labels tended to treat the Internet as a promotional and marketing tool.

The FezGuys felt it would be useful to those using the Internet as a distribution and sales tool to provide educational resources and production tips. We have attempted to provide some clarity in what is often a confusing mishmash of technologies, protocols, and jargon. We

encourage you to contact us; to interact with us and each other. We're starting to get a lot of e-mail concentrating on the technical "how-to" side of audio on the Internet. Please continue to let us know if this is useful to you. The sharing of ideas and techniques easily and simply is what sets our community apart. We cover a lot of evolutionary ground by sharing. Another lesson from the school playground proves its lifelong usefulness.

So where are we — and audio on the Internet — going? Some observable indications can provide intelligent conclusions. As usual, new questions get raised as soon as those conclusions get reached.

Giants like Microsoft are now staking their claims in streaming media (buying into Progressive Networks, VDO, and the now-confirmed reports of relocation packages to Redmond, WA, delivered to people at VXtreme). The music business is preparing to acknowledge that digital distribution is "coming" (a cautious acceptance if there ever was one). The self-described "collection societies" (BMI, ASCAP, etc.) and industry trade groups have begun to aggressively litigate their positions (the last resort of the fearful and often the moment of profound change), and technology continues to do its exponential dance of advancement. At this point it's safe to say more musicians than ever are

THINGS THAT ARE NEW

- LiquidAudio successfully launched the 2.0 version of their electronic distribution technology, which is now being used by a small number of companies securely selling music in digital form. Yes, Virginia, it is possible, and the music you pay for isn't all plastic and cardboard! [www.liquidaudio.com]
- Sure, it's not purely an audio company, but we thought Microsoft's outright purchase of VXtreme, a streaming audio and video technology company, certainly warrants mention as it further shows the claim that the "big kids" are staking out this emerging space. [www.vxtreme.com]
- Progressive Networks announced a partnership with MCI to form RealNetwork to remove some of the limitations on how large an audience can be reached with live broadcasts. This issue is critical to netcasting as it allows it to take a step into the big media leagues. Guaranteeing access to large audiences will assure corporate sponsorship of events and the money will roll right in. This doesn't have to overshadow the efforts and impact of the project studio person, it merely creates another mainstream validation for our "industry." [www.real.com]
- Rumors abound of a new version of VDO Live incorporating improved audio quality with its existing video streaming technology. We'll keep you informed, of course! [www.vdo.net]



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If you're using video decks, the XTC lets you reference a video signal or blackburst input. Add the optional Sony P2 (9-pin) connector and use MMC to control your pro video decks as well!

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COMING UP IN NOVEMBER

DUST THE FACTS. Alan di Perna takes us inside the Dust Brothers' project studio and reveals their techniques for making hit records no matter what genre they are working in.

GOING POSTAL (AGAIN). It's time once again for the Project Post Quarterly, which will offer more ideas and answers to getting your own postproduction studio running smoothly and profitably.

LOTS OF REVIEWS. Look for more of the tell-it-like-it-is reviews that EQ has become known for. This issue's subjects include Sony's new DAT machine, Night Technologies EQ, Apogee's ADAT-to-TDIF converter, and many more.

To be a part of this exciting issue, contact: Herb Schiff, Associate Publisher (ext. 470); Matt Charles (ext. 458); Karen Godgart (ext. 455); Tara Esposito (ext. 456); David Kaplan (ext. 402); Michael Sale (ext. 457); Advertising Sales, Albert Margolis, West Coast Sales (714-582-5951)

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creating their own music at home and putting it online. Many established artists are using the Internet to sidestep the existing physical distribution infrastructure by promoting mail-order CDs from Web sites. Very few organizations or individuals currently use streaming technology to digitally distribute their music. The industry is watching closely.

Over the next year we plan to devote space to the following topics: more about legal issues and your rights as an independent artist or producer to buy, sell, and publish on the Internet (who's suing who and how it affects your online presence); audio technology comparisons (recommendations to be based on ease-of-use, overall aesthetic, underlying code, interoperability, and audio quality); online record company and electronic distribution system profiles; online broadcasting (netcasting); more useful techniques for optimizing your soundfiles; some geeking out (perceptual coding, psychoacoustics, compression); the evolving state of the Internet audio community (examples of artist/listener relations); the universal question, "Can you make a living making music and promoting yourself on the Internet?" (with some examples of how musicians are making money now); "fulfillment" (read: encryption methods that really, securely work); and electronic distribution, removing the need to ship versions of music in the physical domain.

Thank you for your continued feedback. Everybody is invited to contact us with suggestions, complaints, comments, and photographs of yourself wearing a fez. The relevance of this medium is defined by our participation in it. Make history! May the Fez be with you!

The FezGuys encourage participation in the Internet audio community. Please stop by: <http://www.fezguys.com/>.

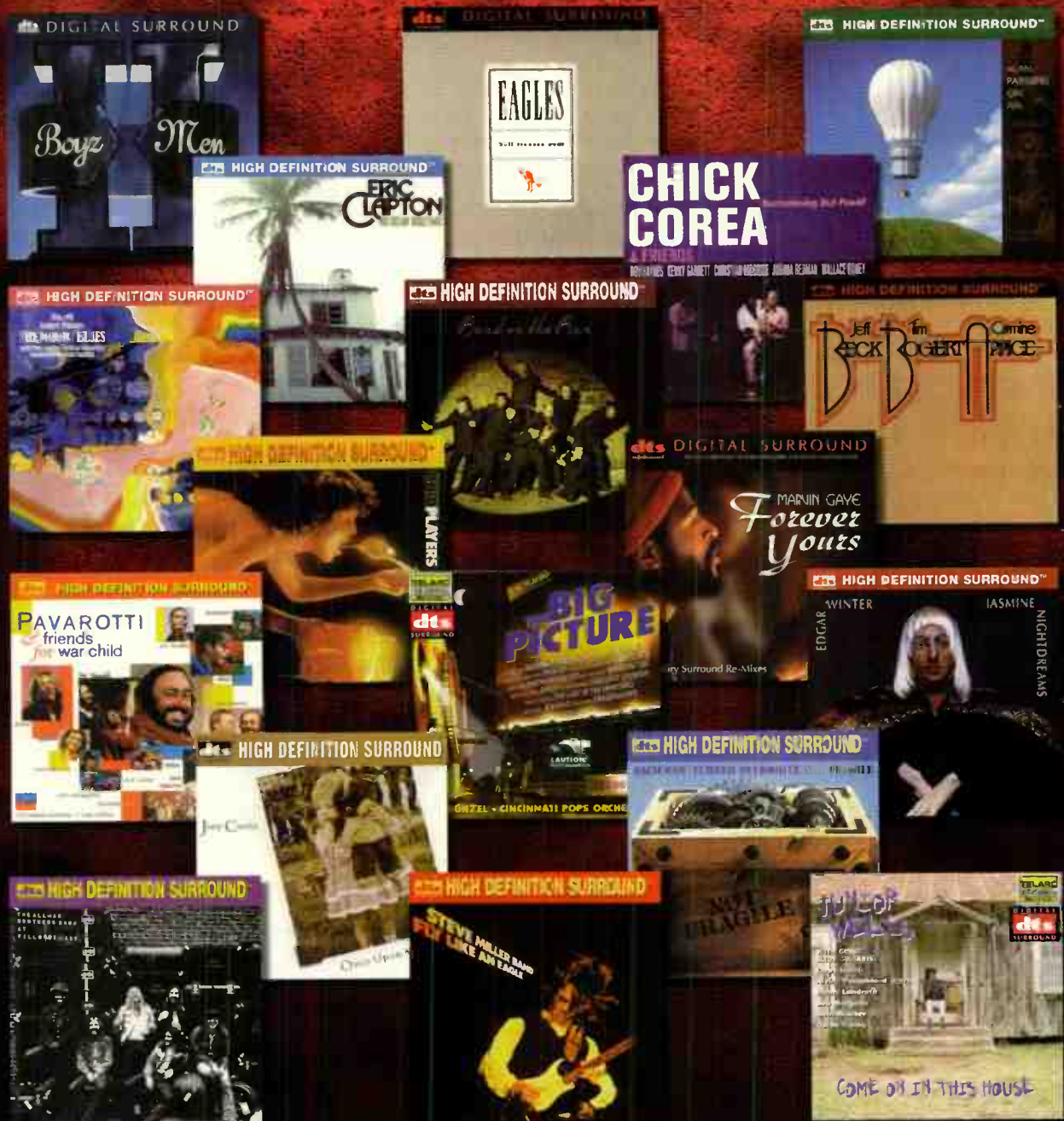
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World Radio History


ROOM WITH A VU

continued from page 19

music, mic techniques, and the type of unique sound that you are trying to focus on. I have three matched U47's that use the original M7 capsules built to original specs, which opens up the sound quite a bit.

We recently recorded classical guitar player Bill Kanengiser at the Chateau Chapel of the First Congressional Church of Los Angeles. For this recording, Mitch Zelezny and myself used three stereo pairs of mics: a close pair using a U47 in cardioid mode behind the acoustic guitar at the floor level to capture the low-end response of the instrument, and a UM57 in cardioid mode angled toward the 12th fret. The UM57, a tube condenser mic, was six inches away from the instrument to avoid a dramatic proximity effect and to retain the guitar's presence. A mid pair of two Oktava mics in hypercardioid mode were placed five feet above the floor, four feet from the instrument, with an 80-degree angle pointing away from the guitar to pick up early reflections from the sides. A far pair using two M49's were placed 30 feet away from the instrument and 15 feet above the floor level. These were set really wide to get more ambient sound and less direct sound.

All of these mics were fed to our Neve console; the direct outputs of the console were routed to the Studer 20-bit converters using the Prism Bit Mapper to record 20-bit on a DA-88. We digitally transferred the 20-bit DA-88 tape into the Sonic Solutions system where we time-adjusted the signals to compensate for the phase differences between each pair of mics. Therefore, it minimized the amount of EQ that we used, improving the clarity, realism, and depth of the recording.

CONTACT: For more information, call 818-623-9033. 

JON GASS

continued from page 44

going to clash with the vocals in terms of the frequency, and on "Mama," the clashing involved the strings.

"Strings are usually very tough," Gass says, "especially when you've got a Rhodes, a guitar, and so on, which are already in the midrange. On this track, I had to get the strings to feel natural and cut around all of the vocals without


being screechy, and, thankfully, I managed that.

"Otherwise, there was a lot of balancing, trying to get the track to work without major EQ, playing with drum 'verbs and working on the bottom end. Of course, with R&B that's probably the second hardest part of the mix; getting that bottom right without blowing up everybody's stuff. On "Mama," I used a sub-harmonic synthesizer on the bass, and then got the kick to work with it. Once the bottom was okay and the air was just right on top of the vocals, I was halfway home.

"A lot of mixers go into the computer really early to make it work, but I try to wait until the last second. I've got to make it sound good without putting the computer through its paces, because, in the long run, I think it makes you work harder to get the sounds to work together, as opposed to having to cut stuff all of the time just to be able to hear the music. Then, when I do go into the computer, I do the swells and little vocal rides that make the track musically come alive.

"For me, the mix usually sounds bad when I start and it sounds worse until just before the end. Then, suddenly, it all makes sense. So, if somebody walks in before I'm ready, I'll ask them to hang on and wait until I've finished. They may think, 'If he's been working on it for this amount of time it should sound better than this,' but in fact it'll sound worse than it did four hours ago, because I'm trying all sorts of different things to try to get it to sit right. I love trying stuff. That's the fun part — trying stuff without rules. Especially when somebody says, 'Don't do this'; I'll think 'Why?' and want to do it right away!"

In line with his preference for the unconventional, Jon Gass opines that, after a few tracking dates, the apprentice engineer should immediately be introduced to the art of mixing. A case of pinpointing the mistakes that have been made during the recording and, aside from learning how to fix them, also taking note of how to avoid making them in the first place.

"Yeah! Don't only learn what to do, but what *not* to do. Some young guys think that if they can pick up some techniques off of the pros then they'll be able to mix, but it doesn't work like that. Everyday, every song, every artist, every bottom end on every track, represents a brand-new day. It's just like starting from scratch, and that's where I think the years of experience really help you. I mean, you can stumble through a few sessions, but sooner or later you're going to get snagged!" 

MISFITS LIVE

continued from page 116


suited to handle that sound and they give us that extra little bit of punch that we need. Basically, all the low-end, or the power, is coming into the system through the DI and all the tone is coming in through the mic channel. It's the same basic principle that we're using with the drums, and it's really working out great."

AXE TO GRIND

Much like Only's bass setup, McLaren is using a combination of mic sources and DIs to capture Doyle's beefed-up guitar sounds. "I'm running my guitar through an SVT bass head and eight custom 4x12's that I built myself," states Doyle. "The cabinets are made out of 3/4-inch hardwood plywood and they're bigger than your standard 4x12's so there's more air in them, and, consequently, more bottom end."

McLaren and Doyle have devised a system that utilizes five channels to capture the full girth of Doyle's tone. "Because the bass is really used as a midrange instrument, the guitar is working the low-end and high-end frequency ranges. We're actually running two DI channels to capture the subbass and three mic channels for the highs and the mids. I like to run three microphones so I can run a full stereo spread. So instead of bringing the actual volume of the guitar in and out, I can bring the spread of the guitar in and out so that I'm not altering the volume at all. Whether it's a nice tight sound in the middle of the room or it's a wide spread-out sound, I can control the overall impact of the instrument without compromising the volume."

McLaren is using an EDI direct box that features built-in amp emulation to handle the subbass frequencies. "Because the EDI's are outfitted with speaker emulators, it sounds just like placing a mic right in front of a speaker when it's blended in. And what's really good about them is that I can take the lows down really low without having to worry about feeding back."

In addition to the two EDI direct boxes, McLaren is using two SM57's on two of Doyle's bottom cabinets for the midrange source, and an SM57, or something comparable, for the high-end source as well. "Since we're not carrying our own production, this setup allows me to run comfortably on any system we come across without peaking it out." 

She Only Reads One Project Recording Magazine.

She's decisive about her recording. And like over 110,000 project recordists who read EQ every month, she's invested a lot of time, creativity and money in her room. Project studio owner/operators own an average of \$151,900 in equipment and are planning on buying an additional \$32,900 worth of gear this year.* And nobody gets in the way of their buying decisions — project studio owner/operators are the decisionmakers. No wonder project studio owner/operators like her are today's most powerful buying force. They are passionate about gear. They have the money to buy. And they get all their information from ads and articles in EQ. EQ magazine — it's the only recording and sound magazine that talks their language.


*1997 EQ Reader Survey

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ProTools Project™ Digital Audio Workstation for Macintosh

With Pro Tools Project you get 8 tracks of digital audio &, on some Power Mac systems, up to 16 tracks of playback & 64 virtual tracks! The Pro Tools Project system includes an audio card as well as award winning Pro Tools software. You choose either an 888 or an 882 I/O to complete the package. Project also features MID recording and playback as well as Quickpunch™ punch-on-the-fly & when you're ready to upgrade, it's ready too.

REQUIRES-

- Qualified NuBus or PCI Macintosh CPU
- 24MB RAM minimum
- Hard Drive, system software 7.1 or greater
- 14" monitor (17" recommended).

ProTools 4.0 Software Digital Audio Software for Macintosh

Pro Tools version 4.0 software provides the next step in the evolution of Digidesign's award-winning digital audio production software for the Mac. Fully Power Mac native, 4.0 features noticeable improvements in every major area. ProControl™ support, improved automation features, real-time fader groupings & group nesting, plug-in MIDI personality files, multiple edit play lists, Sound Designer II™ functionality, Finder-style searching & sorting, and I'm out of breath.



MAC

WINDOWS



Session 8™ Digital Audio Workstation for Windows

Session 8 is a professional quality digital audio recording, editing, & mixing system created specifically for personal and project recording studios. Designed to operate with Windows 95 or Windows 3.1, Session 8 offers professional recording features, powerful random access editing, automated digital mixing, & unparalleled integration with most popular MIDI sequencers.

FEATURES-

- 8-channel direct to disk digital recording
- Random access, non-destructive editing
- Automated, intuitive digital mixing environment
- Built-in volume & pan automation
- Complete SMPTE frame rate support
- Frame accurate sync with built-in .AVI video playback window
- Digital parametric EQ
- Support for multiple hard drive partitions
- Auto sample rate convert to 44.1 or 48 kHz mono .WAV file format
- Choice of audio interface options



SOUNDSCAPE DIGITAL TECHNOLOGY LTD.

SSHDR-1 Hard Disk Recorder/Editor

A professional Multitrack Digital Audio Workstation, the SSHDR1 combines the highest quality processing hardware with easy-to-use Windows-based software. The most complete and affordable solution for high quality digital audio on the PC, the SSHDR1 has over 50 powerful editing tools and is expandable from 8 to 128 tracks, with up to 32 inputs and 64 outputs. Ideal for a wide range of applications ranging from project studios, to multi-unit 32, 48 and 64 track systems for major TV and film studios needing audio post production linked to video.

SSAC-1 Accelerator Card

The new SSAC-1 is a DSP card that can be added to any existing SSHDR-1 system for faster processing as well as an additional 8 channels of I/O in the form of a TOIF port. This card is needed by anyone who wants to upgrade an existing system to V2.0.

SS810-1 8 Channel I/O

This rack mount unit connects to the SSAC-1 card via the expansion port to give you 8 XLR ins & outs with superb A/D-D/A conversion. It also features an ADAT Optical interface. The SS810-D comes without the analog converters for connecting an ADAT without additional channels.

Version
2.0



CD & CASSETTE DUPLICATION

marantz CDR615 / CDR620 Compact Disc Recorder



CDR620 Additional Features-

- SCSI-II Port
- XLR (AES/EBU) Digital In/Out and Digital cascading
- 2x speed recording
- Index Recording and playing
- Defeatable copy prohibit and emphasis
- 34 key, 2-way wired remote (RC620)

*Available on CDR615 w/optional Wired Remote (RC620)

Both next-generation stand-alone write-once CD recorders, the CDR615 & 620 offer built-in sample rate conversion, CD/DAT/MD/DCC sub-code conversion, and adjustable dB level sensing. Additional features include adjustable fade in/fade out, record mute time, & analog level automatic track incrementing. A 9-pin parallel (GPI) port and headphone output with level control are also included.

Telex ACC2000/ACC4000 Cassette Duplicators

Designed for high performance & high production, Telex duplicators offer easy maintenance and operation. The ACC2000 is a 2-channel mono duplicator while the ACC4000 is stereo. Each produces 3 copies from a cassette master at 16x normal speed & by linking additional copy modules, you can duplicate up to 27 copies of a 60 minute original in under two minutes.



ACC2000XL / ACC4000XL

The XL Series feature "Extended Life" cassette heads for increased performance and wear characteristics. They also offer improvements in wow and flutter, frequency response, S/N ratio & bias.

STUDIO DAT RECORDERS

SONY PCM-R500



Incorporating Sony's legendary high-reliability 4D.1 Mechanism, the PCM-R500 sets a new standard for professional DAT recorders. The Jog/Shuttle wheel offers outstanding operational ease while extensive interface options and multiple menu modes meet a wide range of application needs.

FEATURES-

- Set-up menu for preference selection. Use this menu for setting ID6, level sync threshold, date & more. Also selects error indicator.
- Includes 8-pin parallel & wireless remote controls
- S/M recording for improved S/N (Sounds like 20bit)
- Independent L/R recording levels
- Equipped with auto head cleaning for improved sound quality.

TASCAM DA-20/DA-30mkII



- Multiple sampling rates (48, 44.1, and 32kHz).
 - Extended (4-hour) play at 32kHz.
 - S/PDIF Digital I/O, RCA Unbalanced In/Out.
 - SCMS free recording. Full function wireless remote.
- DA-30mkII Additional Features-**
- Variable speed shuttle wheel
 - Digital I/O featuring both AES/EBU and S/PDIF.
 - XLR balanced and RCA unbalanced connections.
 - SCMS-free recording with selectable ID.
 - Parallel port for control I/O from external equipment.

Panasonic SV-3800/SV-4100



The SV-3800 & SV-4100 feature highly accurate and reliable transport mechanisms with search speeds of up to 400X normal. Both use 20-bit D/A converters to satisfy even the highest professional expectations. The SV-4100 adds features such as instant start, program & cue assignment, enhanced system diagnostics, multiple digital interfaces and more.

Fostex D-15



The new Fostex D-15 is the least expensive timecode DAT on the market. It has a host of new features aimed at audio post production and recording studio environments.

FEATURES-

- Change mode functions built in
- Hold the peak reading on the digital bargraphs with a choice of 5 different settings
- Set cue levels and cue times
- Supports all frame rates including 30d
- Newly designed transport is faster and more efficient utilizing a 4-motor design. 120 minute tape shuttles in about 60 seconds.
- Parallel interface
- Front panel trim pots in addition to the level inputs

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E-300

Studio Condenser Microphone

A multi-patterned side address mic that combines vintage capsule design with advanced head-amp electronics, the E-300 has an unusually wide frequency response of 10Hz to 20kHz and an exceptional dynamic range of 137 dB. It also features extremely low self noise of 11dB. Ideal for even the most critical studio applications.

Shown with optional ZM-1 Shockmount

Unique powering of all Equitek Series microphones is accomplished with a pair of rechargeable nicad 9-volt batteries in combination with 48V phantom power. This overcomes inherent current limiting associated with most phantom power supplies & can supply 10x the current.



audio-technica.

AT4050/CM5

Cardioid Capacitor Microphone

The AT4050 multi-pattern condenser expands upon the AT4033 to set the standard for studio performance mics.

- 2 capacitor elements.
- Cardioid, Omnidirectional, & Figure 8 polar pattern settings.
- Vapor-deposits of pure gold on specially-contoured large diaphragms are aged through 5 steps to ensure optimum characteristics over years of use.
- Transformerless circuitry results in exceptional transient response and clean output even under extremely high SPL conditions.



AZDEN

UHF Performance Series

Breaking new ground, Azden's new UHF receiver and microphone transmitters offer superb performance and features at prices far below anything you've ever seen.



411UDR UHF Receiver

Crystal-controlled, PLL synthesized UHF receiver with 63 user-selectable channels in the 794-806 MHz band. Up to 9 systems may be used simultaneously. Features both 1/4-inch and XLR output jacks, volume adjustment and can be rack mounted.

41HT Handheld Microphone Transmitter

Newly-designed handheld with supercardioid uni-directional mic element and 63 user-selectable channels. Uses 2 AA alkaline batteries or Azden ni-cads with the AMG-2A Charging Station.

41BT Bodypack Transmitter

63 user-selectable channels, input level control, standby switch, locking mini-plug connector and metal clip. Ideal for use with lavalier and headset microphones or as an instrument transmitter.

AMC Ni-cad Battery Charging Station

Turns the 41HT into the only rechargeable UHF microphone available. (Uses Azden AN-1A nicad batteries only). Fully charged, the 41HT will run for 4 hours. Charging time is approximately 12 hours.

SENNHEISER

ME66/K6P



This road ready mic system is perfect for camera mount and other short gun applications. Its professional sound quality and affordable price combined with the flexibility of a modular setup make it a hard choice to beat.

MIXING BOARDS

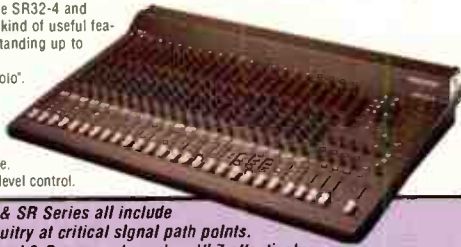
MACKIE.

SR24x4 • SR32x4

Sound Reinforcement Consoles

These consoles do for live sound what the acclaimed 8-bus series has done for studio recording. Both professional grade mixing consoles, the SR32-4 and SR24-4 were built to deliver the same kind of useful features found on "bigger boards" while standing up to 24-hr-a-day use.

- Fast, accurate, easy level setting via "solo".
- 4 submix buses.
- 3 band EQ w/ sweepable mids.
- 6 Aux sends.
- Globally switchable AFL/PFL.
- Mackies "VLZ" technology for low noise.
- Tape return to main mix, mono out w/level control.



The new MS-1202, 1402, 1604 & SR Series all include VLZ (Very Low Impedance) circuitry at critical signal path points. Developed for Mackie's acclaimed 8-Bus console series, VLZ effectively reduces thermal noise and minimizes crosstalk by raising current and decreasing resistance.

TASCAM M-1600

16 & 24 Channel 8-bus Consoles

Great for modular Digital Multitrack setups and hard disk recording, the M-1600 is part of Tascam's next generation series of recording consoles. It features multiple options for inputs and outputs and uses the same, easy to install D-sub connectors as Tascam's more expensive consoles, all in "a compact design."

- XLR Mic inputs w/phantom power on 8 channels.
- Signal present/overflow indicators on each channel.
- Balanced & Unbalanced tape returns & Balanced Group/Direct outputs using D-sub connectors.
- TRS Balanced Line Inputs on all channels.
- 3-band EQ with sweepable mids.
- 5 Aux sends (1 stereo)



- 4 assignable aux returns.
- Perfect for use with DA-88 and ADAT setups.

MINIDISC MULTITRACKS

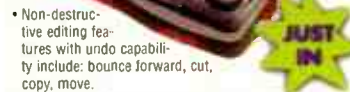
TASCAM

564 Digital Portastudio

The Tascam 564 Digital Portastudio combines the flexibility and superior sound quality of digital recording with the simplicity and versatility of a portable multitrack. Using MiniDisc technology, the 564 has many powerful recording and editing features never before found in a portable 4-track machine.

FEATURES-

- Self-contained digital recorder/mixer.
- Uses low-cost, removable MiniDiscs.
- 2 AUX sends / 2 Stereo returns.
- 4 XLR mic inputs.
- Channel inserts on inputs 1 & 2.
- 5 takes per track, 20 patterns, 20 indexes per song
- Random access and instant locate.



- Non-destructive editing features with undo capability include: bounce forward, cut, copy, move.
- Full-range EQ with mid-range sweep.
- S/PDIF digital output for archiving.
- MIDI clock and MTC.

SONY

MDM-X4 MD Multi-Track Recorder

MD recorders are here! Offering up to 37 minutes of high-quality 4-track digital recording, the MDM-X4 is truly the next generation of personal multi-tracks. With a built-in mixer, exclusive Track Edit system, and a Jog/Shuttle wheel for sophisticated editing with ease, the MDM-X4 will encourage you to flex your creativity.

FEATURES-

- Records on high quality, removable MD data discs
- 3.5-gen. ATRAC LSI for wide dynamic range.
- 10 Input / 4Bus mixer.
- 2 AUX sends, 3-band EQ. • 11-point locator.
- Random access memory for quick playback and record from anywhere on the disk.
- Editing features include Undo, Redo, & Section/Song editing for flying material between different tracks



STUDIO MONITORS

ALESIS

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- 2kHz crossover for accurate phase and a wide "sweet spot" for mixing.
- Accurate flat sound reproduction.
- Great for studio and multi-media applications.



TANNOY

PBM 6.5II

Studio Reference Monitors

The PBM 6.5 II is the industry standard for studio reference monitors. They provide true dynamic capability and real world accuracy.

- 6.5" lowfrequency driver and 3/4" tweeter
- Fully radially and ported cabinet design reduces resonance and diffraction while providing deep linear extended bass.



SONY

SMS-1P Powered Studio Reference Monitors

The new SMS-1P monitors are perfect for post production environments. They feature 2 types of inputs with independent volume adjustment, 15 watts of power, bass/treble control and shielding for use near computer monitors.



JBL

4206 & 4208

Studio Reference Monitors

The 4206 & 4208 studio reference monitors are 6" and 8" respectively. Both offer exceptional sonic performance, setting the standard for today's multi-purpose studio environments.

- Multi-Radial baffle ABS baffle virtually eliminates baffle distortion.
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- Pure titanium diaphragm high frequency transducer provides smooth, extended response.
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PRO CASSETTE DECKS

TASCAM 202 mkIII / 302



These decks provide high-fidelity sound reproduction and a wide frequency response, as well as a host of editing & play back features.

- Dual Auto Reverse, Normal and high-speed dubbing.
- "Dolby HX Pro" extends high frequency performance and minimizes distortion.
- Auto sensing for Normal, Metal & CrO2 tape.
- Intro Check, Computerized Program Search, Blank Scan and One Program quickly find the beginning of tracks.

302 Advanced Features—

The 302 is 2 independent decks, each with their own set of RCA connectors, transport control keys, auto-reverse, and noise reducing functions. Cascade and Control I/O let you link up to 10 additional machines for multiple dubbing or long rec & playback.

112mkII/112RmkII



A classic "no frills" production workhorse, the 112mkII is a 2-head, cost effective deck for musicians and production studios. It features a parallel port for external control and an optional balanced connector kit for integration into any production studio. The 112RmkII features a 3-head transport with separate high performance record and playback heads as well as precision FG servo direct drive capstan motors.

SIGNAL PROCESSING

BEHRINGER

MDX 2100 Composer



- Integrated Auto/Manual Compressor, Expander & Peak Limiter.
- Interactive Gain Control (IGC) combines a clipper and peak limiter for distortion-free limitation on signal peaks.
- Servo-balanced inputs & outputs are switchable between +4dB & -10dB. **NEW LOW PRICE!**

APHEX 107 Tubessence 2 Channel Mic Preamp



The 107 delivers outstanding sonic performance, as well as a great degree of presence, detail, & image.

- Up to 64dB of gain available
- 20dB pad with red LED indicator, 2 LED input meter
- Full 48V phantom power with red LED indicator
- Low cut filter at 80Hz, 12dB/octave
- Polarity inversion switch with LED indicator
- Switchable +4dB/-10dB output, 1/4" Balanced.

109 Tubessence Parametric EQ



The Apex 109 is an extremely versatile, high performance parametric vacuum tube EQ with professional flexibility and sound quality.

Great for "warming up" digital signals.

EFFECTS PROCESSING



Lexicon

PCM-80 & PCM-90 Digital Signal Processors



A great combination for any studio owner with an ear for the best. The **PCM-80** delivers high quality multi-effects based on the legendary PCM 70, maintaining Lexicon's high standards for sonic clarity and extraordinary processing power. The **PCM 90** is a digital reverb with its roots stemming from the studio standard 480L and 300L effects systems. Reverbs from telephone booths to the grand canyon, the PCM 90 is incredibly realistic. Together they make an excellent addition to any rack mount arsenal.

Buy a PCM-80 and receive a **FREE Pitch FX Card** offer valid thru 8-31-97

Lexicon MPX-1 Multi-Effects Processor



Lexicon's latest addition to their Digital effects family, the MPX-1 features top-quality effects in an easy to use, 1 rack space unit. With 56 Pitch, Chorus, EQ, Modulation, Delay, and world-class reverb effects accessible from the front panel, as well as TRS and XLR balanced I/O and complete MIDI implementation, the MPX-1 creates a new standard for cost and quality in a multi-effects device.

t.c.electronics

Wizard M2000 Studio Effects Processor



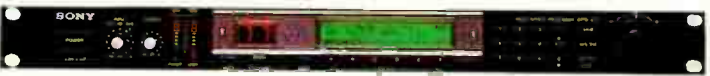
The M2000 features a "Dual Engine" architecture that permits multiple effects and 6 different routing modes making it a great choice for high-end studio effects processing.

FEATURES—

- 250 factory programs including reverb, pitch delay chorus, flange, phase, EQ, de-essing, compression, limiting, expansion, gating and stereo enhancement
- 20-bit A/D conversion, AES/EBU and S/PDIF digital I/O.
- "Wizard" help menus, 16-bit dithering tools,
- Tap and MIDI tempo modes.
- Single page parameter editing, 1 rack space.

SONY

DPS-V77 2 Ch. Master Effects Processor



Sony's latest effects processor, the DPS-V77 yields excellent sonic quality combined with realtime control, a digital I/O and many more features that will put a smile on the face of any discerning studio engineer.

FEATURES—

- 198 preset & 198 user-definable programs.
- Control up to 6 parameters in realtime via MIDI information and an optional foot pedal
- Use the AES/EBU & SPDIF digital I/O to link multiple V-77s together & when working with digital mixers
- 10-key pad input
- Shuttle-ring equipped rotary encoder allows for quick patch changing.
- A noise gate circuit is provided ahead of the input for guitar players and other instrumentalists who want top quality effects without sacrificing tone.

ALESIS

QuadraVerb 2 2 Ch. Master Effects Processor



Alesis' most powerful signal processor, the Q2 offers amazing audio fidelity in a versatile multi-effects unit. Great for professional & project studio owners, its large backlit display making parameter editing intuitive and quick.

FEATURES—

- 100 preset & 200 user-editable programs.
- Octal Processing allows use of up to 8 effects simultaneously in any order.
- Choose between over 50 different effects types for each block, including reverb, delay, chorus, flange, rotary speaker, pitch shift, graphic and parametric EQ, overdriver and more.
- 5 seconds sampling, triggered pan, and surround sound encoding are built in.
- Selectable -10 dB and +4dB levels, servo-balanced TRS inputs and outputs.
- ADAT Digital Interface allows you to work entirely in the digital between the Q2 and an ADAT XT.

PRO HEADPHONES



K240M

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- Circumaural pads for long sessions.
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- 15Hz-20kHz, 600Ω



SONY MDR 7506

The Sony 7506's have been proven in the most trying studio situations. Their rugged, closed-ear design makes them great for keyboard players and home studio owners.

- Folding construction
- Frequency Response 10Hz to 20K Hz
- 1/4" & 1/8" Gold connectors
- Soft carrying case
- Plug directly into keyboards



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DT 770 Pro

These comfortable closed headphones are designed for professionals who require full bass response to complement accurate high and mid-range reproduction.

- Wide frequency response
- Durable lightweight construction
- Equalized to meet diffused field requirements
- Padded headband ensures long term comfort



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HD 265/HD580

The HD-265 is a closed dynamic stereo HiFi/professional headphone offering high level background noise attenuation for domestic listening and professional monitoring applications. The HD 580 is a top class open dynamic stereo HiFi/professional headphone that can be connected directly to DAT, DCC, CD and other pro players. The advanced design of the diaphragm avoids resonant frequencies making it an ideal choice for the professional recording engineer.



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PORTABLE DAT RECORDERS

TASCAM DA-P1

- Rotary 2 head design, 2 direct drive motors.
- XLR mic/line inputs (w/phantom power)
- Analog and S/PDIF (RCA) digital I/O.
- 32/44.1/48kHz sample rates & SCMS-free recording.
- Built-in MIC limiter and 20dB pad.
- TRS jack w/ level control for monitoring.
- Includes shoulder b-lit, AC adapter, & battery.



PDR1000/PDR1000TC



- 4 head Direct Drive transport
- XLR mic & line analog ins, 2 RCA line outs. Digital I/O includes S/PDIF (RCA) and AES/EBU (XLR).
- L/R channel mic input attenuation selector (0dB/30dB)
- 48V phantom power, limiter & internal speaker.
- Illuminated LCD display shows clock and counter, peak level metering, margin display, battery status, ID number, tape source status and machine status.
- Nickel Metal Hydride battery powers the PDR1000 for 2 hours, AC Adapter/charger included.

PDR1000TC Additional Features—

- All standard SMPTE/EBU time codes are supported, including 24, 25, 25.97, 29.97DF, & 30 fps.
- External sync to video, field sync and word sync.

- **M10000 Master Sync module** ensures drift will be no more than 1 frame in 10 hrs.

- **HM10000 Headphone Matrix** provides a rotary switch for selection of Stereo, Mono Left, Mono Sum, & M/S (mid-side) Stereo modes.

SONY TCD-D8

This is the least expensive portable DAT machine available. It features 48kHz, 16-bit sampling, automatic and manual recording level, a long play mode for 4 hours of recording on a 120 minute tape, & an anti-shock mechanism. It includes a carrying case, a DT-10CLA cleaning cassette and an AC-E60HG AC adaptor.



KEYBOARDS & SOUND MODULES



A-90EX Master Keyboard Controller



The A-90EX is an 88-note, weighted master controller with one of the best keyboard actions currently on the market. It offers incredibly realistic piano sounds, powerful controller capabilities and 'virtual' programmable buttons which can be configured to operate your software and other devices. The A-90EX combines the majestic sound of a concert grand, the expressive action of a fine acoustic keyboard and the comprehensive MIDI functions of a master controller—all in a portable stage unit.



JV-2080 64-Voice Synthesizer Module



FEATURES

- 64-Voice polyphony / 16-part multitimbral capability.
- 8 slots for SR-JV80 series expansion boards.
- 3 independent effects sets plus independent reverb/delay and chorus.

Roland sets the standard with the incredibly expandable JV-2080 64-Voice Synthesizer Module. This amazingly powerful package offers unprecedented expandability, digital signal processing, and remarkable operational ease, all housed in a 2-unit rack-mount design.

- 6 outputs. Main Stereo and 4 assignable.
- **NEW** patch finder and Phrase Preview functions for easy access to the huge selection of patches.
- Large backlit graphic display
- Compatible with the JV-1080, XP-50, and XP-80.



JP-8000 Analog Modeling Synthesizer

Analog is back—FOR REAL! This synth delivers a killer array of real-time control, Roland's revolutionary new analog modeling technology, and FAT SOUNDS! The assignable ribbon controller, 4 octave keyboard, built-in arpeggiator w/ external sync capability, and RPS function will make this little gem a must have for DJs and re-mixers as well as that funk musician looking for some new inspiration.



FEATURES—

- 8 note polyphonic, 49-key velocity sensitive keyboard.
- Newly developed DSP oscillator

• Motion Control™ real-time parameter changes in real time

- Single, Dual, & Split mode, assignable on-the-fly.
- 128 user/ 128 preset patches, 64 user/64 preset performances.
- Tone control, 12 chorus, & 5 delay effects. *Flay of soul.*

PORTABLE HARD DISK RECORDING

Roland VS-880 V2

This new version of the popular VS880 incorporates powerful additional software functions that allow you to get the most out of this baby's incredible creative potential.

FEATURES—

- Auto Mixing Function records and plays back your mix in real-time
- Easy recording with an inserted effect in "INPUT-TRACK" mode.
- Process the master output with a specific inserted effect such as total compression.
- Scene change by MIDI program change message.
- Simultaneous playback of 6 tracks in MASTER MODE recording.
- Digital output with copy protection.
- 10 additional effect algorithms (30 total) including Voice Transformer, Mic Simulator, 19-band Vocoder, Hum Cancellor, Lo-Fi Sound Processor, Space Chorus, Reverb 2, 4-band Parametric EQ, 10-band Graphic EQ, and Vocal Cancellor.



- 100 additional preset effects patches.
- Use MIDI program & control change messages to edit and change effects.
- In total, over 20 powerful and convenient features in editing/sync sections have been added. Some require the optional effects expansion board

Fostex DMT-8 VL

The latest in the Fostex HD recording family, the DMT-8 VL truly brings the familiarity of the personal multi-track to the digital domain.

FEATURES—

- 18 bit A/D, 20 bit D/A conversion.
- Built-in 8 channel mixer, Ch 1&2 feature mic & line level.
- 2 band EQ and 2 AUX sends per channel
- Cut/Copy/Move/Paste within single or multiple tracks.
- Built-in MIDI Sync., 6 memory locations.
- Dual function Jog/Shuttle wheel provides digital "scrub" from tape or buffer without pitch change. 1/2X to 16X.
- Divide the drive into 5 separate "virtual reels", each with it's own timing information.

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MIDI

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Studio 5 LX Macintosh MIDI Interface



The Studio 5 LX is arguably the most advanced MIDI interface on the market today. It incorporates a MIDI patchbay, MIDI processor, and SMPTE synchronizer with it's interface functions, all in a 2 rack space unit.

- 15 independent MIDI ins and outs.
- SMPTE reads and writes all formats—24, 25/29.97/29.97DF/and 30.
- Network multiple units, 240 MIDI channels each.
- 128 patches, unlimited virtual instrument controls.
- 2 assignable footswitch inputs, 1 controller input.
- 8X speed when used with DMS.
- Internal power supply.

Studio 3 & 4 MIDI Interfaces, and Vision 3.5 sequencing software also available.



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



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

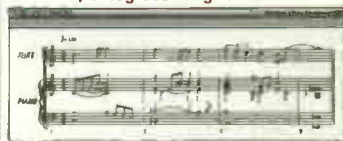
- Same unit works on both Mac & PC platforms.
- 8x8 MIDI merge matrix, 28 MIDI channels.
- Fully programmable from the front panel.
- 128 scene, battery-backed memory.
- Fast 1x mode for high-speed MIDI data transfer.

Pocket Express Mac/PC MIDI Interface



With the pocket express you get a 2 in, 4 out, 32-channel interface that supports both Mac and PC. It also features a computer bypass button that allows you to use it **EVEN WHEN THE COMPUTER IS TURNED OFF.**

Digital Performer Macintosh MIDI Sequencer w/ Integrated Digital Audio



Digital Performer contains all of the sequencing capabilities of Performer V.5 and adds Digital Audio to the picture. Apply effects such as Groove Quantize, shift, velocity scaling and more—**ALL IN REALTIME.**

- MIDI Machine Control, Quicktime Video playback.
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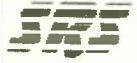
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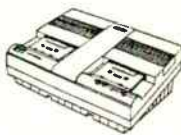


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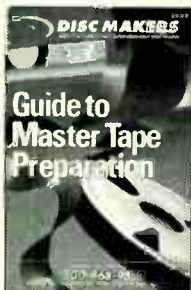
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Care and Feeding of Electric Utilities

There's more to getting juice than simply plugging in

BY MARTIN POLON



It is almost a given in today's demanding recording environment that those who operate project studios, as well as commercial studios, tend to see themselves as "firemen" — dealing with concentrated "heat" from console problems, digital component compatibility, purchasing decisions, and other high-priority audio recording studio issues. Yet nothing is more important to the operation of any studio than the electrical utilities provided to it and nothing is more likely to be ignored in the face of the other various issues.

Whatever utility in any part of the country provides the electrical services, few studios are able to optimize and maximize the relationship between the utility user and the utility provider. There is nothing easy in today's merger-maniaed utility marketplace, and most customers default to the standard plans recommended by the utility.

Allied with the basic provision of power to the studio facility is the question of having the provided power secure from failure or contamination and at the best possible price. The following tips cannot help but to improve the quality of a studio facility's electrical service and its cost.

1. If a studio is new or new to its site, it is imperative to have an actual

meter read done by its electrical provider on the day occupancy begins. Most, if not all, utilities use estimated reads every other or every two monthly periods. That can leave accumulated charges from a previous user on the meter. Ask the utility to accommodate you by sending a meter reader to verify the start reading. Otherwise it could be several months before you actually know what your facility's power draw actually is and you could pay for accrued usage on the meter prior to the inception of your recording activities.

2. Consider shopping around for power service. With the deregulation of electrical utilities nationwide, alternatives to the historical electrical provider in your area are either in place or soon to be.

3. In some areas, there are also plans available that offer lower rates for night and weekend electrical usage. For many studios, this is when they are busiest and it allows for some savings in electrical cost.

4. If a recording facility is operated out of or in conjunction with a residence or with another business at the same location, the existing electrical service may be inadequate. This is a problem both in terms of available current capacity from the overall service to the residence and in terms of balancing the load with whatever goes on in the rest of the location.

Separate electrical incoming service allows for adequate service for recording in excess of the 100-amp or 200-amp maximum service found in many residences and small buildings. Just the presence of electrical fans, cooking, or washing — not to mention heating (motors and/or heat elements) and air conditioning — can compromise concurrent recording activities in the same electrical arena.

It is not an exaggeration to say that we have learned that each studio recording room must have exclusive claim to at least 100 amps or optimally 200 amps of service for power amplifiers, recording electronics, computers, air conditioning, lighting, electrical service for musicians equipment, etc. This figure allows for electrical load swings during a session


without causing voltage and current swings as well. Of course, some rooms have so much equipment that even 200 amps might not be an adequate service.

5. A customer of an electrical utility can have instrumentation put on the AC incoming service to monitor the voltage swing over several 24-hour periods to see if other users are affecting the overall service. Similarly, oscilloscope-like test instruments can monitor for EMF (electro magnetic force) and RFI (radio frequency interference) pollution of the incoming AC.

In either case, the electrical utility will usually assist the studio user and may even provide the necessary test equipment and personnel needed to monitor the incoming service. If problems are found, the offending service can be removed from the "pole" or station transformer loop feeding the studio and/or capacitive and inductive filtering can be installed on the AC incoming feed line. This level of customer service frequently also includes finding a damaged or misdesigned component in adjacent electrical facilities or street lighting that is causing interference that can be picked up by sensitive studio electronics.

6. Some power companies are more technologically sophisticated than others and some are more savvy to special recording studio electrical needs due to the concentration of studios in certain cities (L.A., Chicago, Nashville, NYC, San Francisco, etc.). If your power company is reluctant to help, it still is imperative to perform the tests when a studio starts operating, when major changes have been made, and periodically to ensure quality of service.

Consulting electrical engineers will do the work for a not insignificant fee, but hopefully the local power provider can be coaxed into providing support. This all assumes that the studio has stand-alone electrical service and is not sharing service with other entities.

In an upcoming column, we shall see what the project studio operator can do to control and harmonize the AC input within the studio complex. 

ACROSS THE BOARD

continued from page 170

else you dig up. Now record it into any digital audio editing program and zoom way in to the bit level. Now pretend that you can zoom in until the difference between one level and one bit louder is one inch up on the graph and one bit lower in level is one inch down.

This is your step size for 16-bit. If the guitar level for that sample was halfway in between, the converter could only give you a value that was either one inch up or one inch down. If you were recording 20 bits, there would be 16 level choices between each inch mark. The accuracy is within a 16th of an inch. If you were recording 24 bits, there would be 256 steps between each inch boundary.

So, the resolution vertically is improved, which makes the sound reproduction quality better. In the other direction, left to right on the graph, if you increase the sample rate to 96 kHz, you are only doubling the resolution, but 24 bits increases the resolution by 256 times. Cool, huh!

Next month, the quiz. **EQ**

AUDIO ALCHEMISTS

continued from page 120

how hard we hit the tubes. On drums and just about any acoustic instrument, we drive the tube at a reasonable level, to warm the sound up a little while still keeping it clean. With electric guitars, we generally take the level down a little bit. Guitarists have their amps and the sounds they want. We just try to recreate it faithfully. For bass we like to use the Retrospec "Juice Box" DI. We'll bring one of those in and let the bass player use it. And in that case, we bring the signal into the mic pre and increase the output stage [i.e., rather than the input level] to get the signal to tape solid; we don't want to double-tube it too much."

Of course, not every setting allows time for a leisurely tweaking of levels. Soundcheck time has a funny way of shrinking, if not evaporating altogether. On the Big Head Todd show they recorded, Lettie and Papitto had just a 15-minute soundcheck. "Luckily we'd just done a show with them at the 9:30 Club in D.C., so we were familiar with their setup," says Lettie. "Also the band's engineer was fantastic. He not only gave us the set list and equipment breakdown, he also came out

to the truck and went through the set list song by song to point out where the solos were, where different singers were featured, and things like that.

When preparation time is tight, or nonexistent, Audio Alchemists focus on getting good levels going to their multitracks before turning their attention to their 2-track DAT master. As Lettie points out, "the 2-track master isn't going to mean a thing if they've got distortion on the master."

But even so, Lettie and Papitto have had a high success level with their live-to-2-track mixes. Clients often find them suitable for broadcast and don't bother remixing the multitrack masters. "With Big Head Todd, the Album Network didn't remix the project for broadcast. They used our live 2-track DAT mix, which we had put through an ART VLA tube leveling amp and Summit parametric EQ as the final production mix."

Even the club management, who'd made the duo reposition their cables so many times, was pleased in the end. "They were happy with the minimal impact we'd had there," says Lettie. "They said, 'Oh, anytime you guys want to come back and use the place for a remote, or if you got a showcase that wants to record, give us a call.' So it does work out. People are happier with you if you make their life easier." **EQ**

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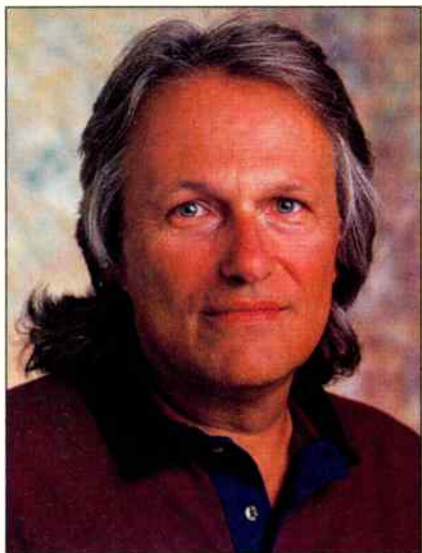


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The ADATs Are Stacked Against Me

Are you *really* getting all the bits you think you are?



BY ROGER NICHOLS

Last issue, I talked about used equipment. I left out the part about the used ADAT market that is starting to emerge. They used to be scarce as hen's teeth, but after the introduction of the ADAT-XT, the "vintage" ADATs started showing up in the want ads.

The reason I waited until this month is because I happen to be sitting in front of a stack of four ADAT M-20 20-bit machines, which I'm using for a Bela Fleck tracking session. First impression says that after the introduction of the M-20, vintage ADATs will flood the used market. This could be good news for those of us who want to add 24-bit recorders to our ADAT stack. Yep, on top of these four 20-bit machines, I have two vintage (digital equipment more than two years old) ADATs recording eight channels of 24-bit audio.

Where am I getting this 24-bit signal to record, you ask? From a pair of Apogee AD-8000 24-bit analog-to-digital converters, I answer. (I actually only needed one, but two looks better in the stack and it makes everyone think I am serious about it.) From the 24-bit digi-

tal out of the Apogee I feed a pair of Rane PaqRats. The PaqRats split each pair of 24-bit signals into four channels of 16-bit information so that it can be recorded on 16-bit machines. Luckily, I just happen to have these 16-bit machines stacked on top of the four M-20's and the two Apogee AD-8000's.

The Apogee AD-8000 has option slots in the back that will accept future AMBUS cards. One card will interface directly to Pro Tools so that you can use the AD-8000 instead of the Digidesign 888 box. Others will connect directly to DA-88 or ADAT machines. The ADAT interface will have the PaqRat software so that you can perform the bit-split recording. These interfaces were not yet available, so I used the actual PaqRat boxes.

BIT OFF MORE THAN YOU COULD ESCHEW?

At this point, I would like to clear up some bit concerns. It is clear that more bits and higher sample rates are better. It is also clear that many people aren't always hearing what they think they are hearing.

There is a difference between the resolution of the recording storage medium and the resolution of the converters on the record and playback side. As an example, many DAT machines advertise 20-bit converters for A/D and D/A, but the DAT tape only records 16 bits of the information. If the 20-bit converters sound better, it is because they are doing a better job of producing the resulting 16-bit information than the straight 16-bit converters did. A Turbo Porsche doesn't work as hard to go 100 miles per hour as a Geo does. It is the same kind of deal. I have had DATs sent to me with notes saying they were 20-bit DATs. Nope, sorry.

The M-20 ADATs were announced about the same time as the introduction of the TASCAM DA-98. Even sales reps

at trade shows told me that the DA-98 was 20-bit. It does not record 20-bit, but it does use 20-bit converters. Big difference.

The same thing has happened to me when using the Yamaha 02R. All of the digital ins and outs are full 24 bits. You can change the output resolution to be 16-bit, 20-bit, and 24-bit. It is very easy to hear the difference between 16-bit out and 20-bit out when you have high-bit audio flowing in to the console digitally. When I finally had some 24-bit audio to play with, I kept switching the output between 20-bit and 24-bit. I didn't hear any difference. I then realized

that the 02R control room monitor output only has 20-bit, 8x oversampling converters. My Apogee DA 100 was connected to the digital out, but they are only 20-bit. Just because the switch says 24-bit doesn't mean that is what you are going to hear without the proper converters. Basically, I had this 24-bit Apogee stack, and I had no way of telling if it was any better, because I couldn't play it back — until the 24-bit D/A showed up. Then it was amazing. It is true: once you've heard the 24-bit stack, you can't go back.

LAST LITTLE BIT

Another thing that comes up quite a bit are questions about the difference technically between 16 bits and 20-/24-bit stuff. The general consensus is that the difference between 16-bit and 20-bit is just the dynamic range and noise floor; 16 bits have 96 dB, 20 bits have 120 dB, and 24 bits have 144 dB. If you are recording rock music or something else that is mostly loud, then you don't need the extra bits. Not true. Here is the way it works.

Let's say you record some really loud music with big bass, big sounding drums, blasting horns, and whatever

continued on page 168

It is clear that many people aren't always hearing what they think they are hearing.

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