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AUDIO

SPECIAL FOCUS: THE DIGITAL STUDIO

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DEPARTMENTS

Cover: Nashville's Masterfonics Studios features the first AT&T DISQ digital mixer core in the U.S., installed into the SSL 4064 E/G console. The 20Hz Tom Hidley-designed control room features an Otari DTR900-II digital multitrack and MTR100 24-track with SR/A. Photo: Tom Gatlin. Inset photo: Ron Batzdorff.

8·BUS SERIES

FROM THE EDITOR

Commodity services. At a recent meeting with representatives of Pacific Bell, I heard of plans to develop a "virtual studio" environment, where clients would be able to "call up" their production needs through the telephone company's broadband connections with large production service providers. We have reported on the growing trend to phone in your part before, but the Pac Bell plan aims to democratize the process much further and treat production services more as commodities.
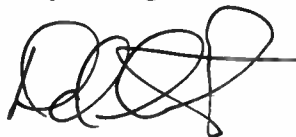
At first, this idea seemed a little strange to me—maybe the personal touch is too important to lose in studio services. But the more I thought about it, the more it seemed that there are many high-volume clients who would like to be able to just patch in to what they need. This certainly would not eliminate other clients' desire for the personal assistance of a favorite facility's staff to help them realize the best version of their project.

In this light, commoditization can create a cost breakthrough for the high-volume client, or even for the project studio that is able to obtain bulk services from a "mothership" provider. It may be that as interconnection becomes increasingly prevalent as a way of doing business, we will tend to categorize facilities of the future as large-node or small-node studios.

As we move further into the era of the digital studio, complex studio operations will take place more and more at the end of the phone lines. But you can bet that the phone companies plan to function as much more than software carriers. Our cover, revealing the AT&T DISQ installation at Nashville's Masterfonics, provides a glimmer of technology to come.

In watching these developments, it is easy to envision the scenario James Coburn encountered in *The President's Analyst*, the classic spy vs. spy film of the '60s, in which the all-powerful force in the world proved not to be the Russians, the Chinese or the Americans, but...The Phone Company.

Keep reading,

David Schwartz
Editor-in-Chief

More records go gold on Ampex than on all other tapes combined.

AMPEX

Dynamic Duo.

FowerBook **Duo** 270c

Opcode Style.

Studio 4

CURRENT

WORKSTATION SHOOTOUT
by Mel Lambert

The Society of Professional Audio Recording Services is once again to be congratulated for organizing an excellent two-day conference at the Beverly Garland Hotel, North Hollywood, during which about 150 industry worthies had the opportunity to examine the latest and greatest hardware from 11 companies (Spectral Synthesis canceled at the last minute).

Not surprisingly, the networking of workstations figured prominently during the technical presentations, including updates on OMF compatibility. Open Media Framework is now being implemented in a growing number of systems and holds great promise in providing transparent access to both audio, data and video files, EDL and processing information.

AMS-Neve was spotlighting its integrated recorder-mixer package, comprising an 8/16/24-track AudioFile and Logic Series Mixer. Hot on the firm's agenda is a refinement of cross-platform OMF compatibility between its proprietary CPU and Macintosh-based platforms. AudioFile is now able to read OMF files directly from magneto-optical disk, without a translation process.

Avid Technology is also modifying its operating system to handle Native OMF structure, but talk centered on AvidNet capabilities via Asynchronous Transfer Mode. Offering data throughput of 1 GB, ATM will permit simultaneous transmission of multiple full-resolution digital video and audio channels of CD-quality digital audio via a single network. Also unveiled: details of a new "SCSI Farm," which allows up to 49 disk drives or similar Fast SCSI-capable devices to be accessed

from AudioVision systems via 80-foot balanced SCSI interconnects.

Digidesign announced Version 2.5 software for ProTools, which offers full TDM support. The Trans-system Digital Matrix Bus allows processing cards and DSP code from Digidesign and 60 other companies to be controlled from within Pro Tools, including enhanced mixing, reverb/ambience generation, parametric EQ and dynamics. Version 2.5 also extends OMF functionality and adds external sync functions. Also new: Post-Conform software, which offers automated EDL autoconform and serial control; and a dedicated hardware controller with eight assignable moving faders and transport controls.

Fairlight ESP demonstrated new features for its powerful MFX 3 system, including 24 channels of playback from a single hard disk, 40-bit DSP architecture running at 133 MHz (!)—which offers real-time EQ, pitch shift and log crossfade profiles—plus an AES and S/PDIF digital I/O card.

Micro Technology Unlimited was showing its cost-effective MicroStation system, comprising a series of PC-compatible digitizing and playback cards, plus a time code sync card. The system handles 15 sample rates and can replay multiple tracks from disk.

New functions available on the Orban DSE-7000 systems, under its revised V4.0 software, include improved librarian capabilities, on-screen displays of metering and I/O status, plus storage and recall of track enables and solos. A new DSE Disk Cache accelerates disk transfers between the RAM-based editor, and a new digital I/O module offers compatibility with AES/EBU and S/PDIF sources and destinations.

Otari showed both the ProDisk 464 and a production version of RADAR, which comprises the digital equivalent of a 24-track recorder, complete with remote control and autolocator. ProDisk 464 is now shipping with the new GUIDE software (Graphic User Interface for Digital Editing), with integrated nonlinear video playback and V5.0 software that offers LTC/VITC synchronization, support for external MO drives, and optional dynamics control and CMX-compatible autoconform.

The V2.0 software of Roland Pro Audio's DM-80 system features waveform display on the remote panel; up to 40 positional markers; auto-trim mode (which searches to the first modulation on a selected sound cue); fader grouping; auto-naming of cues; plus group move and back-timing functions. The Mac-based software controller now supports up to 32 replay tracks from multiple DM-80 systems.

Sonic Solutions announced that its Sonic System editing and mixing software is being ported to run on Silicon Graphics and PowerPC platforms. Networking figured prominently in the firm's demonstrations and hands-on displays, using the new MediaNet Server and Client Cards for the Mac platform. In addition to FDDI and CDDI implementations, allowing a theoretical throughput of 12 MB/second, just around the technology corner is an ATM-compatible version of MediaNet. capable of sustained data rates that will allow both multiple digital video and audio files to be accessed in real time from multiple Sonic Systems.

Studer Editech spotlighted the connectivity of its Dyaxis II workstation and new MultiDesk hard-

What's more fascinating than a man who can sing two notes at the same time?

Imagine if you will the sound of a bullfrog swallowing a whistle. That's the startling result achieved by the throat-singers of a South Siberian region called Tuva.

A mixing system that
and digital at the

That's the AT&T DISQ™ Digital Mixer Core.

Up until now, it's been the same old song. Your studio either stays analog or goes digital.

But all that's changing thanks to the AT&T DISQ Digital Mixer Core.

Invented by the company that's been involved with audio since its inception, this remarkable system offers you the unheard of. Namely, the capability to go back and forth between analog and digital. At the mere press of a button.

Analog is still music to many artists' ears.

After all, many rock musicians still prefer analog. To their way of thinking, digital lacks a certain wallop.

The great thing about the DISQ System is that it supports analog lovers while giving them the option of evolving to digital.

Others are really digging digital.

On the flipside, there are artists and producers—be they in Contemporary Pop, Country, Jazz or R&B—who are already sold on digital. They feel it lets them hear nuances they never heard before. And that digital is important in editing and mastering.

The bottom line? The DISQ System lets you cater to the exact tastes of any client.

Adding digital by adding to your analog system.

The DISQ System works in tandem with your existing analog boards.

Meaning you avoid the big learning curve a new digital console requires. So when clients ask for a certain sound,

can be analog
same time.

an engineer still knows which of 3,000 faders and knobs to move a mere fraction of an inch to give 'em what they want.

Spend half as much to do twice as much.

Besides the incredible flexibility the DISQ System's capabilities afford you, there's also the cost savings.

Because you simply add the DISQ System rack to your existing hardware, there's not a ton of pricey equipment to buy. Or install. Meaning your downtime is kept to a bare minimum.

Add other stuff anytime down the line.

You won't get hit up for lots of gadgets when you want to upgrade, either.

Typically, all it takes is new software.

In fact, the DISQ System is so flexible that mixing board functions can be changed with a mere tweak.

AT&T Bell Labs: A name that's pure platinum.

Not surprisingly, the technology for the DISQ System came from the best R&D (not to be confused with R&B) facility in the world—AT&T Bell Labs.

A mixing system that's both analog and digital. It's not impossible. It's the AT&T DISQ Digital Mixer Core. For details, call 1 800 553-8805. Outside the U.S. and Canada, dial 919 668-2934.
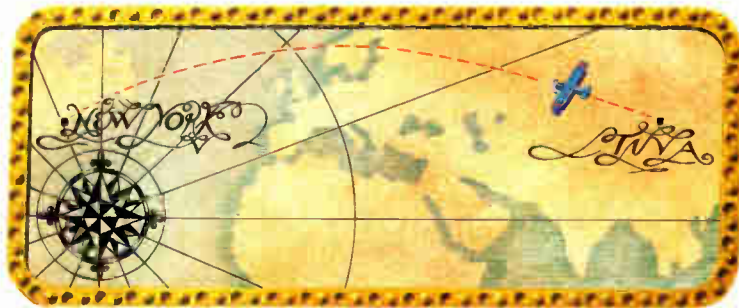
If the Tuvans wanted to use the DISQ System to make an album, they might have to travel to a city many Americans find foreign.

AT&T

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USE READER SERVICE CARD FOR MORE INFO

World Radio History

INDUSTRY NOTES

Shure Brothers Inc. (Evanston, IL) promoted **John F. Phelan** to vice president, international marketing and sales, and **Alan G. Hershner** to vice president, domestic sales... Buchanan, MI-based **Electro-Voice Inc.** named **Jim Long** to head its pro sound team, and **Terri Briggs** was named director of marketing services. Long will direct the marketing efforts of EV's pro sound unit in North America, and Briggs is responsible for development and production of the company's space advertising, literature and other promotional and support programs. In other EV news, **Mark Blanchard** was promoted to applications engineer, and C.L. **Pugh & Associates** is celebrating its 50th anniversary as a manufacturer's rep for Electro-Voice... **Opcode Systems** (Palo Alto, CA) named E. **James Hannon** as vice president of sales and marketing. The company's new multimedia division, Opcode Interactive, hired **Andy Sells** as vice president of multimedia development... **Spectral Synthesis** of Woodinville, WA, appointed **AudioTechniques** as its New York metropolitan representative... **Digidesign Inc.** hired producer and keyboardist **David Lebolt** as professional products manager... **Neutrik USA** (Lakewood, NJ) created two new positions, hiring **Edward Obuch** as engineering/production manager and **Larry Niles** as product manager for jacks, plugs, jack fields and commercial connectors ...Booking agency the **World Studio Group** recently added six new members, including three mobile recording companies, to its roster. The mobiles are **Fleetwood**, out of London, SCI of Tokyo, and **Westwood One** in L.A. Other new members include **Synchrosound Studios** in Kuala Lumpur, Malaysia; **Valley Studios**, Lausanne, Switzerland; and **BearTracks Recording Studio**, Suffern, NY... The **World Percussion Network**, the Percussive Arts Society's bulletin board

system, can now be reached at (405) 353-1441... UK-based studio sound integration and control systems company **Motionworks** recently relocated to larger headquarters. The new address is The Barn, Worton, Oxford, OX8 1EB. Phone 0865 883001, fax 0865 883002... Due to damage from January's quake in L.A., design firm **studio bau:ton** relocated its offices to the Wiltern Theater tower at 3780 Wilshire Blvd., Ste. 420, Los Angeles 90010. Phone (213) 251-9791, fax (213) 251-9795... **AGI Inc.** (Melrose Park, IL) reorganized its sales and marketing departments, dividing the sales force into three specialized market-driven groups: **Pam Sansbury** is vice president of multimedia sales and marketing; **Rich Oppenheimer** is vice president of entertainment sales and marketing. Oppenheimer will also direct the consumer products packaging division... **Dobbin/Bolgla Associates** moved to new offices at 24 East 21st St., 3rd Floor, New York, NY 10010. Phone (212) 388-1400, fax (212) 388-1490... **Dr. Harry Clark**, past president of the International Network of Performing & Visual Arts Schools, was named national director of academic relations at **Full Sail Center for the Recording Arts** in Winter Park, FL. He will be directing the school's outreach programs to high schools and other secondary schools... The first annual International Country Music Workshop will be held August 4-6 at the Music City Sheraton in Nashville. For more information, call (615) 322-9897... Now in its tenth year, **Gand Musictech** will hold its '94 expo on September 17 at the Radisson Hotel in the Chicago suburb of Lincolnwood, IL. Dedicated to electronic musicians and project studio engineers, the show is the creation of Northfield, IL-based Gand Music & Sound. For more information, call (708) 446-4263. ∎

ware controller, including compatibility not only with its own MultiMix and MacMix file structures, but also Sound Designer II, OMF, AIFF and LightWorks formats. Also supported is direct access to Ethernet and FDDI-based network systems. "Plug-and-play" is possible via erasable MO drives, using either a non-compressed format on 5.25-inch media or data-reduced using the modified Dolby AC-2 algorithm for 3.5-inch drives. Direct serial control is now available via Sony 9-pin, Lynx, DA-88, SV-3900 and ASC Virtual Recorder protocols.

Timeline Vista showed a revised and extended version of its new Studioframe DAW-80 workstation, derived from the basic WaveFrame designs that the firm purchased from DFX Systems earlier this year. Version 6.0 of the Windows-based software offers combined functionality for music-recording and post-production applications, plus improved editing functions, floating toolbars and other features.

TEC AWARDS TO HONOR HANCOCK, ZAPPA

Herbie Hancock will be given the Les Paul Award and Frank Zappa will be honored posthumously with a Hall of Fame induction at the Tenth Annual Technical Excellence & Creativity Awards, to be held November 11 in San Francisco.

Academy Award-winning keyboardist-composer Herbie Hancock performed with Miles Davis in the '60s and has emerged as one of the most influential electronic jazz artists of his generation. During his fabled and innovative career, Frank Zappa released more than 50 LPs, ranging from '50s doo-wop to complex symphonic works to spellbinding jazz-rock fusion.

For more information about the TEC Awards, call Karen Dunn, Executive Director, at (510) 939-6149. ∎

by Stephen St.Croix

FROM HERE
TO ETERNITY

W e all live out our lives inside one of these organic machines—you know, the one you are in right now. Each of these machines has a basic operating system and runs one huge (albeit, incomprehensibly efficient and compact) life-long, self-adapting program. Way back in the Piezo-Electric period, the basic Version 1.0, with its four-part superstructure, worked quite well.

Every human machine went through the same program. First, boot. This was, of course, the original "warm boot." Second, learn. Specifically, this is a three-part process: learn what to learn, learn how to learn and then learn the stuff you need to learn. Third, during the period of optimum mechanical performance, the prime directive turns on, and procreation (and the stuff that makes it possible, like fighting for our mates and defending our own little territories) fills the lives of the machines. Finally, the machine self-terminates so that other machines, hopefully of their own manufacture, can have the space and food they need to run the same program successfully again. Remember, we are all sharing a small bit of space on a very tiny rock in a big, black, scary void, and even the modern 1.0.5b machines know that they will never leave this rock.

Oh, yeah, there are a couple of Band-Aids: a built-in reward mechanism to keep the machine in line and built-in self-repair routines to cover the machine's proverbial rear resting pads in the event of unforeseen minor mishaps. This repair ability is limited so that units exceeding certain maximum levels of stupidity or self-destructive behavior cannot recover, terminating the line. Simple. Elegant. Shockingly functional and practical.

ILLUSTRATION ANDREW SHACHAT

World Radio History

So efficient that it got us all the way to now, more or less unchanged.

However, a secondary subroutine developed along the way: society. And operating this machinery within the shell of a society has allowed the addition of a new step between the original steps three and four—procreation and death. That is, free time for the expansion of our personal universes.

Yes, with the advent of mechanized technical society, we are able to pursue more esoteric paths. And what do we *do* with this free time? Some party, some pet their cats, some nap. Some skydive, others dedicate their lives to trying to stop the oil leaks on their Harleys. Still others lift weights, get liposuction, bleach their hair and get chin implants, and *then* pet their cats or nap. But for this discussion, we will focus on those who want to grow, to expand their universes. They want more contact, input, sort of a second shot at the original second step: learning. These are the people who are awake. This is what I assume you are, since you are actually going to the trouble to take a few moments out of your life to read a semitechnical trade magazine. You probably want to share ideas, concepts, experiences even more now than you did as a kid.

So we are constantly reaching out, searching for ways to transcend our earthly bounds, to increase the amount and intensity of input, of growth. We, as mechanical devices, are each in a sort of private physical prison, and we strive to get as much flow through the bars as possible, in both directions. We must experience and learn; we must express and test our own ideas. We must share to exist. Although no man is an island, each is a peninsula at best. I mean, yeah, though we walk in the Valley, we must looketh both ways or we'll get hit by a Porsche.

The physical senses that once helped us survive in the wild, and in turn helped build a society, now turn to inner growth, to self-expansion within that society (and I don't mean hot fudge sundaes and pepperoni pizza).

But wait! Very soon they will turn again, and to the most extreme level that we can imagine today—freeing us from the mortal coils as never before. Technology, which gave us society and has exploded *as a result of* society, is rapidly advancing to the point of transcending the boundaries of life itself.

If you ignore the moral aspects of the point (certainly one of my favorite things to do), there is only one factor separating fantasy from reality—*resolution.* I mean, let's take a term that describes something we really don't have yet, but at the same time have had all along: "virtual reality." Dreams are virtual reality. Some are even more real than the reality that one lives when awake. Some of you may have experienced drug-induced alternate realities that far exceed your "conventional" or "legitimate" reality in both intensity and in sheer profound awareness. Extreme emotional states, good or bad, alter realities. Profound beauty, pain, compassion, despair. Simple stuff like weather, seasons, fatigue, hunger and age all change your perception of reality, and therefore reality itself.

Drawings and paintings were very early glimpses into other realities—

by Ted Pine

AGREEING TO DISAGREE
THE CURIOUS COURSE OF COMPRESSION STANDARDS

I n 1988, the Motion Pictures Experts Group Audio Committee first convened with an ambitious agenda and mission: to standardize the formats and use of audio compression across a wide variety of professional and consumer applications, ranging from satellite and terrestrial transmission to consumer tape and CD-ROM distribution.

Some observers at the time felt that the standardization effort was premature, because new compression approaches were still being incubated in the lab. Sure enough, after five and a half years of international standardization, a bewildering and seemingly ever-growing variety of formats compete for supremacy on an application-by-application basis, including the following:

- ADPCM—CD-I, CD-ROM/XA, video games
- APT-X—Studio-transmitter links (STLs), audio WANs, cinema audio
- ATRAC—MiniDisc, cinema audio
- Dolby AC-2—STLs, studio WANs
- Dolby AC-3—Cinema audio, laserdiscs, video-on-demand
- MPEG-1, Level I—DCC
- MPEG-1, Level II (MUSICAM)—CD-Video, DAB (Europe), DBS
- SEDAT—Network and cable head end satellite transmission

Perhaps the greatest blow to the dream of worldwide conformity came when the HDTV Grand Alliance selected Dolby AC-3 over MPEG-2 as the surround-sound compression scheme for the next generation of U.S. broad-
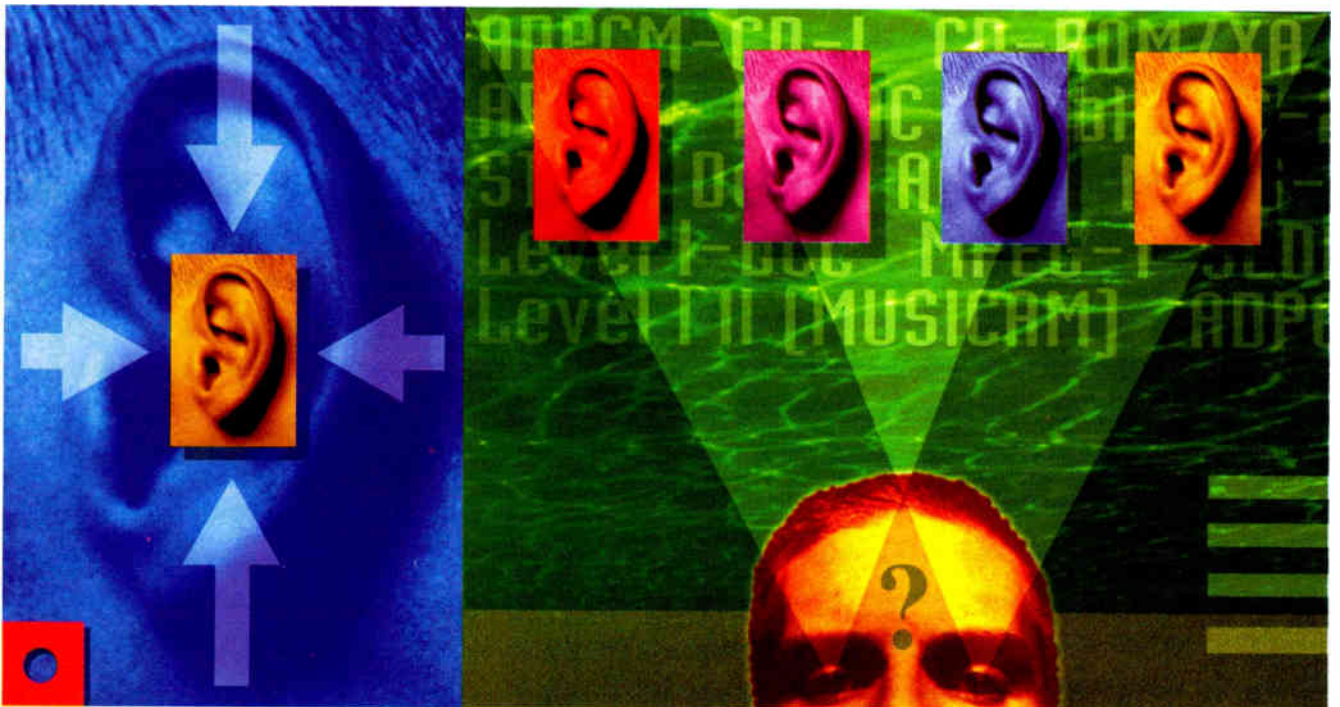
How to Become a Power User

TEC
TECHNICAL EXCELLENCE & CREATIVITY
1994 NOMINEE

Load, edit, and dump simultaneously.

No other digital audio workstation offers the multi-tasking capabilities of the Sonic System. You can load and unload to the hard disk(s) in the background while you edit in the foreground. And while you're working, you've got plenty of playback capability — even the most basic Sonic System can play 12 or more channels simultaneously from a single hard drive! With NoNOISE®, you can now run two jobs simultaneously in the background and keep working in the foreground.

Create radio spots, edit and master a CD, cut sound for film or video, and restore sound with NoNOISE.

The Sonic System is the power platform for a wide variety of applications. Our product line is entirely modular and can be easily expanded or customized to your line(s) of work.

Share soundfiles with the engineer(s) next door.

With MediaNet,™ you can share soundfiles, edit decision lists, and processing resources among Sonic systems. MediaNet is the true Power Users' network — it supports playback of 80 or more channels simultaneously, and multiple users can access the same hard disks (even the same soundfiles!) without introducing a drag on the host system.

Cut to picture with SonicVideo.™

Our built-in digital video gives you fast access to picture so you never have to wait for a tape machine to shuttle. SonicVideo plays back smoothly without any interruptions — even when listening to 24 channels of digital audio!

Write audio CDs and CD-ROMs in double speed.

Sonic Solutions was the first to integrate a workstation with a CD recorder. You can create high-precision CDs which can be used for direct glass mastering, archives, or reference copies. And soon, you will be able to create the new CD-DVs (CD-Digital Video) on a Sonic System!

Invest in a Sonic System.

No other system offers the breadth or flexibility of the Sonic System. And no other system can match the performance for the price — an entry level system, including Macintosh and hard disk, is under $10,000 (slightly higher outside the US).

For more information on why Power Users prefer Sonic, please call your local dealer or our product hot line at (415) 485-4790.

Headquarters
1891 East Francisco Blvd., San Rafael, CA 94901 USA
Tel. 415 485.4800 Fax 415 485.4877

Sonic Europe
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Tel. 31.10.414.7354 Fax 31.10.414.7365

SONIC SOLUTIONS

cast television. The casual observer might quickly conclude that the standardization movement has failed. The question becomes, is there strength in diversity, or will the multiplicity of standards ultimately hinder the audio industry?

THE MARKET SPEAKS

In the search for the saboteur of the standardization movement, one need look no further than the market itself, which has demanded development of digital transmission and storage solutions at a rapid-fire clip, rather than at the slow and deliberate pace of standards bodies.

Consider the evolution of EDnet, which in the wake of its acquisition by IDB, offers three different services for real-time transmission of compressed audio over terrestrial phone lines: The Digital Multichannel System (DMS) for music recording and film/TV post-production offers multichannel, bidirectional recording synched to time code or biphase over leased T1 lines; the Digital Patch System is targeted for commercial voice-over recording and approvals over ISDN or Switch 56 lines, while Direct Dial Digital Audio (3D2), an outgrowth of an earlier analog satellite service for voice-over recording, also has converted to multiple direct-dial ISDN or Switch 56 lines.

Though similar in concept, each of these services was originally developed by different companies for different applications at different times. Today, each has a defined and enthusiastic market niche, and each is based on a separate, incompatible compression scheme: DMS uses Dolby AC-2, DPS uses MUSICAM, and 3D2 uses APT-X.

Howie Schwartz, owner of New York's Howard Schwartz Recording (which has solved the compatibility problem by installing one of each of the systems), maintains that comparing the systems based on the merits of their underlying compression types is largely irrelevant. "If a client wants to know what the difference is between one system and another, we tell them that the difference is some studios have one, some have another," Schwartz explains. "There are some differences, to be sure: 3D2 and DPS are direct-dial systems, so we don't have to go through a hub,

by Mr. Bonzai

Ray Benson
SINGIN' AND SWINGIN'

How do you get Garth Brooks, Merle Haggard, Huey Lewis, Lyle Lovett, Suzy Bogguss, Willie Nelson and Chet Atkins all together for a celebration of Western Swing? Just hop in the audiomobile and make sure that Ray Benson is Asleep at the Wheel. His 1994 Grammy-winning tribute to the music of Bob Wills & The Texas Playboys is a joyride *deluxe*.

It's hard to believe that Bob Wills drove Western Swing to such heights in the '30s and '40s and then it all but petered out in the '50s. Wills was a rare and hugely popular figure in American music, a crossover country pioneer who combined blues, Dixieland, fiddlin' cowboy tunes, mariachi, polka and traditional folk music into a style that makes you want to put the pedal to the steel and gun it. Merle Haggard has been a tireless advocate for the Wills legacy, and for much of the past two decades we've had Ray

Benson bringing it to the forefront, creating a stir at urban hoedowns across this great nation of ours.

At six-foot-seven, Benson's a mighty big man with a mighty big heart, down-to-earth but with his ten-gallon head close to cowboy heaven. When Benson isn't behind the Wheel, he's a wrangler of talent, getting the best from the best, as producer of such mavericks as Aaron Neville, Bruce Hornsby, k.d. lang and Dolly Parton. What may surprise you is that this colorful character is also a studio owner and tech weenie. Join us now as we learn how to hotwire some old tubes and get the show on the road...

Bonzai: How's your studio coming along?
Benson: Great, everything is cookin' right along. The studio now is 1,000 square feet total, and we're adding about 1,000 more.

PHOTO: JIM CARR

Bonzai: What kind of console are you using?

Benson: Right now I've got a Peavey AMR, upgraded a bit. We're shopping now, but it's been so damn confusing because we really just monitor back through the console. I just need a board to listen to, and the Peavey has been retrofitted with different chips. They use these great TLO-72s, but Burr Brown makes a replacement that gives it a little more high-end clarity and low end.

When I got down to building my own studio, I realized you're paying for a lot of unnecessary gear in terms of the board. For instance, you're talking about each channel with a compressor and a gate, etc., and how many of those things are you actually using? We dig outboard gear anyway, and specific little things. I don't like the sound of a certain compressor, or limiter, for all instruments.

Bonzai: How did you develop your passion for outboard gear?

Benson: Well, I started out going from studio to studio with the same microphone for my vocals, figuring that I had found the right one, a Neumann U47. My voice has all this barking low-end stuff. But even with this mic, I found that I had to EQ my voice. Why is this? Well, there's this little thing called a microphone preamplifier. I then found that a Trident A-range was the mic preamp for my voice in combination with the U47. That was the first gear I bought, which I had fitted into a box with a power supply. No matter what studio I worked in, I could get my voice to sound right.

I took it a little further and decided that if it was true for my voice, then it was true for every instrument. I don't mind EQ, but I want to do as little EQing as possible, because of things like inherent phase shift. I don't mind it much in the mix process, but I really don't want to EQ when I first go down to tape unless I've got exactly what I want. I figured that every instrument must have an ideal mic pre.

I love the Trident A-range for a lot of people's vocals, and for electric guitars, steel guitars. I've got a total of 27 channels of mic pre, and I'm thinking of adding a few more. I've got two channels of Neve 1066 EQs, which I like for crunchy guitars. I've got two channels of Neve 1272 line amps that were modified by Brent Averil to be mic pre's and also direct in, and they're good for all kinds of instruments. I've got four channels of Summit tube mic pre's, which are very versatile for everything from vocals to fiddles. I've got four channels of API 312s, just cards I bought and hooked up with 550A and 550 EQs.

Bonzai: Don't you find it kind of funny to be rattling off all these numbers?

Benson: Yeah, my wife thinks I'm talking Greek, but to me they are *sounds*. A snare needs a 550A to sound right. You use them enough and they become more than just techno-words. It spooked me at first, but you learn as you go.

Bonzai: What recording medium do you use?

Benson: I go to ADAT first, a great format because of its [low] expense, and it's also modular. I've got 48 channels of ADAT, and you can just pop another tape in and you've got another 8 channels. When I recorded Chet Atkins, for instance, there was nothing more frustrating than having a 24-track machine and having two tracks to do guitar overdubs on. I know

you can slave it to another 24-track, but you're also talking about $150 for a reel of tape, X amount of dollars to rent the machine. Rewinding with two machines locked up is no fun. It's lotsa bucks and a pain in the ass.

Bonzai: Yeah, paying for a pain in the ass is like going to a proctologist.

Benson: [Chuckles] I'll take your word for that, Mr. Bonzai. Anyway, when the ADAT came out, I bought the machine immediately. We listened, and also modified them with Burr Brown chips in the D-to-A's. The company is out of Phoenix, and they make high-end chips for many applications. They make the chip for the ADAT, but they have a high-end one that is a little bit better for our purposes—just for listening. So, we record ADAT, and that gives me the flexibility to assemble all the tracks that we need.

But to me, and to many folks, digital sounds a little thin—like when you hit the snare drum. And with fiddle, it adds a little edge that I don't like. We found that we got what we wanted by transferring to analog through Dolby SR, and I happen to have a Studer machine. SR to the high-formula tape, the 499 or the 996,

gives me that desirable analog effect.

Now we are also mixing to ADAT because we found you could punch in your mixes—just going to two channels of ADAT. If we want to keep a mix, we can do a whole mix down to 2-track, and you have four 2-track mixes on the ADAT. You can store four mixes and punch in and out of them, or you can punch in and do your mixes to two tracks of ADAT. We call it "poor man's automation."

Bonzai: Well, I think we've covered enough to satiate your fellow tech weenies.

Benson: But we haven't even got to my microphones and my compressors. Let me tell you a radio story—I went to this little station and asked them if they had any tube stuff. They said, "Yeah, we just bought the station last year, and we've been shoveling it into the basement." I went downstairs, and there laying in the corner was an LA-2A. I asked them if they would sell it, and they told me to go ahead and take it before they dumped it. I got a perfect LA-2A for nothing. I felt so good, I went out and bought a DAT machine.

Bonzai: Let's jump to the music.

What is the history and the greatness of Western Swing? Can you tell me a little about Bob Wills?

Benson: Western Swing is music that was a hybrid from the Southwest starting in the late '20s, and it was pioneered by Bob Wills and a guy named Milton Brown. They had a band called Milton Brown & His Musical Brownies. These were wacky guys—the main instrument of the Western band was fiddle, and then this Hawaiian guitar thing.

You've got to understand that in the '20s and before, the population was about 70 percent rural. The fiddle was the lead instrument. If you were a cool guy and wanted to get the girls, you played the fiddle. These guys were fiddlers in the country mode, but Bob Wills said it all changed when he heard Bessie Smith. And then he discovered vaudeville, ragtime, Dixieland and swing. He went, "Wow, this is young people's music, this is dance music." They combined it with their fiddling heritage and formed this Western Swing band. Before that, Bob had played with a medicine show as a black-faced fiddler.

He was directly influenced by an

old guy named Emmet Miller & His Georgia Crackers. This is the guy I call the missing link in American music. Emmet was a white guy who did black-face vaudeville stuff, sang like a black man, and did the original version of "Lovesick Blues," which was a big hit for Hank Williams 30 years later. He also did "Anytime," and in his band was Tommy Dorsey, Jimmy Dorsey, Jack Teagarden, Gene Krupa and some other great players. Emmet sang in a kind of falsetto and also yodeled. Bob Wills said he got his inspiration here, and Jimmy Rogers also got his yodel from him. There's the history of country music right there.

Bonzai: Isn't it hard to believe how big a star Bob Wills became in the '40s?

Benson: Well, in 1940, Bing Crosby had a Number One pop record on Bob's "San Antonio Rose," and Bob Wills had one, too, with what was known then as a race record, which sold a million copies. Hillbilly music was race music, and he was sort of classified as a hillbilly entertainer.

In 1940, he went to the Grand Ole Opry, because "San Antonio" was Number One. He arrived with drums and four horns. The Opry said, "No drums." Bob said, "Pack 'em up, boys, we're goin' home." They wanted him to play, so they made a compromise and put the drums behind the back curtain. They let him play but wouldn't let anybody see the drums. So, this was a first. Minnie Pearl, the great comedienne, said that country music was never the same. Before Bob Wills appeared, every hillbilly used to wear overalls, flannel shirts and big brogan shoes. Bob and his band wore Western suits and cowboy hats and cowboy boots. As soon as Bob left, they all got new wardrobes.

Bonzai: Well, this is a fashion statement that we still see in force today. Just look at you!

Benson: [Laughs] Yes, the history of country music is very cool. In vaudeville they used to have the "rube," a country guy who was such a hick that he didn't know about big city ways. The Grand Ole Opry was a celebration of this, and here was Bob Wills—no rube, he was a slick guy. Texas has always considered itself apart from the South. And there was a sophistication that wasn't evident in the rural South. Bob was no hick, although he was rural.

Bonzai: Is it true that Bob put the

"western" in country & western?

Benson: Absolutely, and he had electric guitars—the first popular country artist with an amplified band. I've spoken with Leon McAuliffe, who was his steel guitar player and had joined Bob when he was 16. Leon had a Martin guitar with a raised nut for playing slide. When this electric thing came out, he said he bought a pickup from the furniture store. Since they sold phonographs, that's where you went to get your electronic stuff. They had this big block magnet, and they'd shove it in the hole there and run a cord out to the amplifier, and that's

how they electrified the guitar. It was just a big magnet, and he told me that it had to be remagnetized every week. At the end of the week, it started getting real distorted and fuzzy. You had to take it in and run it through the magnetic field. Radio was big, and this was an outgrowth of radio technology.

Eldon Shamblin, who plays on our latest record, was one of the Texas Playboys. He's 79, from Oklahoma, and he had been influenced by players like Charlie Christian and George Barnes from Chicago. Bob Wills heard Eldon and hired him because he was such a good musician. You see, Bob's

early band had guys who weren't really great musicians, but they were energetic. They did great stuff like "Who Broke the Lock on the Henhouse Door" and "No Matter How She Done It, She's Just a Dirty Dame." All these bawdy kind of New Orleans songs, ragtime stuff.

When Eldon joined the band they became more polished, more swing-oriented. They also liked blues music, and black music. This was the most racist time in American history, and these were good ol' boys from Texas and Oklahoma, brought up to believe that black people were inferior, and yet they knew these people could play music with a level of sophistication that was way beyond what they had been told. It was a dichotomy, but they understood that black people had the key, and they borrowed from them heavily. That's why they were great.

Bonzai: How did you get hooked on this music?

Benson: Well, it was 1968, and I heard it and really liked it. I enjoyed western music: Buck Owens, Merle Haggard, Hank Williams. I was playing rock 'n' roll and folk music, and as a kid I had played in square-dance bands. When I was 11, I started a band with my sister and we played folk music, doing songs by Woody Guthrie, the Carter Family. Then came rock and electric guitars, and jazz. I played tuba in a marching band, bass fiddle in the orchestra, sang in the choir. And I could read music, so I got jobs through high school. When I heard Bob Wills, I bought a cowboy hat and started Asleep at the Wheel to play country rock, and country music. When I heard Bob, I realized I could wear a cowboy hat and play jazz! [Laughs]

So, being a hippie by then, we moved the band to West Virginia and bought a farm, and we played the honky tonk in town and met girls. We played country music and then a little western swing. The feeling of playing this music is like getting high—the 4/4 kicks in and you improvise.

Bonzai: What strikes me is that the stories are sad but the music is so uplifting.

Benson: Exactly, the whole point is to have a good time, either playing it or dancing to it. It's a social event. In 1971, we moved out to Oakland at the behest of Commander Cody & His Lost Planet Airmen. We still do his "Hot Rod Lincoln" regularly in our shows.

Without Cody, we never would have made it. He introduced us to people and pretty much got us our record deal. We spent three years in the Bay Area growing up. There's lots of Texans and Okies in California, and Bob Wills lived in Sacramento in the early '50s. We met a lot of his players and studied from the source. That's when we really became a western swing band. Things changed when we met Willie Nelson while touring in 1971, playing some shows with Kinky Friedman, who Cody really liked.

Bonzai: Weren't Kinky Friedman & the Texas Jewboys a tip of the hat to the Texas Playboys?

Benson: Yes, a play on words, but musically there was nothing in common. Kinky is his own world. He used to tell me that being a Jew in Texas was the kinkiest thing that could ever happen; like being from Mars. Kinky is an unnerving kind of guy. It comes from being Jewish in Texas during the '50s. A friend once told me that he thought it was worse than being black because at least there were a lot of other black people. Not only did you get beat up, but you didn't have anybody to date. Kinky is a talented writer and a great social commentator; he's the Lenny Bruce of Texas.

Bonzai: Do you think Merle Haggard could dig Kinky's "I'm Proud to Be an Asshole from El Paso?"

Benson: On a given night perhaps. But Willie Nelson was a major Kinky fan, and Willie is the one who got us to come back to Texas. He saw our show and told us we should move to Austin. Willie was everything, and so I just said, "Okay." He's like a Pied Piper. And during the '80s, he really helped us out and gave us some studio time. He was huge—making 20 or 30 million a year, and generous at a difficult time for the Wheel. But later on, I found out that two studios in town went out of business. They told me they could compete with $25 an hour—but not with "free."

Bonzai: And now we've got huge paintings of your new album on Sunset Blvd. in Hollywood.

Benson: Somebody must have bribed somebody.

Bonzai: And this is your fourth Grammy?

Benson: Yes, and it was great working with these people on the album. I've known Dolly for many years, and it was great to work with her again. It started out when we were

doing *The Tonight Show*: I was sitting backstage when I got a call from Dolly Parton. I thought it was a joke at first, but she asked me if I would make a movie with her. She's the coolest gal I know, and we did this TV movie, *Wild Texas Wind*. I did the score, wrote six tunes with her and costarred with her and Gary Busey.

Bonzai: You've got a pretty good voice. Where did that come from?

Benson: Ernest Tubb. I started out imitating him, while most people try *not* to sing like him. My inspiration was that you should sing like you talk, and then you'll always have your own style. It's hard to talk about your own singing, because you have to be totally insecure to be a good singer—you have to self-examine to get decent.

Bonzai: What's the best thing about being six-foot-seven?

Benson: You can stand at the back and still see the parade.

Bonzai: What's the worst thing?

Benson: Airplanes.

Bonzai: Do you tour a lot by bus?

Benson: We sit on a bus for about 100,000 miles a year. The bus is really cool—you've got VCRs, stereos, microwave, and you don't need a stewardess. But it's endless hours of road. I loved it for about 15 years, seein' all the towns—but I've seen 'em all 15 times by now. Sometimes the hours are a bit disconcerting.

Bonzai: On the new album you do the old favorite "Big Balls in Cowtown." Is that only about dances?

Benson: There is no innuendo there, but the kids think it's hilarious. We played the Minnesota State Fair, and a lady from the fair committee came backstage and said, "Did you sing 'big balls in cowtown?'" We had to explain how many old songs have taken on extra meanings.

Bonzai: What's this about you doing dance remixes of your songs?

Benson: Well, there is this huge dance thing going on for country & western clubs, all over the country. They don't want to stop dancing after three minutes and 20 seconds, so you have to elongate the songs. It's really cool—add a drum machine kick and snare for more rhythm, a little something for the subwoofers, and some extra choruses—the '40s meets the '90s, and all hell breaks loose! ■

In keeping with the spirit of the downsizing '90s, roving editor Tex Bonzai recently switched from a 10-gallon to a 6-gallon hat.

YABBA-DABBA-DUB!

THE
FLINTSTONES

● ●

BY
TOM
KENNY

No metal. It's an edict from above: No metal sounds. After all, the Flintstones are a modern Stone Age family—not from the Bronze Age, not from the Iron Age, and director Brian Levant is adamant. At one point during the final mix on Reel 6, Fred flips Barney, who's now a waiter, a coin as a tip. "I heard metal!" Levant says, turning to supervising sound editor Mark Mangini, who then calls back to the machine room

Editing
And Mixing
Stone Age Sound
For Digital
Delivery

for another unit. One more pass, and the metal "chink" is replaced with a stone/wood "chunk."

This, of course, is an easy fix, as the units are on hand. There are more pressing concerns in the final mix of *The Flintstones*. It's Thursday afternoon on the Hitchcock stage at Universal, and there are still three reels to prepare in order to have a 2-channel mix ready for a Sunday night screening at executive produc-

PHOTO: RON BATZDORFF

er Steven Spielberg's house.

A music track over the Bamm-Bamm montage has a sync problem carried over from production. And the premix for Reel 2 has been held up because the pencil test on a pterodactyl hasn't arrived yet from Industrial Light & Magic. Still, every film has its last-minute concerns.

For *The Flintstones*, the big challenge for the audio team has been in defining the film as a cartoon or a comedy. From the beginning, the

movie version of *The Flintstones*, that immensely popular prime-time cartoon that ran from 1960 to '66 and has enjoyed an unlimited run in syndication, has been pitched as a live-action comedy—*not* a cartoon.

"Like the writing, like the acting, like the production, you're always walking a fine line between making it real and its cartoon roots," Levant says. "As you may have observed, sometimes I say take out all the cartoon effects, and other times I say turn them up. So it's choosing your spots. The best example of how that merged was in our first temp dub for the big fight scene, when Barney hits Fred. Mark Mangini put in the sounds of birds circling Fred's head. We laughed, and it made me think, 'Why don't we put birds circling his head visually?' But it's the Flintstones, so we don't do birds—we do pterodactyls.

"Luckily, we had money left in our ILM war chest and could go to the mat one more time," he adds, "so we made pterodactyls flying around his head. But there's a balance you walk on every decision, and I'm the director, so it has to be my choice. I worry about being too cartoony in the sound and not real enough, or too cartoony in the acting. It's always a balancing act."

That balance has led to some frustration for the audio effects team, mainly centering on the no-metal dictum. Mangini, a principal at Weddington Productions whose entree into sound editing was at Hanna-Barbera 18 years ago, would have preferred a more cartoony track, including the use of metal, a cartoon library staple.

"But Brian has said, 'No metal' from day one," Mangini says, "which has severely tied our hands. He's decided that it's all right to break the rules momentarily for a cartoon moment [such as when the bowling ball falls on Fred's head, accompanied by an anvil sound], but in the picture you don't see metal anywhere. That's tough for us. It would be like

PHOTO: GEORGE LANGE

Stars of The Flintstones, an Amblin Entertainment/Universal Pictures release: (left) John Goodman and Rick Moranis with the Dictabird; (top) Rosie O'Donnell, Moranis, Goodman and Elizabeth Perkins; (right) Perkins making a Bedrock breakfast.

giving Picasso a palette and saying, 'You can't use blue. Do whatever you want, but just don't use blue.'"

Admittedly, *The Flintstones* is not an effects-heavy movie, and on first reading the script, Mangini's main concern was Dino and the other dinosaurs. After experimenting with animal sounds, he knew that Dino couldn't be fabricated; he would have to be performed. Numerous voice auditions didn't pan out, so for the scratch [temp] mix, Mangini and Levant went into Weddington, and Mangini performed Dino's vocalizations to picture, recorded to 3-track mag with SR. More auditions followed, but in the end, Mangini was still Dino. .augmented with tracks from the master, Mel Blanc.

"Brian's son, in this sort of offhand-

PHOTO: RON BATZDORFF

ed way, said one night, 'Hey, dad, why don't you get Dino's voice off the TV show? '" Mangini says. "That is something I never considered, because I knew they didn't have a library of Dino's voice at Hanna-Barbera. I told them I would look into it, and that's when I got these 60 half-hour episodes from the early '60s, from Turner Network—on ½-inch, 4-track, reel-to-reel: time code, dialog, music, sound effects. Dino's voice is married to the dialog track.

"So I spent two weeks listening to 30 hours of *Flintstones* TV shows, and from that, I got five minutes of

(Left) The Flintstones audio team (from left): Mark Mangini, film editor Kent Beyda, director Brian Levant, co-producer Colin Wilson, Jimmy Bolt, unknown, Andy D'Addario, producer Bruce Cohen, (seated) Rick Alexander; (top) music editor Laurie Higgins-Tobias at her Pro Tools station; the re-recording team with Beyda and Levant at the SSL 5000 on the Hitchcock stage.

Dino vocals in the clear," he continues. "We used that as a basic kit, then. I had a ½-inch, 4-track sitting next to my Pro Tools station—actually, I loaded it all into Sound Tools, into Sound Designer II—and I built up this huge kit of material. I cleaned it up and organized it into groups of 'Dino Happy Barking,' 'Dino Sad,' 'Dino Panting.' Then I ran it through the DINR noise reduction algorithm to get rid of tape noise and artifacts of re-recording over the years, and I made a master out of it. I gave that to the sound effects editors, and they could pick and choose between Mark's slurpy thing here and Mel Blanc barking there. The stuff I did was usually specific to certain scenes, like Dino singing during a conga dance scene. The problem ended up solving itself simply and easily without having to go through a lot of sound creation."

All of the effects, including Fred's footsteps and Fred's car, came from the Hanna-Barbera CD library, distributed by Sound Ideas ("You have to know where to look," says Mangini. "Fred's car is under 'cement mixer,' because that's what they used to make the original."), and Weddington's in-house library, which includes such Stone Age sounds as the rock-slab tomb removal from *Raiders of the Lost Ark* (by supervising sound editor Richard Anderson, also a Weddington principal) and the baby cry of Max Spielberg.

There was no original recording on this film, though there was quite a bit of Foley and a huge amount of what Mangini calls "fabrication." The

effects from production were unusable, as all the sets were made of styrofoam. Because the town of Bedrock doesn't exist anywhere except in a makeshift quarry outside of Los Angeles, all backgrounds and "atmospheres" had to be constructed from scratch.

"As a sound editor, it's your job to make a complete aural landscape, with foreground, midground and background sounds," Mangini says. "The thing I was very concerned about was giving a sense of being in a Stone Age community—a Stone Age downtown with Stone Age traffic. We started by making individual prehistoric vehicles and a variety pack of car passbys. Then we build that up on the multitrack to create traffic. We add goose horns and bulb horns on top of that, then sprinkle in some kids playing. Some of it is made from carts that Richard [Anderson], my partner, recorded for *The Color Purple*—big buckboards and old Western-style wagons rolling in dirt and gravel. The downtown is something we created piece by piece, vehicle by vehicle, horn by horn, because it doesn't exist anywhere.

"Brian's sensibility, and the sensibility of the cartoon, is that everything is big, everything is stone, everything is prehistoric," he continues. "For example, Bedrock at night—we wanted to have huge crickets, so we made these atmospheres and we slowed down and harmonized crickets to make them

big and prehistoric-sounding. Then in Fred's neighborhood, Dino is the family pet, the dog of the Stone Age. Whereas in modern-day film you play offstage dog barks whenever they're in somebody's house, we have to have offstage Dino barks. Birds have to be bigger and squawkier. There are little pterodactyls in the trees instead of blue jays. So all the atmospheres had to be fabricated."

All dialog, music and effects were edited on Pro Tools; ADR and Foley were edited on mag. "That's intentional," Mangini explains, "because we're a Pro Tools house and we can't scrub video and audio simultaneously—we don't have PostView yet. Until I get PostView, for me, Foley and ADR just aren't very well-done electronically, at least for the kind of accuracy we want."

For the final, effects mixer Jimmy "Bamm-Bamm" Bolt had to bring in a 24-channel Ramsa console to complement the 120-input SSL, because the effects, which were cut to 6-track stems, often filled 54 to 72 tracks, depending on the reel.

A couple of final effects notes:

Those distinctive Fred footsteps are straight from the Hanna-Barbera library—"some guy slapping his thighs," according to Mangini. The six-minute rock-crushing machine sequence in the climactic scene is all created from sound effects, no Foley. And when Fred gets hit on the head with the bowling ball, a real cartoon moment, that's a brake-drum hit, much as it would be on Saturday morning.

"This is a comedy," Mangini explains, "and we had to be very careful not to go overboard with the sound. This film shouldn't be overwhelming sonically speaking, like a *Jurassic Park* should be, or *The Fugitive*, or *Cliffhanger*. Those pictures want and play for big sound effects. This is not that kind of picture. The sound should never be that big in size or volume, but it should always be interesting."

MUSIC

In this 86-minute movie, there is roughly 75 minutes of score and source music. The director has a rock 'n' roll mind-set, and film editor Kent Beyda, who had as much input on the final mix as any member of the sound team, is rumored to have one of the more impressive record collections around. While many of the sight gags and one-liners seem to be written for baby boomers, the source music selections—from Green Jelly to Screaming Blue Messiahs to US3—seem to be aimed at twentysome-things. The crossover group, which sings the title track "Meet the Flintstones" and appears on camera singing "The Bedrock Twitch" at Cavern on the Green, is The B-52's, cleverly renamed the BC-52's.

"The Bedrock Twitch" created a few problems in the mix. The B-52's recorded to 48-track digital with time code, which was mixed down to ¼-inch, no time code, then transferred to DAT for playback on the set. At this point, the tracks are wild. So when Kent Beyda cut the sequence to the ¼-inch, there is no sync.

To further complicate matters, the group Foley hand claps were recorded by a sound effects editor (i.e., not a music editor) against the ¼-inch non-sync tape, and everything had to be resynched in the final. Once supervising re-recording mixer Rick Alexander reached his frustration boiling point at repositioning individual hand claps, 12 people were called

down right next to the SSL console to perform two passes of hand claps into an old RCA mic—for stereo right and left—live to picture playback, one week before the print master.

As is common on a lot of films, a music supervisor was not hired. Laurie Higgins-Tobias (*Murder, She Wrote, Columbo* and the films *Problem Child 2* and *Shanghai 1920*, scored by Kitaro) was brought on as music editor in October to prepare the first temp dub, which was built specifically for Spielberg. She was not, however, consulted on preparing playback tapes for the set.

"A musical selection can be made from any non-sync source," Higgins-Tobias says. "The B-52's or any other band can send their song to the editor with or without SMPTE code. The music editor then prepares a master. A good, solid, sure-fire sync master in my opinion is on 35mm sprocket-driven audio tape. Thus, the song is then transferred to 35mm mag and is now on a film sync medium, and it should be from this sync master that all sync transfers should be made—whether for the ¼-inch Nagra playback on the set or for dailies and picture editing."

During the final, Higgins-Tobias had an 8-channel Pro Tools station

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not the size
of the console. . .

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Some Thoughts on Editing And Mixing for DTS

MARK MANGINI ON EDITING:

"DTS changes my editing procedure very little. I will give more consideration to creating additional atmospheres to be played in the surrounds. In Dolby Stereo, you could put up a stereo pair—you know, an ORTF or something—background, play it left and right, and the Dolby stereo matrix will bleed some into the center and some into the surrounds, giving you a nice sort of warm, rounded sound field for your backgrounds. That's not going to be very good in a discrete format, because it's just going to be left and right with nothing in the center backing up dialog. But then you've got these split surrounds that can give you another stereo field.

"So the only additional consideration I give it is that I may have editors double-cut a stereo background. For example, if you have a four-minute atmosphere, I'll have them cut it in half and take the first two minutes so things don't duplicate, and play that front left-right, then play the second two minutes rear left-right, creating some sort of pseudo-quadrophonic sound field. Or we have some quadrophonic atmospheres in our library, and the DTS format gives us the ability to use them. The only other consideration is that you may lay out your premixes where you put sounds in a given channel or unit for panning from one speaker to a surround speaker, or something like that. But, by and large, I don't do much differently.

"I'm assuming, at the final mix, that it's going to play in a perfectly aligned theater like the Academy, and that's what I want to mix for. I don't want to limit dynamic range and have a too-squashed track just because I know it'll play that way in most theaters. I mix for the optimum. Now, given the DTS, it gives you a little more room to breathe in terms of dynamic range and all these discrete channels. You'll take a few more chances to let loud sounds fly a little more because you know you're going to get away with it."

RICK ALEXANDER ON MIXING:

"The problem with optical, of course, is level. With DTS, we get so happy with the low-frequency response that we go to make the optical, and the optical can't handle all that low end.

"One thing we are all pretty cautious about is that we're able to put a lot more level down, and everybody kind of gets carried away with it. For one example, we did *Hard Target* last summer, and John Woo just loved that we could make things so loud, and he really pushed it all the time. But it was too loud for me.

"It goes back to this: When you go to make the 2-track print master that goes on the optical channels, what you end up having to do is compress the sounds and lower some of them, because if you compress too much they get mushy. It's a little different mix that goes down on the 2-track print master—a little softer and a little easier to listen to for the average person." ∎

with a Quadra 950 front end set up in the lobby of the Hitchcock stage to accommodate picture changes and last-minute musical selections.

"Pro Tools is actually the music master," Higgins-Tobias explains. "We mixed down over at Paramount M directly into Pro Tools. Of course, I also lay back all the music to 24-track, so that if I have to make picture changes in another reel, the stage can continue to dub from the 24-track without Pro Tools. I have eight tielines from my machine to the board, and then I just add a SMPTE cable, which goes directly to the back of the Pro Tools rack, and they just take it away like any other machine—it goes online and plays right along in sync."

Unlike the effects and dialog editors, who break down the show into reels, Higgins-Tobias records the entire film as one session in Pro Tools so that she has instant access for borrowing cues between reels. *The Flintstones*, score and source, occupied about 5.5 gigabytes on three 2-gigabyte DEC drives.

Having the Pro Tools station in the lobby certainly allowed for flexibility in a picture where many musical decisions were made during the final. For the Big Audio Dynamite song over the Bamm-Bamm montage, director Levant wanted to end with a specific drum hit, which wasn't part of the original tracks. Higgins-Tobias ran over to Stage 10 on the lot, where they were doing *SeaQuest* sessions, and asked the drummer to record a drum hit to DAT. She brought it back to the Hitchcock stage and recorded it into Pro Tools, then sent it directly to the mixing board. It took a half-hour.

While live-action Hollywood today thrives on big songs from big artists to help sell a movie, for cartoons, score is everything. Often, it is the ambience; always it drives the animation. David Newman composed and arranged a dynamic but fairly straight score, albeit with a Flintstones edge and Henry Manicini beatnik flavor. A 90-piece orchestra was tracked at the Todd-AO scoring stage to 32-track digital, then mixed down into Pro Tools with a protection copy made to 35mm mag.

"David studied the Carl Stalling project, which assembled all the Warner Bros. cartoon cues," director Levant says. "Stylistically, we borrowed from the antic cartoon nature

combined with very straight things to play specific moments—to play Fred's and Barney's themes, Wilma's theme, the Rubbles' theme—but to try to do them with a comic touch."

DIALOG

Although Levant requested a large number of alternate ADR lines to sift through on the final mix, when it came down to choosing between production dialog and a loop line, most often production won. Except, of course, when the test screenings revealed that audiences didn't laugh or understand a joke, as in Reel 6, when Rosie O'Donnell's line "a pack of dire

wolves" was changed to a "a pack of rabid wolves." It didn't seem to matter that the lip sync didn't match.

Production sound mixer Charles Wilborn used a Fostex PD-2 on the set, left-channel only, and always had a Nagra backup running. Although the director often chose to go with the production track rather than an ADR line when both were available, dialog from the set was not without its problems.

"If I could tell production sound mixers one thing from a re-recording mixer's point of view, it would be to quit putting EQ on the tracks," says supervising re-recording mixer Rick

Alexander. "I think I know why they do it—to sound good in dailies—but they don't have near the tools on location that we have in a dub stage, and they don't necessarily know how the scene is going to play once we bring in music and effects. What's best for us would be an absolutely flat, round track.

"Now on *The Flintstones*, we had additional problems with the radio mics," he continues. "Because of the costumes people had on—this pretty thick leather stuff—the dialog had a tendency to be real muddy. So our job was to try to keep it alive. I think what happens with radio mics is that they actually deaden the sound and it doesn't sound natural. To try to add some presence, some harmonics and that sort of thing, is difficult. We have to brighten the tracks up and get rid of the dullness, so we take some of the midrange out, then add a little bit of a Lexicon room program to liven it up. Sometimes EQ isn't enough. It just comes down to experimenting—trying different room sizes and different EQ. Sometimes one angle will be worse than another, so you have to make them all match."

Amblin Entertainment and Universal are banking on a big summertime hit with *The Flintstones*. Maybe not *Jurassic* in size, but big nonetheless. The 2-track optical print was ready in time for a screening at Spielberg's house on a Sunday night in late April. According to Alexander, Spielberg said, "I love it. Don't touch a thing."

There were a few picture changes made the following week, based on suggestions from Sid Sheinberg and Tom Pollock at MCA/Universal, and Levant decided at the last minute to add back some of the more cartoony effects. "We expected to be home every night at 7 that last week," Alexander says. "But at least three or four nights we were here until midnight. We thought it was over, but it all started up again."

Six weeks were spent in the dialog and effects predubs, and then a lot of that work, namely the cartoony effects, was thrown out in the final. It was not an easy mix, though it turned out to be a solid, loud, invigorating mix. One of the problems with making a film like *The Flint-stones* is that everybody involved has a notion of what it should look, sound and feel like, but in the end, it is the director's decision.

"Sound is not the first thing I think of," Levant admits, "so that is why I surround myself with people who really are very 'aural'—Mark and his gang, and Kent. I think I know my music okay, but when I go to a movie, I don't watch with my ears; I watch with my eyes. And maybe that's reflected in my dubbing. [Laughs] I like to come into the dub stage, narrow it down and make the choices, letting the music and sound be the pretty ribbon on the package.

"This is a world made of stone, so we wanted everything to be stone, or at least to sound different," he adds. "That means when you're doing restaurant Foley, you can't use knives and forks and crystal. Every sound, like every prop, every piece of wardrobe, every vehicle, every utensil, had to be constructed from scratch, and that is the ultimate challenge of this movie." ∎

Tom Kenny is a Mix *associate editor.*

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STRATEGY

MANUFACTURERS JOIN FORCES AND MAINTAIN THEIR INDEPENDENCE

SYNERGY

In this industry, as in others, large companies buy smaller ones to eliminate competition and expand their product lines, in the process improving support for clients and customers. When Harman International acquired Studer Revox early this year, for example, the April '94 issue of *Mix* reported that Studer management "welcomed the purchase and [are] convinced that the connection with Harman will beef up Studer in terms of both technology and marketing."

In some cases, a company's desire to be acquired stems from the feeling of being dwarfed by its marketplace foes. "Most of our competitors are now parts of larger companies," former Lexicon president Ron Noonan said after his company was purchased by Harman International in 1993. "As a small, independent American company, we felt that we were somewhat vulnerable, even though we finished [1992] with earnings up 45 percent."

If all goes well when a small company merges with a large one, the new entity retains the larger group's financial strength without losing the smaller firm's flexibility. Theoretically, the customer emerges the victor because the merging of product lines increases the efficiency of sales, marketing and support efforts. "We're now able to offer even better service to our clients, at

by Linda Jacobson
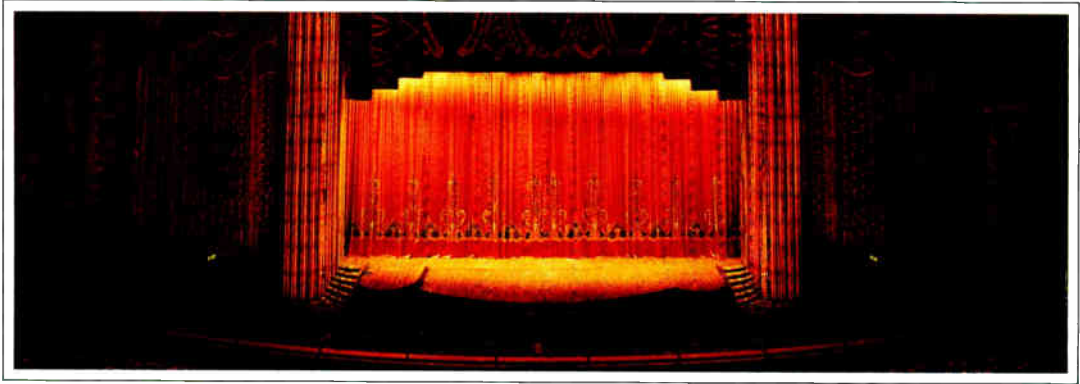
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a fair price," a former Tasco VP noted when A1 Audio bought the assets of Tasco Sound Ltd. in early '93.

Sometimes the most ballyhooed by-products of mergers and acquisitions are the products themselves, as was the case when giant Siemens bought AudioFile manufacturer AMS in 1990. AMS co-founder Stuart Nevison pointed out that the new association, which encompassed a relationship with Neve, another Siemens holding, would extend to future R&D, resulting in accelerated product introductions.

The most obvious reasons for companies buying companies are economic. As Otari Corp. of California's president, Jack Soma, bluntly stated when his firm bought King Instruments, "Otari has been looking for manufacturing capacity in the U.S. to provide freedom from the foreign exchange nightmare and potential restrictions on imported goods."

There's nothing wrong with being honest. And certainly, there's nothing wrong with saving money and lifting restrictions via merger or acquisition, because in the end, the customer reaps the benefits.

If, however, such sweeping consolidations continue to take place, the professional audio industry could end up looking like the record business, with four or five huge companies raking in the bucks and hundreds of smaller firms fighting for profits.

It's a good thing, then, that the pro audio business is experiencing an intriguing new trend: the strategic alliance. Some companies call it by another name—"partner participant," for example, or "development partnership"—but a rose by any other name is still a significant other.

Strategic alliances take shape from the vision of their advocates, who see eventual, if not immediate, benefits. Fighting the urge to merge, they maintain independence while finding ways and means to match complementary resources. This lets them meet market needs that they couldn't before. Sometimes they hunker down specifically to help each other develop, manufacture and market products. In many cases, the newly allied corporations previously had never even crossed each other's sales paths.

In late 1993, for example, Southern California-based Desper Products Inc. announced that Matsushita

NOTABLE BUSINESS MOVES IN THE '90S

(Dates indicate when *Mix* reported the moves.)

January '90	Digidesign announces development deal with Otari Corp. E-mu completes licensing agreement with Matsushita Electric
March '90	WaveFrame merges with Cybermation Inc.
May '90	Swiss company SAEG Refindus acquires Studer Revox
June '90	Young Chang buys Kurzweil Music Systems DOD/Digitech purchased by Harman International
Oct. '90	AKG Acoustics Ltd. purchases controlling interest in Edge Technology Ltd., including BSS, Turbosound and Precision Devices
Nov. '90	AKG Acoustics buys Quested Monitoring Systems Otari Corp. of California acquires King Instrument Corp. GML & Focusrite sign OEM agreement
Jan. '91	Sennheiser buys Neumann Mark IV Audio buys Klark-Teknik
April '91	Siemens Austria, parent company of Neve, purchases AMS Industries plc, makers of the AudioFile
June '91	Otari acquires Digital Dynamics BASF Audio Video acquires Agfa Magnetic Tape Division
July '91	Mark IV Audio & Intelix sign licensing agreement
Aug. '91	JBL Professional acquires Audio/Digital Inc.
Dec. '91:	Studer acquires Digitec WaveFrame & Magna-Tech announce joint development plans
Jan. '92	Neve & AMS merge
Jul. '92	Digital F/X acquires assets of Hybrid Arts
Dec. '92	WaveFrame acquired by Digital F/X
Jan. '93	A1 Audio buys Tasco Sound Ltd. U.S.
March '93	Creative Technologies purchases E-mu Carver acquires U.S. Sound
May '93	Harman International acquires Lexicon
June '93	Avid strikes joint R&D deal with Lucas Digital
July '93	Samson to distribute Zoom
Aug. '93	Roland Japan acquires Roland Corp. U.S. Gauss & Concept Design sign joint venture deal Turtle Beach & Integrated Circuit Systems merge
Nov. '93	Studer handling Nagra product sales & service
Dec. '93	Harman is new majority owner of AKG TimeLine acquires WaveFrame
Feb. '94:	Bose acquires U.S. Sound
April '94:	Harman acquires Studer Revox

Electric Corp. of Japan would be producing integrated circuits based on Desper's Spatializer 3D Surround Sound Processor. Matsushita intends to underwrite the development costs, manufacture the chips in large quantities and sell them to consumer electronics manufacturers. Also in late 1993, Northern California-based Sonic Solutions signed a licensing deal with Sony Corp., agreeing to incorporate Sony's Super Bit Mapping technology into Sonic Solutions products. The two companies also proclaimed their plans to develop al-

gorithm circuitry jointly, for use in CD premastering.

The industry's most recent such affiliation unites AT&T Digital Studio Systems and GLW, makers of the Harrison console. Together, they will develop and sell digital audio products. "We're always holding discussions with others in the audio industry, and in the case of Harrison, the discussions were heading in a direction that seemed to be an advantage to both of us," explains Bill Jones of AT&T Digital Studio Systems. "Harrison has digital console-building expertise that we

didn't have, and we had technology that they didn't have."

That technology is a digital signal processor developed by the legendary research facility, AT&T Bell Labs, to help the U.S. Navy with anti-submarine warfare. The DSP is used to filter out submarine noise from other oceanic sounds. Entrepreneur and audio professional Russ Hamm pointed out to AT&T that the DSP would help in music mixing, too. His savvy led AT&T to develop the DSP-based DISQ Digital Mixer Core for pro audio production. This

system plugs into high-end analog consoles to add digital mixing capabilities. The first DISQ Digital Mixer Cores are in use at Nashville's Masterfonics and Tokyo's SEDIC Audio. Today, GLW and AT&T Digital Studio Systems plan to create a brand-new (and a new brand of) digital mixing desk, although it's too early to tell, Jones says, when the system will hit the market.

Even competing companies are coming together these days—with good reason: They cast aside their rivalries so they can foster compatibility between different manufacturers' platforms and products. The result is products with longer shelf lives and happier owners. Last year, for example, Avid Technology released its Open Media Framework Interchange format to provide a common set of standards for sharing digital media. (See "File Interchange Formats: Looking at the Options," p. 140.) Complying audio industry companies include AKG, Aware, Digidesign, Blue Ribbon Soundworks, Doremi Labs, Fairlight ESP, GML, Lexicon, Otari, Roland, S Systems, SSL, Sonic Solutions, Spectral Synthesis and Studer

Editech. Some of these companies may be recognizable as direct competitors—to those who work there and to those who buy their products.

Industry soldiers are throwing down their arms in the name of synergy. They're aiming to create a whole that's greater than the sum of the parts—to benefit the bottom line, certainly, but most importantly, to benefit the end-user.

Such an approach also benefits organizations on an individual and thus *esprit de corps* level. Companies whose employees' exposure to each other is typically limited to attending the same industry convention parties now find themselves cooperating to create a larger variety of solutions to their shared customers' problems. Digidesign's VP of marketing, Tom Virden, points out, "People in the different pro audio and music companies typically work in their own little worlds, not with each other. But as we move to more of a software world, you have to have standards."

Digidesign Audio Engine (DAE), an Apple Macintosh device driver bundled with various non-Digidesign digital audio software packages, is

"our attempt to establish such a standard," Virden says. "It means developers don't have to write DSP code to create, for example, compressor software; they just write the compressor code on top of DAE." As a result, it's easier for those developers to write many different, complementary applications; presently, four companies are writing DAE-based sequencers, and about 30 are designing reverb, EQ and compressor/limiter "plug-ins" for DAE.

A company sets such standards, knowing that it alone can't be all things to all customers, so it proffers the fruits of its R&D to third-party developers. Another example of a standard set in this spirit is Opcode's Open Music System (OMS), a Macintosh INIT, or system extension, that serves as a MIDI system equivalent to the Mac's Control Panels. Digidesign, the digital audio company, supports OMS, and Opcode, the MIDI company, supports DAE. "We were the first company to support DAE," Opcode communications director, Paul de Benedictis, says. "The cooperation between our companies, which started four years ago

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with the release of Studio Vision [software], meant working together to make both companies' software and hardware work together better. The customers were asking, 'How can we work with MIDI and digital audio together?' It was obvious that we should work with Digidesign."

Not only obvious, but necessary. "When you're talking about computers, compatibility between systems is one of the most important things," de Benedictis adds. "In the same way that professionals know a reel of 24-track tape will work from studio to studio, we're trying to come up with similar analogies for computer music. Not that it's always hunky-dory, but at least it's not a hair-tearing experience. It's what studios want: the power of instant random-access control with MIDI *and* digital audio."

In true synergistic fashion, almost all of Digidesign's software products, including Pro Tools and SampleCell, are compatible with Opcode's OMS, or will be by the next update.

The result? The end-users—the engineers and producers—enjoy more choice from more vendors.

Of course, devising and proclaiming a technological standard can ignite politically fueled fires, especially when two or more developers want to use the standard as a platform on which to base the same type of application. As Virden points out, "We have to keep at arm's length [from the many various DAE Development Program Partners] because we don't want to show favoritism. The market will define the best solutions."

Whether companies become partners to increase their relative strengths and fill each others' gaps in that market, or they join forces to fill gaps in the market itself, or cuddle up to share technology and learn from each other, strategic alliances enhance the strengths of all parties involved—empowering them to advance the state of technology in their segment of the industry. In the end, the market shoppers emerge the winners. ■

Linda Jacobson is the author of Garage Virtual Reality: The Affordable Way to Explore Virtual Worlds *(Sams, 1994) and the editor of* Cyberarts: Exploring Art & Technology *(Miller Freeman, 1992).*

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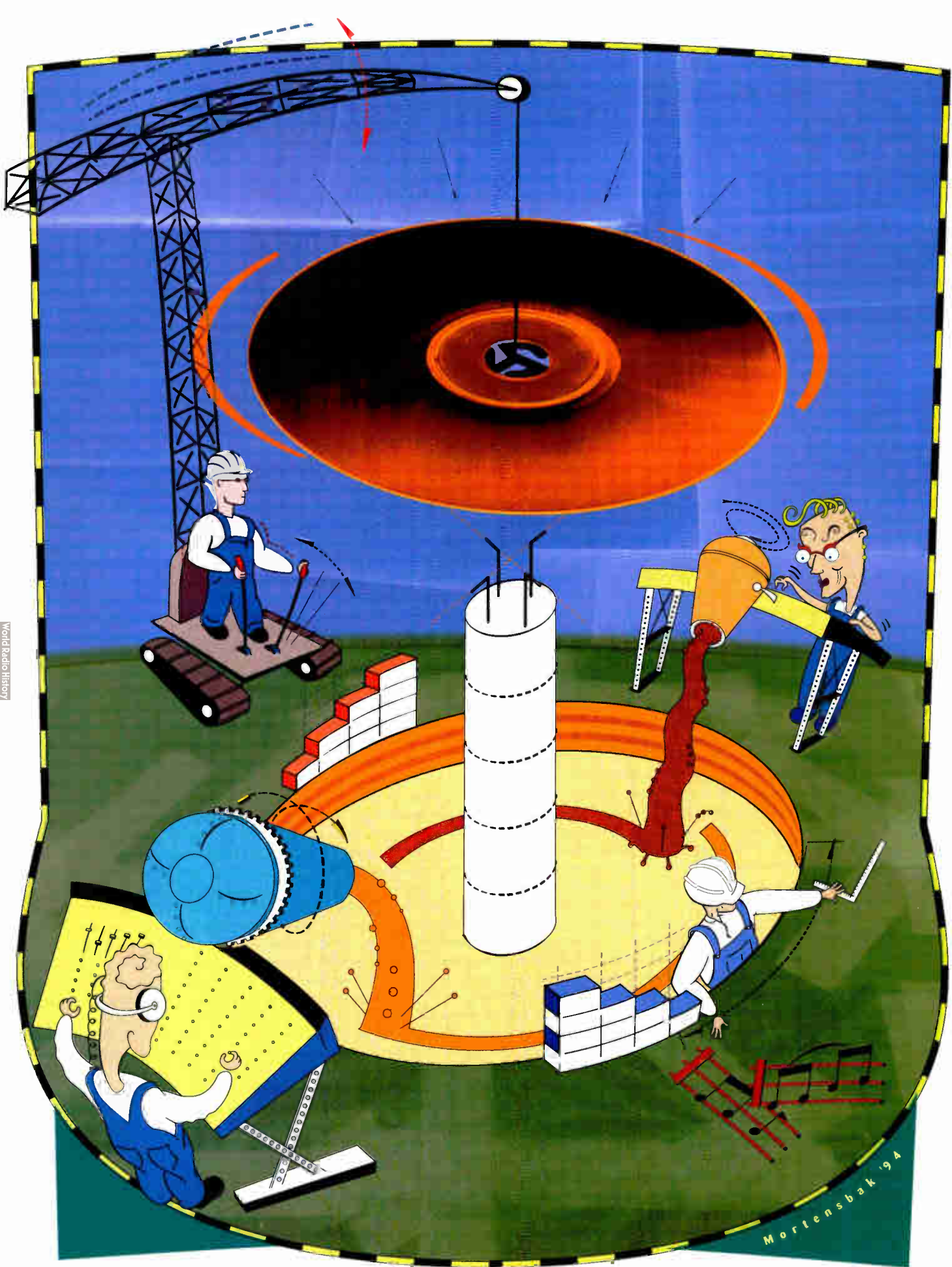
Mortensbak '94

Building A Mix

Four top engineers discuss the art and science of mixing a great song.

BY RICK CLARK

ILLUSTRATION BY JACK MORTENSBAK

I f you ask most consumers what drives them to purchase certain albums, chances are the way an album sounds figures in almost as much as the artist's elements of songwriting, playing and singing. If you ask almost any mixer to state a mixing philosophy, he or she will probably tell you that it is to be as transparent as possible, allowing the artist's vision to shine properly.

The average music listener might be content with the idea that the artist naturally sounds the way he or she does on record, but what would the Beatles have sounded like without George Martin? Would the Righteous Brothers' "You Lost That Lovin' Feeling" or "Unchained Melody" have the same transcendent power had Phil Spector not imbued them with his trademark "Wall of Sound"? Surely, some of the most appealing qualities of Sting's music come from the sonic de-

tailing, impact and space revealed in Hugh Padgham's mixes.

None of this is meant to discount the very real talents and artistic statements made by those artists, but even the most "transparent" mixing by a great engineer has a way of enhancing the magical elements of a performance, elements that might otherwise have been hidden in less capable hands.

Those who obsessively check out album credits will often find the same names appearing on many of their favorite albums. It's a great argument for the value of the right mixer with the right project, and nearly anyone reading this magazine will certainly recognize names like Tom Dowd, Chris Thomas, Mutt Lange, Tom Lord-Alge, Creed Taylor, John Potoker, Ed Cherney, Eddie Kramer, Bruce Swedien, Daniel Lanois, Steve Lillywhite, Glyn Johns and Eddie Offord.

Mixing might merely be a matter of, as one producer put it, "turning up the good stuff and taking out the bad," but it takes great ears and a sure command of the tools of the studio to know what to enhance and what needs eliminating to create the most emotional impact.

For this piece, *Mix* was fortunate enough to corral the time and talents of four acknowledged greats of the mixing world—Bob Clearmountain, Richard Dodd, Ken Kessie and Phil Ramone. Special thanks go to each of these men for sharing some techniques that have placed them among the music world's best mixers.

BOB CLEARMOUNTAIN

In the world of mixing, Bob Clearmountain is a superstar. Among his extensive credits are Bruce Springsteen, the Rolling Stones, Chic, Bryan Adams, Roxy Music, Robbie Robertson and The Pretenders.

Since the mid-'70s, when he first made his name at New York's Media Sound and the Power Station, Clearmountain's mixes have expanded the possibilities of dimensionality and nuance on the popular music soundstage.

For example, check out Clearmountain's mixes of "Tougher Than The Rest," from Bruce Springsteen's *Tunnel of Love*, "Hymn To Her," off The Pretenders' *Get Close*, or the title track from Roxy Music's *Avalon*. His mix of Chic's dance classic "Good Times" blended the song's visceral R&B bass and drum punch with an almost otherworldly atmospheric string and vocal sound that perfectly suited the heady spirit of disco escapism. Clearmountain could also get incredibly raw, as evidenced on his mixes of the Rolling Stones' *Tattoo You*. The track "Neighbors" benefits from possibly one of the trashiest snare sounds ever committed to tape. For those wanting to hear fine examples of Clearmountain's earlier work, get a hold of David Werner's self-titled 1979 Epic album or *Can't Stand the Rezillos* (Sire) by The Rezillos.

Also among Clearmountain's favorite projects are Aimee Mann's first solo album (particularly the track "Jacob Marley's Chains"), Willy DeVille's *Miracle* (especially "Assassin of Love"), "Satisfied," the opening track on Squeeze's *Play*, and "Floating World," off the second King Swamp album, *Wise Blood*.

"My favorite things are usually because of the music, more than what

I did. I have trouble separating what is the mix and what is the record," Clearmountain explains. "If I did a good job, it is because of the music."

In October of 1992, Clearmountain installed a mixing facility in his house, designed by Bret Thoeny from the L.A. company BOTO Design. The very first project was Springsteen's "Streets of Philadelphia," which won an Oscar and a Golden Globe Award.

At the time of this writing, Clearmountain had just finished Bryan Ferry's latest opus, called *Horrorscope*, and was getting into mixing

Waylon Jennings' forthright style of country music.

For mixing speakers, Clearmountain usually sets the mix up on Yamaha NS-10s and then switches back and forth between them and KRK-9000s. He has also become fond of using a standard Apple computer self-powered speaker for testing mono balance. He generally likes to listen "at an average level, usually quietly." SSL is Clearmountain's console of choice. He mixes to a Sony 7030 DAT machine and uses Apogee DAT tape.

Clearmountain begins all of his mixes with a rough. During that time,

he familiarizes himself with the lyrics and emotional context of the artist's performance, especially if it is a track he hasn't heard before. Early on, as Clearmountain refines the rough, he visualizes the instrumental setup and begins developing his ideas on how he wants the vocal to sound. "After I have a perspective on the vocal," he says, "I will start basing the rest of the mix around it. I really don't have a systematic way of doing it. I just go back and forth."

Clearmountain claims that Led Zeppelin's larger-than-life drum sounds were a big inspiration for him, but he says that going for those sounds first can cause the mixer to lose sight of the song.

"At every stage of the mix, step back and ask yourself, 'Is this actually helping the song? Is this something that makes the overall thing better?' Think of it from a listener's point of view, who doesn't care about that fancy flange you just used on the hi-hat. Your effect could be great, but listen to the song and see if, when your effect occurs, it doesn't distract you from what the song is all about. I think people get carried away with their sounds and sometimes the best thing to do is nothing."

For instrument compression, Clearmountain will usually first work the bass guitar, if it hadn't already been compressed. He will solo the bass with other instruments to see where it is sharing frequencies that may potentially muddy up the mix. "Sometimes you go crazy trying to EQ the bass and you just can't get it. It is usually because there is something else in the mix clouding it," Clearmountain explains. "All you might have to do is roll off on something else and suddenly the bass will come shooting out and sound real clear. EQ isn't just adding top and bottom. It is also balancing the frequencies of the mix, and that is what a lot of people don't realize."

For outboard gear, Clearmountain is a "big fan of Pultec tube equalizers. There is nothing like it for guitars, as far as I'm concerned. You can make a guitar bright without it getting harsh."

He also lists the Roland SDE-3000 as his favorite digital delay, partly due to its convenient no-nonsense design. Clearmountain employs an Apogee A/D converter after the signal leaves the SSL in mixdown. He is particularly fond of the Soft Limit feature, which rounds off the leading edge of the tran-

sients (on snare, cymbal or hi-hat) and allows more level on to the DAT and ultimately makes the CD sound louder.

"I find as I hit it harder, it actually makes the signal sound more analog," Clearmountain says. "Analog tape does exactly the same thing, but you don't have the noise or signal degradation that analog has."

For digital editing, Clearmountain likes Pro Tools, because "it is really fast for editing" and has a "really good variety of crossfade options." He uses Sound Designer for assembling album sequences.

"People mistakenly think that specific kinds of gear make the mix," Clearmountain concludes, "but you can use the cheapest brand of equipment and make the most amazing-sounding record in the world. Making a mix is all about how you approach your feeling towards the music."

RICHARD DODD

Richard Dodd's mixes vibrate with raw organic musical energy, like molecules blasting off the walls of the aural soundstage. Preferring analog and manual mixing over digital and automated mixes, Dodd revels in the challenge of making something special happen in settings that would cause many engineers and mixers to pack up and go home.

Artists like George Harrison, Tom Petty, Roy Orbison, Jeff Lynne, Joe Cocker, Boz Scaggs, the Traveling Wilburys, Clannad and Little Richard have benefited from Dodd's sonic touch. A number of these projects were recorded and mixed in home settings with the most basic and limited gear.

"With the exception of 'Handle With Care,' which I didn't mix, both Wilburys albums, George Harrison's *Cloud Nine*, and at least 90 percent of Tom Petty's *Into the Great Wide Open* and Boz Scaggs' *Some Change*, I used two more channels than I had tracks on the console," states Dodd, who normally used the spare channels for mono effects returns. "They were manual mixes, done without any computer whatsoever."

When Dodd speaks affectionately about a mixing console, it is the old Soundcraft 1600, precisely the model on which he mixed Petty's most recent hit "Mary Jane's Last Dance." Incidentally, that was Dodd's rough mix.

Most recently, Dodd finished MCA country artist Marty Brown's third and best album, *Cryin', Lovin', Leavin'*, a masterfully imaginative piece of engineering and mixing work that captures the primal energy of great country and roots rock.

"There are no wrongs, and, if there are, I make sure that I don't know

"I very often attempt to
balance the whole song,
before I consider what
things will sound like."

—Richard Dodd

them," Dodd remarks. "I have one thing that I take with me whenever I mix, and it is not a piece of equipment: It is an attitude of 'I'm going to make this thing work.' I don't carry monitors, and I don't have a favorite room. I'm looking for something that I haven't done yet."

When Dodd does bring along a complement of outboard gear, the setup often consists of a UREI 1176, an AMX DMX, a pair of Drawmer gates, a D-76 Telefunken mic preamp and a Groove Tube for changing guitar sounds.

"I like UREI 1176s, especially the black-faced ones with the little transformers in them," Dodd explains. "People go for the silver ones, without transformers, because they have a cleaner signal path. I like the distortion. Distortion and noise have never bothered me. The Drawmer 201 gates have got great highpass and lowpass filters that will actually overlap. Very few consoles have got that." Dodd also likes to carry a stereo UREI 1178 limiter and a Massenburg parametric equalizer.

"Basically, if you put your mix up and it sounds a bit dull, why go through 24 equalizers, when you can put the whole thing through one stereo one, brighten them all up in one go and they're all in-phase with each other," Dodd says. "I hope that you could play any of my things in mono and still enjoy the balance. That is a criteria that I have.

"The most important thing to me is understanding and knowing the song and knowing what is wanted," he adds. "Generally, I like to start the

mix with something that represents the song, something with the chord structure, like a couple of acoustic guitars, if there are any. You've also got to get a clue from something other than the drums about what the drums are going to sound like, in my opinion. I very often attempt to balance the whole song, before I consider what things will sound like.

"It really makes me feel sad when I see an engineer about to commence a mix and he lifts up the mics closest to the kick drum and snare and reaches for every piece of equipment he's got on his hands, to try and make it sound like a drum with a mic two or three feet away," Dodd laments. "A few faders off are the overheads, and that is where his drum sound is. If he listened to that, he would know what he's got. Very often, all he would need those close ones for is to give the feeling that that is where the beat is, and where they are in the stereo picture."

Dodd also encourages mixers to consider the unintended colors that mic bleed presents as an asset. Throwing various mics in and out-of-phase is a favorite way Dodd expands his sonic palette.

"Just because a fader says 'kick' doesn't mean it's just a kick mic," he says. "There is also a little bit of hi-hat there as well, unless it came out of a machine. The drums all interact, and they are all miked for each other.

"People tend to like the manual mixes more, because they have got fewer options," Dodd deadpans. "If they see you sweating like that, they are more reluctant to say, 'That word "the," on the second verse—could it have just been a tenth of a dB louder?' They don't say things like that when you are doing manual mixes. They go, 'That felt great,' or 'Did the voice feel loud enough?' They refer to feeling. When I am working on a computer, they refer to things by tenths of a dB.

"I spend more and more time on digital. It is the way things are going," Dodd states. "Instead of saying, 'No, I won't work on SSLs or a Sony 48-track,' I now say, 'Okay, I'll have to do this to make it sound right.'"

To help put the right amount of his "attitude" in a final digital mix, Dodd uses some Telefunken tube mic pre's and runs the whole output bus through them, before the signal gets anywhere else. "I always vary the chain according to the song," Dodd ex-

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plains. "Somewhere in there is a stereo limiter, I guarantee you. It is not always before, not always after, the limiter or the Telefunken. The output bus will invariably have an equalizer, a limiter and a tonal device, whether that be an analog mastering machine or my tubes, both or whatever."

Dodd is fascinated with the idea of the physicality of music etched on acetate. For "Too Blue to Crow," off of Marty Brown's *Cryin', Lovin', Leavin'*, Dodd pressed an acetate off of the 2-track and dubbed the master off of it: "One day, I want to do a whole album like that. You could master tracks individually, using good quality 12-inch acetates, if you could find them. Every track could be that perfect vinyl thing for one moment in their life. It is like giving it its final meal before it gets executed," Dodd laughs. "At least I'd be giving it a good time before it goes."

KEN KESSIE

R&B dance mixes are an art form unto themselves, and it takes a special kind of engineer to understand what constitutes a mix that gets people moving, while tapping into the
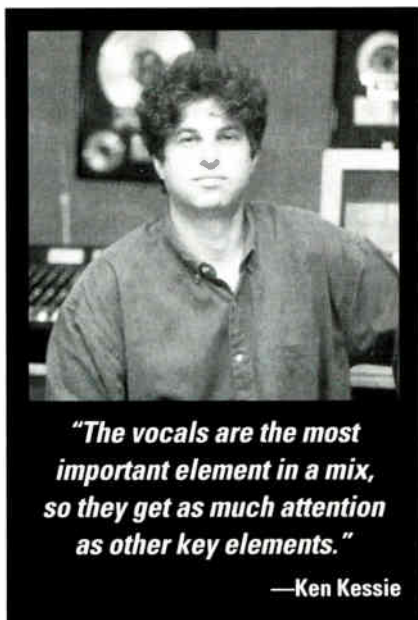
"The vocals are the most important element in a mix, so they get as much attention as other key elements."
—Ken Kessie

lyrical heart of the material.

Ken Kessie has successfully done that for the likes of En Vogue, Tony! Toni! Toné!, Bell Biv Devoe, All-4-One, Ralph Tresvant, Jody Watley and a host of others. Since the early '70s, when he started working at San Francisco's (now defunct) Automatt, Kessie has amassed a string of Top

10 pop, dance and R&B singles and albums, including En Vogue's multi-platinum *Funky Divas*.

Unlike the glossier side of urban R&B, Kessie prefers to keep his mixes slightly raw-sounding, because he feels that the rough edges make for a more interesting listening experience. "The foundation of R&B and hip hop are kick and bass," Kessie states. "The Holy Grail is a fat low end that shakes a club or Jeep system, while at the same time sounds clear and punchy on a small radio or TV speaker."

To help accomplish that end, Kessie sometimes uses "a lot of fader multing, which is a twist on bi-amping. What I do is mult the kick onto two different faders. The first fader gets the low end and without too much punch," says Kessie, who usually adds some slight compression (SSL or dbx 160X) and "lots of Pultec boosted at 100 or 60 dB.

"The other fader is set for maximum punch, heavy compression (again using SSL or dbx 160X), harder EQ (SSL, API Graphics, Massenburg), boosting upper mids and cutting speaker distorting low-mids," Kessie continues. "I then mix the two

World Radio History

faders till I get a kick drum that booms on big systems but doesn't distort the NS-10s.

"Another trick for removing those pesky low-mids is a BSS DP904, set to remove 200 to 400 Hz on kick impact only, restoring them after the attack has passed," adds Kessie, who also uses a similar multing process to achieve the ideal bass tone. "I go for the lows on one fader, using Pultecs or my pet Moog parametric. On the other fader, I use SSL filters to take out a lot of the bottom and a bit of the high end, until the bass pops out of an Auratone speaker at low volume." Kessie adds that, for bass compression, he will use either the 160X, SSL, LA-2, LA-3, Dynamite, Summit or Tube Tech: "I often chorus the bass slightly with a TC 2290 (preset 85) to fill out the sides of the mix."

Kessie doesn't hesitate to employ snare samples, usually from his own collection or an Alesis D4. In dealing with the flams, muddy bottom, hiss and completely filled-in midrange found in the obligatory sample loops, Kessie often uses an API 560 graphic to boost or cut desired frequencies.

"Sometimes I spread a loop using a short delay (14 milliseconds), then pan the original to the left and the delay right," Kessie states. "This can prevent clog-up in the center of the mix."

For vocals, Kessie is a firm believer in clear, bright "more-personality-than-effects, Motown-style vocal. The vocals are the most important element in a mix, so they get as much attention as other key elements," Kessie states, mentioning that vocal and groove combined get about 70% of his mixing time.

For male lead singers, Kessie says that 1176s seem to work best for compression, while he prefers to use API or Massenburg EQs to address the top end with a Pultec or Focusrite for warmth. He uses a dbx 902 de-esser if necessary.

Kessie feels that female singers generally require a more complex outboard chain. "On the last En Vogue album, a typical lead vocal went through an 1176, Massenburg EQ, a dbx 902, and a dbx 165," he says.

To give a lead vocal some ambience and help it punch through the mix, Kessie may use a couple of delays and some reverb. Delay #1 might be very short, usually a 32nd or 16th note, and EQ'ed very brightly "to make the S's and other consonants bounce slightly." Delay #2 would probably be set for an 8th or dotted 8th, and EQ'ed to give a subtle trail to the singer. For reverb, Kessie often uses AMS Ambience, 480 Warm Plate, or Zoom 9300 Clear Plate, all used with outboard predelay to keep the singer up front.

"If your lead vocal isn't bright enough, you don't necessarily EQ the vocal itself, because you might start thinning it out," Kessie elaborates. "Add an effect to the vocal that is very bright, and that way you get to keep the body and tone of the original vocal, but you have added the high end that you need. That works great on background vocals, too."

Unlike many mixers, Kessie starts loud on the mains and then switches to NS-10s, with only occasional moments back on the mains. "Many pop mixers remove bottom from a mix until they can crank up the NS-10s without distortion," he says. "This would be too thin for a good R&B mix.

"I leave in a little bit of low end break-up when the NS-10s are loud," Kessie adds. "As the mix goes on, the

volume gets quieter. Just before printing, I am switching between near-fields, a mono Auratone and headphones. I use the headphones to check for any left-right imbalances, unwanted noises, and to ensure seamless transitions between all sections."

For the transfer from console to 2-track, Kessie prefers using an Apogee A/D before going to DAT (for rock and pop) but prefers the Panasonic 3700 onboard converters for R&B and hip-hop. He usually prints a variety of mixes to cover any possible situation—vocals up and down, no lead vocal for TV, an instrumental for single and editing purposes, a cappella lead and background for sampling and digital editing, and any other variations that might be desired.

PHIL RAMONE

Phil Ramone has always associated himself with great artists. And certainly the artistry of his production and engineering skills have gone a long way toward attracting great talents like Paul Simon, Billy Joel and Frank Sinatra, among many others. Over the years, Ramone has worked hard on fine-tuning his methods of storing mix information for easy recall. Ramone was eager to share his ideas on storing digitally subgrouped mixes.

"Traditionally, I don't mix quite the same for an album any more than we used to years ago," Ramone explains. "Once I worked in film, I realized that the subtleties one goes through to recall mixes and make subtle changes required that the music be stored in a different medium than the standard 2-track format. It was then I began to use a multitrack format in stereo pairs for storage.

"Once I finish a mix, or am close to finishing it, I will store the rhythm track on to two tracks," he adds. "Then I'll put the horns and/or whatever sweeteners there are on two tracks, the keyboards and guitars on two tracks. The vocal, with its effects, and any background vocals, go on a couple more tracks. I also commit specific effects in the master that I feel are available in a certain studio, in case I'm unable to use them again.

"Some places, like Capitol 'A,' have access to eight live room chambers. You are not going to get that when you leave that place and come back," Ramone elaborates. "So you should store the material, with its chamber effects, separately.

"It was about eight or nine years

"I'm happy to pay top dollar for the best studio for remixes, but once you leave, the storage method is what is going to save you money and give you variety."
—Phil Ramone

ago, when I first did this," he recalls. "It was for a movie for Disney, where we used Billy Joel's voice. As we added or subtracted from the piece, I realized that I didn't have to keep remixing it, but just keep re-servicing the same six or eight tracks with additions or subtractions."

With increasing demands for multiple mixes by record companies and others, Ramone felt his sub-group mix storage method was a logical evolution. "What does happen between label, producer and artist, is that on reflecting upon a mix or the album mix, two weeks later you hear the little things you might have missed and felt could be slightly better," says Ramone, who is currently using the Tascam DA-88 as his format for mix storage. "It is not always about redoing something. It is also about refining it. If I went back to recall a mix, it can be quite expensive. When we get a call five or ten days later, or you look at it yourself and say, 'Hmm, I could fix this in 20 minutes. I know exactly what is needed.' This way, I have got all the tools at hand.

"You can make your tracks in the world's greatest studios and do your vocals and guitars in the project studio and go back there and mix if you wish," Ramone continues. "Any remixes don't have to go back. I'm happy to pay top dollar for the best studio for remixes, but once you leave, the storage method is what is going to save you money and give you variety." ∎

Rick Clark is a Memphis-based writer and all-around cool guy.

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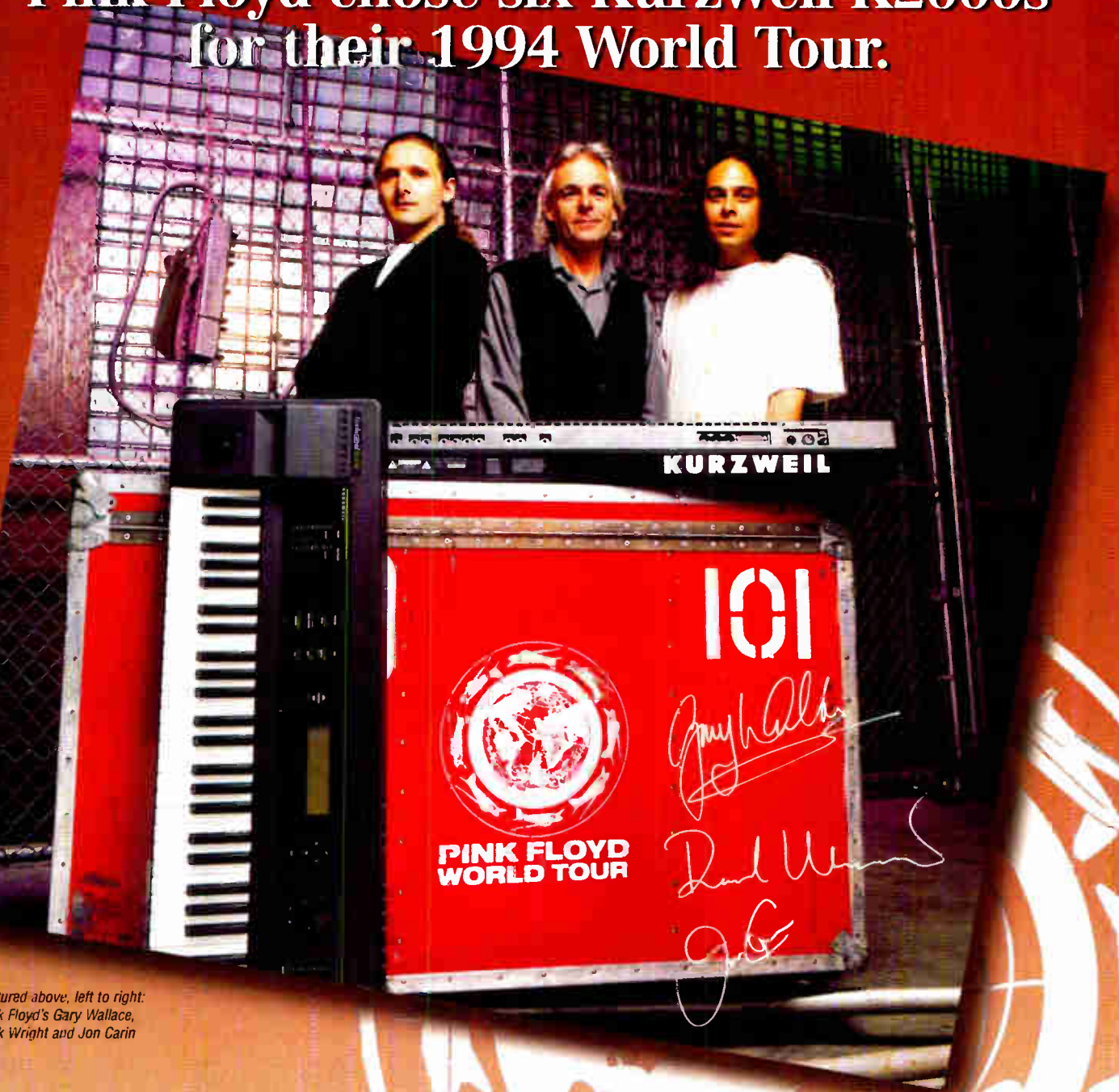
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Pink Floyd's Gary Wallace,
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Pure Inspiration.

by Dan Daley

MDMs Hit The Road

M odular digital multitracks in a truck. The very nature of it makes a perfect project studio-type story, but it's more than that. Modular digital multitracks might present a perceptual problem in trying to replace large, open-reel decks in a static studio environment —as good as they are, they're not confidence-inspiring in situations where you're about to make a major record. At least not yet. But they're getting there. Thus, in stationary studios the MDM has been confined largely to project, personal and small independent studios, and to secondary rooms at larger facilities.

But in remote applications, they've got more leverage. For starters, the confined nature of a truck box makes the MDM's small size advantageous and the absence of open-reel decks is less noticeable. Also, the artist isn't in the truck as much, so the entire

Karisma Recording out of Montreal, Quebec

Chris Andersen inside Nevessa Production, based near Woodstock, N.Y.

recording process, at least from their point of view, is that much more transparent. But the real benefit lies in MDM's lower tape consumption and thus lower software costs. Live performances are by nature extended performances, and oftentimes the activity in between songs doesn't get edited out until later, if at all. So

rather than take a chance and lose something, the tape tends to keep rolling throughout two-, three- and four-hour shows, and the tape costs keep adding up.

One remote engineer with plenty of such live-tracking experience is Chris Andersen, owner of Nevessa Production, a mobile unit in a 16-foot box based near Woodstock, N.Y. Andersen took out his analog 24-track machine last year and replaced it with six MDMs, in this case, Tascam DA-88 decks. Not only did it double his track capacity in half the space, but his tape costs are now, by his estimate, around 7% of what they were when he was running 2-inch analog.

The transition from open-reel to a cassette-based format had less to do with technology than with basic business: Andersen felt he could expand his mobile work by making it more affordable. "Tape costs sometimes ran more than the rate of $1,500 a day I get for the truck rental," he comments. "The videocassette format makes that a lot more affordable to a

lot more people."

Andersen, whose regular remote clients include the television broadcast *Showtime at the Apollo*, and independent and major record acts, found a high-profile production to show off what the MDM can do on the road. On February 12, the Bottom Line in New York City kicked off its 20th anniversary celebration series with a show by David Johannsen—this time playing himself rather than his alter-ego, Buster Poindexter, an act he also bases out of the club.

Both shows were recorded live by Andersen using the Tascam DA-88 from his truck parked on Mercer Street.

The six decks were divided into two groups of three, with one group running as the 24-track show master and the second as a backup. The tape difference made itself immediately apparent. "On this show, and for future broadcasts of the Apollo shows, I record the stage patter in between, not just the songs," Andersen says. "I had no worries about incurring additional costs to the client for tape."

With a full 24-track backup to mitigate any anxieties, Andersen took direct feeds from the stage microphones, bypassing the board—an AudioArts model 44—and leaving EQ and processing decisions for later, another benefit from the MDM approach. "This way, there were no decisions that had to be made in the truck," he explains. "Everything could be decided later. It was one mic, one track." The additional number of tracks doesn't eliminate using grouping to solve input-management problems, but it does minimize them.

His digital rates are lower than his 2-inch analog rates. That statement in and of itself is rather remarkable and illustrates what MDMs have done to the business side of the remote recording business.

At a little over 100 minutes per tape, the entire show took up 18 tapes—two banks with each machine consuming three tapes over two shows. "The only problem was really an operator-error problem," he recalls. "One of the tapes had its label misapplied, and it jammed in the machine. That's where the backup came in very handy." Two DATs and two analog cassettes ran simultaneously with the MDMs.

Prep for the MDMs was a bit more elaborate and time-consuming, but eminently worthwhile. After formatting, Andersen winds the tapes in shuttle three times, start to finish, to loosen up any particles on the tape, then cleans the heads a second time using a dry video head cleaner. Synchronization came from the word-sync output of the primary block of decks. When needed for the mix, any information from the secondary

World Radio History

set of 24 tracks could be synched up using an offset.

Andersen says that there's been no real resistance to using an MDM platform in the truck from artists or producers. "But the security of having a backup I think has a lot to do with that," he says. "With this setup, I can sometimes throw in the tape, it's so inexpensive."

The MDM has not only empowered the smaller user but the big rigs, too. Karisma Recording is Canada's largest mobile operation; owner Marcel Gouin runs his mobile from a 40-foot Soundcraft and Mitsubishi Westar-equipped trailer based out of Montreal, Quebec (where he also has a stationary studio), and has recorded major acts including AC/DC, King Crimson, Joe Cocker and Paul Young on their Canadian tour legs.

Though the Karisma mobile's format has been based around 2-inch analog for most of its dozen years in business, Gouin installed 13 Alesis ADATs into the truck in 1992 (and seven more in the fixed studio), providing 96 tracks and one spare unit of digital at $5,000 Canadian per eight tracks, far less than a pair of 48-track digital open-reel decks. Even for big operators, the economics of MDMs are undeniable. "They're flexible and cost-effective," Gouin observes. "In this market, there aren't many people who can, or want to, pay for a 3348 on a mobile project."

Gouin generally runs his ADATs in banked pairs of various track configurations, depending upon the client and the project. The modularity of the format has been an advantage, from his point of view, allowing him to configure the truck as needed and price it accordingly. In general, his digital rates are lower than his 2-inch analog rates. That statement in and of itself is rather remarkable and illustrates what MDMs have done to the business side of the remote recording business.

Gouin's only complaint involves the still-evolving synchronization aspects of MDM. He uses the Timeline-Alesis jointly developed, external synchronizer system but says he still has no absolute reference to SMPTE, which thus far has been an annoyance but not critical when not working to picture. "You have to part the systems at some point and listen to them to see where sync is," he explains. "You can't use an EDL to get an offset. It can be cumbersome, but considering

the cost and the flexibility, it's worth it. And the technology keeps improving, so I'm sure that issue will also get resolved in the future."

Another consideration—one that sets MDMs apart from analog recording—is tape preparation. "In analog, you want to make sure your alignment is done and correct," Gouin says. "Once that's done, you can sort of relax, and you don't generally run an analog backup. With [these types of digital systems], tape formatting is the key. You want to double-check formatting with spot records first before committing them to the project. We've had formatted tapes that have turned out bad because the formatting wasn't successful. And in digital, you have to watch for drop-outs."

Karisma's clients were hesitant at first to go with MDMs for their remote recordings. "Their main concerns were, 'where will we be able to mix this?'" Gouin recalls. "But once a lot of ADATs had been sold, that concern went away. The format seems to be widely accepted by virtually everyone at this point."

Veteran producer Brian Ahern moved to Nashville from Los Angeles three years ago with his lead-lined, 40-foot mobile unit that he built in 1972. Ahern recently did a George Jones all-star record on the five ADATs that he's now loaded the truck with. Recorded at Bradley's Barn in Mount Juliet, Tenn., cost was not a consideration for Ahern, either in terms of the units themselves or for billing.

"I just like the way they sound," Ahern explains. However, every advantage brings an offset. Ahern cites the slow shuttle times inherent in MDM architecture. "So while I'm waiting for the decks to shuttle, I think about the important stuff: women and cars," he adds.

The essence of the story is that MDMs have made for a more level playing field in the remote recording arena, from large to small operations —rather like the effect digital has had in general on the industry. Given the transparency of the remote recording process to artists, expect to see MDMs proliferate in this area thanks to their small footprint, low media costs and increasing reliability. ■

Dan Daley is one of them there Mix *editor-type guys.*

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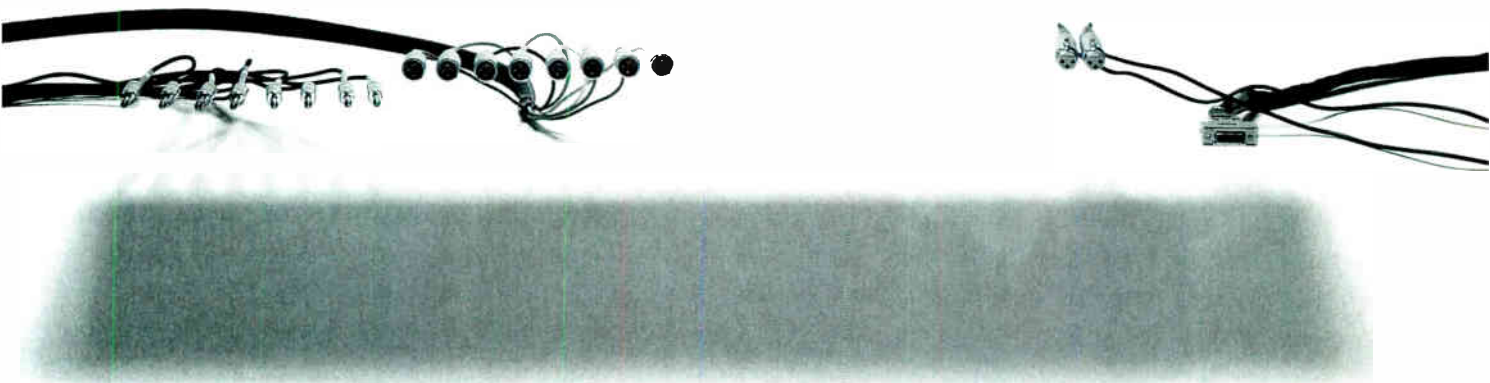
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by Paul Potyen

QUICKTIME 2.0
A MULTIMEDIA STANDARD?

L ast February, Apple Computer announced Version 2.0 of Apple Quick-Time. Expected to be released in June, QuickTime 2.0 provides a larger video image at faster frame rates, support for music (via conversion of MIDI files), enhanced support for time-coded, 60-fields-per-second video, data throughput greater than 3 MB per second (a 300% increase over previous versions of Quick-Time), and support for interactive television applications.

QuickTime 2.0's greatly increased performance over its predecessor means that a user can work with full-screen movies—without the addition of any hardware—approaching what viewers see on television today. For example, on a Macintosh LC475, one of Apple's lowest-cost computers, 30fps video is possible at a resolution of 320x240 pixels, or full-screen video (640x480) is possible at 15 fps.

The power and flexibility of Quick-Time have already attracted the attention of multimedia developers, who are anxious for a standard method of creating, storing and delivering their digital media. And the quantum im-
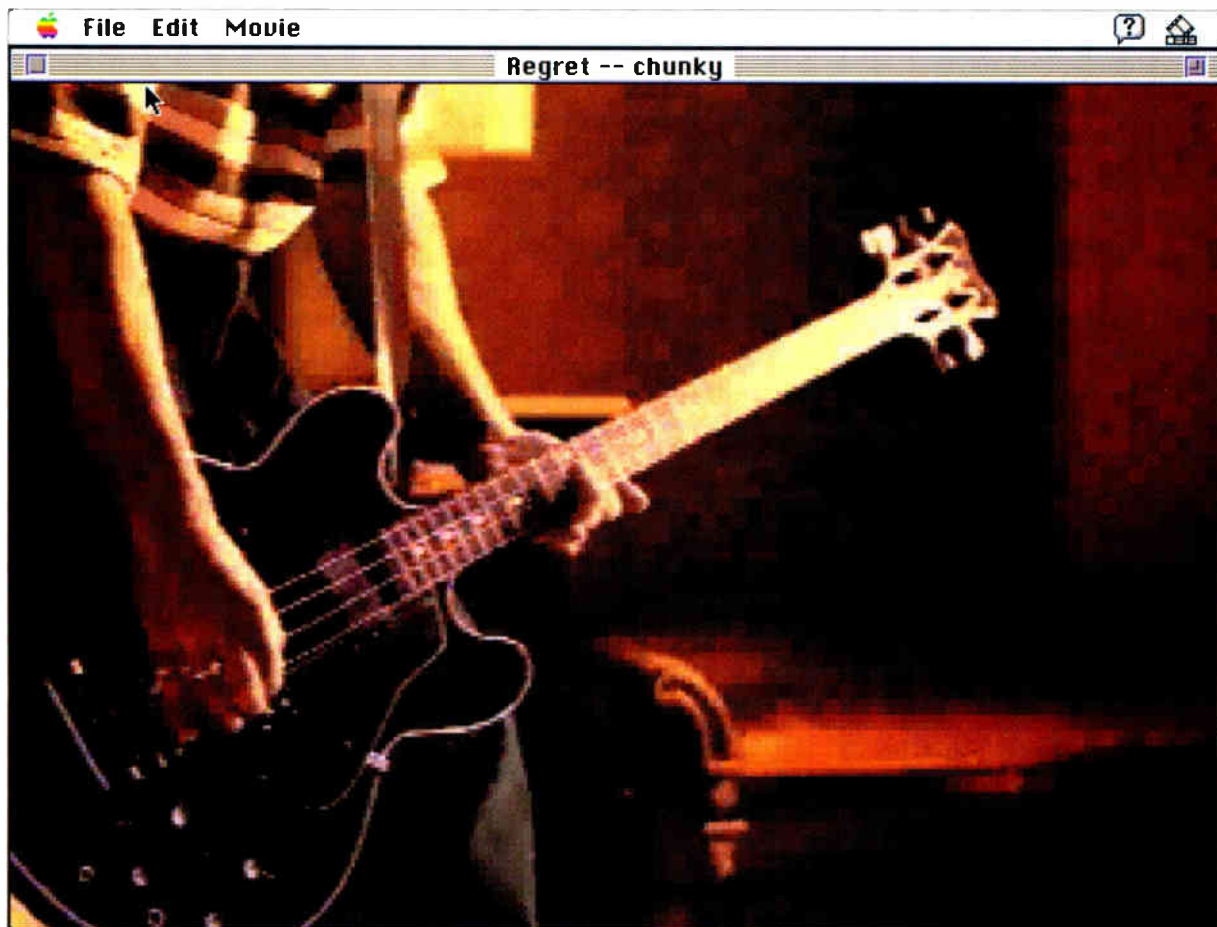
The QuickTime 2.0 Version of New Order's "Regret" music video

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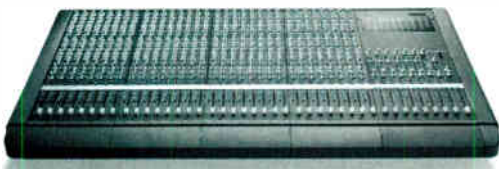
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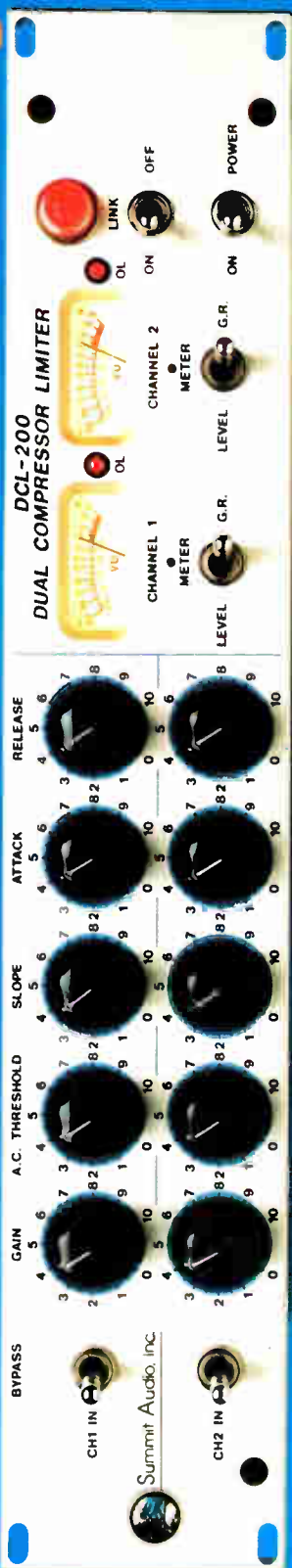
provements in this newest version of QuickTime are sure to strengthen its position as a candidate for a standard in that industry, as well as attract the attention of more than a few professionals in the area of video and audio post-production.

One result of this higher level of audio and video resolution, says Duncan Kennedy, multimedia product line manager at Apple, is that "we've seen an incredible interest from musicians. The British band New Order has been using a prerelease version of QuickTime 2.0 to work with their latest music video from the album *Regret*. We think that this will result in a whole new generation of titles."

I met with Kennedy recently at Apple's Cupertino, Calif., headquarters, where he demonstrated a Quick-Time 2.0 movie of the "Regret" music video, which was recorded using the Radius VideoVision hardware and QuickTime 2.0. Radius hardware-assisted playback of that movie was full-screen at 60 fields per second with 16-bit, 22kHz stereo audio, but software-only playback of the same movie on a PowerPC was full-screen (using pixel doubling) at 15 fps with the same 16-bit stereo audio.

MUSIC MOVIES
The incorporation of MIDI-like capabilities into QuickTime 2.0 has also been significant. "It's important to make a distinction between MIDI and the QuickTime music architecture." Kennedy says. "It's not MIDI, and it's not digital audio. It is a way of doing internal sound synthesis on the computer. And it is scalable. You can take an existing Standard MIDI File, convert it into a QuickTime movie and then play that music movie back without any MIDI device connected." However, if you have an external MIDI device connected to your Macintosh, the QuickTime music movie will automatically direct its output to that device to take advantage of its higher quality. "It's a lot like Post-Script in that it's rendered to the best resolution that's available."

The QuickTime music architecture is also totally different from existing ways of producing sound internally on the Macintosh. (See sidebar: "Synthesis on the Macintosh.") Apple has been working with Roland to license its samples as the basis within the

QuickTime system software. Kennedy explains, "Roland has a lot of skill in creating high-quality samples, and we've been working with them to figure out the best way to implement those sounds in a software-based PC architecture."

A MIDI file can be easily converted into a "music movie" using Apple's MoviePlayer. The conversion process includes the optional selection of a patch for each MIDI track from a set of patches that conform to the General MIDI standard. It then embeds them in the movie. Kennedy explains that Apple won't provide all 128 patches in the basic set. "It's just too big. But we'll probably offer them as some kind of an add-on product after we get Version 2.0 out."

If you don't select any patches, the software will default to the closest approximation of whatever MIDI patch is embedded in the file being converted. "We can't promise that it's going to sound good," Kennedy warns. "We try to make a best guess, based on what internal instruments are present. If you have only 12 instruments installed, it's probably not going to sound as great as if you have all 128 sounds.

"We're still deciding how many instruments will come with the standard set," he adds. "We want to make sure there is a usable standard base set of patches available across all supported platforms, including the set-top box, where there's not a lot of extra ROM."

The number of voices you can

Synthesis on the Macintosh

The Mac currently has three types of synthesizers. They reside in the System File as "synth" resources. The note synthesizer, or square-wave synthesizer, can play simple sounds described by frequency or pitch, amplitude and duration, such as the standard system beep. The wavetable synthesizer creates sound by using a single wave cycle that can be looped to create a continuous sound. The sampled sound synthesizer can play sounds stored as 'snd' resources and AIFF files. This third type is the most sophisticated, and the most data-intensive of the three types of synthesis.

play simultaneously depends on the machine and, of course, what else is going on at the same time. "We've gotten seven or eight simultaneous voices on an LC and about 20 on a PowerPC," Kennedy says.

Apple intends to have QuickTime 2.0 for Windows as well, and engineers have successfully implemented many of its features on the lab bench. However, the Windows version will not be available until some time after the Mac version ships. "We're hoping that the next Windows release will bring the two versions a lot closer than they have been to date," Kennedy says. "We feel that this is absolutely critical. On the delivery side, Windows is a much more important platform."

QuickTime movies that contain video, digital audio and music data open up a new set of possibilities that were previously impractical. For example, in an interactive application, you could use music data to play during transitions between screens, because the bandwidth is roughly the same as for MIDI and can be easily held in RAM without hogging a lot of space. "A lot of people think of QuickTime only in terms of video," Kennedy notes. "The music part is really important. Titles today are really missing the continuity that music brings to a filmic experience." Among the other possibilities that these new QuickTime 2.0 enhancements promise are in the area of interactive music, where you can play along with a previously recorded set of music movie tracks.

VIDEO POST-PRODUCTION

Professional video producers and people who do audio-for-video post-production also will find advantages in products based on QuickTime 2.0. According to Tim Meyers, product manager of Adobe's Premiere software, that program accepts SMPTE time code (and has for a while), but "because it will also be a part of the new version of QuickTime, Premiere 4.0 will be able to write and read SMPTE to and from QuickTime 2.0 files." This means that if you record video with time code, QuickTime (and Premiere) will remember the time code numbers so that anyone can edit the movie, and there will be a way to automatically print out or otherwise use an edit decision list that is embedded in the movie for on-line purposes. (Premiere 4.0 generates

EDLs, as did the previous version.)

"It doesn't matter whether it's VITC or LTC," says Meyers, "although it does require additional hardware to read the time code. This is done via plug-in modules. Existing modules generally get time code off the tape deck through the 9-pin serial control port."

In addition, Premiere 4.0 will incorporate OCR to read SMPTE code that exists on video as a window-burn. So users who can't or don't want to deal with LTC or VITC time code will have the same capability for creating EDLs that the high-end folks have. Premiere 4.0 was scheduled to ship at the end of June.

Kennedy adds, "The range of tools that are QuickTime-based is really large. If you're creating digital video, in a proprietary environment such as with an Avid or motion JPEG system, you will be limited to a [smaller] set of tools. The other thing that's really important is that, as professional post-production video people move from outputting just to videotape into other environments such as interactive television or CD-ROM, they won't have to re-create the content if they did it in a QuickTime format in the first place.

"Today that's what a lot of people do: They take a digital satellite feed and dump it onto analog videotape; then they redigitize it into an Avid for editing, and finally output to another videotape format," he continues. "What is needed is a single digital pool of very high-quality data that can be used in various ways. The MPEG content goes to ITV, the motion JPEG goes to online editing, Cinepak and CD-ROM. It's much more difficult to do that with proprietary systems."

INTERACTIVE TELEVISION SUPPORT
An important part of Apple's strategy is to be a major player in the ITV arena. QuickTime 2.0 creates an in-

More than one million copies of Apple's QuickTime have been sold as of March. Both Windows and Macintosh developers have adopted QuickTime technology, and there are more than 300 software products supporting it today.

frastructure for development and delivery of interactive television applications through MPEG support and network enhancements. Now, with its new protocols, QuickTime can address distributed networks and devices, such as video servers, on that highly publicized infobahn.

MPEG is widely regarded as the industry-standard method of delivering video into the home for interactive television applications such as Video On Demand (VOD) and home shopping. MPEG is an ISO standard that allows for a greater video compression rate, resulting in faster, smoother video. The standard has been cooperatively developed by more than 70 companies and institutions worldwide, including Sony, Philips, Matsushita and Apple. However, MPEG by itself allows only playback. With QuickTime 2.0, users of MPEG-based devices will also be able to edit, search for and interact with video information.

"We recently announced an agreement with [database software developer] Oracle to develop a set-top box for the interactive television market," Kennedy says. "The basis of that run-time delivery in the set-top box is QuickTime. So content developers will be able to preserve their investment across multiple platforms.

"A lot of Apple's investment is in software," he continues. "We are working with Oracle and others to put together solutions for customers such as British Telecom. This is a much bigger potential market than the PC can offer. Apple's goal is to put together a complete delivery solution, with QuickTime as the standard. Developers will be able to create content on the Mac that can be delivered to other places, including platforms like Windows, and the ITV environment. Content can be interactive, or it can simply be Video On Demand. The extent to which content is interactive will greatly depend on the software that is in the box." ∎

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Paul Potyen is a Mix *associate editor.*

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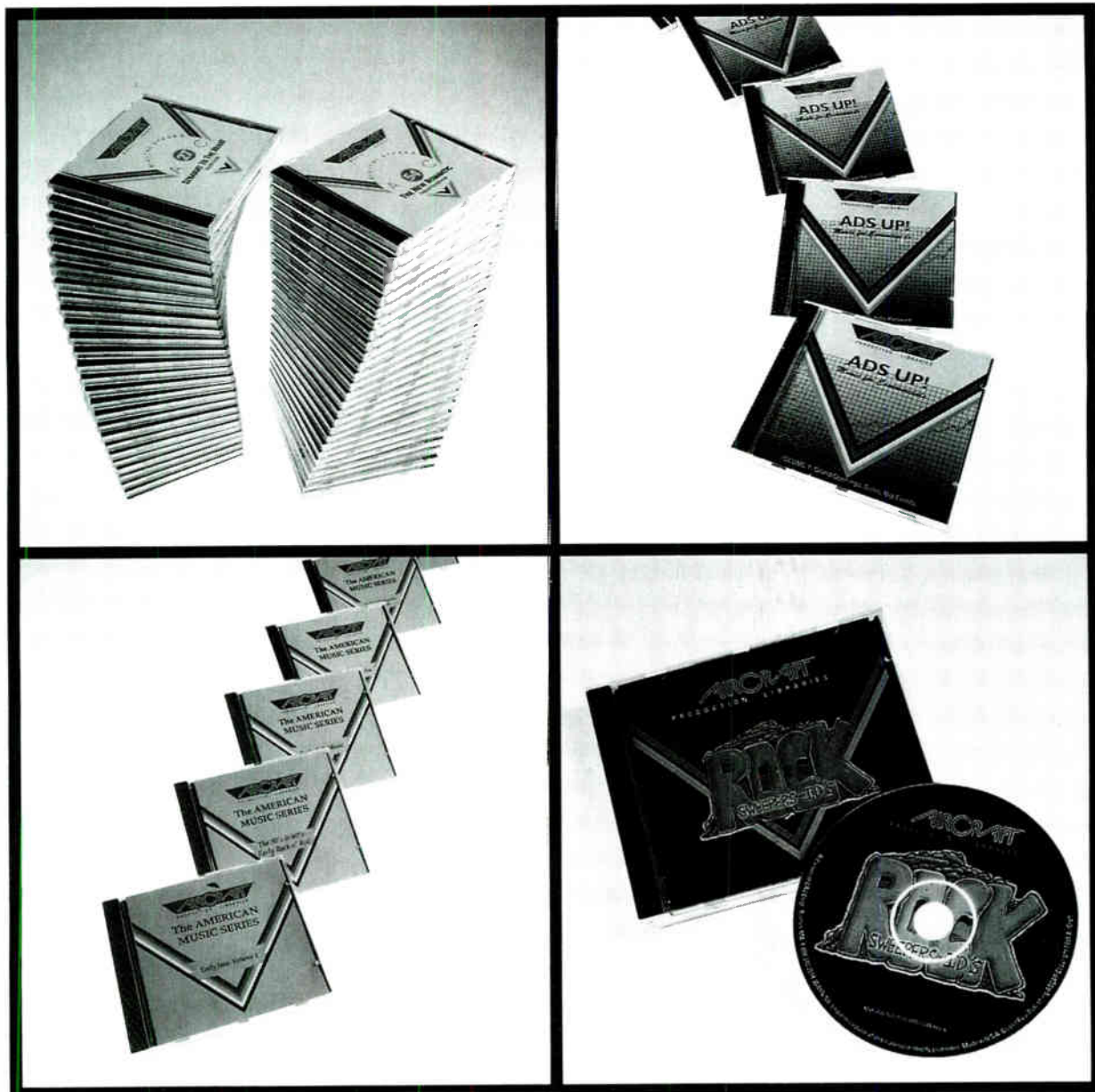
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by Philip De Lancie

AUDIO IN MAC AUTHORING

PART 1: HYPERCARD, X-COMMANDS AND QUICKTIME

Ten years ago, Apple Computer introduced the Macintosh with the bold claim that it was "the computer for the rest of us." Under Steven Jobs' liberation theology, the new machine was intended to free legions of lab-coated lemmings from their plastic pocket protectors, and to place the power of personal computing into the hands of Everyman.

Following these ambitious beginnings, the Apple visionaries and their successors spent eight years testing the proposition that the price/performance ratio isn't important in the computer market. They were wrong. Despite the Macintosh's clear conceptual superiority, "the rest of us" turned out to be a mere 13% or so of the market. "The rest of them," meanwhile, bought PC-compatibles.

Though Apple lost the market war, the central tenet of its computing philosophy has triumphed. It turns out that one need not join an obscure order of the techno-elite to master the productive use of computers. Ironically, perhaps the most conclusive evidence of Apple's success at making computing easier for everyone is the popularity of Microsoft's Windows, which brings many of the benefits of the Macintosh's mouse-oriented "graphical user interface"—actually conceived by Xerox—to the PC.

THE "HYPERMEDIA TOOLKIT"

While dissemination of the point-and-click interface may be the Macintosh's most obvious contribution, Apple's original goals weren't limited

A sample HyperTalk "handler" for fading out the volume of a QuickTime movie, the name of which is contained in the variable "shownMovie." The handler, residing in the script of a card, background or stack, would be activated when that object is sent the message "audioFadeOut."

```
on audioFadeOut
  global shownMovie
  put the audioLevel of window shownMovie into x
  repeat until x = 0
    subtract 1 from x
    set the audioLevel of window shownMovie to x
  end repeat
end audioFadeOut
```

Sample HyperTalk scripts for a pair of buttons that would respectively lower and raise the volume of a QuickTime audio file as the mouse is pressed. The name of the specific file would be contained in the variable "playingSound."

Lower Volume

Raise Volume

```
on mouseStillDown
  global playingSound
  put the audioLevel of window playingSound into x
  if x > 0 then
    subtract 1 from x
    set the audioLevel of window playingSound to x
    send idle to window playingSound
  end if
end mouseStillDown

on mouseStillDown
  global playingSound
  put the audioLevel of window playingSound into x
  if x < 255 then
    add 1 to x
    set the audioLevel of window playingSound to x
    send idle to window playingSound
  end if
end mouseStillDown
```

Figure 1: A combination of HyperTalk scripts and X-Commands gives HyperCard flexible control over QuickTime audio.

World Radio History

to making computers more accessible to users. The company also set out to offer every user the tools to be a programmer. Starting as early as 1985, a team of Apple software engineers led by Bill Atkinson began work on HyperCard, the software engine for a "hypermedia toolkit." The intention, as former CEO John Sculley said at the time, was to encourage the development of new applications, "not from the ranks of experienced Macintosh programmers, but from nonprogrammers who are otherwise intimidated by serious programming."

The "every user is a programmer" approach didn't exactly catch on like wildfire. But Apple's "hypermedia toolkit" was really a multimedia authoring application by another name. By building audio and graphics capabilities into every machine and distributing HyperCard free with every Mac, Apple sowed the seeds for what has since grown into desktop interactive multimedia. The company's subsequent development of QuickTime has also been instrumental in helping the new medium to blossom.

Apple's interest in HyperCard has ebbed and flowed over the years, and many powerful competing authoring programs have been introduced, some of which will be covered in part two of this article (coming in September). But our look at audio in Mac authoring begins with HyperCard—despite its serious limitations—in part because it is a common point of reference within the multimedia community.

More important, programmers who haven't been content to work within HyperCard's limitations have devised a variety of "X-Commands" to extend the program's capabilities. In particular, XCMDs enabling the use of Quick-Time audio and CD-Audio can greatly enrich the palette of the sound-savvy author. And many XCMDs written for HyperCard can be used in other authoring environments as well.

HYPERCARD BASICS

Authoring environments are said to be based on various metaphors that provide ways of visualizing the process of integrating media elements into a finished production. In Macromedia Director and Passport Producer, for instance, elements are ordered along a timeline that serves as a framework for events. HyperCard uses

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the metaphor of a "stack" of "cards" in which the topmost card is the current card displayed on screen. Cards may contain buttons, fields of text and illustrations, and a group of cards may share a common background.

Each of the above objects (cards, backgrounds, buttons, fields) may have associated with it a series of instructions describing actions to be taken in response to a given event. It is these event "handlers" or "scripts," written in the HyperTalk language, that give HyperCard its power and flexibility. And it is HyperTalk's similarity to English that puts that power into the hands of non-programmers.

With HyperTalk, it is a fairly simple matter to begin exerting custom control over aspects of a multimedia presentation that may be difficult to modify in some other authoring environments. The first script in Fig. 1, for instance, illustrates a custom "audioFadeOut" handler that could be called when the user decides to go from one card to another in the middle of a QuickTime movie. This avoids the abrupt cut-off of audio that is
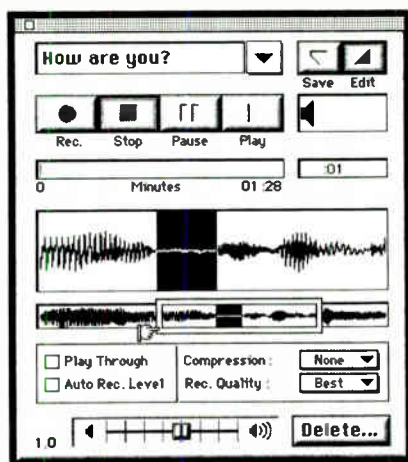
Figure 2: HyperCard's audio palette offers straightforward recording and editing.

characteristic of many transitions in multimedia. The next two scripts let the user control the volume of an audio clip playing under QuickTime without the need for showing the full QuickTime controller. (We'll get further into using QuickTime for audio in HyperCard below.)

NATIVE SOUND

Before we can begin using Hyper-

Talk to control audio events, we first have to get sound into a form where it is accessible to HyperCard. A number of sound file formats are commonly used on the Mac, but three are most relevant here: .snd resources, audio-only QuickTime movies and Red Book audio from CD-Audio or mixed-mode CD-ROM.

The sound format native to Hyper-Card is the .snd resource. HyperCard includes an audio recording control palette (see Fig. 2) on its Edit menu to facilitate the recording, editing and integration of sound in this format. The process is straightforward. The input source (built-in, NuBus card, MacRecorder, etc.) is determined by the Mac's Sound control panel. The options toward the bottom of the palette determine the record parameters (data compression is not recommended for music). Based on these settings, HyperCard displays the maximum recording time available, which varies depending on the machine's RAM.

Once audio is recorded into RAM, a representation of the entire sound appears in the bottom waveform window. The upper waveform display provides a close view of that part of

the sound lying within the rectangle in the lower display. The location of the rectangle and its length are set by simply dragging on it. The shorter the rectangle, the finer the resolution of the upper display.

Editing takes place on regions selected by dragging in the upper display. A selected area may be played, copied, cut, pasted, etc. When the result is satisfactory, the sound is given a name and saved to disk. Previously saved sounds may be selected from the pop-up list at the top of the palette for re-editing, renaming or deletion.

Once a sound is saved as part of a stack, the "play/play stop" Hyper-Talk commands, followed by the sound name, may be invoked from any script to hear or stop the sound. A ready-made button for each sound is created when the sound is saved to a stack, which gives the user a head start on incorporating the sound.

HyperCard's built-in sound-capture capability is well-designed and easy-to-use, and it may be all that is needed for adding basic sound excerpts to a stack. But there are some important limitations. Primarily, you can't change the recorded level of the sound, or fade it out when it ends. If you need these functions, you have to record, edit and prepare sound files in another application such as Sound Designer or SoundEdit, and then convert and install them into a stack as .snd resources.

This brings up the question of whether to use the resource approach to sound at all. A sound saved as a resource becomes part of the stack, which means you don't have to worry about keeping track of separate sound files. But any substantial use of sound will add up very quickly to a huge stack. This can be a big disadvantage in moving, storing and distributing the stack. In CD-ROM publishing, for instance, you want users to move the stack from the CD to their hard drives for improved performance (speed). If the sounds are part of the stack, users will need much more free space available on their drives. Another limitation of .snd resources is that they are loaded into RAM during the playback process. For example, files with more than 3 MB of data (typical of a 3-minute piece of 8-bit mono 22kHz audio) will simply not play if there is less than 4 MB of RAM available.

QUICKTIME X-COMMANDS
X-Commands are modules of programmed code that extend Hyper-Card's capabilities, allowing it to carry out operations involving data and activities external to itself. The XCMDs and their companion X-Functions (XFCNs) may be added as a resource to a given HyperCard stack with ResourceMover (found in the PowerTools stack that comes with HyperCard) or ResEdit.

In the case of audio, XCMDs allow HyperCard to play audio stored as external files in formats other than .snd. There is an XCMD, for instance, for playing the common AIFF format. But it is the use of QuickTime to play sound that can really open up
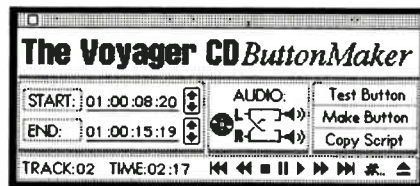
Figure 3: Voyager's CD-Audio ToolKit includes this palette for creating buttons that play audio from CD.

new possibilities as far as event synchronization and control.

QuickTime, of course, is most familiar as a system extension allowing video to play on Macintosh and Windows PCs. (For more on QuickTime 2.0's capabilities, see "QuickTime: A Multimedia Standard?," page 72.) But underlying the video capability is a system for synchronizing and controlling parallel streams (tracks) of information. Editing programs such as Adobe Premiere allow the easy creation of QuickTime movies that have an audio track without a video track, and under Sound Manager 3.0 up to 16-bit/44.1kHz fidelity is supported. In HyperCard and other programs that support HyperCard XCMDs the author can play with a host of parameters ("properties") of these audio movies.

The two main XCMDs in use for playing movies within HyperCard are Movie from Claris (included with HyperCard 2.2) and QTMovie, available as part of Apple's tools for Quick-Time developers. A comparison of the two is beyond the scope of this article, and most of their functionality is redundant anyway. All of the possibilities mentioned below are supported by both, though the actual scripting used varies from one to the other.

As with .snd resources, QuickTime sounds may be started and stopped by a call from a script. But because QuickTime movies contain an internal time reference (analogous to a tape striped with SMPTE), scripts can also command the movie to go to any address and start playing or wait for further instruction. Other options include playing a defined segment of a movie, looping, changing the speed and playing backward.

You can also program preset actions based on the address of a movie as it plays. One simple application of this "timedCallBack" feature would be a "slide show" in which an audio movie used as a soundtrack would allow changes in displayed graphics to be synchronized with the sound.

The audioLevel property, as discussed earlier, may be manipulated with scripts such as those in Fig. 1 to smooth unplanned transitions and give the user more control. But because QuickTime movies may have multiple audio tracks—originally intended to allow for soundtracks in different languages to accompany one video track—the possibility also exists for mixing on-the-fly by playing many tracks at once and changing their level, either with timedCallBacks or in response to user action (interactivity!). This capability is used to good effect on Peter Gabriel's Xplora1, where a 4-channel virtual console allows users to create (and save) automated, updateable mixes of Gabriel's song "Digging in the Dirt."

It would be nice if all these possibilities were laid out in some easy, prepackaged form. But even Premiere, a very powerful and thorough QuickTime editor, steers clear of the more obscure uses of QuickTime and only supports the creation of a single audio track (mono or stereo) in the movies it makes. There are Quick-Time development tools available from Apple, however, that include stacks allowing further exploration of the available options.

MIXED-MODE AUDIO XCMDS
Aside from QuickTime, another whole world of audio possibilities is offered by the use of XCMDs with mixed-mode CD-ROMs. A mixed-mode disc is like an enhanced form of CD-Audio where the first track contains CD-ROM data rather than sound data. In a regular CD-Audio player, all tracks except the first will play normally. Put the disc into a CD-ROM drive, and

the first track is recognized by the host computer as a computer program, which would normally include all the elements of the multimedia program other than the CD-Audio tracks. By sending control commands to the drive, the CD-Audio tracks may be accessed and integrated into the presentation as needed.

The main advantage of the mixed-mode approach is fidelity. Where music is the focus of the multimedia content, full-fidelity sound blows away the 8-bit/22kHz sound standard with many PC sound cards and built-in to most Macs. True, 16-bit is rapidly becoming standard for PCs, and Mac users can buy AV Macs or NuBus sound cards—but most won't. If you rely on QuickTime, AIFF or other through-the-computer means of delivering sound, most listeners today will end up only being able to listen in 8-bit even if you put 16-bit on the disc.

There are several important factors to remember when considering the mixed-mode approach. First, the sound from the CD-Audio tracks comes through the audio outputs on the CD-ROM drive itself. Some integrated computer/CD-ROM systems include automatic routing of the CD-Audio sound to the same speaker that plays the internal, computer-generated sound. But users with stand-alone drives will need to hook self-powered monitors or a stereo system to their drive outputs (both RCA and headphone jacks are commonly provided).

Second, the drive cannot simultaneously play an audio track and access files from the data track. Whatever is going to go along with the CD-Audio must already be in RAM or accessible from a hard drive before commanding the CD drive to play. Third, CD-Audio tracks take up a lot of storage space on a disc; a 16-bit/44.1kHz stereo file is eight times larger per unit of time than the same audio in an 8-bit/22kHz mono format.

For access to CD-Audio sounds, HyperCard and other programs use XCMDs to interface with the CD drive. Apple and Voyager sell kits (both built around the same Apple XCMDs) that aid in adding the appropriate scripts to stacks. Commands for all the basic transport functions of the drive (play, pause, eject, scan, next/ previous track, etc.)

are included. So too are a set of XFCNs which get information about such things as where you are on the disc (disc time or track time, in CD-standard 75 frame-per-second time-code), the disc title or ID number and the current status of the drive (playing or paused). The information may then be displayed on screen.

While both kits include ready-made buttons and "button builders" or "event makers" (Fig. 3), the Voyager kit goes much further in providing ideas—supported by ready-made scripts—of how CD-Audio may be used in a stack. Among the intriguing possibilities are the measure-by-measure highlighting of music notation as a passage plays from disc, a slider allowing the user to drag to any point on the CD, and synchronized text commentary (another form of the timedCallBack idea) displayed on screen as the music plays. These approaches have been used very effectively by Voyager and others in music appreciation CD-ROM titles (see "Music CD-ROMs" in the December, 1993 *Mix*). It is also possible to provide voice-over narra-

MULTIMEDIA CHIP SHOTS

MACROMEDIA SOUNDEDIT 16

SoundEdit 16 is a 16-bit Quick-Time-compatible sound editor for Macintosh computers from Macromedia (San Francisco) that is capable of recording and playing back multitrack CD-quality soundtracks without DSP-based hardware. The number of tracks is limited only by the amount of memory allocated to the application. Other features include fade-ins and -outs, normalizing, the ability to convert to and from sound files in the .WAV format, and support of sampling rates from 5.564 to 48 kHz at 8- or 16-bit resolution. Suggested retail price is $379. Registered users of MacRecorder Sound System, SoundEdit and SoundEdit Pro may upgrade to SoundEdit 16 for $99.

RADIUS VIDEOVISION TELECAST

Radius Inc. (San Jose, CA) announced VideoVision Telecast, a powerful, production-level digital video solution for Macintosh. It features broadcast-quality output, 16-bit audio, and Betacam input and output in a system that meets both RS170-A and CCIR 624-4 specifications for broadcast video. The system consists of two NuBus cards and a 19-inch, rack-mountable control box with 30-frame, 60-field, full-motion video, full-genlock ca-
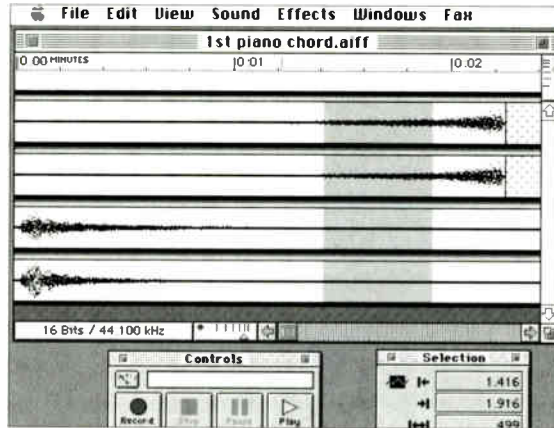
SoundEdit 16 software interface

pability, SMPTE time code and NTSC, PAL and SECAM support. Scheduled to ship this summer, VideoVision Telecast requires a Quadra Series computer.

APPLEDESIGN POWERED SPEAKERS II

New from Apple Computer (Cupertino, CA) are the AppleDesign Powered Speakers II. Measuring about ¾ the size of the original AppleDesign Speakers, the new product is magnetically shielded specifically for use with computers and includes specially designed transducers with a frequency response of 150 to 20k Hz. Among its other features are the ability to mix inputs from your computer with an outside line-level source, an easy adjustment of listening angle, volume control and headphone jack.

Scheduled to be available in June, the AppleDesign Powered Speakers II are priced at $79.

DIGIDESIGN SAMPLECELL II PC

SampleCell II, Digidesign's (Menlo Park, CA) stereo, 16-bit, 32-voice, 32MB sample playback card is now available for the Windows/PC platform. The SampleCell II PC system features dynamic digital filtering and eight polyphonic analog outputs. Each card supports up to 32 MB of standard Macintosh II 4MB SIMMS. Suggested retail price is $1,495.

PINNACLE FAST MODE FOR SIERRA

Pinnacle Micro (Irvine, CA) has developed a proprietary Fast Mode software program that, when used with its Sierra 1.3GB optical drive, improves both read and write times up to 25% over the drive Standard Mode with 1.3GB media. Fast Mode works transparently with all applications and operating systems, without driver changes. However, a disk formatted in Pinnacle proprietary Fast Mode will not be usable in non-Pinnacle drives. To take advantage of Pinnacle's Fast Mode, users can download firmware 1.40 through Pinnacle's Bulletin Board Service at (714) 453-8619, or call (800) 553-7070 to receive the upgrade by mail at no additional cost.

CORRECTION

In the May "Multimedia Chip Shots," it was incorrectly reported that MacWaveMaker from Morning Star Solutions incorporated the full set of Kurzweil K-2000 and Mark 10 sounds on a Macintosh NuBus card. While some of the technology and sounds incorporated in MacWave-Maker are derived from several Kurzweil products including the K-2000, the product does not use the full set of K-2000 sounds.

AppleDesign Powered Speakers II

World Radio History

ENGINEERING THE GOSPEL

BY DAN DALEY

"**A** big-selling Contemporary Christian record is like a big-selling pop record—just minus a zero [at the end]." That's how Contemporary Christian Music producer Reed Arvin (4-Him, Rich Mullins, Billy Sprague) communicates the scale of this sprawling, growing and surprisingly quiet industry. "A 300,000-unit record has

RECORDING
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the same significance for gospel music as a three million-seller in pop," according to Arvin. CCM unit sales in the 80,000 to 100,000 range are considered successful.

The best known of the CCM artists are the ones who have crossed over to mainstream charts, most notably Sandy Patti, Amy Grant, Michael W. Smith and BeBe & CeCe Winans. But the genre supports a wide range of acts of all sizes and sales, with subcategories that range from inspirational to country to rock to rap to heavy metal. According to the Gospel Music Association, headquartered in Nashville, sales of Gospel/CCM recordings were 50-plus million in 1993 and are expected to reach 59 million units by 1996. (With at least half of those units falling into the CCM category, which includes rock, rap, pop and metal.) The genre has its own Grammy-equivalent, the Dove Awards, and is looking to further exploit a base of what it estimates are 78.5 million "active" American Christians, over half of whom have purchased Christian records at some point. In other words, as

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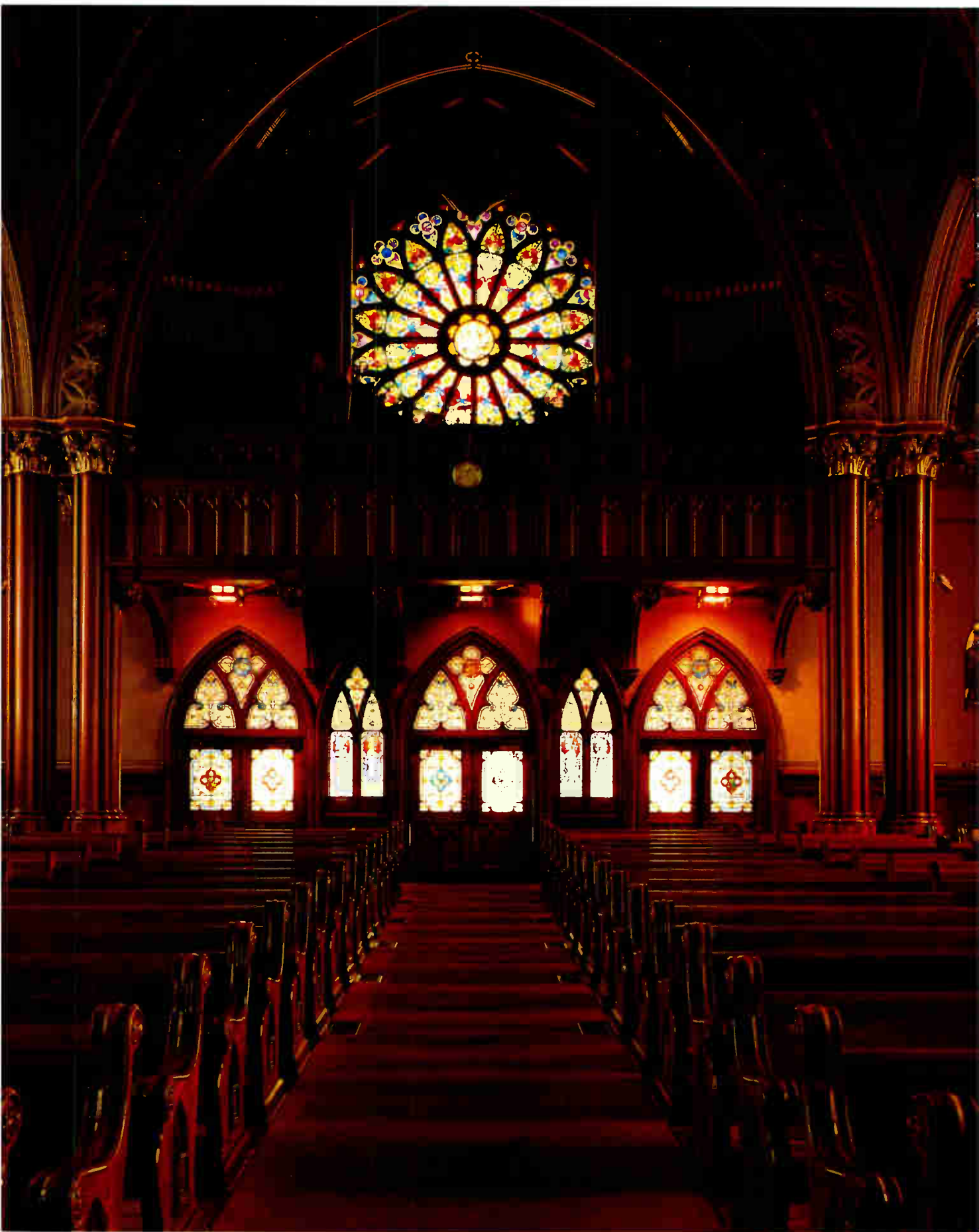
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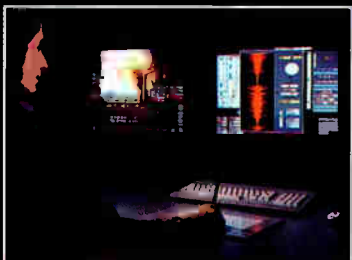
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WorldNet

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- Live audio links or complete multitrack project transfer

Solid State Logic

quiet as this industry segment appears to be, it has significant numbers.

The essential numbers for gospel, though, lie in its budgets. CCM budgets average in the mid-five-figure range, with budgets spanning the area from $25,000 to $100,000. Since the Christian message of the music—evangelical and proselytizing as it is meant to be—seeks to penetrate mainstream consciousness, the engineer is often responsible for making a recording as commercial as possible on relatively small amounts of money per project.

Virtually all the engineers working regularly in CCM say that the techniques resemble those of pop, but the budgets set the music apart. The industry is centered in Nashville, where the country music industry itself has only recently seen pop-level recording budgets. Just a decade ago, country records were routinely budgeted at about $30,000. Now the average is closer to $150,000.

BEATING THE BUDGET

The solution to the dollar crunch for CCM engineers and producers has been to stretch their creativity. Pre-production is extensive and often converted into master tracks; the use of personal and home recording studios is increasing; and engineers and producers often use non-union musicians. The results often are surprisingly competitive with pop and rock efforts.

Keith Compton is a Nashville-based engineer whose work led to seven Grammy nominations in 1993, including Wayne Watson, Sandy Patti, DC Talk, Michael W. Smith and Mike English, and Bruce Carroll. Working with artists ranging from CCM mega-sellers to newcomers means that the budgets are equally varied. Compton records in various studios, from traditional Nashville rooms like Omni Recording to his own dining room, where he worked on Bruce Carroll's tracks. "CCM artists differ from their mainstream counterparts in that they are more willing to take the time to experiment sonically," he explains. "They'll spend a lot more time on the vocal sounds."

Engineers have to be conversant with the musical cliches of the different genres of CCM. "For the rap group DC Talk," Compton explains, "I worked with them at [Michael W. Smith's private] Deer Valley Studios

in [Nashville suburb] Franklin. We used a lot of loops and trashy drum sounds, which I got by compression through some old RCA BA-6A and Gates M3529B limiters and you get the hip hop effect."

Compton says it's easier getting paid by CCM clients than by some secular ones. "Back in Muscle Shoals, I had enough latex checks to paper my bathroom," he recalls, only half-jokingly. Staff engineer Bill Whittington of The Bennett House in Franklin, owned by Amy Grant's producer Keith Thomas, notes, "You'll get between $25 and $50 an hour doing CCM dates. Not too much different from regular pop or country sessions. And people will negotiate day rates for longer projects. It's the budgets that are significantly smaller; they break down to about $5,000 per song. Not a lot to be competitive with the pop market, which a lot of these records are trying to be."

Whittington says that both the production values and musicianship on CCM records have become more aggressive in recent years as the genre looks to increase its market share. "But the budgets haven't really changed much," he admits. "It's still a very small, closely knit community of producers, artists and engineers, and 90 percent of it is based in Nashville."

FLEXIBLE PEOPLE, INFLEXIBLE RULES

The flexibility of CCM engineering is evidenced by Ronnie Brookshire, who has engineered for a wide variety of categories within CCM, including the R&B of Cindy Morgan, the pop sound of Steven Curtis Chapman, and the metal of White Heart. "I like the fact that there are so many bases to cover from a sonic point of view," Brookshire says. "It keeps me open and fresh to a lot of new things. The trade-off is that you'll often put in longer hours for less money and even do parts of it for free. The budgets are low, but the listeners don't know if you spent $5,000 or $50,000 on a song."

Brookshire concedes that he and other CCM-oriented engineers take advantage of project studios as often as makes sense. For instance, Cindy Morgan's record was virtually completed in a MIDI realm before the first tape machine was aligned. Brookshire used the small studio at producer Mark Hammond's home to

keyboardist with rock band Petra, one of CCM's few Platinum-sellers. He left the band to pursue production, solo projects and full-time recording ventures. His home studio is based around analog recording technology, and its intent is partially to help maximize the budgets endemic to the industry. "You can't get a Rolls Royce on a Volkswagen budget, and you can't go into the studio to do a Christian record solely on a quest," he says. "There's less room for experimentation. You have to focus on how to get the most out of the budget you have and rely on proven methods. That's one of the reasons I chose analog technology."

There are also fewer spiritual constraints on CCM engineers and their clients: It is a commercial enterprise as well as a metaphysical one, a ministry mixed with artistry. "It comes down to what the label is asking for as well as what the artist and producer wants," Lowry says. "That's where the home studio comes in. It gives us more opportunity to experiment, as well as more time to be at home with our families."

There also is that part of the spiritual element that is less definable. CCM engineers possess a level of commitment that goes beyond technology and personal satisfaction. "There is a lot of prayerful consideration in a CCM record," he explains. "And the message is a major consideration for everyone involved, including the engineer. If the message isn't theologically sound, you'll have a problem. That's because there are psychological elements that go into choosing sounds. It's not just the notes or the rhythm; there are a lot of other things going on that affect the record.

"If there's a single purpose of mind between the artist and the producer and the engineer, then things are more intuitive between them," Lowry concludes. "And that's important not only because you're trying to make as good a record as you can with a limited budget, but also because CCM is rapidly becoming a definable product from the U.S. music industry and getting secular airplay. You're out there competing on a higher level, and you want to use every advantage you have." ∎

Dan Daley is a Mix *contributing editor. He considers religion and politics fair game in any industry.*

NASHVILLE'S FINEST

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It Ain't Just Country

THE DIVERSITY OF MUSIC CITY'S STUDIO BASE

by Dan Daley

I was lying on the bed in a London hotel room two years ago when a teaser for a UK television magazine's segment on Nashville came on BBC2. "Next up—a look at Music City, USA," proclaimed the proper British voice-over. "The world's hottest new music!" The teaser brought out the amateur sociologist in me, and I opted to stay with it instead of watching a Benny Hill rerun, which I had hoped might reveal some startling new insights about the man when viewed in PAL.

The story opened with a shot, not of Nashville, but of Pigeon Forge, Tenn., home of Dollywood, and as if that were not enough, it superimposed Parton's natural endowments over the shot of the theme park. This was supported by an audio track that featured a Flatt & Scruggs cut, of roughly 1970 vintage. "This could be trouble," I thought to myself, as I reached for the Gordon's bottle.

This is not a new scenario to Nashville. Country music has been both a blessing and a curse for this city with more recording studios per capita than anywhere in the world. (More churches, too, but that's another story.) The Nashville Yellow Pages list more than 200 facilities.

But even the migration of more and more country artists to the pop charts hasn't been sufficient to convey to the music industry at large the depth of the studio base in Nashville. At the same time that Vince Gill, Reba McEntire and George Strait are cutting in town, recordings for acts such as Foreigner, Vanessa Williams, Peabo Bryson, Echolyn, Donna Summer and Al Kooper are also taking place. Tony Brown, James Stroud and Jimmy Bowen are here, but so are Michael Omartian, Brian Ahearn, Mutt Lange, Janis Ian, Bob Gaudio and a host of other pop and rock producers.

Several attractions bring them to Nashville: a talent pool of musicians that has literally no equal in the world in terms of breadth and depth;

a base of recording studios to accommodate virtually any level of technology and economics; a group of engineers that can—and have—cut any style of music; and the less tangible but equally significant concept of "quality of life." The last has probably been the most oft-cited reason for those who have come here and put down roots. A recent radio report had the Nashville department of motor vehicles exchanging 750 Los Angeles driver's licenses per month.

"I came down here six years ago kicking and screaming, and I tell you, you couldn't get me away now," says Glenn Rosenstein, a quintessential New Yorker and producer of alternative and pop acts Ziggy Marley, Michelle Shocked, October Project and Echolyn. Rosenstein, who was in the midst of another pop date at Sixteenth Avenue Sound, had shared the perception many have of Nashville as a country music town. However, once here, Rosenstein found not only a diverse base of studios and engineers, but other significant ancillary services.

"Fender, Gibson and Pearl all have offices here," he says. "I never got that kind of service in New York or L.A. And there's also a sense of musical community here you don't

find elsewhere. If I need something, not only does someone have it, but they're usually willing to bring it on over. Nashville's not the orphan it once was—it's actually driving the revenues of several labels."

That statement is buttressed by the fact that, for instance, MCA Records' Nashville division accounted for $120 million of the company's total sales of $344 million for 1992, the year in which country sales garnered 16.5% of the total U.S. music sales market share. The figure rose to 17.5% last year. Shares for the Nashville divisions of other major labels show similar strength.

Richard Dodd, an engineer and UK native who came to Nashville in 1991 after working in Los Angeles, has found that he moves easily between genres. In addition to country dates, Dodd has engineered and/or produced records for Jeff Lynn, Slick Lillie, Julianna Raye and Misato Watanabe. "The musician base and the attitude are the real pluses here," he says on a break from tracking at Masterfonics.

When he worked in Los Angeles, engineer John Guess did records for Rod Stewart, Christopher Cross and Jermaine Jackson. His talents translated perfectly for the contemporary country milieu. Since moving to Nashville in 1988 after a year of commuting, he's worked on Reba, Vince, Tanya and Patty (they tend to use first names in Nashville), as well as a slew of German pop acts, including Sonic Award winners PUR. On a break from a mix of Laura Vida at Sound Stage, he observes, "What I've found about Nashville is that the proximity of the studios to each other reminds me of the way L.A. used to be. It's very conducive to making records. I can see this as being the place to make any kind of record."

Award-winning producer Michael Omartian, who has produced for Rod Stewart, Donna Summer, the Jacksons, Michael Bolton and Christopher Cross, among others, is now a Nashville resident. In the time he's been here, he's worked on records for Amy Grant, Kathy Troccoli and Gary Chapman. After tracking, overdubbing and mixing in Emerald, Sound Stage, Javelina and Secret Sound, he's found the studio base to be as diverse as Los Angeles'.

"There's also this aspect that's like Avis—they try harder," he comments. "In Los Angeles, I was usually starting with MIDI and calling in musicians for overdubs. It was getting kind of impersonal. Here, the musician community encourages you to do live tracking dates from the start. I can see that in four or five years, Nashville will no longer be regarded as just a country music town. They'll be doing everything here on a regular basis."

The range of support systems for audio projects in Nashville includes full-service tech and equipment sales, rentals, cartage, catering, musician referral, personnel, etc. The city's audio-for-picture base also is broadening, with commercials and feature film work. While this remarkable infrastructure has been created on the shoulders of the country music industry, the larger music community is becoming more aware of Nashville as a center for country music *and* as a locus for music, period. As Richard Dodd puts it, "Once you close the control room door here, you can do anything." ∎

THE

B ENNETT HOUSE

The Bennett House regards itself as more of a varied and synergistic recording environment rather than a recording studio. Located in the historic and affluent Nashville suburb of Franklin, the facility is ensconced in a stately Greco-Victorian two-story house built in 1875. The multiroom structure utilizes three of its rooms as primary cutting areas, with up to five additional rooms serving as alternate cutting rooms and ambient chambers. The result is a unique, flexible and almost infinitely varied realm of possibilities for tracking and overdubbing, all centered around an "at home" environment, with full kitchen, two lounge areas and a secluded, fully landscaped deck and courtyard.

The studio has undergone significant evolutionary changes since its conversion to a recording facility in the late 1970s. Legendary producer Norbert Putnam (Joan Baez, Dan Fogelberg, Jimmy Buffett) was the first studio owner and used the dining room as the control room and cut tracks in the various parlors. Putnam later added two new buildings to the structure, one of which currently houses the control room and isolation rooms, as well as offices. Under the stewardship of publisher/producer Bob Montgomery (Joe Diffie, Waylon Jennings/Willie Nelson), the second building, a carriage house, was converted into an overdub and programming studio.

In February, 1992, noted pop/R&B producer Keith Thomas (Amy Grant, James Ingram, Vanessa Williams, BeBe & CeCe Winans, Whitney Houston) purchased the facility. Since then, with new construction, The Bennett House has functioned in the dual and distinctly separate roles of housing Thomas' private studio and the main studio for such clients as Ian Moore, Faith Hill, Allgood, Dusty Springfield, Ashley Cleveland, Simon Climie, Beth Nielson-Chapman, Sandy Patti and other pop, rock, gospel, R&B and country artists, as well as noted producers Tom Shapiro, Justin Neibank and most recently Niko Bolas.

As beautifully rendered as the structure is, it is also technically solid. The main rooms have turn-of-the-century hardwood floors, plaster and brick walls, and 12-foot ceilings. Both the first and second floors of the house are tielined to the control and isolation rooms via 48 mic lines, two stereo cue feeds and six closed-circuit video feeds

"The house itself is extremely creative," says studio manager Daryl Bush. "The various surfaces and sizes of the rooms provide an incredible range of sonic textures and potential. Everything that's been done to the house structurally and technically has been aimed at supporting that."

BATTERY STUDIOS

Battery Studios occupies an interesting niche physically and philosophically in Nashville. It's located in the original Glaser Brothers recording studio, which during the 1970s was the home base of the country music outlaw movement. The studio produced the recordings of Tompall Glaser and Waylon Jennings, and it's where Jimmy Bowen said he got his education in country music upon arriving here in 1977 from Los Angeles.

Battery in Nashville is one of several studios operated by Zomba Recording Corp., along with facilities in London, Chicago and New York. Opened in July 1992, Battery represents a total redesign of the Glaser Brothers studio into a state-of-the-art single-room facility.

Battery's control room features no parallel walls, with soft surfaces on the front wall and hard surfaces behind the console. The heart of the studio is a 44-input Neve 8068 console with GML automation. The producer's desk directly behind the console houses three racks of outboard equipment, including AMS delays and reverbs, five stereo Drawmer gates, two UREI 1176 compressors and Lexicon processors. Battery also shares its quarters with Dreamhire, another Zomba company and one of the world's largest equipment rental companies. Thus, the studio's access to outboard, microphones and multitrack decks is vastly enhanced.

Battery's control room is wired to accommodate 24-, 32- and 48-track decks, and its adjacent client lounge is wired with four mic inputs, allowing it to be used as an additional recording space.

The 600-square-foot tracking room, based on the original Steven Durr design, includes four iso booths and an air lock with a sliding glass door that also can be used as an iso. The recording room surfaces are paneled with highly resonant tongue-in-groove spruce. The three cue systems, which are powered by the same Perreaux amplifier that powers the main monitors, include two passive cues and one 8-channel active system.

"The accent here has been on service and on client privacy," explains Lee Groitzsch, Battery's manager and chief engineer, citing the private staircase that leads from the parking lot of the studio as an example. Those who have used the room include top country producers Tony Brown and Paul Worley, and pop producers Mutt Lange, Mike Chapman, Nigel Green and Tony Platt. Artists using Battery have ranged from Randy Travis to former Rascals leader Felix Cavaliere, produced there by Don Was.

Groitzsch, who has worked in the Nashville studio environment as an engineer, studio manager and independent label owner for 14 years, says he's seen Nashville change from a cloistered community to one that can and does accommodate an incredibly broad range of music. "It's a healthy competition that goes on here," he says. "Everyone participates in everyone else's success. It's a rare thing to experience. But I'd like to think it's the way it should be."

STUDIO SPECS: Owner: Zomba Recording Corporation; Manager: Lee Groitzsch; Engineer: Lee Groitzsch. Dimensions: control room 19x15x7-9 (slope); studio 34x13x16, drum room: 14x12x9; iso booth: 8x6x9; Mixing Console: Neve 8068, 44 inputs with 12 channels of 1081 mic pre's and GML automation; Audio Recorders: Otari MTR90-II; Studer 1-inch A820; Panasonic 3700 DAT, (2) Tascam 112B analog cassette; Monitors: KEF C-55; Yamaha NS-10; EV Sentry 100; Tannoy 12-inch LGMs with Mastering Lab crossovers; Of Special Interest: Live reverb chamber; EMT stereo plate; four iso booths; 6'9" Kawai grand piano with Gulbransen KS-20 MIDI package.

Battery STUDIOS

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CASTLE RECORDING STUDIOS INC.

The Castle is one of the truly unique recording studios in the world in that its physical plant was once a rest stop and hideout for the Roaring Twenties' most notorious figure, Al Capone. Built between 1929 and 1932 on 34 pine and cedar-covered acres just south of downtown Nashville, the stone edifice housed Capone and his crew during their frequent runs between Chicago and Miami, doubling as a bootlegging site. Since then, the building has seen various incarnations, including a short-lived gambling casino and a rather elite restaurant whose regulars included Spencer Tracy and Bob Hope (who, during a show in Nashville, peered out into the cavernous interior of the the Ryman Auditorium and uttered, "What time do the bats come out?").

By the time the Castle was acquired by the Nuyens family of Antwerp, Belgium, in 1979, the building had acquired quite a past. Jozef Nuyens proceeded to add to its history. After its opening as an analog studio in 1983, in short order The Castle became the first facility to introduce digital recording to the area, and its combination of SSL console and digital storage has provided a template for other facilities. The Castle also was one of the first studios to make sequencing and synthesis an integral part of its technology.

Studio designer Mike Blackmer incorporated much of The Castle's unique character into the acoustical design, e.g., the original hardwood floors in the recording room. Birchwood gobo panels were designed to allow engineers to quickly tune the room's resonances to individual tastes. Client amenities keep alive some of The Castle's former incarnations: two lounges including a full kitchen, a gas barbecue and a basketball court. Situated midway between Nashville and the upscale suburb of Franklin, The Castle has had a mixed base of clients over the years, from country artists such as Travis Tritt, Alan Jackson and Brooks & Dunn, to pop and rock artists such as Bruce Springsteen, Michael Bolton and October Project. At the 1994 ACM

Awards, artists recording at The Castle won in the following categories: Album of the Year, Single of the Year, Vocal Duo of the Year, New Female Vocalist of the Year, New Male Vocalist of the Year and Song of the Year.

"It wasn't an easy thing to start the studio in Nashville in the 1980s," recalls Nuyens. "I've watched Nashville change over the past ten years or so, and it's like a different city as far as recording is concerned. What hasn't changed is that the people are amazing. That's why we're able to keep a lot of the European flavor in the operation of the studio—Nashville is a place where the subtle things, the little things, get noticed and make a big difference. And it shows in the music that comes out of here."

STUDIO SPECS: Owner: Jozef Nuyens ; Manager & Bookings: Mike Janas, Jozef Nuyens; Dimensions: control room 1: 15x28x8, control room 2: 14x16x9; studio 1: 18x52x10, studio 2: 9x20x10, studio 3: 9x23x8; Mixing Console: SSL 4056 G Series, Otari Series 54; Audio Recorders: Otari DTR-900II, Mitsubishi X-880, Studer A820, Studer A827; Monitors: UREI 813A, Yamaha, KEF; Of Special Interest: Large and extensive complement of classic and modern microphones and outboard equipment. The Castle also operates a production company, which has signed six artists to major-label recording contracts, including the Neville Brothers.

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GEORGETOWN MASTERS

The first thing one notices upon stepping across the upstairs threshold at Georgetown Masters is a striking collection of vintage guitars and amps arrayed throughout the upper lobby. Old Gibsons, Fenders, Rickenbackers, Silvertones and Supros mingle with the digital technology in the adjacent suites. As much emphasis as studio owner Denny Purcell has traditionally placed on technology, the guitar collection serves to underscore the fact that, as far as he's concerned, the music always comes first.

This year marks Georgetown Masters' tenth-anniversary milestone. A decade ago, legendary Nashville producer, bassist and studio owner Norbert Putnam laid out four nonparallel lines in chalk on a concrete floor as he and Purcell collaborated on what Purcell describes as a "gut design, one based on what I believed would feel right." It's felt right for the many Nashville, national and international clients who've crossed that threshold in the past ten years. Georgetown has mastered more than 400 Gold and Platinum records during that span, including work that encompasses genres from Garth Brooks to Neil Young and everything in between.

The design of Purcell's personal room, the Analog Suite, features some nontraditional approaches, including a console facing away from the monitors. "The reason is that there's nothing between me and speakers," he explains. The Digital Suite and two edit suites are designed for a broader base of clients but still have touches of Purcell's own personality incorporated into their designs.

So does Nashville's only private THX-standard movie theater, located in the basement of Georgetown Masters in what was once a tape vault. The nine-seat screening room was built by Purcell in 1993 to offer labels, managers and artists a private, acoustically perfect environment in which to view music videos. The studio, as a result, is often the site of premiere receptions catered on the main floor.

"What we're seeing here in Nashville over the last several years is a far more diversified base of clients who are coming from far beyond Nashville itself," says Purcell. "It

didn't happen overnight, and neither did Georgetown Masters. Because the one thing I realized after all this time in town is that you don't win stock car races with stock cars. I mean, Nashville's always had a studio base that stayed on the technological edge. But the answer for me has always been to first have hand-built, proprietary signal processing equipment, and second, to constantly evaluate and A/B new products." That approach led Georgetown Masters to implement the world's first Sony PCM 9000 mastering system, as well as the first combination of MiniDisc and DCC mastering capability in the U.S.

"But you know, as good as all that is, I still believe that in the end, the song's the thing," Purcell observes. "You can't get into it so deeply that all you're doing is following the electrons. You have to step back a bit and listen with your heart. And that's what Georgetown Masters was built around."

STUDIO SPECS: Owner: Denny Purcell; Contact: Kysa Estes, Cynthia Ragan; Engineers: Denny Purcell, Carlos Grier, Don Cobb, Jonathan Russell; Dimensions: Analog EQ suite: 28x22; Digital EQ suite: 24x20; Edit suite 1: 18x20; Edit suite 2: 18x20; Consoles: Analog suite—Rick McCollister hand-built discrete console; Digital suite—Audio Animation The MUSE; Edit suite systems: (3) Sonic Solutions networked; Audio Recorders: Sony 1630, DAT, PCM 3402, (4) PCM 9000; Monitors: Analog suite: Duntech Sovereign 2001 and B&W DM-100; Digital suite: Genelec 1031A; Edit suite 1 KRK 1300; Edit suite 2: Meyer HD-1; large selection of close-field monitors; Of Special Interest: First mastering studio in the world with Sony PCM 9000 system; (3) networked Sonic Solutions systems; the best selection of vintage guitars and amps, outside of George Gruhn's basement.

Georgetown
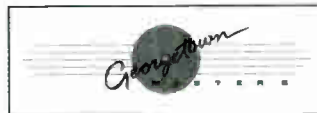
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JAVELINA RECORDING STUDIOS

Veteran Nashville engineer and producer Warren Peterson took over one of the most prominent recording facilities in Nashville in 1990. Javelina Recording is now located on the same site as the original recording facility for RCA Records. Built in 1963, the huge, classically designed studio was the site of major recordings by producers Chet Atkins and Owen Bradley, among many others, and both of those seminal Nashville producers are still the owners of the real estate upon which the studio sits. "A lot of people wanted this studio, and I was first in line," says Peterson.

After moving in, Peterson restored the interior surfaces of the studio to their original state, re-creating one of the world's finest live rooms. It continues to hold the status of Nashville's largest tracking studio.

"We took the carpets off the walls and brought back the surfaces that really make this an incredible tracking facility," Peterson explains. "You just don't see construction like this anymore. It's amazing to hear large string dates in this room." The large room also has been the site of several major video shoots, including some for Garth Brooks, Marty Stuart and Travis Tritt.

The main studio's spacious control room is centered around a rare 48-input Calrec UA 8000 console with AMS TASC automation. "It's one of about only ten or so in the world," Peterson says. "I think it's a truly superb-sounding console, and most people agree once they've tried it."

Javelina's microphone closet is already exceptional, and Peterson continues to add both new and vintage ones as they become available.

The client list has grown to include many of the major country artists and producers of Nashville, including Horizon Award winner Mark Chesnutt and producer Mark Wright, senior VP of Decca Records, as well as rock acts such as Billy Joel, Mark Knopfler and Donna Summer. The studio's amenities have also expanded. A larger lounge and kitchen area were recently installed, and the studio also has private offices available for clients.

Javelina Recording has a second room—Studio B—which was the studio's first location, at a site two blocks away. "It's only small in comparison," observes Peterson of the Trident 80B-equipped room, which has evolved into the overdub studio for the complex. "The main thing I'd like to point out about both studios is the fact that they were both built from the beginning as recording studios. Many studios have their origins in converted homes and office buildings. Javelina's rooms were conceived of originally as recording rooms, and that's what they continue to be."

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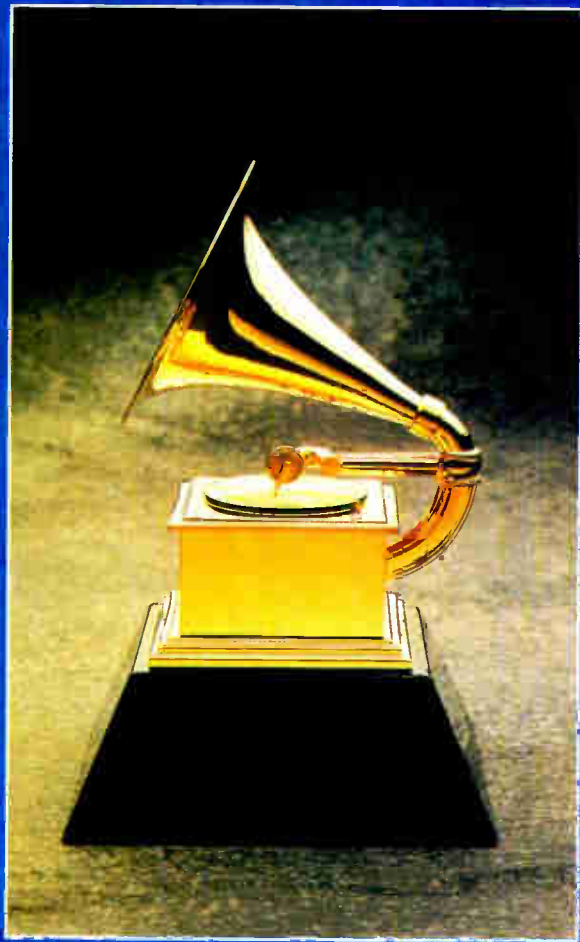
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MASTERFONICS

Masterfonics is as famous for its commitment to the client's comfort as it is for technical excellence—from fresh fruit, drinks and snacks, to, as general manager Lisa Roy puts it, "Caviar and champagne, upon request."

Near the top of Music Row, Masterfonics maintains that its philosophy of growth and management, predicated on twin pillars of leading-edge technology and commitment to quality, has stood the studio well since its founding in 1973 to its current status as one of the world's leading mastering, recording and mixing facilities.

Masterfonics has led the Nashville market technologically in several areas, including the first Neumann SAL-74 cutter control rack, the Ampex ADD-1 digital cutting delay and the first Zummaudio cutting control computer. Half-inch analog was introduced to Nashville in the late 1970s with the first Ampex ATR-102, and digital 2-track followed in 1981 with the JVC DAS. In 1983, the first JVC digital mastering console was installed at the studio. These innovations were complemented in 1991 by the CEDAR system, allowing computer-enhanced restoration of recordings.

In terms of design, Masterfonics implemented a Tom Hidley 20Hz, full-spectrum mix room in 1986, followed three years later by Studio 6, a recording and overdubbing studio. Then last year came the installation of the world's first AT&T DISQ Digital Mixer Core, allowing seamless switching between digital and analog console modes. Attention to detail is evident in the custom signal path circuitry in all studio rooms.

The facility has evolved into a favorite of most major Nashville producers and artists, including Tony Brown, Jimmy Bowen and Tim DuBois, and clients include pop luminaries Roger Nichols, Mark Knopfler, Sting, Whitney Houston and Bob Seger. Owner and studio president Glenn

Meadows began his career in Atlanta and has become one of the the world's most sought-after mastering specialists, nominated three times for the prestigious TEC Award.

The installation of the AT&T DISQ system in late 1993 caps two decades of staying at the forefront of technology for Masterfonics. Since its installation, the DISQ system has been used for mixes on such artists as Vince Gill, Patty Loveless, Sammy Kershaw, Diamond Rio, George Strait, Tanya Tucker, Little Texas and Michelle Wright.

MASTERFONICS

28 MUSIC SQUARE EAST
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MasterMix

It was pure serendipity that someone named Hank Williams wound up with a studio in Nashville. "Not named for him, never met him," is the stock but light-hearted reply of Hank Williams, owner of MasterMix on Division Street, off Music Row. It's one of those accidents of fate, like Nashville itself, that neither bears nor requires any explanation.

Neither does the client roster of MasterMix. Over the course of its 11 years in Nashville, the facility has hosted mastering sessions for the entire spectrum of Nashville's country artists, from Alan Jackson, Brooks & Dunn and Billy Ray Cyrus, to contemporary Christian best-sellers DC Talk and Cindy Morgan, as well as a broad range of alternative music acts.

"There's a tremendous depth and range in the city itself in terms of music," explains Williams, who has established himself as one of the country's leading mastering engineers since he started in 1977. " MasterMix simply reflects that diversity. What's really happened in Nashville over the last several years is that the line between country and pop has blurred. Rather than differentiate the music into categories, I've come to realize, as have many others in the industry, that what we do here is the pop music of the moment."

The studio is based around two mastering suites, one designed by Neil Muncy and the other originally designed by Steven Durr and refurbished in 1992 by Russ Berger. The studio philosophy is a synergy of technology and talent. Signal processing is built around the Daniel Weiss Harmonia Mundi Acoustica system, and its algorithms are constantly updated as Weiss makes further refinements to the system architecture. But Williams has always stressed equal emphasis on the people who work there, including Ken Love, who, in his early 30s, represents the next generation of mastering engineers, and Ronnie Thomas, who handles MasterMix's editing and album assembly.

"The strong point of Nashville and MasterMix is that we're not blinded by digits," Williams explains. "We have the best of the technology, as does everyone. But we don't let that overcome the performance and soul of the song. The good thing about Nashville is that it's a song town first and foremost—it never forgets to remind you that you're here for music first."

STUDIO SPECS: Owner: Trio Entertainment; Manager: Hank Williams/Linda Morrell; Engineers: Hank Williams, Ken Love, Ronnie Thomas, Todd Brashear; Dimensions: mastering room: 12x16; mastering room: 23x21; editing room: 10x14.5; Mixing Consoles: Neumann analog, Harmonia Mundi Acoustica digital; Audio recorders: Studer with Cello playback electronics, Sony 1630 and 3402, DAT, SR; Signal Processing: Sontec, API, NTP, Fairchild, Sony, Wadia, Apogee, Harmonia Mundi Acoustica; Monitors: State of the Arts Electronics, E.M. Long, numerous close-fields; Of Special Interest: Continuing tradition of offering complete editing and mastering services for all formats, including CD reference discs. The latest in hard disk editors, digital signal processing and classic analog devices.

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RECORDING ARTS

Recording Arts was designed so that as soon as you walk into the control room, it feels "right." With the help of acoustic design guru Art Noxon of Acoustic Sciences Corp., studio owner Carl Tatz has fined-tuned this unique facility into one of Nashville's finest. Since its opening in 1985, the studio has garnered numerous Gold and Platinum records. Housing one of Nashville's largest automated consoles, Recording Arts has secured its niche as a studio that can accommodate any mixing session, as well as those that require multiformat lockups.

Besides the lavish array of outboard equipment, Tatz points out that the piece de resistance of the studio is its extremely tight and accurate monitoring system. "The studio also features the best drink-stocked refrigerator in town," says Tatz, the former maitre d' at a well-known Nashville four-star restaurant. That background has served Recording Arts clients well on more than a few occasions, including five-course gourmet meals in the skylit lounge. "Those make up for all the pizza," he adds.

While best known as a mix/overdub facility, Recording Arts has a very capable tracking room. "Its strengths as a mixing facility are obvious," he says. "But a lot of people come here for the intimacy of the tracking room, and artists love to do their vocals here."

Recording Arts has catered to many of Nashville's top acts, including Platinum performances from Alabama, Dolly Parton, Confeder-ate Railroad, Travis Tritt, Faith Hill, Randy Travis and Alan Jackson. Pop artists have also regularly visited there, including producers Don Was and George Massenburg.

STUDIO SPECS: Owner: Carl Tatz ; Manager: Lou Johnson; Engineers: Wayne Morgan, Daryl Roudebush; Dimensions: control room 12x25x10; studio: 16x14x9; drum room: 14x12x9; iso booth: 8x6x9. Mixing Console: Soundcraft 3200 with 64 channels of Optifile 3D automation; Audio Recorders: Mitsubishi X-850 32-track digital w/Apogee filters, Otari MTR90-II 24-track analog, Fostex D-10 DAT, Panasonic SV-3700 DAT, Denon DTR-2000 DAT, Aiwa AD-F1000 and Aiwa AD-F990 cassette; Monitors: Yamaha NS-1000, NS-10; Bryston amplification. Of Special Interest: An ideal balance of client comfort and technology, as well as Focusrite ISA 110 mic pre/EQ modules, Lexicon 480L and PCM 70 processors, Klark Teknik DN780 reverb, Eventide H3000SE, Teletronix and UREI comp/limiters.

RECORDING ARTS

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SIXTEENTH AVENUE SOUND

Sixteenth Avenue Sound began in the late 1960s as the home base of country legends Tammy Wynette and George Jones. Through the years, it has served the same function for, among others, international publishing concern ATV Music. It became a two-room facility in 1986 with the addition of what is now Studio A, the facility's main tracking room.

Designed originally by Mike Poston and retuned in 1994 by Acoustic Sciences Corp., Studio A is one of Nashville's larger tracking rooms, featuring gabled ceilings and modifiable reflective surfaces, making it a premier live room. The tracking room features three isolation booths, plus a separate and more tightly isolated vocal area. Studio A also features one of the first large-scale control rooms in Nashville. The skylighted room was designed specifically to accommodate the trend toward more control room recording. Adjacent to the control room is a large machine room, and the entire studio uses Mogami.

Studio B is upstairs in the same building, mechanically and acoustically isolated from floated Studio A. Studio B has become a favorite for acts to do overdubs after completing tracking downstairs.

Both studios have experienced several upgrades recently, including the addition of Brent Averill-modified Neve 1073 mic pre's with direct inserts, ten new API mic pre's and EQs, new graphic equalizers, additional LA2A comp/limiters and more sampling systems.

"This combination has really done a lot to attract more international, New York and Los Angeles-based acts to the studio," says studio manager Preston Sullivan. Some acts that have recorded recently at Sixteenth Avenue include Stevie Wonder, Take 6, Mark Knopfler and Echolyn. That is in addition to the country acts such as Restless Heart and producers such as Josh Leo, who regularly use the facility, as well as contemporary Christian music producer Greg Nelson. Furthermore, Sixteenth Avenue has been the site of considerable film audio work, including Alan Jackson's work for *Home Alone 2*, mixes for *The Bodyguard*, George Strait's featured appearance in *Pure Country* and Dolly Par-

ton's work for *The Beverly Hillbillies*.

Sixteenth Avenue Sound also is home to an in-house production company and record label, headed by Laura Fraser, which has placed several of the acts with international labels.

Gesturing toward the pool table that sits in the corner of the studio's spacious lounge area, Sullivan says, "During all the upgrades and modifications that we've gone through here, the overriding concern has been a combination of keeping the studio as leading-edge as possible, both electronically and acoustically, and keeping the clients as comfortable as possible. The staff here has collective experience in just about every facet of the recording and record industries, so we've built on that by being able to anticipate a lot of client needs. And in the broad range of clients we're serving here, I think it shows."

STUDIO SPECS: Owner: Services Management Inc.; Manager: Preston Sullivan, John Trevethan; Engineers: John Trevethan, Pete Martinez; Dimensions: control room A: 28x24; studio A: 40x24 plus three iso booths; control room B: 15x24; studio B: 15x24 piano room; Mixing Consoles: studio A: 56-channel SSL E with G computer and 32 G mic pre's, SSL G Series 3.52 automation, Studio B: 32-channel, 32-bus D&R Avalon with 36 channels of Optifile Tetra automation; Audio Recorders: Mitsubishi X-880 digital, X-850 digital, Studer A820 24-track analog, Otari MX-80 24-track analog, Studer A820 2-track; Monitors: Studio A: UREI 813c, Meyer HD-1, Yamaha NS-10M, Formula Sound Cue 8 system; Studio B: Meyer 833 w/subwoofer, Yamaha NS-10M; Of Special Interest: Both studios are set up for 32-track digital and 24-track analog recording. A large selection of vintage Neve and API outboard gear. Great-sounding Kawai 7' 5" grand piano. Studio B is able to offer 32-track digital recording with automation at extremely competitive rates for both major-label and developing acts.

sixteenth avenue sound

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World Radio History

SECRET SOUND

A graphic illustration of the broadening of Nashville's studio base can be found in the success of Secret Sound, which opened in 1993 and rapidly became one of Music Row's hottest facilities. Owner Chas Sandford moved his studio of the same name from Los Angeles and set up shop on The Row, catering to a mixing and overdub clientele, but with a very respectable tracking room, as well.

Sandford, whose personal production and composition credits include Chicago, Stevie Nicks, Rod Stewart, Roger Daltrey, Berlin and John Waite, continues a long tradition of linkage between Los Angeles and Nashville—one that has seen the likes of Jimmy Bowen, James Stroud and Josh Leo make the transition from Left Coast to Third Coast. Since its opening, Secret Sound has hosted sessions for major producers in both country and pop, including Bowen and Leo, Tony Brown, Michael Omartian and Beau Hill.

"As country music moves more and more into the pop mainstream, the producers, the musicians and the studios are all reflecting that shift," Sandford says. "The net result is that Nashville has become a city with a dense core of studios that can literally handle anything."

Based around a large (64 channels) fully automated SSL 4064G console and designed by Bruce Millet, the control room was acoustically engineered for tight and accurate monitoring, and ergonomically designed to allow the most critical outboard processing to be behind the console but still within the stereo field.

"All the outboard is within arm's reach," Sandford explains. "It's a small but important point, because Nashville is changing and attracting a much more international clientele. What we're doing is aimed at accommodating that new breed of client for this city. We want to have the kind of facility they're used to being in."

Another design aspect of Secret Sound is its home-like environment. Sandford's previous studio location had actually been in his home, and that consideration drew as many positive comments from clients as the technology. Secret Sound offers a comfortable lounge with television, CD player and full kitchen, as well as office amenities such as fax, photocopy, Mac computers and multiline telephones.

"We're also the only major studio in town to my knowledge that includes an assistant engineer and a personal assistant for each booking," he says. "The staff engineers know the room intimately, and that makes a big difference for first-time clients."

Secret Sound has already put into motion plans for a facility expansion, calling for the addition of a new tracking studio and one more overdub/mixing studio sometime in the near future. "Nashville's expanding, and we're planning to expand with it," Sandford says.

STUDIO SPECS: Owner: Chas Sandford; Manager: Reneé Sandford, Carolyn Cole; Engineers: Nick Sparks, Keith Robichaux; Dimensions: control room: 19.6x20.2; studio: 33.10x28; Mixing Console SSL 4064G with discrete outputs, Total Recall, Ultimation, plasma metering, 48 channels of "E" EQ, 16 channels of "G" EQ, Motionworker sync interface with Adams-Smith 2600; additional 20-input custom submixer with Total Recall, Ultimation, parametric EQ and aux sends; Audio Recorders: Otari DTR900-II 32-track digital w/32-channel PD-to-DASH converter; Studer A827 analog 24-track with additional 16-track head assembly; Studer A820 ½-inch 2-track; (2) Panasonic SV3700 DAT; Studer D740 +4 cassette; Apogee filters; Studer CD-R; Monitors: Tannoy Super Reds and 6.5 minis, Yamaha NS-10, AE. ROR, Fourier; Of Special Interest: All signal path is individual Mogami Lab Series cable; outboard includes Neve Class A, Pultec, Fairchild, API, ITI, Sontec, Telefunken, Focusrite, Massenburg Lang, Teletronix, UREI, dbx, SSL, Aphex, Drawmer, Summit, Amek Angus, EMT, AMS, Quantec, Eventide, Yamaha, Roland and more.

SECRET SOUND

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World Radio History

SOUND EMPORIUM RECORDING STUDIOS

When independent producer Garth Fundis bought Sound Emporium in 1992, he knew he was buying a piece of Nashville studio history. The facility's log books date back to the very first week of sessions, including the November 6, 1969, booking by Canadian country artists Ian & Sylvia and Todd Rundgren.

Fundis, a vice president of A&R at RCA Records, and producer through the years of such extremely successful artists as Trisha Yearwood, Keith Whitley and the New Grass Revival, was well aware of the depth of history at Sound Emporium. The studio, built by pioneer Nashville publisher and producer Jack Clement, was where Fundis' career as an engineer began in 1972. As its main client throughout the 1980s, Fundis was intimately aware of the potential of the studios. Since the purchase, he's led the studio into yet another new era.

Sound Emporium retains the magic that made it one of Nashville's longest continuously running recording facilities. A complete refurbishment by Mike Chappell & Associates this spring combined the site's two buildings into a single, more efficient and spacious two-room facility. "Studio B is that in name only," explains studio manager Denise Tschida. "The B room was redesigned for optimum use, and the entire facility was designed around the idea of client comfort." That includes a full kitchen, conference room, a full-service staff, door phones and security cameras. Musician and artist comfort are provided for with special technical features like the Formula 8 cue system, allowing individual headphone mixes.

The B studio was sculpted with live tracking dates in mind. A cathedral ceiling was included in the remodel. The redesign was structured to retain the best acoustical properties of the room while maximizing efficiency of the facil-

ity as a whole. Studio A, which retained its own live chambers and was virtually untouched acoustically during the renovation, remains one of the largest tracking rooms in Nashville. Both studios now have custom Mogami wiring.

Those who have used the facility for tracking, overdubbing and mixing include Yearwood, Dolly Parton, Michelle Wright and Pam Tillis, as well as non-country acts Al Kooper, Belly, R.E.M., Mark Knopfler, and MCA Records' recent *Country, Rhythm & Blues* project with producer Don Was.

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WOODLAND DIGITAL

Woodland Digital is one of Nashville's newest mothership studios, built in one of the city's oldest studio locations: the original Woodland Sound Studios building. There are currently two large studios, and work is in progress to convert a Tom Hidley-designed disc mastering room into an overdub and editing suite.

Woodland Digital strives to provide an optimum combination of new and classic equipment. Both studios have Neve consoles: a classic 8068 with all-discrete circuitry and expanded to 44 inputs/32 buses in Studio A, and a 60-input VR in Studio B, with Recall and Flying Faders automation. Both rooms come with 32-track digital recorders; analog 24-track is also available, and lockups between formats are regularly and easily accomplished.

Studio A has been extremely popular as a tracking room—it's the only large room in Nashville that's mated with an all-discrete vintage console; it's been described by Ocean Way Recording's Allen Sides as the livest big room in town. Studio A also features a Formula Sound 8-channel cue system and has six isolation spaces. Studio B has a wide selection of outboard gear, including two live chambers and five tube EMT plate reverbs, as well as a large tracking room.

Woodland's guiding philosophy is to provide maximum service so the client can focus on creativity. Maintenance and engineering, with a dedicated, full-time staff, is paramount, followed closely by client services ranging from a well-stocked refrigerator to catering and instrument and equipment rentals. As studio coordinator Hope Turner puts it, "We're not running a hotel here, but we'll be glad to get you one!" And Woodland Digital has its own rather unique and eclectic collection of vintage instruments for client use.

"This combination of client support and technical support has caused any number of our customers to remark on how much they like the overall atmosphere when they work here," says Bob Solomon, Woodland Digital's owner.

Those clients have covered the entire gamut of style and genre, including John Anderson, Brooks & Dunn, Larry Carlton, Mark Chesnutt, artists on the Platinum-selling *Common Thread* Eagles tribute and Handel's *Messiah: A Soulful Celebration*, Nanci Griffith, Michael English, 4-Him, Faith Hill, Elton John, George Jones, Indigo Girls, Patty Loveless, Lynyrd Skynyrd, John Michael Montgomery, Bob Seger, Doug Stone, Take 6, Randy Travis, Tammy Wynette and many others.

WOODLAND DIGITAL

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by **Rick Clark**

BARRY BECKETT
FROM MUSCLE SHOALS TO NASHVILLE

Muscle Shoals is an extremely laid back hamlet that shares Tennessee River frontage and relentlessly hot summers with three other conservative northwest Alabama towns—Florence, Sheffield and Tuscumbia. Until the mid-'80s, you had to call a bootlegger if you wanted a drink in this Bible Belt region. Unless fishing is your thing, the Quad-cities (as they are known) have never been exactly what you would call an exciting vacation getaway.

Regardless, artists and producers wanting to tap into some earthy R&B-rooted magic have made Muscle Shoals a popular destination for over 25 years. Beginning with the R&B/soul music explosion of the mid-'60s, Muscle Shoals began churning out classic hit after classic hit, initially at Rick Hall's Fame Recording Studio.

One of the biggest calling cards for Fame was Hall's second studio band, who split to form their own studio in April of 1969 called Muscle Shoals Sound, which was a 4-track facility set up in an old casket factory. The Muscle Shoals Rhythm Section, as they called themselves, was made up of drummer Roger Hawkins, bassist David Hood, guitarist Jimmy Johnson and ultimately led by keyboardist Barry Beckett.

Beckett began playing music in Pensacola, Fla., clubs when he was 15, at the end of the '50s. By the mid-'60s, he was making trips to Muscle Shoals, cutting sessions with DJ-turned-producer Papa Don Schroeder. One of Schroeder's acts was James & Bobby Purify, whose 1966 Bell Records hit "I'm Your Puppet" became Beckett's first taste of the making of a hit, and a Top 10 one at that. It was at that session that Beckett met future Rhythm Section members David Hood and Roger Hawkins.

Over the years, Beckett and the Muscle Shoals Rhythm Section have appeared on scores of now-classic hit singles and albums, and their formidable arrangement chops made it possible for them to share production credit on many of those projects.

By the late '70s, the Rhythm Section's success enabled them to move from their original location to a 30,000-square-foot empty armory by the Tennessee River, which the city of Sheffield offered them for a dollar a foot. For a few years during the early '80s, the Section even had their

PRODUCER'S DESK

own Muscle Shoals Sound label distributed through Capitol.

Changing musical trends in pop music caused Beckett and the Section to reevaluate their position in the marketplace, resulting in the selling of Muscle Shoals Sound Studios and Beckett's subsequent move to Nashville in 1985.

Beckett's production baptism began in 1967 when Rick Hall handed over Jewel Records act the Wallace Brothers to the keyboardist at Fame Recording. Since then, Beckett (with or without the Section) has earned an impressive string of production credits with artists that include Bob Dylan, Paul Simon, Art Garfunkel, Bob Seger, Dire Straits, Etta James, Jason & The Scorchers, Glenn Frey, Joe Cocker, Doro Pesch, Phish, Elton John, Tammy Wynette, The Waterboys and Lynyrd Skynyrd.

Since Beckett's move to Nashville, he has successfully integrated his R&B sensibilities for a string of hit country artists like Neal McCoy, Confederate Railroad, K.T. Oslin, Lee Roy Parnell, Lorrie Morgan, Hank Williams Jr. and Alabama. At the time of this interview, Beckett was enjoying the fact that his production of Neal McCoy's "No Doubt About It" had reached Number One on the *Billboard* country charts.

Beckett took time from mixing Lynyrd Skynyrd's latest album, an unplugged blend of old classic and newer material, to speak with us.

This is your second Skynyrd album, and this time it is all acoustic. Unlike many artists who "unplug," the rootsy Southern origins of their material actually lends itself to this kind of treatment.

Exactly. It is all based around the blues and country influence; it is all there. The acoustic nature helps out. The songs certainly have stood up. They wanted to see if they could try this approach and stay true to their style, and it seems to be working. We aren't going for perfection. Instead, we are going through this very spontaneously. It's what I sometimes call "the back porch feel." It is not so much like a performance as it is like a jam. There is more emotion and more blues involved.

What are some of the stand-out tracks on this project?

"Saturday Night Special," for sure.

World Radio History

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"Sweet Home Alabama" came out great as usual. They had four new originals, which are a little bit more R&B-influenced and down-home. Owen Hale joined the group on drums and has brought quite a lot to the group's sound. He is more involved and more suited for the band's style.

Many of your earlier production credits, like Paul Simon's There Goes Rhymin' Simon, *say "Muscle Shoals Rhythm Section/Barry Beckett." How did that break down? Was it more of a by-committee production?*

It was more or less artist-Rhythm Section, more than it was just me. I was just a band leader, in general.

Which are among your most memorable productions?

I loved doing Bob Dylan's *Slow Train Coming.* I will never forget that session. It took Bob three or four days, while we were cutting, to even trust me. When he finally did, he let me know with a very slight smile, or something like that, to say I was okay. I was pretty nervous when we started.

How were his vocals cut?

They were live. He had been singing those songs over and over to himself, so he had them down backward and forward. He would just get it on the first pass, which blew me away. (laughs) I did insist on trying to punch him in on one line, but we couldn't match the voice, so we just let it go. He later won the award for Best Vocal on that song, which was "Slow Train Coming." (laughs) I went up to him later and said, "I give up." He just laughed.

If you get into technical ability, he isn't a great singer. But if you get into the communication and interpretation of the song, he is an excellent singer. He is extremely versatile in the blues. He communicates through blues: That is his forte. Once you've got that figured out, you've got him figured out pretty much.

You've worked with Joe Cocker.

Yeah. He is an unbelievable singer. He broke into a vocal that was just amazingly good on the first take. I was so totally enthralled that I forgot the structure of the song. At one point he stopped singing and just stood there. The track was going on, and I stopped the tape and said, "Is there something that we can help you with? Is there something wrong?"

He said, "No, this is the instrumental part." He couldn't punch in. Dylan was the same way. They are among a few who just can't punch in. They would have to do the vocal all the way from the top, good or bad.

Is it because they would be so into the truth of the moment that punching in would not have the same overall integrity?

It was that, and I always felt that good vocalists have dynamics throughout, and they plan for that. I generally think they want to go all the way from the top, and they pretty much don't want to be interrupted. So

when I stopped the tape, I felt stupid as hell. What made matters worse is I had only one remaining track when I got the tape.

So it was hard to fool him, in other words.

Hell no! (laughs) I was scared to death that we were going to pass up something else. I could have put it in "input," and done it all the way from the top, but I might have had something else just as good. He ended up being maybe one percent off what I was hoping for, but it was still good.

Speaking of natural dynamics, what are your feelings about using com-

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pression?

I don't like squashing dynamics. I like letting it flow. See, if you have good musicians who really know what they are doing, they are just as good producers as you are. Absolutely just as good. They just haven't had the luck to produce. They know dynamics. They know when to play soft or when to get loud. If the song is a good song, all I have to do is sit there and count it off, and we've got a hit. I hate to make it sound that easy, but most of the good musicians know when to play those dynamics in. If you've got compression that squashes it, then it is not helping you.

After all your activity in Muscle Shoals, what brought you to Nashville?

Around the late 1970s, punk started making its imprint, and there was a lot of disco. We weren't the kind of band that could go in and cut that. I took about a year off to figure out what I wanted to do musically. One day, my wife left her radio on a country station, and they were playing John Anderson's "Swingin'" and Rodney Crowell's "Stars on the Water." I thought

Standing left to right: Charlie Brusco, manager of Lynyrd Skynyrd; Gary Rossington, Skynyrd band; Little Steven. Sitting left to right: Johnny Van Zant, Skynyrd band; Barry Beckett, producer; Billy Ray Cyrus

that this was interesting for country and that I could get into some of this music.

We didn't feel that way with most country music. We were usually busy making fun of it. (laughs) We always tried to play so un-country in Muscle Shoals. When this music came on that station, I realized that this could work both ways. So I went up to Nashville in late 1985, with my assistant Dick Cooper, and we rented an apartment and started checking the whole scene out. I finally figured out who were the best players for the way I produce, and then I brought the family up. Jim Ed Norman offered me a job in A&R at Warner Bros. We jumped right in and produced Hank Williams Jr. The second album Jim Ed and I did together got a CMA award. That was *Born to Boogie*.

So the feasibility of integrating R&B and rock 'n' roll into country was what gave your move to Nashville a sense of possibility.

I could hear a small amount of soul in some of the singers and in the type of songs they were cutting.

When you start moving people, those people start spending money to buy records. (laughs) Any time you have emotion involved in recording, people are going to spend money to get it.

You are currently having much success with country artist Neal McCoy.

Neal is a very good country singer. He loves R&B, and all of his stylings are built around it, even though he probably doesn't even know it. We were fortunate to get a Number One hit in the last couple of weeks with "No Doubt About It." It is a perfect example of blending country with R&B. It is very easy, because the two musics have a certain amount of soul involved. One may be the white man's soul, and the other might be the black man's soul, but right now the highest paid people are learning how to combine the two elements and styles to make country an extremely legitimate, soulful style of music.

Is there a sonic signature in the sounds that you go after as a producer?

I like big, thick, hard, cracking drum sounds. I like a lot of things that are totally opposite of what people regard as country. (laughs) Some people call me a renegade. I like something that is going to hit with a lot of power, because I like songs and singers in that style. Then again, I can turn right around and love to cut something that is very smooth, soft and silky.

The classic Muscle Shoals drum sound isn't explosive. It creates tension through restraint, almost like the magic of defining a groove comes from the way you let the silence talk.

Exactly. The rolls and grooves are very simplified. You would be surprised how many players don't know that. The amount of players you run across who try to play every single eighth note there is amazing.

I need to have drummers who know how to play an intense groove that always holds you up and is never relaxed. Those guys are hard to find.

Who would you list as the drummer who can do that?

The best drummer around here right now is Eddie Bayers. For other instruments, the best bass player is Michael Rhodes, as far as I'm concerned. Paul Franklin is the best steel

player. He toured with Dire Straits last year. Don Potter is an excellent acoustic guitar player who I think probably has the best sound in town. Larry Byrom also plays acoustic guitar with great intensity and power. On electric guitar, I prefer two: One is Brent Rowan for country, rock 'n' roll or country-rock, and then there is Dan Huff, who was in the group Giant. He is an official Nashville cat now, but he is not fully incorporated into the country mode. That is not to his detriment; it is to his benefit. He can do anything from hard rock to extreme ultrasmooth pop or jazz.

Besides yourself, who would you use for keyboards?
There are three: Matt Rollings, John Jarvis and Bobby Ogdin. They are the best. Jarvis has pretty much backed up everybody. Bobby Ogdin is an excellent keyboardist, especially when it comes to working with acoustic guitars. Those three really know taste. They know when not to play. That is probably the most important thing.

Any favorite engineers?
The engineer I am working with right now just moved here from L.A., Csaba Petocz. He is great. I like to use Pete Green from Muscle Shoals and Justin Niebank. Between those three, I've just about got it covered. They all know how to make simplified, but big-sounding records. They know that I like the drums a certain way.

When people call up Barry Beckett to produce, what are they looking for?
That is a good question. I've always wondered that. I don't know, unless they wanted what I know in blues, or unless they need what I know about feel.

Is there anything you wish you'd have done differently when you were first learning the ropes producing?
I wished I had taken Psychology 101 in college instead of making music. It would have helped me out a great deal.

Regardless, you've managed to successfully navigate producing a number of acts as diverse as Etta James to Art Garfunkel. That's over 25 years of schooling. So what's your grade?
Right now, I'm batting a thousand. (laughs) When I started, I was batting a zero, but, yeah, I've pretty much completed the course. ∎

World Radio History

Defining a
DAW's
Multipurpose
Role

A User's Guide to Features and Functions

igital is here! It works. And it gets the job done cleanly and efficiently. Virtually all of us in recording studios, broadcast facilities, post houses and live-sound situations take for granted the speed, power and quality advantages of digital production; few, if any of us, haven't been able to extend our creativity in a number of ways.

by Mel Lambert

WORKSTATIONS

Yet it is vital that we keep up with developments in this rapidly changing field. Futurist (and Intel co-founder) Gordon Moore was among the first to quantify the speed with which technology expands. In the early '60s, Moore predicted that the computing power and speed of computers would double every two to three years, while computing cost and hardware would halve during the same period. Today we enjoy immense power and flexibility in more and more areas of audio production.

At the heart of most operations will be some form of workstation or digital editor, capable of recording 16, 18 or even 20 bits of data to hard disk, removable optical or related media, performing sample-accurate editing, and off-loading material. Subframe synchronization to video and word clock ensures trouble-free entry into the world of multimedia production.

But what should we expect from the current generation of workstations? I expect digital audio workstations to provide the following functions:

• Real-time multitrack recording and playback, with at least four/eight channels of simultaneous analog or digital I/O.

• Real-time, nondestructive editing and sound-cue assembly.

• Real-time mixing and signal processing, including parametric EQ, compression, limiting and expansion/gating (plus optional ambience and reverb functions).

• Dedicated work surfaces offering a combination of fixed and assignable "people-sized" controls.

• Subframe synchronization to SMPTE/EBU time code, VITC and video sync.

• High-speed backup and archiving, via networks, removable media or background off-loading.

• Integral machine control of external audio and video transports and other peripheral hardware, using standardized protocols.

• For video-based systems, importing and exporting of industry-standard Edit Decision Lists.

Add to this list the ability to communicate with other systems via standardized digital I/Os, plus compatibility with master synchronization references (including house sync, dedicated word clock and/or AES11-for-

World Radio History

mat DARS), and it becomes clear that any workstation scheme worthy of our attention has to fully integrate with current and future operations.

DIGITAL INTERFACE STANDARDS: SIMPLE DATA TRANSFERS

In much the same way that information is passed between computers, printers, modems, etc. in the form of serial data, several interconnect schemes have been developed to simplify the transfer of digitized data between workstations, consoles, hard disk recorders, signal processors and other components in the all-digital audio/video facility. The current industry standard is defined by AES3-1985 and AES3-1992 Recommended Practices, which specify the format of an AES/EBU serial bitstream.

AES/EBU-format data is self-clocking and does not require an additional Word or Bit Clock connection to synchronize source and destinations. The interface can accommodate 16, 20 or 24 bits of audio information, sent LSB (least significant bit) first, with alternating subframes for Channel 1 and Channel 2, and four ancillary bits for Validity, User Bits, Channel Status (emphasis, sample rate and various other data) and Parity information. The specified connector is a standard 3-pin, XLR-type plug and socket; an appendix to the AES3-1992 Recommended Practice specifies the alternate use of 75-ohm, video-style coaxial cable and BNC connectors.

The revised AES3-1992 document also defines no less than three Levels of Interface Implementation, which indicate to receiving units the exact nature of important data being carried across the I/O. Definitions of Minimum, Standard and Enhanced Implementation establish a basic amount of information that needs to be carried within the datastream. Such designations will remove a great deal of ambiguity from earlier AES/EBU-format interfaces.

For larger production facilities, or for networked systems, the ability to simultaneously pass multiple channels of digital data simplifies wiring and synchronization. Specifically designed for such purposes, the MADI (Multichannel Audio Digital Interface, defined in AES10-1991) format allows 56 channels of 16/20/24-bit data to be exchanged via simple coaxial (or fiber-optic) connections. MADI is capable of operating at sampling frequencies between 32 and 48 kHz, over distances of up to 150 feet; FDDI-based optical connections extend this to several thousand feet.

SYSTEM SYNCHRONIZATION: GETTING THE BITS TO LINE UP

To prevent any surprises, including both silence and obtrusive clicks and pops, we need to ensure that all system components lock to a common digital synchronization source; for audio-video projects, this sync source should also be crystal-referenced to a master video sync signal. For ultra-reliable digital operations, both frequency *and* phase accuracy have to be maintained, meaning that sampling rates must be equal (or within a tight tolerance), and each bit of information should start coincidentally.

Having established a master relationship between digital data blocks, signals can be combined freely within mixers and workstations, processed through equalizers, limiters, compressors and other system components, and recorded to tape, hard-disk and optical media.

Digital Audio Reference Signal (DARS) is defined in AES11 for any of the familiar 32, 44.1 or 48kHz sampling rates. AES11 defines a DARS accuracy of either Grade 1 (long-term frequency accuracy within ±1 ppm) or Grade 2 Reference Signals (less than ±10 ppm, as specified in AES5-1985).

FILE INTERCHANGE: INTER- AND INTRA-PLATFORM DATA COMPATIBILITY

In addition to handling editing, mixing and signal processing chores on your workstation of choice, there's now a growing requirement to exchange data between similar and/or different platforms. After all, it would be extremely useful if a dialog-editing session could be transferred from a 4-track Digidesign Pro Tools to a 16-channel Doremi DAWN II for remix to picture, without having to retype the time code location of each cue and information regarding the edit points and crossfade profiles (not to mention any EQ and signal processing that's been used).

The dream of transparent file exchange is rapidly becoming a reality. Several hardware and software manufacturers, including Avid Technology, Siemens Audio, Studer Editech and others, have already demonstrated the ability to read, write and exchange data files using the Open

WORKSTATIONS

Media Framework Interchange format. OMF is designed to handle EDLs, digitized audio, digitized video and digitized still frames, as well as project data.

Using a high-capacity, 1.3-gigabyte MO drive, for example, it's now possible to simply insert a cartridge and resume the sound editing or mix-to-picture project on another platform. True "plug-and-play" flexibility!

OMF allows both the content and descriptions of edited program material to be shared, exchanged and augmented. A series of APIs (Application Programming Interfaces) translate the file structures used by one manufacturer's proprietary format to one that can be read by other OMF-compatible systems. In other words, digital media files become "ingredients" for a designated project, while program descriptions—the way in which sound files are laid out and intermixed, edited and processed—can be likened to "recipes." OMF ingredients comprise various media, ranging from animation frames to digitized audio, while recipes list time code-based data relating to edit points, crossfade profiles, multitrack source/destinations and DSP data via an appropriate file structure.

Why is it taking so long to implement a transparent, universal information-transfer format? Quite simply, a complex mixture of political and technical factors has meant that it's been—and will continue to be—a long road. However, OMF represents the beginning of a practical solution to the confusion encountered when trying to get different brands of hardware to communicate with one another. I would encourage all of us to pressure manufacturers with our demands, and keep on their case. OMF, or something like it, can be done; it should be done.

EDIT DECISION LISTS
AND AUTOMATION DATA
After early teething problems, some genuine progress has been made toward sharing session information from one system to another. There now exists a standardized format for transfer of Edit Decision Lists that include audio tracks—with subgroups, channel and subgroup levels, plus sample-accurate editing. The format holds tremendous promise of offering reliable, consistent data exchange between workstations and audio editing systems. And, of course, CMX-compatible and other EDL formats continue to be used regularly to streamline autoconform and other routine functions within editorial suites.

And several firms continue to develop a fascinating data-exchange language, referred to as MFX, which would allow conversion from one system's proprietary data format to the other, including relative fader-level changes, moves, channel groups, mutes, etc.

AUDIO LOCAL AREA NETWORKS
AND RELATED SCHEMES
Moving beyond the exchange of discrete chunks of media, a growing number of users are exploring techniques for interconnecting workstations and storage devices via twisted-pair or optical networks, thereby extending random-access functionality throughout a larger facility. Via high-speed Local Area Networks, editors and mixers can share common libraries of sound effects, for example, in addition to partially completed or finished audio and video work reels.

Because of the data throughput involved, digital audio puts more demands on networks than you'd find in a familiar office LAN. Aside from the data throughput—a single channel of 44.1kHz, 16-bit audio occupies 705.6 kbps—we need to ensure that these rates can be sustained over extended periods of time. (After all, we can wait a couple of seconds to access a remote disk storage device that holds, for example, our accounts-receivable files; it's quite another thing to press the Play button and hear an intermittent output as the bandwidth capacity becomes used up by additional traffic on the network.)

An audio network supporting, let's say, six workstations might require as many as 16 channels of simultaneous data transfer between individual units. At such throughputs, a high-speed Fiber Distributed Data Interface (FDDI) allows multiple stations to be connected in various configurations using a token-ring topology, with data rates approaching 100 Mbps. (A twisted-pair version of FDDI, known as CDDI—Copper Distributed Data Interface—also is available.)

An alternative network strategy might achieve even higher levels of data throughput via a different arrangement of distributed audio and stor-

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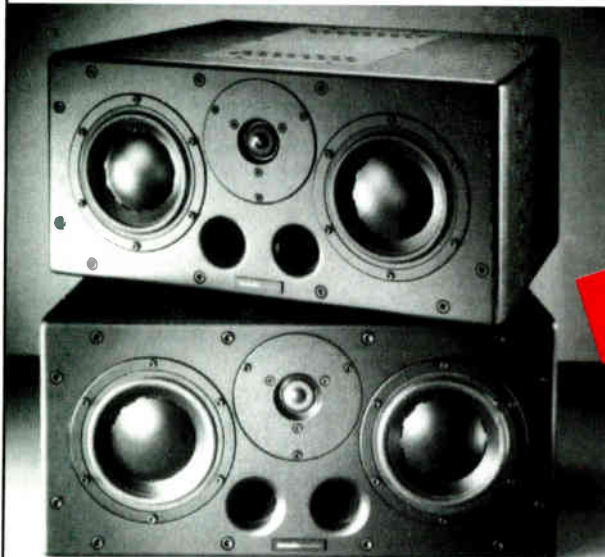
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WORKSTATIONS

age resources. A central array of hard drives, MOs and backup Exabyte cartridges, for example, can be made available on demand to a number of users via high-speed SCSI links laid out in a star topology. A serial Ethernet network between the individual stations and the central storage elements would handle command and control functions.

Correctly implemented networks will directly support audio transfer at any required transfer rate. Beyond the data throughput offered by FDDI/CDDI-based systems are the next-generation systems based on even faster networking topologies. ATM (Asynchronous Transfer Mode) offers rates in the gigabytes-per-second range and opens the possibility for hundreds of users operating on a single network that could even link East and West Coast facilities.

Also under final development are schemes that would enable transparent translation between audio and video file structures, including sample-rate conversion and even digital data compression.

SERIAL TRANSPORT
CONTROL FROM WORKSTATIONS

To offer integrated control of various system components from the master control surface, we obviously need to be able to initiate remote implementation of analog and digital tape transports. Fortunately, there exist well-documented serial-control schemes that use bidirectional protocols.

In addition to the original Ampex and Sony communications dialects developed originally to control VTRs from a video editor, network-capable ESbus protocol and MIDI Machine Control (MMC) are being featured on workstations. Developed jointly by the EBU and SMPTE, ESBus is now implemented by a growing number of synchronizer, console, ATR and VTR manufacturers. MMC is also being included by several workstation manufacturers, primarily those designed to run on computer platforms that also support MIDI-based sequencers or controllers. ■

Formerly editor of Recording Engineer-Producer *magazine, Mel Lambert now heads up Media&Marketing, a consulting service for pro audio firms and facilities.*

World Radio History

FILE INTERCHANGE FORMATS

LOOKING AT THE OPTIONS

Until recently, tape was the only way audio professionals had to exchange media. Although a tape can contain basic indexing, it contains no information about the location of individual elements. Users of nonlinear audio editing systems want the same thing they have come to expect with conventional tape machines: the ability to transport material from one system to another regardless of manufacturer. Although the subject of file interchange has been well-covered by the press, this article will attempt to give some new insight on the topic.

PRO CHOICES

There are at least six nonproprietary digital audio file formats now in use, including Audio IFF (AIFF), Digidesign's Sound Designer II, OMF, QuickTime, SoundEdit Pro and WAVE Although there are un-doubtedly other great proprietary file formats, their manufacturers would have to make them public in order to be considered for universal exchange. Of these six, four are considered to be serious contenders as a universal file format. This article will focus on AIFF, Sound Designer II and OMF. For more on QuickTime, see "QuickTime 2.0: A Multimedia Standard?", p. 72.

AIFF is commonly used to exchange sound files on the Macintosh. Most sample-editing software can read or write AIFF files, and at least one manufacturer uses it as its native file format. AIFF is based on work done by Electronic Arts and Apple Computer dating back to 1985. Digidesign's Rob Currie feels that AIFF is good for file exchange and playback but undesirable as a multitrack file format, because all of the parameters and sound data are stored together. He poses the

by Rick Schwartz

PHOTO: IMAGE BANK/STEVEN HUNT
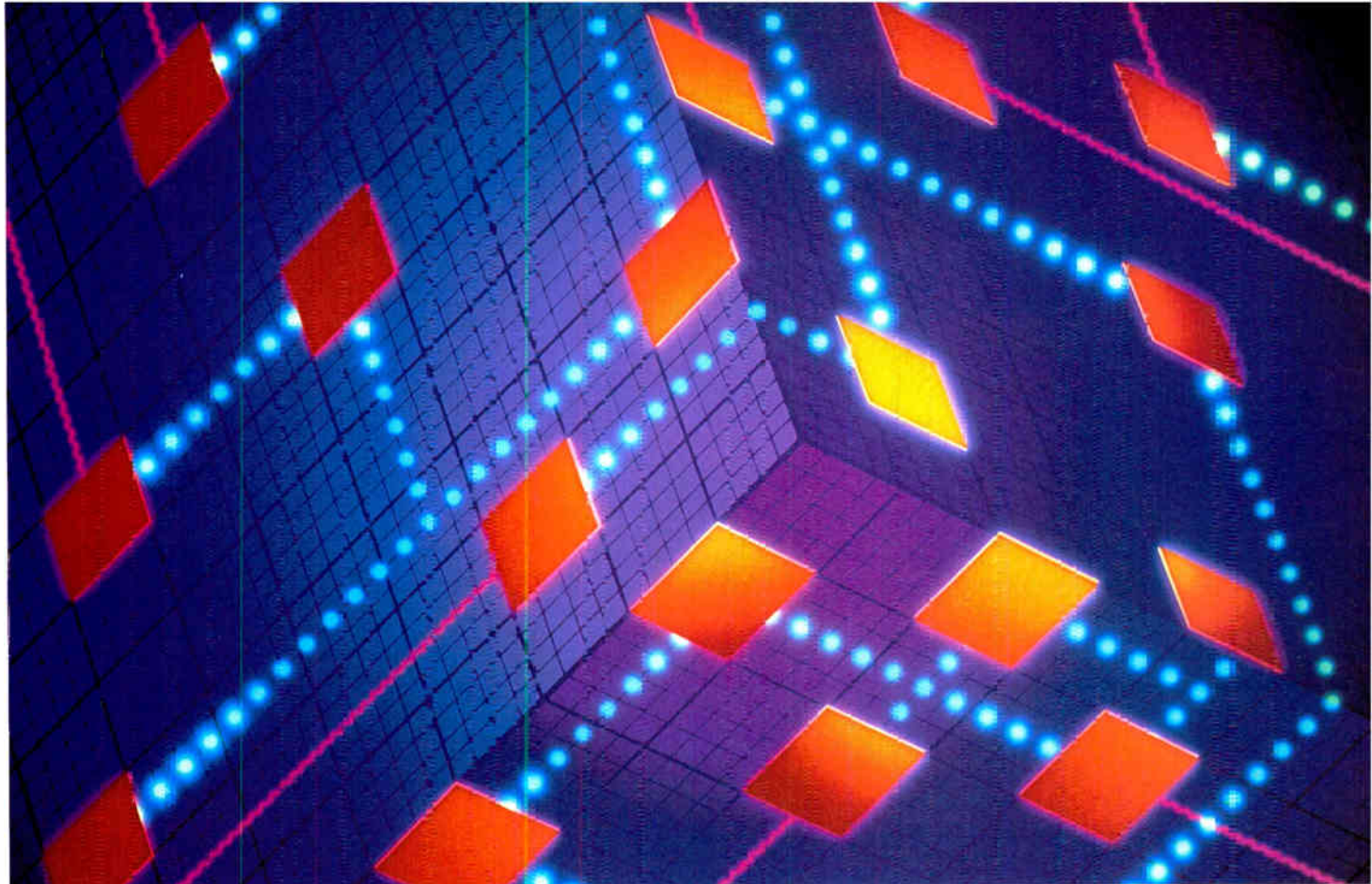
question, "What happens if a user wants to add more regions to an existing file? One option is to pick up all the sound data and move it (which takes time), or you can tack the new regions onto the end of the file. But what happens when you want to punch-in on the last minute of the file and extend it by another ten minutes?" It should not come as a surprise that he prefers Digidesign's Sound Designer file format. According to Currie, Sound Designer doesn't have this problem, because sound file parameters are stored separately from the data.

The Sound Designer file format was first used by sample-editing software made for the Emulator II. It has evolved into the Sound Designer II file format, which has been around since 1988 and is considered by many to be the de facto audio file format for the Macintosh. Why not

**There are at least six nonproprietary digital audio file formats now in use, including Audio IFF (AIFF), Digidesign's Sound Designer II, OMF, QuickTime, SoundEdit Pro and WAVE. Of these six, four are considered to be serious contenders as a universal file format.**

use SDII for all audio products? Aside from the fact that some audio companies might be reluctant to use a competitor's format, some feel that Sound Designer II and AIFF are not good choices as a universal multimedia file format because they are just sound file formats; they don't contain any EDL information. Although the Sound Designer file format could be changed to contain more information, according to Rob Currie this is unlikely to happen. Currie sees Quick-Time as a possible universal multimedia file format because it contains composition information. He explains: "When you copy and paste in a QuickTime editor, it doesn't move the data, it just copies references to the media files. So a QuickTime movie is really a composition, because you can get the start times of all the tracks." A composition consists of pointers to the actual media files

and could be thought of as a highly advanced EDL.

Apple Computer's QuickTime may be the most popular multimedia file format on the Mac, but can it be taken seriously by professional audio users? Currie thinks so, because it now supports professional sampling rates. Bob Dorris of Sonic Solutions is a bit more skeptical. "If you ask Apple about QuickTime, they will say it's great for everything," he says. "But if you ask a practitioner, I think they would say today that it's a little limited." One thing is for sure: QuickTime should not be written off, because it is widely in use and continues to improve.

OMF is certainly not the only game in town, but almost everyone I spoke with felt that it was the most likely to succeed. Early this spring, the Interactive Multimedia Association (IMA) announced that it had selected OMF as a recommended practice for digital media interchange. One reason for this is that, unlike audio file formats such as SDII, OMF also incorporates animation, graphics, text and video as well as audio files. The audio part of OMF uses an encapsulated version of AIFF called AIFC.

ALL OMF IS NOT EQUAL

Avid Technology is the driving force behind OMF and claims that more than 20 other companies have actually demonstrated OMF in their products. Unfortunately, of the seven audio manufacturers considered to be OMF champions, most are demonstrating nothing more than AIFF file import. Only two or three of them were able to import, and only one was able to export an OMF composition. So even though OMF is a standard, not all OMF support is the same.

GETTING THE PICTURE

No companies outside of Avid were able to interchange video files. But this could change soon. Avid claims to be working on a bridge between QuickTime and OMF that would allow users with QuickTime capabilities to play back OMF video files. This could allow garden-variety workstations to utilize media created on high-end professional video editing systems. Many manufacturers have said they intend to read OMF video files for use with their audio editing systems. Although JPEG is (at

least in theory) a standard, in practice most manufacturers are using proprietary JPEG files. Avid's Mac Leathurby agrees. "There's a lot of confusion about playing OMFI video files," he says. "None of the other DAWs are compliant with both audio and video files."

Multimedia consultant Matt Ward, formerly of Otari, says, "It's all or nothing; either you do something that's fully compatible, or you shouldn't bother. If you're going to have to rewrite sound data or you can't import the video, then what have you got? If you don't go all of the way with full plug-and-play

compatibility, then you might as well not do anything."

TEAR DOWN THE WALL

Proprietary platforms have some unique challenges in implementing OMF into their products. Software engineers from several companies told me that they felt it would be very difficult for proprietary platforms to actually implement OMF without some kind of time-consuming file translation. Although OMF is supposed to be a multiplatform spec, the problems of actually transporting media between proprietary platforms haven't been fully addressed, making

it unclear whether interplatform file exchange is practical.

"Because the ProDisk uses a proprietary file format, OMF would be difficult to implement in a meaningful way," Ward says. "If you're talking about sound file compatibility, you're going to have to do a rewrite, which means double the disk space. There's no way around that."

But Doug Ford of AMS says this is not always the case. AMS claims to be able to read media directly from an Avid Media Composer, without doing a file conversion. The system simply looks out on the drives to add their files to its directory. Once those files are online, the system treats them as any other file, with full playback and editing. OMF export is not possible, however; any additional recordings will be stored in the Audiofile format. AMS may have been the first with real-time translation, but it is not the only proprietary system with OMF. The Synclavier Company has a cross-media translator called S-Link, which allows Macintosh users to play sounds residing on NED disks remotely from a Macintosh and convert them to a number of formats, including OMF.

VARIATIONS ON A THEME

For some, compatibility with the Media Composer is even more important to manufacturers than OMF compatibility. Ironically, converting to AIFF would actually bring them further from that goal. This is why Digidesign plans to use a part of the OMF spec referred to as the public interchange format. Use of the public OMF format would allow them to go between systems that use Sound Designer II as their native file format without a file conversion. Currie explains: "If you want to be guaranteed of going from one system to another, you should use AIFF, which is the common interchange format. If you know that you are going from an Avid to a Digidesign system, then you could use an OMF composition with SDII files as your external media files."

WHAT'S MISSING?

One of the problems with standards is that they tend to be too general. Surprisingly, this does not seem to be the case with OMF. Programmers told me the spec was flexible enough that they could add their own objects that the general user wouldn't know about. Early focus groups indicate OMF 2.0 will most likely include support for clip volume, audio compression, MIDI and basic pan information. What's still missing? Things like signal routing, mute and solo, file history, EQ and dynamic automation. Don't hold your breath, though. Things like EQ could be very difficult to specify without actually including the algorithm with it. Dorris says, "We would like to see a much richer edit list description with more comprehensive crossfade support."

In theory, OMF is bidirectional. Unfortunately, right now video editing systems are having a hard time importing compositions because they are frame- (or quarter-frame) accurate, while most audio workstations are subframe- or sample-accurate. Fortunately, work flow goes from the video editor to the audio editor, because it is difficult (if not impossible) to convert sample-accurate audio edits to frame accuracy and have them sound the same. Video editing software is going to have to be changed to become subframe-aware in order for bidirectional work to be feasible.

Possibly one of the most important things that came out of the recent OMF Developers conference was the recommendation of a physical medium/format for the exchange of OMF files. To make this work, a common SCSI driver will be written for different platforms. This driver will ensure that regardless of the media type chosen (4mm, 8mm, MO), the format of OMF data will be consistent. Although OMF is media-independent, the group approved the recommendation of the Exabyte 8500 drive with a 5GB capacity.

THE OMF POLICE

There is a big difference between comprehensive OMF support and simple import capability. According to Leathurby, "Some companies are making claims that are questionable at best. There is a definite need to do benchmarks in this area." Other manufacturers agreed that some type of performance verification is needed. Leathurby recommends that customers demand to see the interchange process all the way from the time a project leaves one system to the time it becomes usable on their editing system. He adds, "There are many different aspects of compati-

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bility. A true interchange will only be achieved by manufacturers who support full import and export of compositions as well as media."

OMF has gone from total hype to the point where a handful of audio companies are now starting to incorporate it into their products. Although there is still a fair amount of confusion about OMF, everyone I spoke with felt it has the best chance of succeeding. If OMF is so great, why doesn't everyone support it? Good question. Some companies are taking a wait-and-see attitude; for others, it has to do with a finite amount of engineering resources, and believe it or not, there are companies who are arrogant about their lack of support.

For most systems, OMF will function as an interchange medium. To date, it only functions as a means of exchanging audio information. In order to achieve a totally transparent exchange, manufacturers would have to switch to OMF as their native file format (or support public formats), which will not happen overnight, if at all. As it stands today, OMF is an important step as we move toward a totally networked, all-digital production environment. Meanwhile, multimedia developers are using QuickTime as a de facto media exchange and delivery format. Once the bridge between the two is complete, it will be up to the players in the converging computer, video, audio and multimedia industries to take standardization to the next level. ∎

Rick Schwartz works in West Coast product support for Avid's AudioVision.

The ProMix 01

It's no secret that the small-console market has been heating up over the past couple of years. While other manufacturers have been slugging it out, Yamaha has stood on the sidelines and waited. That is, until now. With the introduction of the ProMix 01, a full-featured programmable digital mixer with the unprecedented price point of less than $2,000, Yamaha has shattered the price/performance barrier for digital mixing consoles.

Housed in a 26-pound chassis designed for tabletop or rack-mount (11-space) use, and measuring 19x17x5 inches, the ProMix 01 has 18 analog inputs (16 balanced mic/line, one stereo line input), phantom power, four aux sends, two stereo effects returns, 3-band parametric EQ, solo and two sets of stereo outputs (+4dB balanced XLR -10dB unbalanced and RCA and ¼-inch stereo cue output). So far, no big deal—similar feature sets are available in competing models for

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less money.

What makes the ProMix 01 different is that it's a digital console, with analog inputs coming into the digital domain via new-generation, 20-bit, 64-times oversampled A/D converters and S/PDIF digital and 20-bit, 8-times oversampled analog outputs. The ProMix 01 also includes two internal digital multi-effects units, programmable digital EQ (the same as that

by George Petersen

used in Yamaha's $30,000 DMC1000), three assignable stereo compressor/limiter/gates, moving faders, four fader groups (assignable to and controllable by any single fader), dynamic real-time automation of all console functions (via any MIDI sequencer) and 50-scene instantaneous recall. A central 240x64-pixel backlit LCD screen on the mixer's top panel provides visual displays of EQ curves or dynamics activity, fader groups and input channel levels.

Additionally, Yamaha reports that several leading sequencer companies are developing software-based systems for controlling ProMix 01 directly from a computer—either as editor programs or as add-on controller screens to existing sequencers.

According to Yamaha, the ProMix 01 puts high-end features, such as automation capability, instant reset and moving faders into an affordable package. The philosophy is to "avoid creating another 'me-too' mixer," says Yamaha pro audio marketing manager Michael MacDonald. "We see the ProMix 01 as an intelligent DSP-based controller, rather than a simple summing network. Think of it as your favorite mixer, with the addition of a brain that can remember everything you do. We expect the market will come to the conclusion that a mixer without memory is only half a mixer."

In a project studio, the ProMix 01 could become the central mixer for MIDI-driven keyboards, electronic instruments and samplers. And whether working to tape or hard disk, a single ProMix 01 can handle mixdown of two 8-track recorders and effects. In a commercial studio, the ProMix 01 could serve as an automated submixer for effects, a sidecar addition to larger consoles for additional inputs in tracking and mixdown, or provide additional cue mixes for headphones as well as for mixdown to DAT of virtual tracks and multitrack tape.

However, the ProMix 01 could also find a home in audio applications outside of the traditional recording studio environment. One of the ProMix 01's users is Hans Zimmer, a top film composer whose credits include *Driving Miss Daisy, Rain Man, A League of Their Own, Thelma and Louise* and this summer's Disney animated film, *The Lion King*. "In the life of a composer, I'm called upon to

play 30 or 40 cues to a director with no time to adjust the mix," Zimmer explains. "ProMix 01 with snapshot recall is ideal for my work."

In the audio-for-picture suite, ProMix 01 could provide full-function, automated mixing for use with digital audio workstations, VTRs and other sources. In conjunction with an outboard computer or SMPTE-MIDI converter box, ProMix 01 could automate mixdowns relative to SMPTE time code. The mix can be modified easily to incorporate last-minute demands; alternatively, multiple versions of mixes can be created and stored for client-requested playback. Also, sound designers may find ProMix 01's snapshot memory, powerful EQ and internal effects useful when summing audio elements. ProMix 01's digital output allows the marriage of audio elements to be transferred digitally to DAT or a sampler.

Another application for automated, resettable consoles is sound reinforcement. "The market has been screaming for a memory console for years," says user Stan Miller, who has been Neil Diamond's sound system designer and chief live engineer for three decades. "With the ProMix 01, I have a mixer module that allows me to control the balance of all the elements of a show from my computer. I'm dying to get a pile of these to try on Diamond."

In large-concert situations, ProMix 01 could serve as an automated submixer for outboard effects or additional mic/line inputs. But automated mixing should also appeal to live sound situations that are less complex than a Neil Diamond production. Used as a primary mixer for the gigging band, for example, the ProMix 01 could eliminate the night-after-night chore of trying to get back to a previous sound, while onboard effects and dynamics simplify setup and reduce the cost of the system. With the ability to store snapshots of previous mixer settings, soundchecks would be a breeze. This flexibility should also be useful in theater, dramatic productions, theme parks and industrial shows, where repetitive precision is essential in playback of cues.

So far, I've given all the pluses, without mentioning any of the negatives. The mixer has no digital inputs, so combining the digital output of a multichannel DAW (with on-

screen mixing) with MIDI instruments or other analog sources is impossible without taking the DAW input into the analog domain. Also, the ProMix 01's S/PDIF digital output is set at a 48kHz sampling frequency, so going directly from the mixer output to CD can't be done without some sort of sample rate conversion. The packed rear input panel didn't have enough room for 16 XLR mic inputs (the first eight are XLR; the second eight are TRS ¼-inch), so connecting 16 mics to the ProMix 01 will require special snakes. And unlike other Yamaha digital consoles, the ProMix 01 doesn't have a cas-

cade connector for combining the mixer to other digital consoles in the digital domain.

However, most users will be able to tolerate these few drawbacks, and the Yamaha ProMix 01 should be a winner. As for me, I'm quite interested in spin-offs that could emerge from this technology, such as larger-format (24-, 32- or 48-channel) models; versions incorporating digital inputs in standard multitrack formats—such as MADI, ADAT or DA-88; switchable sampling rates; SMPTE control and more. Sounds like there could be some interesting times ahead. ∎

NEW PRODUCTS

SSL WORLDNET
Solid State Logic (U.S. offices in New York City) announces WorldNet, a networking philosophy that uses ISDN technology to allow facilities to send entire projects across town or across the world. Two versions are available: WorldNet Project is specifically designed for use with SSL digital products, such as Screen-Sound or Scenaria, with transfers of full-bandwidth sound files, stereo mixes or entire Scenaria projects, including all source material, automation and edit data. WorldNet Audio allows low-cost, real-time digital links between studios, for recording or transfers, with simultaneous transmission/reception of analog or digital audio (AES/EBU or S/PDIF), with or without time code.

FAIRLIGHT MINI
Fairlight (U.S. offices in L.A.) released a smaller, portable version of its MFX digital audio workstation. Fully compatible with the larger MFX mainframe system, the Mini can be configured from 4 to 8 channels and is available in a compact chassis or in rack-mount form. Prices begin at $27,000.
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OTARI RADAR
Now distributed by Otari (Foster City, CA) is RADAR, a disk-based 8-, 16- or 24-track recorder/editor offering complex editing facilities with the look and feel of a tape-based multitrack. Housed in a 4-rackspace chassis, the standalone (no computer required) system features nondestructive editing, track slipping and looping, balanced audio inputs/outputs, varispeed, 32/44.056/44.1/47.952/48 kHz sampling and SMPTE sync at all frame rates. A 24-track system, including full-function remote control (with dedicated function keys and jog wheel) is under $24,000.
Circle #229 on Reader Service Card

LSI FIBOX
Fibox from Lightwave Systems Inc. (Dallas) is an affordable (less than $2,000) digital optic transmission system that can send two channels of mic- or line-level signals up to 2.5 miles over a fiber-optic line. The system consists of compact (⅓-rackspace) send and receive units, using 20-bit/48kHz technology to provide a dynamic range of 108 dB and a frequency response of 0.1 to 21.5k Hz. Applications include mobile broadcast, post-production, live recording, sound reinforcement and studio tielines. The transmitter includes mic and line inputs (balanced with switchable 48VDC phantom power) and a wide-ranging 4dB to 70dB gain control.
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CARVIN DX CONSOLES
Designed for sound reinforcement or recording applications is the DX Series of 16- and 24-channel, four-subgroup consoles from Carvin (Escondido, CA). Features include line and balanced mic (with switchable +48V phantom power) inputs on all channels, 3-band EQ with sweepable midrange, two prefader and two postfader aux sends, dual 9-band graphic EQs on the outputs, 100mm long-throw faders, three stereo returns and a rugged 18-gauge steel chassis. The mixers are sold factory-direct: The DX1642 is $1,199; the DX2442 is $1,699. Options include an internal digital processor with 127 reverbs and effects ($199), Anvil™ cases and a miniature light.
Circle #227 on Reader Service Card

SONY PCM-9000 EDIT CONTROLLER

Sony Pro Audio (Montvale, NJ) unveiled the DAE-D5000, a digital audio editing controller for its PCM-9000 Master Disk Recorder. The DAE-D5000, combined with the PCM-9000, creates a high-resolution (up to 24-bit) stereo workstation with fast, accurate editing using removable, rewritable magneto-optical (MO) cartridges. The editor also can control the Sony PCM-1630/DMR-4000 system. Features of the PCM-9000 include AES/EBU digital I/O, 20-bit ADCs and DACs, selectable 44.1/48kHz sampling and disks with a capacity of up to 100 minutes.

TEST 1-2-3

MAS/West, of Torrance, CA, offers Test 1-2-3 ($89.95), a pocket-sized audio signal tracer designed for troubleshooting musical instruments, mics, speaker systems, components, video gear and any audio signal chain. Use is simple: connect a device to the ¼-inch jack (or use an appropriate adapter), and colored LEDs glow to indicate the presence of mic/instrument, line or speaker level signals. Built into a rugged aluminum body, the unit has a ten-year battery, so no power switch is required. Other applications include testing for phantom power, gain matching through effects chains and tracing RGB, composite or video sync signals.

Circle #230 on Reader Service Card

STUDIO TECHNOLOGIES AES/EBU DA

Distributed by QMI (Hopkinton, MA) is the Studio Technologies Model 85 AES/EBU distribution amp, which provides two AES/EBU digital inputs that can be switched to feed eight AES/EBU outputs. Possible configurations include creating a dual 1x4 DA or a combination 1x3 and 1x5 from the two inputs. Housed in a single-rackspace chassis, the Model 85 features transformer-coupled inputs/outputs and minimal processing to the input signals, so each output is essentially identical to the original.

Circle #231 on Reader Service Card

ENERGETIC MUSIC

Energetic Music (Seattle) offers a library of 22 CDs of production music, buy-out-priced at $995 or available separately. More than 1,100 cuts in lengths from one second to ten minutes are provided in genres ranging from sound effects, logos and bumpers to classical, industrial, romance, broadcast, holiday, sports, weddings and Jewish music.

Circle #232 on Reader Service Card

YAMAHA DIGITAL EQUALIZERS

Yamaha (Buena Park, CA) expanded its pro audio line with two new single-rackspace digital equalizers. The YDG2030 is a 2-channel, 30-band graphic with four notch filters and high/lowpass filters. The YDP2006 is a digital parametric with stereo and mono operating modes. In Stereo mode, it provides 2-channel, 6-band parametric EQ, four notch filters and high/lowpass filters. In Mono mode, the YPD2006's flexibility is expanded to offer single-channel, 12-band parametric, eight notch filters, HPF and LPF. Both units feature an LCD screen to show EQ curves, 20-bit DACs and ADCs, switchable -20/+4dB analog XLR I/O, MIDI control, 40 user presets and up to 730 ms of delay for driver and/or distance alignment. An interface for controlling the units via a Mac or Windows-based computer is optional.

Circle #233 on Reader Service Card

TROISI 20-BIT CONVERTERS

Troisi Inc. (Westford, MA) announces the newest addition to its Companion series of analog/digital and digital/analog converters. The new DC 20AD A/D 2-channel converter is available as a stand-alone rack-mount unit or as a plug-in module to upgrade existing Troisi 16- or 18-bit units. A matching 20-bit digital/analog converter is also available.

Circle #234 on Reader Service Card

KRK 15P-3 MONITORS

The KRK Model 15P-3 (dist. by Group One of Farmingdale, NY) is a passive (bi/tri-amp optional) mains system for high-power monitoring. Priced at less than $9,000, the system delivers a frequency response of 29 to 19k Hz (±3dB) at SPLs up to 115 dB from a single 250-watt amplifier. Designed for free-standing or soffitted installations, the 15P-3 measures 35x24x20 inches, weighs 250 pounds (each) and combines a 15-inch polyglass woofer, 7-inch Kevlar cone midrange and 1-inch Kevlar inverted dome tweeter.

Circle #235 on Reader Service Card

EMT 248

Now available in the U.S. from G Prime Ltd. (New York City) is the EMT 248, a digital effects device offering true stereo processing of analog (balanced XLR) or digital (AES/EBU) signals. Reverbs range from cathedrals to stairwells; effects include delay, stereo synthesis, M/S decoding and stereo channel balance; up to 120 user programs can be stored. Optional cartridges include an EQ program module and a real-time adaptive dynamic noise filter for removing noise from noisy recordings. De-clicking and dynamics processors are planned.
Circle #240 on Reader Service Card

BGW NF25B MONITORS

BGW Systems (Hawthorne, CA) offers the NF25B, a compact (10x11.25x10.25-inch) powered monitor system for near-field listening. The magnetic-shielded speakers include internal bi-amplification with dual 17.5-watt amps, active crossovers and active time response networks feeding the 5.25-inch woofer and 10mm ferrofluid-cooled tweeter. Frequency response is rated at 53 to 22k Hz ±3dB, with a max SPL of 100 dB. Inputs are unbalanced -10dBV ¼-inch and RCA jacks, and the weight is 32 pounds/pair, including the external power supplies. Retail is $795/pair.
Circle #236 on Reader Service Card

HHB CD-R OPTIMIZER

HHB, distributed by Independent Audio (Portland, ME) developed the Bit Box CD-R Optimizer, which translates index points, converts sample rates and manipulates status bits to facilitate data transfers from pro and consumer DAT recorders to CD-R devices. Retail is $1,599.
Circle #237 on Reader Service Card

THE MIX BROADCAST MUSIC LIBRARY

New from Sound Ideas (Richmond Hill, Ontario) is "The Mix Broadcast Music Library," with more than 1,200 royalty-free tracks on ten CDs. Styles range from easy listening, classical, jazz and rock, to pop, dance, country and holiday music, as well as production elements (logos, stingers, beds and bumpers) and 300 digital sound effects—all buyout-priced at under $500.
Circle #238 on Reader Service Card

HOT OFF THE SHELF

The Sheffield/Coustic Test and Demonstration Disc ($19.95) has music selections, test tones, surround tracks and 14 bench test signals for evaluating recording/playback gear. At your hi-fi dealer, or call Coustic at (213) 582-2832... **Goertz MI (Matched Impedance)** is a low-inductance, high-capacitance speaker cable for critical listening applications. Prices range from $4.20/foot to $84.80/foot for the MI AG 2, a heavy-gauge cable with solid silver conductors. Call (203) 335-6805...**Analog Devices'**

BELDEN DIGITAL CABLE

New from Belden (Richmond, IN) are AES/EBU digital audio interconnect cables designed for 110-ohm transmissions of 3MB/6MB per second digital audio over extended distances. Cables are available in single- and double-pair versions (series #1696A and #1800A), as well as 4/8/12-pair snakes (series #1803A, #1805A and #1806A). All feature crush-resistant foam insulation and low-capacitance conductors.
Circle #239 on Reader Service Card

"System Applications Guide" ($30) is an 870-page handbook of techniques, topologies and methods concerning the analog-to-digital signal path. Call (617) 329-4700... "The Power of the Platform" is a brochure overview of Techron's TEF system, with data on specific TEF applications and instructions on getting a free demo disk. Call (800) 833-8575 for your copy... Polydax, a subsidiary of Audax Industries, offers a **28-page catalog of loud-speaker kits.** Call (508) 658-0700 for a copy...AudioCalc™ ($55) is a calcu-

MAXELL DIGITAL CASSETTES

Designed for use on modular digital multitrack systems such as the Alesis ADAT, Fostex RD-8 and the Tascam DA-88, is the BQ series of S-VHS and Hi-8mm video cassettes from Maxell (Fair Lawn, NJ).
Circle #241 on Reader Service Card

lator program for Atari computers, providing specialized modes for audio/music production, such as Doppler shifts vs. relative speed, speed of sound vs. temperature, propagation delays, delay line settings, varispeed to pitch change ratios or play time, SMPTE time code to musical tempos, feet/frame conversions, decibel (peak to peak/RMS vs. waveform) conversions, dBu, dBv, dBm, tape flux calculations in nWb/m2, digital storage rate vs. time/sample rate and more. Phone/fax (514) 226-3476 for info. ∎

KRK MONITORING SYSTEMS ™

Smooth sound, smooth frequency response, low distortion, & high quality components are a common element in every KRK speaker.

The entire KRK line features the most advanced speaker and cross-over design to provide the smoothest, most natural sound possible. Whether it's the large Model 15A5, the moderate-sized Model 3000B, or the console-top Models 9000B, 7000B, or the very popular Model 6000, KRK has the perfect speaker for your needs.

We know you'll be convinced. Demo a pair at your dealer today!

EXTREMELY SMOOTH

KRK
15A5

TEC
TECHNICAL EXCELLENCE & CREATIVITY
1994 NOMINEE

World Radio History

by Mel Lambert

Ed Golya, audio mixer, C.A.S., and Dan McClelland, audio mixer from Avenue Edit in Chicago

SSL SCENARIA
POST-PRODUCTION MIXING SYSTEM

The SSL Scenaria is one of the most powerful, fully integrated digital audio workstations that I have ever used. In addition to housing a full-function, multichannel mixer and hard disk editing system, Scenaria provides a unique solution to centralized control of peripheral audio and video transports, plus random-access video record/playback. Factor in the enhanced flexibility offered by Sound-Net, VisionTrack and the newly released OmniMix MultiFormat Production System, and it doesn't take a genius to realize that SSL has developed a better type of DAW mousetrap.

Configured to provide full control of all editing, mixing and processing functions during audio for video and film post-production, Scenaria's main elements include an assignable, 38-channel audio mixing console; a 24-track hard disk audio recorder/player; an 8-track ScreenSound Editing Suite; and a random-access Vision-Track video record/playback unit. Interconnection between the various subassemblies—console control sur-face, VisionTrack, SoundNet controller, edit controller and processing rack—is via Ethernet, allowing the compact user interface to be located up to 450 feet from the hard drives and other inload/archiving devices.

In this way, a central machine room can be used to house the multiple hard drive systems, 8mm Exabyte tape streamers (running at five-

Close-up of Scenaria assignable EQ and dynamics section

World Radio History

times real time), and removable magneto-optical drives holding 60 track-minutes of digitized audio. Via Sound-Net, SSL's proprietary Ethernet control protocol and SCSI Switcher, Scenaria or ScreenSound systems within a multiple-room facility have access to any or all of the available hard drives and audio-video transports.

The Scenaria control surface comprises a central color VDU that displays multitrack layouts and other system graphics; a bank of eight servo-controlled, motorized channel/group faders; a transport control, scrub-edit and bank-switching panel; an assignable 4-band EQ, pan, dynamics and aux-send panel; plus a familiar SSL graphics tablet and pen. A second color VDU is provided for Scenaria's built-in ScreenSound editor. A pair of programmable 24x8 signal routers also is featured, along with a local MO drive for access to libraries of sound cues, as well as routine backup.

In addition to the 24 virtual disk tracks provided by Scenaria's built-in hard drives (plus MOs for access to libraries of music cues, sound effects, etc.), an additional 32 analog and/or 24 digital (12 AES/EBU-format) inputs are available for connection to external sources. Analog or digital inputs are routed to the selected system input channel via one or more computer-controlled routing units. A total of 32 dedicated analog and/or 24 digital outputs are also available.

Scenaria's eight channel faders can be assigned freely to individual track or source inputs, or as subgroups. To help identify what signal is being adjusted by which fader, each signal input, subgroup, effects return, etc. can be assigned an eight-character label that appears above the channel strip and on the various EQ and dynamics sections. The bank of physical faders can be remapped easily to any layout the user prefers and recalled in banks of eight at the touch of a button.

SYSTEM SETUP AND OPERATIONS

Setting up Scenaria is a breeze. The various system setup "pages"—File, Mix, Network, Machines and Misc—are accessed via dedicated keys or the graphics tablet. The main screen display shows a graphical representation of the 32 available system channels. In addition to a level meter, each channel features two on-screen buttons that control playback assignment (normally the corresponding disk track, although it can just as easily be an analog or digital input) and input-record assignment. Color coding is used to designate analog inputs (pink), digital inputs (purple), disk track (ochre), aux-send (cyan), Main Mix (magenta) and unused (gray).

Also in-line with these graphics is a color display—one per channel—that contains a miniature representation of the audio modulation envelope, which is useful for quickly scanning through a mix to see, for example, when the next cue is scheduled to appear. Another section of the screen displays the current fader level of the corresponding channel—very handy if you do not have that channel currently assigned to a physical controller and cannot observe its relative moves on the servo-driven fader.

The File Page shows a listing of current Project Files, individual Desk or Sound Files contained on Scenaria's hard drives. In SSL lingo, Desk Files contain up to eight tracks/reels of audio (in the form of Sound Files) that have been assembled to a time

code reference on Scenaria or ScreenSound. In this way, a complete project can be reloaded—including all sound file references, level, EQ and dynamics automation—or just a portion of it. Or the Scenaria might be setting up for mixdown of three ScreenSound Desk Files that represent, let's say, the 8-channel dialog, music and Foley/effects editorial premix sessions.

Each of the three 8-channel source reels appears on the Scenaria's trio of disk drives, with an additional 12 channels available for other sources.

ScreenSound V5 software now features an enhanced processor that dramatically speeds up a variety of functions, including screen displays, machine control and scrub editing. Other new V5 features include high-resolution screen graphics, advanced editing options, plus audio reconform and autoconform.

able for stereo assignments, along with eight aux-send controls per channel. For fine-tuning, the equalization gain/frequency curve produced by the corresponding EQ section can be displayed as a pop-up graphic, with numerical readouts of the current controller. The dynamics section offers expander/gate, compressor and limiter functions, with a frequency-conscious sidechain. Up to 500 ms of delay also can be inserted into the feed forward or delayed path.

The parametric EQ and dynamics sections are easy to set up and produce an extremely smooth response. All settings are stored to the accuracy of a digital sample, allowing complete mixes to be reassembled during each subsequent pass. The ability to park a mix at a time code location, adjust the equalization profile to correspond, let's say, to an exterior rather than interior scene, make an
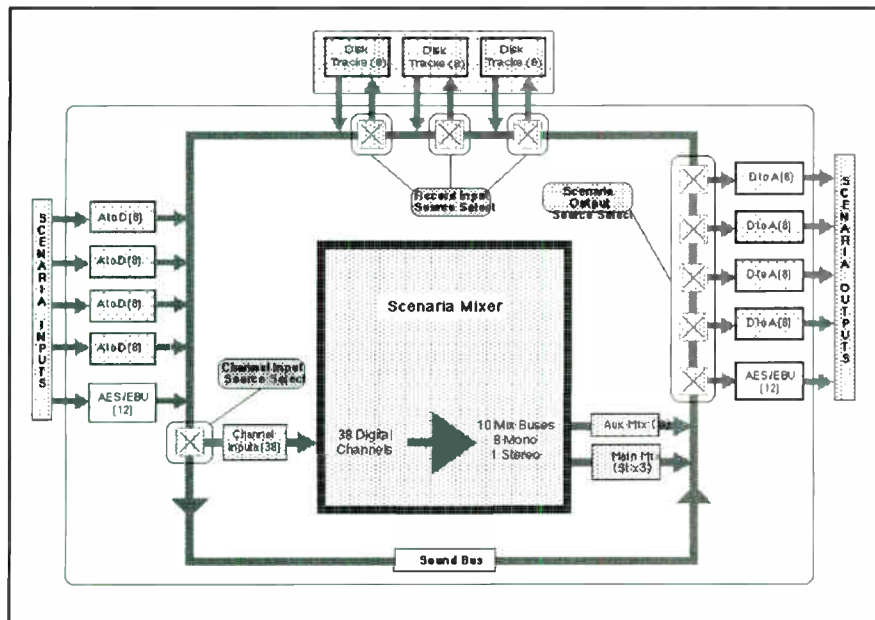
Block diagram of Solid State Logic Scenaria post-production mixing system

The Mix Page's primary function is to display information relating to channels that are not currently assigned to the console's eight physical faders. The color screen shows 30 fader locations at a time. This page also displays the main transport control icons, master clock displays and system control functions. The assignment of logical faders and groups is also controlled from here.

EQ AND DYNAMICS CONTROL
Prefader Insert send/returns and Channel Processing are controlled from this page. A pair of 4-band parametric EQ controls with pan are avail-

adjustment and have the EQ change instantly is particularly useful. (Try doing that with an analog console and multitrack!)

Scenaria's stereo mix bus is fed equally to the Main L&R Output, plus Monitor 1 and Monitor 2, each of which is provided with an individual onscreen output fader and level display. (The Main L&R Output is intended for layback to external machines. It has a very useful auto-fade function, which also acts on the Monitor 1 for control-room monitoring of the fade-out profile.)

All external machine-control and internal hard disk motion functions

are controlled from the front-panel
transport buttons and jog wheel.
Macros also can be recorded for set-
ting up, let's say, I/O routing setups
via the programmable patch bay, or
even custom monitor switching.

The Overview Display comprises a
series of modulation profiles for each
channel, any location of which can
be accessed instantly by stabbing at it
with the graphics pen. All tracks lo-
cate to that point almost instantly, in-
cluding picture sources. (If the visuals
are being replayed from the inter-
locked disk-based VisionTrack, the
jump is almost indistinguishable.)
Once play is selected, the entire syn-
chronized audio and video tracks lock
up within less than half a second.

All fader moves, I/O routing and
processing settings are memorized
against time code and can be saved
to disk at any time. Available modes
include Static (for setting basic
mix/EQ levels); Absolute (updates
are implemented through the current
location to the end of a mix); Roll-
back (update recorded through until
a rollback point); Clip Fill (updated
through the end of a targeted clip
after rollback); Clip End (updated
through the end of a clip); and Snap
(fader levels are written only while
the selected fader is being touched).

These operations are easy to
grasp quickly. In addition to dynam-
ic automation, up to six SnapShot
Memories are provided of all front-
panel settings. Snapshots can be used
independently of the automation
data and saved as part of a Project
File (and even used in macro sets).

NETWORK AND MACHINE MENUS
The Network menu enables the Sce-
naria's built-in ScreenSound editor to
be assigned as a slave and selects
which SCSI-capable hard drives will
be accessed via Scenaria's disk-access
inputs. Analog/digital I/O routing as-
signments—as well as the inter-rela-
tionship between ScreenSound, Sce-
naria and VisionTrack locations—are
also controlled from this menu. In
this way, any subsystem can be as-
signed as master, simultaneously arm-
ing that section's transport controls
and interlinking slave/master status
as required.

All of these network functions add
a great deal of power to Scenaria's
already flexible operations. Because
each of the various audio and video

record devices—including Exabyte
and MO drives—can be accessed
and controlled via the high-speed
Ethernet LAN, adding additional com-
ponents is a snap. In reality, a single
Scenaria system comes with a very
powerful Local Area Network topol-
ogy that is easy to expand and en-
hance with additional drives, added
programmable patch bays and relat-
ed devices. The addition of Sound-
Net, for facilities that operate more
than one SSL workstation, forms a
multifunction bridge between two or
more Ethernet LANs, offering full ac-
cess to individual storage devices via
switchable high-speed SCSI ports.

For assigning hard disks, MO disks
and backup tape drives, SoundNet
uses high-speed, point-to-point SCSI
interconnects laid out in the "star"
configuration; a separate Ethernet se-

Once play is selected,
the entire synchronized
audio and video
tracks lock up within
less than
half a second.

rial network connects all processors
in a "ring" topology for coordination
and control. Such a hybrid ring-and-
star network is essential to fast work
flow. Post and broadcast facilities can
operate ScreenSound units in sound
editorial, effects or ADR rooms, for
example, with all sound files, au-
tomation data and music/EFX li-
braries being accessed by one or
more Scenarias located in the master
mix-to-picture suite. Because each
SoundNet supports a total of up to
eight users (including offline Exabyte
and MO backup), the network offers
the equivalent to 64 simultaneous
channels—including up to 150% vari-
speed—from a central storage area,
without compromise or conflicts be-
tween individual stations.

The Machines menu controls the
formatting of MO drives and the
transfer of files between these and
the permanent hard drives, as well as
Output Assignments between the

OmniMix
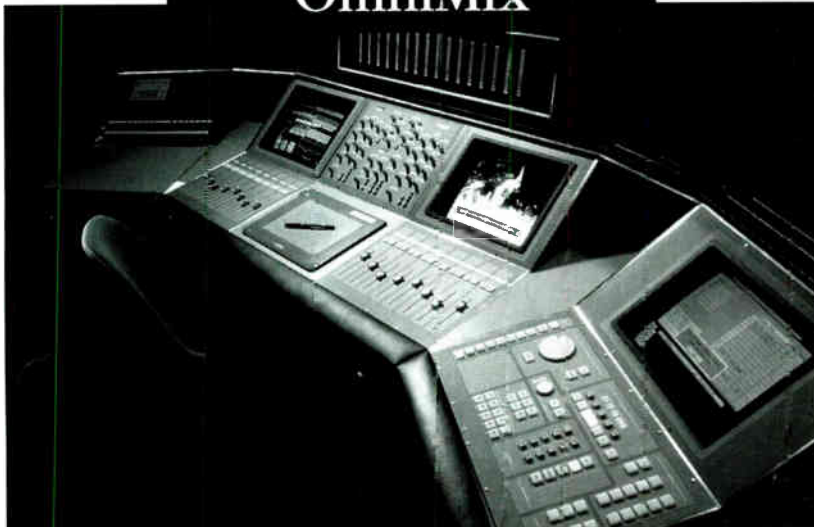
DIGITAL MULTIFORMAT SURROUND SOUND TECHNOLOGY FOR FILM AND VIDEO POST

At press time, news reached us that the first U.S. installation of the OmniMix system took place at Hollywood Digital. Because it represents a major enhancement for the already powerful Scenaria, we felt it necessary to provide at least a brief overview. OmniMix will be available as a complete system or as a hardware upgrade for Scenaria. The upgrade comprises an additional color CRT, a multichannel LCD meter panel (with VU or PPM ballistics), plus a second bank of eight motorized, assignable faders (for a total of 16).

In essence, OmniMix adds another layer of I/O flexibility to Scenaria's 38-channel mixing functions. Now the pre- and post-fader signals are available at the input of two additional processing blocks. The first block offers 24 channels of reverb and ambience generation, plus 24 channels of delay. The second block, known as the Hierarchical Sub Mix (HSM) Bus, features 68 discrete mixes and submixes derived from combinations of post-fader mixer signals, as well as outputs from the 48 signal processing channels. (A glance at the accompanying block diagram might make things a little clearer.)

Within the HSM Bus, multiple LCRS2 (left, center, right, surround-left and -right) mixes can be assembled, until the 68 discrete mixes have all been assigned. In this way, for example, separate music, effects and dialog surround sound mixes can be derived and then summed together to form master discrete outputs, or the inputs to matrix-encoding systems. A total of 32 HSM outputs are available. Reverb and ambiences also can be created in full surround sound and added into the master outputs. Of course, with so many assignable I/Os available within the HSM Bus, a variety of stems, with or without reverb, can also be derived simultaneously with the master mixes. All level adjustments are automated against time code.

In addition, SSL's patented MotionTracker allows precise placement and dynamic automation of individual or grouped sound elements against picture. The sound trajectory can be plotted in space using the graphics tablet, then edited to achieve the desired result. For example, a sound effect could be panned between the left and center speakers and then, at a predesignated time code or Desk location, pass rapidly through the listener's position as it spreads out and disappears into the surround channels.

The implementation of SSL's new Spatial Processing algorithms allows sound sources to mimic more closely the way air absorption, for example, attenuates the HF response of distant sound sources, without affecting the LF spectrum. These and other processing "tricks" are intended to add enhanced realism to complex and layered surround-sound mixing sessions.

—*Mel Lambert*

ACKNOWLEDGMENT:

My sincere thanks to Andre Perreault, Hollywood Digital's Audio Division Director, for his patience during my various evaluation sessions with the facility's pair of Scenaria (now OmniMix) systems.

system's disk, auxiliary and mix sources, and the physical analog and digital ports. In addition, the various dialects of serial machine-control protocol, including Sony P2 9-pin, Ampex VRP-3 and TEAC laser disc, can be assigned to any or all of the four available transport I/Os.

And, yes, Scenaria handles virtually all time code rates, including HDTV (30 fps for 1125/30 projects), NTSC Film (24 fps film that has been resolved to NTSC video sync) and PAL Film (24 fps film resolved to European PAL video sync).

Several of Scenaria's new capabilities are due to a recent software upgrade, Version 3.0, which adds serial control of track arming, new EQ types (HF shelf, LF shelf and MF parametric) and other useful features. The good news is that V2.0 Project Files are compatible with V3.0 files; the not so good news is that this isn't true in reverse. It is expected that the majority of users will upgrade to V3.0, and that few, if any, projects will need to be ported from V3.0- to V2.0-compatible Scenarias.

MIX-TO-PICTURE FLEXIBILITY
One of Scenaria's stand-out functions is VisionTrack, which allows one hour of bandwidth-compressed video to be stored on a dedicated hard drive. Besides providing instant access to a selected time code location, without the inevitable delays associated with VCRs or even laserdisc players, edits also can be made to VisionTrack files. Material can be removed from a master reel, or "black" can be placed in a section where new material must be added to accommodate picture changes. All Project Files and the accompanying dynamic system data will be updated automatically to accommodate any relative changes made to the master video time code track. VisionTrack also features a useful graphic display, Vision Cue, which shows previous and upcoming picture events on an annotated Now Line.

A new function just released for VisionTrack is the ability to record two channels of audio to a Sound-Net-capable hard drive. In this way, a dedicated station could record Foley or ADR tracks directly to disk using the guide video track, and then the data could be transferred to one of Scenaria's hard drive tracks prior to

the mix session. (If the tracks need to be slipped or edited, then the data might first pass to the built-in Screen-Sound, and then on to the mix.)

Edit Decision Lists generated by conventional video editors can be imported into Scenaria and assigned to tracks for auto-conform sequences under ScreenSound.

A Scenaria with ScreenSound and VisionTrack is a remarkably fast and powerful device with which to lay up source reels, edit them if necessary, slip channels against time code, and then blend and process the composite elements to form a master stereo output. My only complaints lie in two small areas, both of which have ready solutions. With only 2-channel output assignment and panning, it is difficult to produce surround-sound mixes on Scenaria without resorting to additional aux sends and/or some gymnastics as faders and rotary controls are pressed into service as front-back panners.

In addition, the lack of dedicated submix outputs means that music, dialog and effects stems, for example, or mix-minus balances for foreign-language dubs, are difficult to achieve with Scenaria. Sure, it is possible to use a couple of the aux send buses —or even make multiple passes through the automation data, routing off submixed stems via reassigned outputs—but there is an easier way: OmniMix, which takes the Scenaria concept to another plateau of creative power and flexibility (see sidebar).

SYSTEM INTEGRATION AND PROJECT MANAGEMENT
As I often have stated within the pages of *Mix*, I firmly believe that the true definition of a Digital Audio Workstation encompasses more than a hard disk-based recording, editing and mixing device. I believe that systems for the '90s must intelligently integrate the various composite functions that a post-production mixer might need to perform on an audio soundtrack.

For those who want to take full advantage of the operational flexibility and creative potential of fully integrated digital recording, editing and signal processing—including elegant project management and librarian functions across fully integrated Local Area Networks—nothing comes close to offering the power of SSL's new Scenaria Post-Production Mixing System. ∎

Better Gate Finally Found, Aphex Forced to Pay $10K!

In 1987 Aphex offered to pay $2,500 to anyone who could find a better gate than their Model 612. When no challengers appeared, Aphex upped the offer to $10,000! Still, no one met the challenge! The Aphex Model 612 Expander/Gate became the industry reference standard in studios and in sound reinforcement around the world. Until now.

Introducing the all new **Model 622 _Logic Assisted Expander/Gate_**™.

The Logic Assisted Gate circuitry of the Model 622 assures positive, accurate and reliable triggering, patents pending.

The ultra pure audio path features the exclusive Aphex VCA 1001 offering unmatched speed without clicks. Combined with enhanced servo-balanced I/O, the Model 622 boasts a dynamic range in excess of 20-bit digital!

Other special features include:
- Key input monitor via front panel headphone jacks
- 24dB/octave parametric Key input filters
- Dedicated Expander mode
- Relay bypass with remote control
- Switchable ducking mode
- 5-Year Limited Warranty
- Made in the U.S.A.

Listen to the Model 622 Logic Assisted Expander/Gate at your Aphex dealer today. You will agree it was worth every dollar Aphex had to pay ... itself.

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by Paul Potyen

OSC DECK II
DIGITAL AUDIO WORKSTATION
SOFTWARE FOR MACINTOSH

San Francisco-based OSC has been around since the early days of random-access digital audio on the Macintosh. Version 1.0 of DECK was released in 1990, providing four tracks of digital audio and simultaneous MIDI file playback with a Digidesign NuBus card. The company also spent significant time developing software for Digidesign's Pro Tools system. And OSC has waded into the waters of CD-ROM production with its collection of bizarre and wonderful sound effects, called *A Poke in the Ear With a Sharp Stick*.

OSC's engineers have apparently made it their self-appointed mission to create inexpensive yet powerful tools for professional digital audio production. The most recent evidence of that is DECK II 2.1, a remarkable software package that offers true random-access digital audio multitrack recording and playback to Macintosh users at an unprecedented low price.

Designed for a variety of setups, this new version of DECK II is capable of at least four, and up to eight, tracks of high-quality audio (selectable between 44.1 or 48kHz sample rate), depending on your system. An 840AV Macintosh without any additional hardware can play back eight tracks (mixed to stereo) with DECK II. The 640AV model supports six tracks in playback, as does any other NuBus Mac equipped with Spectral Innovations' NuMedia card. Digidesign's AudioMedia or AudioMedia II cards—and RasterOps' MediaTime card—can support playback of four tracks (mixed to stereo) with DECK II. Sound Tools II
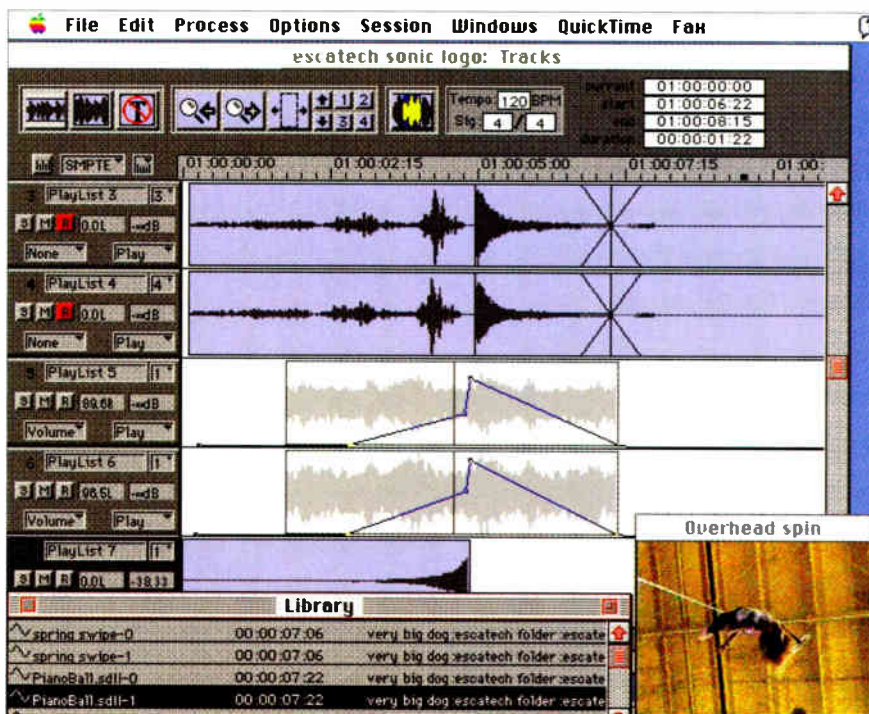
Figure 1: DECK II's Track window with the Library window (lower left) and the QuickTime window (lower right)
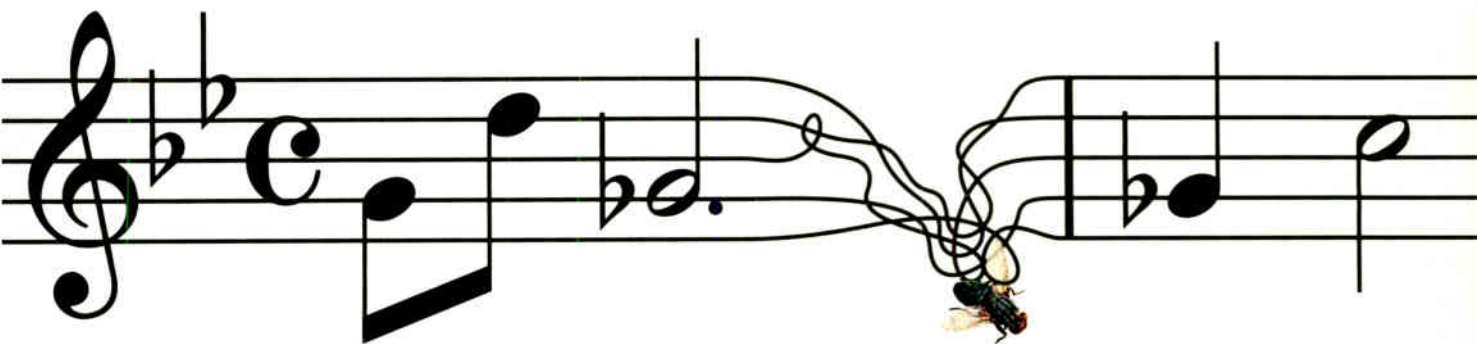
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users can record and play back four independent tracks. And with the addition of OSC's 8-Track Tool, Pro Tools cards will provide eight tracks of playback mixed to four outputs.

DECK II is intended for a variety of users, from those who produce music for release on CD to audio-for-video and multimedia producers, who can use it as a self-contained QuickTime post-production environment. DECK II is well-suited to audio sweetening and layback to video, and the incorporation of MIDI expands its usefulness.

I used DECK II with a Quadra 650 and 16 MB of RAM, both with a Sound Tools II system and with a Pro Tools system. Setup is trivial (assuming your audio hardware has already been installed). OSC uses a copy-protection scheme that authorizes you to install up to two copies of DECK II, and it permits you to optimize your hard disks without risk to the installed software.

A DECK II session consists of the session file and associated folders containing sound files and crossfade files. The Mixer window and the Track window provide different ways to view,

record and edit session material. A third window, the Transport window, allows you to control your session using a traditional multitrack transport interface, complete with Record, Play, Fast Forward, Rewind and Return-To-Zero buttons, as well as Autolocate, Punch-In and Looping functions.

RECORDING AND IMPORTING AUDIO

You can record directly to your hard drive from DECK II, and the files will automatically be placed in the appropriate folder. New tracks are first record-enabled in either the Mixer window or the Track window. With Sound Tools II, I was able to record and play back two stereo pairs of tracks simultaneously to hard disk without a hitch. I also was able to play back eight tracks of audio after installing OSC's 8-Track Tool onto a system with a Pro Tools Audio Card.

Because the Pro Tools Audio Interface (which is used for both Sound Tools II and Pro Tools setups) has only four inputs, DECK II won't support more than four simultaneous record tracks. When you record, the audio files are automatically saved to your hard disk. The session itself, which handles your audio file locations as well as level and pan information, requires a separate Save function. Besides direct recording, DECK II allows you to import sound files that reside on your hard drive into your session. The program uses monophonic sound files in the Sound Designer II format but allows conversion of stereo SD II and AIFF files, regions and loops.

My biggest complaint about DECK II is that it doesn't support stereo files without first converting them—a process that is time-consuming with large files and creates its own version of the existing data, which eats up more of your hard drive real estate. (To be fair, this conversion process is not unique to DECK II; Pro Tools and StudioVision, for example, require the same conversion from stereo to mono.)

As part of the import process, DECK II also performs sample-rate conversions of integer multiples of the selected session sample rate (but not from 48k to 44.1k, for example). You can load SD II mono tracks directly into DECK II using the Load Audio File command, in which case the file(s) can be pasted in from the beginning of the track(s). Or you can use the more flexible Add Audio to Clipboard command, then paste that

audio at the desired location in the Track window using several methods. This option also lets you audition any file, region or loop by selecting it and clicking on the dialog's Play button. Multiple files can be pasted into multiple tracks at multiple locations using this method.

Both methods allow you to use audio from anywhere on any connected hard drive; DECK II will create a new set of files and place them in the current session folder. Just be aware that you'll either need to delete the original files or have sufficient disk space to allow your session to grow. (DECK II gives you the option of deleting original files when you create and convert audio files for your session; this is just one of many thoughtful, handy features I discovered in this package.)

TRACK WINDOW
NAVIGATION AND EDITING TOOLS

Users of multitrack digital audio workstations and high-end MIDI sequencers are probably familiar with many of the navigation tools that DECK II provides. Icons are available for viewing the tracks at various vertical resolutions and timeline magnifications, and you can memorize your four favorite resolutions by clicking on the appropriate View Memory button. DECK II's Track window (Fig. 1) has two fundamental editing modes: Range mode and Object mode.

Toggling between the two editing modes is accomplished by clicking on the Mode Selection icon at the top center of the Track window. Range mode allows you to select waveform ranges by dragging the mouse across those ranges. Regions selected in this way can be cut, copied and pasted to other areas of the Track window. Object mode is used for arrangement of entire regions, as well as general trimming via "handles" on the corners of a region.

An extensive set of key commands allows you to perform dozens of useful editing tasks quickly. For example, when dragging regions, you can hold down the control key to "shove" all regions after the current region back in time by the length of the selected region. Or you can hold down the command key to "stick" a region onto the end of a previous region.

Among the new tricks implemented in this version are the ability to zoom in automatically on a current selection by simultaneously holding

down the "z" key while selecting with the mouse, and the ability to scrub on a track by holding down the "s" key while dragging the mouse on that track. Another way of scrubbing is accomplished by clicking and dragging the mouse across the counter in the Transport window; the same process works in the Begin and End tape counter windows to scrub to and select a desired "in" and "out" location.

User-selectable default and custom constructive crossfades are easily accomplished by selecting overlapping audio regions on single or multiple tracks and choosing Fade Selection from the Process menu. The newly created crossfade files are stored in the crossfades folder for that session. And DECK II provides some destructive signal processing operations, too. They include Invert, Duplicate, Reverse, Normalize and Group Normalize. This last feature is particularly useful in that it will search for a single maximum value among several selected files—such as a split stereo pair or an entire track playlist—and normalize all the files with respect to that single value.

AUTOMATION

Each track has its own volume and pan automation controls. From the Track window, you can draw—and edit—automation envelopes for pan and/or volume using methods similar to those in Pro Tools, Opcode's StudioVision and other audio software packages. From the Mixer window, you can record volume and pan moves in the same way that traditional automation is handled. Although it's possible to do this using a mouse, a much more practical solution is to map the controls to a MIDI controller, such as JLCooper's FaderMaster.

The bandwidth of MIDI doesn't support high resolution of fader moves, but DECK II interpolates your moves up to 24-bit resolution for smooth playback. During my testing of the system with both a Pro Tools and a Sound Tools II card, I created the most taxing of playback and automation scenarios. I never experienced sonic degradation; the only effect was slower updates of the visual fader representations.

MIXING TO DISK

You can open and load as many tracks as you wish in DECK II, but only the first four (or the first eight with Pro Tools and the 8-Track Tool) will play back. All other tracks are work tracks, as indicated by the letter "W" that appears in their Track Label/Drag areas. The easiest (but not the only) way of rearranging your track playlists, all audio files and crossfades placed on a given track, is to use the Playlist Pop-up menu, which appears when you
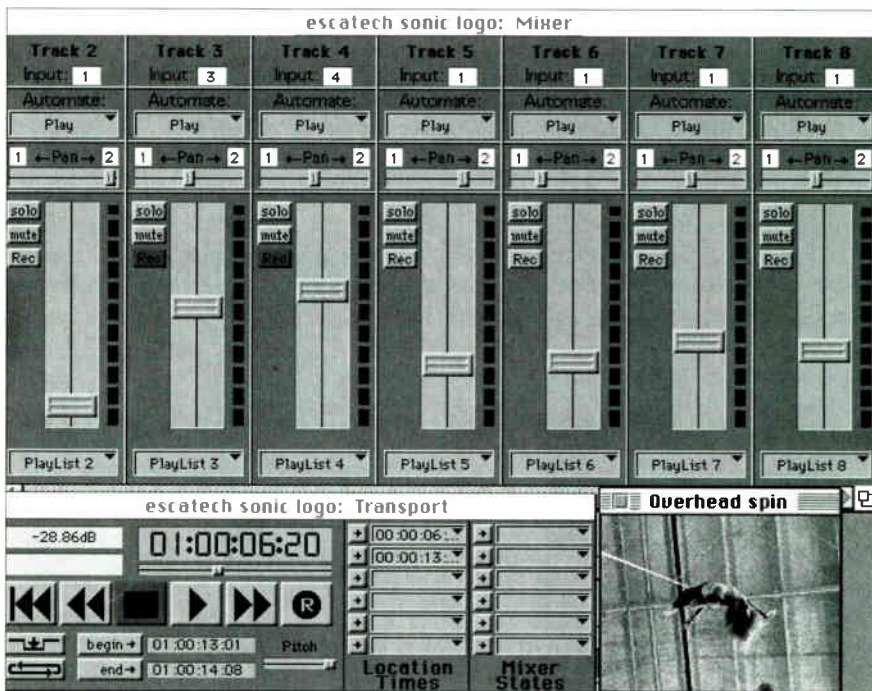

Figure 2: Many of the Track window operations can also be performed in DECK II's Mixer window.

click and hold on the playlist name of the destination track in either the Track window or the Mixer window. Simply select the new playlist and let go of the mouse. This makes it easy to perform premixes on groups of tracks. They can subsequently be moved to work tracks, providing the opportunity to premix another set of tracks. Final stereo mixdowns of simple sessions can be accomplished by the Mix to Disk command; more complex mixes can be accomplished using the Virtual Mix command. This latter option allows you to bounce or mix to disk all tracks, including those premixed tracks that are located in the work area.

OTHER FEATURES

Space doesn't permit me to describe all of DECK II's features in detail. Suffice it to say, this is a deep program. Despite its complexity, it is solid. I never experienced a software crash, and I've crashed with the best of them. In addition, it provides several ways of performing most of the common recording, mixing and editing tasks—including the extensive use of Mac keyboard shortcuts.

And the ability to import QuickTime movies into the DECK environment makes it an important tool for random-access digital audio post-production, especially with the increased bandwidth of QuickTime 2.0, expected to be available this month (see pg. 72, "QuickTime 2.0: A Multimedia Standard?").

DECK II can not only import and play back MIDI files created with other MIDI sequencers, OSC's METRO sequencer can be synchronized to DECK II on a single Macintosh. With both applications open, you can switch between them during playback. DECK II can also be slaved to external audio and video devices using SMPTE. It is fully compatible with continuous record resync devices such as Digidesign's SMPTE Slave Driver.

The principals of OSC also run a post-production studio called Meta-Language that does sound for broadcast video and independent feature films. Pro Tools and Avid Media Composer systems are used in connection with component Betacam online editing suites. And this is where OSC software packages like DECK II receive their first trial by fire. So the

tools are designed by people who use them on a daily basis.

The professional attitude is not only present in this software, it's there in a well-written and comprehensive manual, a well-informed technical support staff and one of the most reasonable upgrade policies I've seen in the industry. DECK II 2.1 is available for $399, but owners of Version 2.01 after November 15, 1993 (which was priced at $299), are offered free upgrades.

DECK II is an excellent software solution for those who have a need for multitrack digital audio recording, editing and mixing. It's particularly well-suited to those 4-track Pro Tools users who want to expand to eight tracks but don't need the independent outputs that the 8-track Pro Tools system provides. (The 8-Track Tool is offered separately at a suggested retail price of $129.) But users of lower-end systems will also find big advantages here. And the incorporation of QuickTime into the DECK II environment is more than a bonus; it's a breakthrough.

OSC, 480 Potrero, San Francisco, CA 94107; (415) 252-0460. ■

by George Petersen

AUDITIONS
PRODUCT CRITIQUES AND COMMENTS

BEYER MC 834 MICROPHONE

Some years ago, I tested the MC 740, Beyer's first entry into the realm of large-diaphragm studio condenser microphones. It was—and still is—an excellent, all-purpose studio microphone. However, carrying a retail tag of $2,439, it probably won't find its way into too many project studios or other budget-conscious production situations.

Beyer has never been associated with low-end products, so rather than cutting quality to create a more affordable studio mic, it reduced the feature set of its flagship product. Thus, the concept for the MC 834 was born. Priced at $1,419, the MC 834 retains the sonic quality of its bigger sibling, while eliminating some of the nice—but often unnecessary—features, such as multipattern operation.

The MC 834 is a cardioid mic with transformerless condenser electronics, powered by an external 48VDC phantom source. The body is just over 6.5 inches long and weighs approximately 10 ounces. The capsule is mounted in a side-address configuration, so the logo should be pointed toward the sound source. Standard features include three position switches for low-frequency roll-off, with linear (flat) and -6dB/octave at 80 or 160 Hz; and a choice of -20/-10/-0dB pre-attenuation.

The mic has a quality look and feel throughout. The switches are the inset thumbnail type, with a window that indicates the selected parameter. The pressure required to turn the switches is just right: It's sufficient that the chance of accidentally changing a setting by bumping a switch during setup is unlikely, yet the switches turn easily when you want a different setting. Another nice touch is the mic's matte black finish, which was visibly unobtrusive and very tough—after using the mic for several months, the external finish showed no wear whatsoever.

I began testing the 834 as a solo mic on some horn overdub sessions. The mic handles SPLs of up to 130 dB without attenuation; and with the -10dB and -20dB pads kicked in, it handles up to 150 dB! Unfortunately, I wasn't miking any nuclear tests on this session, but for close-miked solo trumpet, I kicked in the -10dB pad anyway, just to be on the safe side. Trumpets—including the piccolo variety—were clear, bright and punchy, without sounding shrill, while group saxophones were rich and full. I also was pleased with the results on solo sax, using a combination of the 834 up close (18-inches) and a tube mic farther back in the room.

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The 834 also received high scores on acoustic guitars (steel-string and classical), providing an excellent blend of the woodsy bottom end with all the transients of the high strings intact. Twelve-string guitar and banjo —recorded with the mic slightly higher than the seated player and about two feet away—particularly spotlighted the 834's ability for clear reproduction of upper harmonics.

The most likely studio task for the 834 is vocals. The mic has an effective internal windscreen, so the need for an external pop filter (foam or nylon) is unlikely. The mic has a pronounced proximity effect when used up-close, which can be used to advantage if the vocalist or narrator knows how to "work the mic." I only experienced a few cases where breath pops were objectionable, so I tried the bass roll-off switches. On vocalists, neither the 80Hz nor 160Hz positions were acceptable. In these situations, I used a Popper Stopper screen filter with the mic set in the "linear" response setting, which was fine. And after using the 834 for sev-

eral months (including outdoor recording in windy areas) I never used the 160Hz roll-off as a breath or wind filter. The 80Hz setting is fine in such circumstances (or to reduce the proximity effect in narration).

The 160Hz filter is fairly steep, and I only encountered a few situations where it was helpful: One was rolling off unnecessary frequencies when recording hi-hat or overhead cymbals, which it captures quite well. The 160Hz filter can also be used as an effect, to emphasize the breathy quality of background vocals.

On male or female lead vocals, the 834 provided a natural sound, with a gently rising HF boost (about +2 dB above 10 kHz), which adds a nice sheen without becoming harsh or peaky. The cardioid pattern remains constant at all but the very lowest bass frequencies, and the pickup pattern is fairly wide, which is somewhat of a two-edged sword. This wide cardioid pattern makes it more difficult to achieve isolation in a tight, multimiked zone, such as on rack toms in a drum set. However, the 834's broad cardioid pattern is extremely helpful when you have a

vocalist who likes to move around a lot when singing; the sweet spot is wide, and the mic's sound is consistent throughout this area—even 60 degrees off-axis.

I also had an opportunity to test the optional EA834 shock-mount, which proved to be a vast improvement over the EA742 shock-mount for the MC 740. Priced at $199, the EA834 held the mic securely and was effective in isolating the mic from external vibrations. However, I wasn't entirely comfortable with hanging the mic upside down in the shock-mount without looping the cable around the stand a few times, as the mount relies on the friction between the mic body and two elastic bands to keep it in place. There's nothing inherently wrong with the mount, as long as you're careful when the mic is upside down.

Over a period of months, on all types of sessions, the Beyer MC 834 proved itself to be a high-quality, general-purpose studio condenser. Combining versatility and accurate reproduction at an affordable price, this mic will find homes in studios large and small.

Beyerdynamic, 56 Central Ave., Farmingdale, NY 11735; (516) 293-3200.

STUDIO TECHNOLOGIES STUDIOCOMM

Digital audio workstations have changed the way in which we all work with and create audio. And with the proliferation of multichannel digital workstations (many having internal, onscreen mixing), the days of the console—at least as we know it—may be numbered. However, as much as things change, other factors remain constant, such as the need to provide talent cue mixes, route signals into the system and have a simple, accessible means for monitoring our work, whether in a state-of-the-art control room, simple project studio or desktop digital suite.

One possible solution to these needs is the installation of a traditional console in the DAW suite, which would solve all the requirements for routing, talkback and monitor control. But with an automated digital mixer on the screen, the "mix" func-

tions of the traditional console would be superfluous. Another factor in the equation is that space is typically at a premium, and adding a large console to perform a few functions may not make a lot of sense.

One alternative is StudioComm from Studio Technologies, the folks who brought you the excellent Mic PreEminence microphone preamp. Designed to provide communications and monitoring functions for digital audio workstations, a Studio-Comm system ($1,799) includes the Model 50 Central Controller and the Model 51 Control Console, plus optional portable talent amplifier units. The Model 50 contains the electronics for seven stereo line inputs, two control-room monitor outputs, studio monitoring capability, a stereo line-level output for dubbing and an integral headphone system. Switches, LEDs and rotary knob controls for on-the-spot operator action are provided by the Model 51 Control Console, as well as a talkback microphone that enables communicating to studio speakers, headphone feeds or audio slating to disk.

The StudioComm system can

drive up to four talent headphone stations, which connect via standard mic cables. Two versions of the headphone stations are available: The Model 35 ($159) is a direct box-sized chassis with internal headphone amp, mono/stereo selector switch, two headphone output jacks and a loop-through connector (standard 3-pin XLR) for daisychaining other stations. The Model 38 ($249) is a more elaborate affair, having all the features of the Model 35, while adding a stereo line/mic preamp with a separate level control so the performer can create a custom blend of his/her own input, along with the program mix coming from StudioComm.

A few comments about the headphone systems: Although small in size, the output of the headphone amps is substantial, providing plenty of punch. And while the talent units connect with typical XLR mic cables, the audio configuration is proprietary and unique: Pin #1 is designated as common, Pin #2 carries +23 VDC (for "phantom" powering the electronics in the talent units) modulated with left channel audio, while Pin #3 has the right channel audio. The tal-

ent output on the Model 50 Controller is a male XLR that mates to female XLRs on the talent box inputs. This reduces the possibility of accidentally connecting studio mics or other devices to the talent lines, as any male-terminated plugs in the studio room would be talent lines, and any female-terminated lines would connect to microphones.

The heart of the system is the Model 50 Central Controller, a single-rackspace chassis with all the input and output connectors, along with operational status LEDs and AC power connections. Inside the controller is a microprocessor that operates all functions, including all settings of the internal, 16x8, crosspoint routing switcher, as well as the VCAs that determine control room and studio monitor levels.

Due to space limitations, all line-level audio connections are via balanced ¼-inch TRS jacks, as 21 XLRs wouldn't fit on a one-rackspace chassis. Two "dub output" jacks are line-level outputs that can be assigned from any of the seven stereo input channels; for convenience, these dub outputs are provided on both the front and back panels. Additionally, the seven stereo line-level inputs can be independently set to operate at +4 dBu or -10 dBV. The controller provides no mic-level inputs; however, by coincidence, Studio Technologies just happens to manufacture a high-quality outboard mic preamp that interfaces easily with the StudioComm system.

System setup is straightforward, and I had no problem incorporating StudioComm into my disk-based

multitrack audio suite. Using the Control Console's Configure mode, users can store preferred settings, such as -10/+4 operating levels, or customized setups. For example, the control room Dim button can be set to mute the signal completely or attenuate the audio by 10/15/20/25/30 dB. The choice is yours.

Other configurable settings include defaults such as latched or momentary operation of the mono listen, talkback and slate buttons; auto dim; talk-to-phones (interrupt or talk over); slate routing; 50Hz slate tone in/out; stereo/mono inputs and whether the studio source is fed from the CR or headphone mix. Certainly not the most important feature of Studio-Comm, "configure" is a useful function that is virtually unknown even in the realm of very expensive traditional studio consoles.

Though a compact six-by-six inches (the perfect size to sit alongside a computer keyboard), the Model 51 Control Console has 30 LEDs that indicate status at a glance, along with switches for selecting "A" and "B" pairs of reference speakers, monitor and dim switches, source selection for routing the inputs to phones and control room outputs for the dub outputs. It also has selectors for sending the talkback to the studio, headphones or slate, as well as independent level control for each.

On the back of the Control Console is a ¼-inch jack for connecting external switches for talk-to-studio and talk-to-phones functions. These could be installed at some remote location, thus keeping a producer/

director at a safe distance from the session engineer, while still allowing them access to talkback. This is a feature that any engineer will appreciate.

The Control Console communicates with the main controller via MIDI, although the normally unused pins (2 and 3) of the 5-pin DIN are used for sending the output of the talkback mic to the main controller and for supplying power to the Control Console. As the power for the Control Console is carried over the same cable as the data, there's no need for a separate power cable or dreaded "wall-wart" supply. Any standard MIDI-type cable can connect the Control Console to the controller, as long as all five pins are connected at each end. A cable up to 50 feet long can be substituted for the cable that comes with the system.

All controller functions are manipulated via system-exclusive MIDI commands; these are described in detail in the manual for any users who wish to write custom software control routines or integrate Studio-Comm control into their sequencing systems. By the way, the manual that comes with StudioComm is clear, well-written and complete.

After a brief period, I became accustomed to using StudioComm and incorporating it as a necessary fixture in my digital suite. The system would also be a useful adjunct in a multimedia production environment. Fingertip access to monitoring/routing functions is wonderful, and the audio quality of the system is first-rate throughout, which should be no surprise, given Studio Technologies' reputation for high-performance—yet affordable—gear.

My complaints about the system are few and minor: The rack-mount controller lacks an AC power switch and the action of the control room monitor level knob is underdamped, giving it a mushy feel. But overall, StudioComm is a well-thought-out, good-sounding and flexible system that brings the concept of the desktop audio studio one step closer to reality.

Note: StudioComm is also available in a simpler, 4-input version (Model 55/56) priced at $1,299.

Contact Studio Technologies directly at 5520 West Touhy Ave.; Skokie, IL 60077, (708) 676-9177; or through its representatives: QMI, 25 South St.; Hopkington, MA 01748; (508) 435-3666.

Studio Technologies' StudioComm Model 50 Central Controller, Model 51 Control Console and Model 35 Talent Amplifier

OXMOOR DEQ-I/II
PROGRAMMABLE EQUALIZERS

Over the years, Oxmoor has earned a reputation for excellence with a variety of products—such as wall-mounted digital attenuators, room-combining systems and distribution amplifiers—designed for the fixed installation and contracting markets. With its series of DEQ high-resolution programmable equalizers, Oxmoor is looking to enter into new markets, such as studio installations and live sound production, where high-quality audio, versatility and reliability are paramount.

Two versions of the DEQ are available. Both are single-channel, 29-band, ⅓-octave graphic equalizers, with ±12dB gain range, second-order (12 dB/octave) high-/lowpass filters and digital control over the analog filters. The main difference between the two units is that the DEQ-II can be controlled by its front panel, via a rear-panel PA-422 port or an external switch box connected to a 15-pin port for selecting any of eight nonvolatile user presets.

Designed for use as a slave or pod-style device, the DEQ-I ($1,195) has no front-panel controls and can be adjusted only via control input from a DEQ-II, computer or internal switches that prevent unauthorized tampering. Additionally, system passwords provide several levels of system security. Computer control of either unit can be made via Oxmoor's TWEEQ™ software packages for Macintosh and IBM-compatible PCs.

Housed in a two-rackspace chassis, the DEQ-II ($1,470) features a large LCD status/EQ curve display, with cursor controls, menu buttons and softkeys for storing, recalling or manipulating settings from the front panel. Operations are fairly straightforward, and the softkey labels change to suit any of the menu pages you're in, to further simplify use. One nice touch is the ability to assign names to presets, which are displayed along with the EQ curve. The DEQ-II also provides a cut-and-paste function that allows users to copy the EQ curve settings from one preset into another, to provide a starting point for creating new presets. From the Edit mode, information can also be sent from a DEQ-II to a DEQ-I.

The DEQ system has two levels of password protection, so a system administrator has access to all equalizer functions, while a user—with a different password—may have access to a limited number of other functions, such as changing presets.
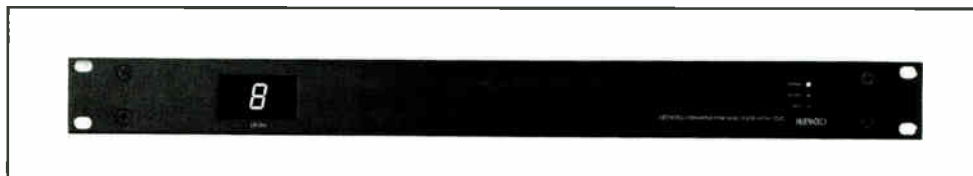
One possible application for this two-tier system would be allowing a nontechnical user to select from various presets in a fixed installation, such as picking appropriate equalization curves for music or vocal reinforcement, curves for various types of music (opera or rock), or different
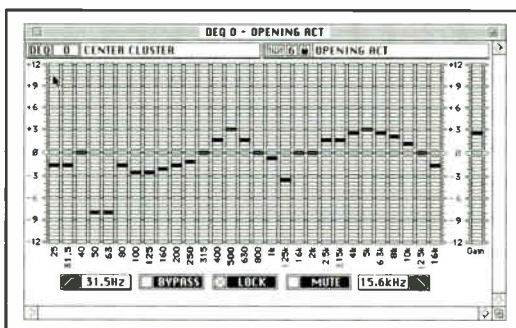
settings for various crowd sizes.

In situations where presets are selected from two on-site DEQ-I units, a simple switch box can easily be fabricated, and the pinout is provided in the manual. In the studio, a variety of programmed preset curves could be offered, giving the listeners a choice from a preference list of several EQ curves. As an example, specialized curves for mixing film or video could be added to a list that may also include compensated (flat) room response, or special settings for clients who dislike hearing playbacks on a flat system. The possibilities are endless.

The TWEEQ™ software package ($315) consists of a PA-422 conversion box, appropriate cabling to interface your computer and DEQ unit(s) and PC or Mac software. I tried the Mac version, which operates on a Mac Plus or higher machine, and found it to be intuitive and easy-to-use. Each preset and individual DEQ equalizer can be designated with 16-character names, and access to the high-/lowpass filters, ±12dB main output gain, and lock, bypass and mute switches is all right in front of you on the screen. The onscreen "Help" functions are fairly limited, but fortunately, the software operates easily and you probably won't need them.

As hybrid (digitally controlled analog) devices, the DEQ equalizers offer the best of both worlds: the flexibility of programmable, digital control and the smooth action of analog filters. The analog audio circuitry in the two equalizers is essentially identical: Both use constant-Q, minimum phase, combining designs with discrete components. Frequency response is -0.3dB down at 20 kHz and extends well beyond that, being only -3dB down at 60 kHz. In short, the units offer a combination of excellent audio specs with a powerful control interface, so don't be surprised if you encounter an Oxmoor DEQ system in your future.

Oxmoor, 2111 Parkway Office Circle, Birmingham, AL 35244; (205) 985-7040.   ■

Mix senior editor George Petersen is the author of Modular Digital Multitracks: The Power User's Guide, *available through Mix Bookshelf.*

by Bob Hodas

APHEX 622
LOGIC ASSISTED EXPANDER/GATE

Aphex has taken a giant step forward with the introduction of the Model 622 expander/gate/ducker. They have reworked a fine product (the 612), creating a "next generation" tool that offers high-quality audio with versatile, extremely accurate operation. The 622 is a whole new animal inside with major improvements due to new design concepts and a new implementation of the proprietary Aphex VCA. The company's patented "logic assisted" gate circuitry, combined with more flexible controls, offers engineers a beneficial studio tool.

Before we look at the controls, let's look inside. Layout consists of five PCBs—four for audio and control and one for power. Front-panel controls manipulate logic and DC circuits only so that the audio path can stay short at the rear of the unit near the

gates. It eliminates the problems of envelope detection, as the source is no longer a control voltage and hysterisis is not required to control wobbling around the threshold. There is also no rectifier filter that can lose transients and add trigger time delay. When a signal crosses the 622 threshold, a logic switch forces the gate to open for the length determined by the hold and release controls regardless of attack time. Problems due to trigger signals shorter than the attack time and retrigger chattering are eliminated. Higher threshold settings are thus possible, so finer isolation in tracks with high bleed should be no problem. Real consistency is possible with this system: I was able to set the threshold and open or close the gate consistently by varying the input level only ¼ dB!

in/out connectors. Aphex spent considerable time developing the VCA 1001. It is of the highest audio quality, very fast and will not produce clicks associated with short attack times due to its very low DC control voltage feedthrough. This results in a processor with exceptional distortion figures and a dynamic range of 119 dB. According to Aphex, this VCA has the lowest control voltage feedthrough available.

Another internal improvement is the logic-assisted gate circuitry, which separates the 622 from conventional

The 622 performs gating, downward expansion and ducking. Gating allows only the signal that is above a set threshold to be heard, cutting off everything after a user-specified time. Expansion comes in handy for adding dynamics to a track that is just a bit too compressed or has significant background noise (many guitar amps). With the proliferation of digital recording, extended dynamic range can be used without having to worry about the noise floor of vinyl or analog tape. Expansion also can help eliminate noise without the abrupt

effects of hard gating. Ducking can perform automatic level changes or remove program completely. An example of this is keying a signal to automatically reduce the level of a music track by several dB when the voice-over starts.

The 622 is a dual-channel, 1U unit that operates at +4dBm or -10dBv. It is transformerless and can be used in Balanced or Unbalanced mode. Rear-panel connections include an AC power receptacle, fuse and chassis ground nut. Each XLR I/O has a separate operating level switch, external unbalanced key inputs and an RJ11 jack that controls a bypass relay. A nice additional feature is the side-chain output (unbalanced), which is a buffered copy of the audio input. This may be fed to other devices for triggering, for example, without using up patch bay mults.

The 622 has two identical channels with a switch on channel 2 that allows it to slave to channel 1 for stereo operation. There are rotary pot parametric key filters for tuning out unwanted sounds from the key source. The filter's center frequency is tunable from 30 to 12k Hz. These are 24dB/octave slopes for high discrimination. Bandwidth is adjustable from 1.7 to 9.2 dB/octave. The 622 operates on an internal key unless the external key switch is engaged and an input is fed to the rear panel key input jack. A key listen switch allows the user to hear the key input for easy manipulation of the filters.

A useful new addition is the key monitor headphone mini-jack, for headphone listening of the key filter without interrupting the normal signal flow. This is extremely handy in a live venue when you need closer scrutiny than the hall acoustics allow, or a studio when you don't want to drive everyone out of the control room with the horrible filtered key sound. (If you don't need to isolate your key source with filters, I recommend leaving them switched out. Filter circuitry in the path of any key source—be it used for gates or whatever—will slow down your trigger time.)

Two LEDs (green and red) indicate whether the signal is above threshold (open), holding or below threshold (closed). These indicators are not part of the audio path and do not fade with release times. An in/out switch may be engaged to by-

pass the channel, and there are switches to select ducking and expansion. All switches have an associated LED. Variable rotary pots are used for setting threshold (-50 to +20 dBu), attack time (10 µseconds to 100 ms) and gating range (0 to 100 dB). Hold and release pots offer full control of the decay envelope shape. The Hold function prior to release is adjustable from 10 ms to four seconds. Release time is adjustable from 40 ms to four seconds. The ratio pot is only active in the Expansion mode and allows adjustment of the operating ratio from 1.2:1 to 10:1.

> The 622 is the only gate I have tested that has passed all the tom hits without opening on the snare.

Boy, this thing sounds good. The quality of audio passing through the processor is almost exactly the same as in bypass. I used my usual torture tape of problem tracks, and the 622 ripped right through it. First came the stereo tom toms. By manipulating the key filters and fine-tuning the threshold, I found that it was possible to isolate the toms and still discriminate against the snare and kick. I only needed a key filter on one side to help set the proper threshold. The parametric filter really let me get in tight on the tom. The 622 is the only gate I have tested to date that has passed all the tom hits without opening on the snare. The separate hold and release pots also allowed me to contour a decay that felt totally natural. Next came kick and snare tracks, which worked with ease. On the kick, I was able to adjust the threshold, hold and release so as to beautifully discriminate against the grace notes that the drummer had played.

Expansion was tested on guitars and background vocals. With rhythm guitar, I set about a 1:4 ratio and eliminated the little noises and finger hits that existed between sections.

On the vocals, I used a higher ratio to pull out the headphone bleed as well as the group's breathing. On lead guitar, I eliminated all the amp noise, headphone bleed and fingerboard crap between licks. The 622 set up quickly for these tasks and performed wonderfully.

I did my standard gate release test on the 622 to look for decay irregularities. I set up a 20-second decay on my Quantec and fed a snare into it. The outputs of the Quantec fed through the 622, and I keyed it to open with the snare. I then set fairly long hold and release times on the 622 and listened to the outputs. This thing was smooth as silk. I could even set up some very nonlinear decays without causing problems.

No matter how fast I set the attack, I experienced no clicking when the gate opened. Lots of transients and life remain intact with this unit. With the logic circuit, I used extremely small changes in threshold to affect the gate trigger. The 622 is definitely a precision tool.

I spoke with producer David Holman to get his feelings on the 622. He thought the unit was sonically marvelous. He loved the low transients and felt that the gated signal was as pure as the original. Although he never gates toms because of the usual degradation, he said he had no second thoughts about gating toms with the 622. He also thought the unit was very easy and intuitive to operate and looked good, too.

The manual is clear, with full explanations of design philosophy, controls and a good applications section that benefits the seasoned pro or novice engineer. Technicians will appreciate the schematics and parts lists, although with a five-year limited warranty, I don't think this section will see much action.

I was thoroughly impressed with the audio quality, speed and precision of the Aphex 622. It vastly improves the current gating "state of the art." Now engineers in both studio and live situations will find that they can have exceptional gating control along with audiophile-quality sound in an easy-to-use package. The retail price of the 622 is $795.

Aphex Systems, 11068 Randall St.; Sun Valley, CA 91352; (818) 767-2929. ■

Bob Hodas is an independent engineer and producer based in the San Francisco Bay Area.

by Mark Frink

SoundCheck

TOA DP-0202, DP-0204 and DX-0808

NSCA 1994: REPORT FROM THE SHOW FLOOR

The National Systems Contractors Association convention, held April 7-9 this year in Las Vegas, originally catered only to contractors and installers, but over the years, it has become an important show for anyone interested in sound reinforcement.

Evidence of the convention's wider appeal is the fact that the NSCA renamed itself this year; the National Sound and Communications Association has become the National Systems Contractors Association, hinting at contractors' expansions into many other types of installations, from security to video, including paging systems and intercoms. For the "live sound guy," the show could also be called New Speakers, Computers and Amps, and many of these were displayed.

One of the burning questions among manufacturers this year is how the issue of "computer control" of sound equipment will be resolved. There are currently three contenders in the pro audio field, with a couple of oth-

ers focusing on industrial applications such as airports and stadiums.

If you haven't heard of Lone Wolf's MediaLink yet, I suggest you check out what the company's networking technology is offering to the sound system of the future: a whole lot more than control and monitoring of audio gear. Lone Wolf's system will offer the ability to ship digital signals on it when the higher-speed chips become available next year. Lone Wolf is constantly adding manufacturers to its list of licensees, and at the show the company demonstrated a system running equipment from eight different vendors.

At one demonstration, Lone Wolf's Visual Network Operating System (VNOS) software was running on multiple computers—Macintosh and IBM—on the same network and at the same time. Crown, having already firmly established itself in this field with numerous IQ installations, has shown a commitment to bringing other manufacturers onto its system and to continue to provide working solutions. If

these two companies would get together and resolve their differences to create a unified system (Crown has even been a Media-Link licensee for some time now) the AES's SC-10 committees could stop wasting their time, and the members could get down to the real work at hand. Should this occur, it will undoubtedly be the milestone the industry has been trying to move toward for some time.

My first stop on the floor was at the booth of Sabine, a company that caused a small revolution with its FBX "feedback exterminator" technology. The new FBX-901, like the the FBX-900 it replaces, is a processor-controlled filter device that automatically senses feedback, determines its frequency and places one of nine narrow, digital notch filters to cancel only the ringing frequency. This is done using $\frac{1}{10}$-octave filters instead of the much wider filters associated with $\frac{1}{3}$-octave EQs, which can sometimes be up to a full octave wide. The FBX results in less gain reduction of musical material and less muffling of the sound at frequencies adjacent to those feeding back. The unit's reaction time is typically under half a second—light-years faster than the average sound person could set up a parametric to do the same thing. There is also an upgrade kit available for FBX-900 owners for $70 that includes an EPROM chip. There is another 901 version available with $\frac{1}{5}$-octave filters, and Jensen transformers are also an option.

I have used FBXs from time to time for several years, and there are many clubs out there that could benefit from adding a couple of channels of these, par-

Janet Jackson's World Tour Dances Into Oakland

EDDIE WOLFL

Below: FOH engineer Steve Guest.
Bottom: Monitor engineer Randy "Randbo" Bryant

by Jeff Forlenza

BOOOMM!! Flashpots explode, and sparks rain down behind the stage. The band kicks into a bass-heavy groove, and Janet Jackson hits the stage with her dancers—the sell-out crowd at the Oakland Coliseum Arena goes wild. It's the worldwide *janet.* tour, and the fans love it. However, very few in the sell-out crowd know how much effort and preparation it took to make it all happen in such an explosive, musical and well-choreographed way.

Musicians and dancers auditioned and practiced for three months before setting foot on a stage. Music director/keyboardist Rex Saliss worked on the music pre-production for the tour—picking musicians and rehears-

ing the band. Jimmy Jam Harris (of the Jimmy Jam/Terry Lewis production team on Janet's albums) sent snippets of studio multitracks to make sure the musical arrangements and keyboard sounds for the tour were up-to-snuff with Janet's studio work. Tina Landon expertly choreographed the team of eight dancers to make sure the show is every bit as spectacular as Janet's videos. And the stage is an elaborate work of high-technology and theatrical art.
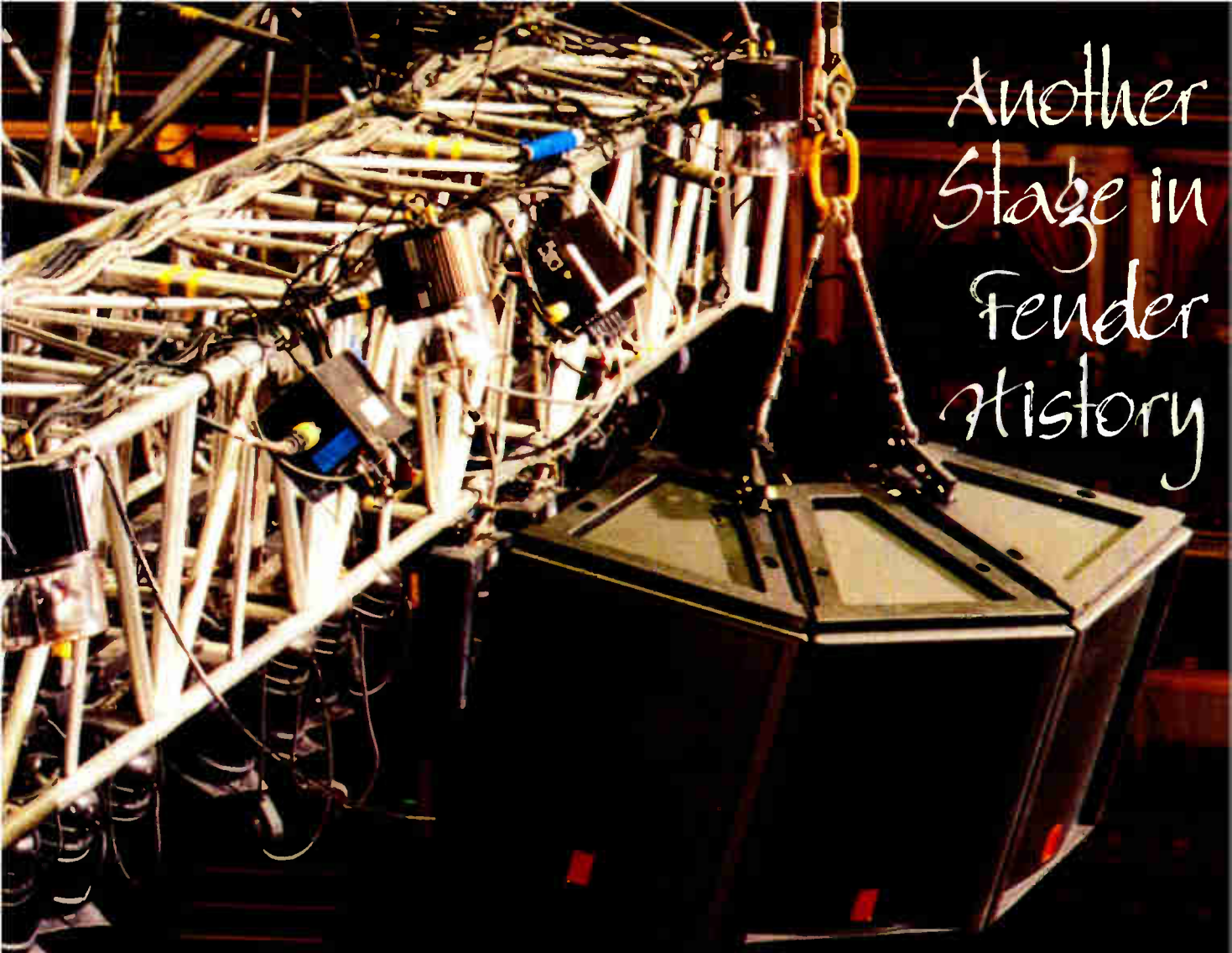
The large stage and set design by John McGraw is multitiered, featuring free-standing pillars for individual player positions, a hydraulic drum riser that rotates 360 degrees, another hydraulic riser for Janet, inflatable clowns and circus characters, pyrotechnics ranging from explosives to

World Radio History

sparklers, and ramps providing the dance troupe access to the different levels behind, around and in front of the band—all built into a lavish, rococo motif. But the real tech story of the *janet.* show goes on *beneath* the stage.

Affectionately dubbed "The Underworld," the area below the stage is a network of monitor cables, microphone subsnakes, and racks of keyboard and MIDI gear. It's the domain of the Showco crew out of Dallas. Techs Danny Machado and Robert Drewes are responsible for The Underworld, and they have intercom communication to monitor engineer Randy "Randbo" Bryant and front-of-house mixer Steve Guest, who is a regular MSI employee.

"It's about three or four different levels," Bryant says of the layout. "The band's kind of on what we call lillipods. It's a really large stage; there's a lot of area for the dancers to cover. They mostly work downstage. We have an upstage tier that goes all the way around the back; usually they work that if we're sold 360 degrees for the evening. There's holes drilled into the stage, and we've run quite a few cables down into The Underworld."

"Each keyboard player has an entire rack of MIDI-controlled gear underneath the stage run by [keyboard technician] Mike Dean," FOH mixer Guest explains. "And I get a left and right out of the keyboard mix. So I get three keyboard mixes from the stage." Altogether, Guest has to deal with "about 50 inputs, not counting effects returns" coming off the stage.

Drummer Jonathan Moffett sits atop a rotating riser with built-in subwoofers. "He has wedges and what Showco calls two 'B1s' that are strapped under his drum rig: basically, two single 18s, as a little sub-box for the wedge," Bryant says. "So he's got two wedges behind him, and then underneath, blowing up through a grate, are

two 18s."

Reinforcing the throbbing drums, bass and tender vocals on the *janet.* tour are Crown amplifiers and a Prism™ speaker array. "The Prism is good at covering horizontally in the room. It's very even coverage," Guest says of the proprietary Showco system, which provided ample power and coverage for the 14,000-seat Oakland Coliseum Arena. Eighty Prism enclosure boxes and 20 sub-bass boxes were used in the array of cabinets stacked on both sides of the stage.

"Randbo" Bryant sits to the side of the stage at his Harrison SM-5 board (with extender), mixing monitor feeds for Janet and the band. At the FOH mix position, Guest operates two Midas XL3 consoles. Guest became familiar with the console from previous assignments mixing Paula Abdul and Bette Midler.

Guest explains his mixing goals: "I want everybody to hear everything, as much as possible. Generally, what makes the audience happy is what makes the artist happy," he explains. "If the crowd gets excited, that's the whole purpose of having the show. But I have to mix the show how I like to hear it, and hopefully what I like to hear is the same thing that they like to hear.

"I'm not a heavy effects-oriented mixer," Guest continues. "I keep reverb to a minimum, because in an arena, you have quite a bit of natural reverb. In certain songs, I'll use it. But I go for more dynamic control, like compression and gating. I use a few drum effects, like some gated reverbs and some long, trailing reverbs for ballads on the snare drum. We have a full complement of Aphex gates—612s—and we have some tube compressors."

Monitor engineer Bryant judiciously uses his processing gear. "I'm using Drawmer dual-gate DS-201 gates on the drums. For my compressor/limiters, I'm using the Klark-Teknik DN-504s. And I'm using Showco 1017

crossovers and Klark-Teknik 360s on the graphic equalizers. It's pretty basic processing." Aside from dynamics processing, Bryant does very little sound-shaping or EQing. "I'm actually running everything pretty flat. Everything coming off the stage sounds great. The keyboardists [and musical director] went through a lot of trouble getting the racks together and making them tip-top shape. All the samples that we use for keyboards and drums are really clean sonic-wise. So I'm not doing a whole lot of EQing.

"There's three stereo mixes for people who are wearing Future Sonics ear monitors," Bryant explains. "I have three groups of people using them—three background singers, the guitar player and Janet—all in stereo, and then everybody that's on a wedge is in mono except for the musical director [Rex SalISS], who's in stereo. There are ten musicians on stage, plus Janet. I have six people using in-ear monitors and five using wedges [Showco's proprietary BFM-600 Floor monitors]. I have Future Sonics in-ear monitors myself. We have a spare beltpack for Janet, and I'm listening off her beltpack and mixing the show for her.

"Janet wants a front-of-house mix," Bryant explains. "We're using three different effects—a REV5 on her voice, two SPX90IIs for general background vocals and then a general band reverb. Basically, Janet wants a full mix. So what I'm doing is putting all the other mixes on 'pre' and putting hers on 'post,' and then the fader moves I do are all for her."

Bryant handles wireless and hard-wired mics. "There's a couple of wired vocal mics for the guitar player and bass player, who both sing, but the background singers are on wireless," he explains. "Janet has a wireless handheld and a wireless headset. The handheld is a Beyerdynamic SDM-170. For the headset, we're using a Crown CM 311. The actual headset piece was built by a special effects guy in Hollywood.

"My biggest concern is adjusting my antenna array everyday," Bryant adds. "When I do my monitor check, that's probably the thing I work on the most. So I walk everything around the stage seeing where we're at, because we have a pretty large set. I'll also put on the Future Sonics to see how the mix is going in the ears. Then I'll just walk the Future Sonics around the stage. They're not a totally closed system. Even though they are

Club of the Month: CAFE WHA?

A fixture on the Greenwich Village scene in the '60s, Cafe Wha? is where Bob Dylan made one of his early New York appearances, and Jimi Hendrix was "discovered" there. Janis Joplin and Jim Morrison also performed there around the same time. Reopened five years ago after several years as a Middle Eastern music nightclub, it now is firmly back as a Village landmark.

The club uses Bose 802 and 302 speakers with the Series II-C System Controller. The sound design is derived from the shape of the room. Owner Noam Dworman, who also plays in the house band, explains, "We have a low ceiling and a long, narrow room with dead acoustics. We set up the room in four sections. It's disconcerting, especially for vocals, if they're not perceived as coming from the stage. I have a ring of speakers around the stage, which are just for vocals, and they blend in with the stage sound. As you move away from the stage, you get a different mix from other speakers to compensate for the deterioration of the stage sound. I went with Bose speakers because they're small and also because people are sitting fairly close to the speakers. I noticed that with a lot of speakers that use tweeters, you have to get a certain distance away before it all blends together. With the Bose, you can sit near them and get a natural sound."

Six 802s are used for the main vocals, six more for the monitors, another four for the fills plus four 302 subwoofers. Other 802s are used for instrument reinforcement toward the rear of the room, and they are also used in the keyboard and guitar rigs. There is a Mackie 1604 for the vocals, which is mixed into an Allen & Heath GL3 along with the instruments. The GL3 sends four separate mixes for the various parts of the room, plus controls the mix for the part of the system, which is just vocal and controls the mix for the monitors. There is another Mackie board on the stage so that, on slower nights, the sound can be run from the stage without a sound person. The 802s are powered by a variety of QSC amps and the subwoofers with a Stewart 1800 and an AB 1200.

Outboard gear includes a Lexicon LXP-15 reverb, dbx 160x and JBL 7110 compressors, Ashley GQ231 graphic and Furman PQ3 parametric equalizers. The club uses Shure Beta 58s for vocals, SM58s for instruments, and the ever-popular D-112 kick-drum microphone. "AKG C-451s are used for overheads, although only for recording purposes," house engineer Michael Greer adds. "The club has two Tascam DA-88 digital 8-track decks and a Tascam M2516 for recording tapes that we soon hope to be producing independent albums from."

If you are a touring engineer and you have worked in a club where there has been an investment in sound equipment that makes it an exceptional place to mix, write to Mark Frink at Mix *and please enclose a photo of the equipment with the people responsible.* ∎

House engineer Michael Greer

World Radio History

molded to the ear, you're still gonna hear something. It's easy to get stuck over by the board, but the gig's out there onstage, so you gotta go out there and listen."

Overall, the show sounded good and strong with an accent on the bottom end. The band was well-rehearsed and tight: The three keyboardists deftly re-created the synth textures from the Platinum-selling albums; the drums were big and boomy; the background singers were always there with sweet-sounding support; and Janet Jackson sang, danced, hurried through five wardrobe changes, and even cried for her adoring fans. ∎

Jeff Forlenza is an assistant editor of Mix.

ticularly the ubiquitous "monitors-from-the-main-console" variety.

The new 2-channel FBX-1802 is essentially two 901s in one with some added functionality over the 901. The user can lock the filters to keep them from going deeper, and the total number of filters and the number of fixed filters can be selected, as well as the width of the filters. It offers improved dynamic range (100 dB vs. 92 dB), and at $1,299, its list price is exactly twice that of a 901. This unit uses the same processor found in the ADF-2400—minus all the front panel controls and the LCD window—for less than half the price of the 2400. The 1802 may be one of the hottest new products this year.

Professional Audio Systems (PAS) of San Marcos, Calif., was showing its TOC (Time Offset Correction) System-2 speakers. The floor monitor is the SW-2, which has a coaxial 15 with a JBL 2450 on a 30x60 horn. The FOH speaker, the

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Energy Time Curve Diagram
As can be seen in this plot, external time correction is not required because of the near perfect arrival times for the 12", 6.5" and 1" drivers in the TFL-760H.

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Since all transducers in a single TFL-760H are mechanically aligned and in-phase, external time correction is not required *(see ETC diagram)*.

Worldwide, live sound engineers have lauded the smoothness of

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RS-2C, uses the identical coaxial transducer and adds a high-power 15-inch bass speaker to extend the low-frequency response down to 50 Hz. These full-range, trapezoidal cabinets measure 18x36 and weigh about 125 pounds. Both are used with a processor. Having a common axis for the radiation of all frequencies, coaxial speakers can be completely time-corrected for offset acoustic centers, and this offers them an advantage over most three-way designs.

A brief aside: Last winter, I spent a couple of weeks substituting for house mixer Vance Anderson on the Tony Bennett tour. The Dallas stop was part of an MTV acoustic Christmas festival, at a club that, judging by its appearance, was appropriately named "The Bomb Factory." When I walked in, I was pleased to find a PM3000 at the house mixing position and a Ramsa onstage. The main speakers were PAS RS-2Cs, which I had

never heard. I listened to the main speakers with apprehension, preparing to adjust the graphic equalizer. Unfamiliar with these speakers, I carefully listened to the interaction of each slider on the Klark-Teknik, and to my amazement, when I had finished there was only one frequency I needed to move

Renkus-Heinz CoEntrant CE-3MH

down 3 dB, and that was more a function of the room and the microphone than anything else.

Renkus-Heinz demoed its new Complex Conic horn tech-

nology, which combines the best features of constant directivity and the fashionable circular horn designs. This approach eliminates the "pattern flip" exhibited by CD horn designs, where the dispersion characteristics reverse at lower frequencies (a 40x60 becomes a 60x40 at 1 kHz). They also showed the new CoEntrant concert speaker system, a two-box, three-way trapezoidal design. The CE-3MH mid-high has six 6.5-inch carbon fiber mid-drivers and six 1-inch compression drivers, all loading into one large 60x40 horn. Due to the large format of the horn the drivers all load into, the pattern control is quite good, with a smooth transition from mid to high coverage. The companion CE3-LOW has four horn-loaded 12s in the same size cabinet (32.5x21x24D). There is also a double-15 horn-loaded sub, again in the same size cabinet. Concert Systems USA of Nashville is on tour with Doug Stone using this system, pow-

Marine World Africa USA, Killer Whales Yaka And Vigga, And A Ton Of Series One Amps, Hold The Attention Of Millions Of Visitors A Year.
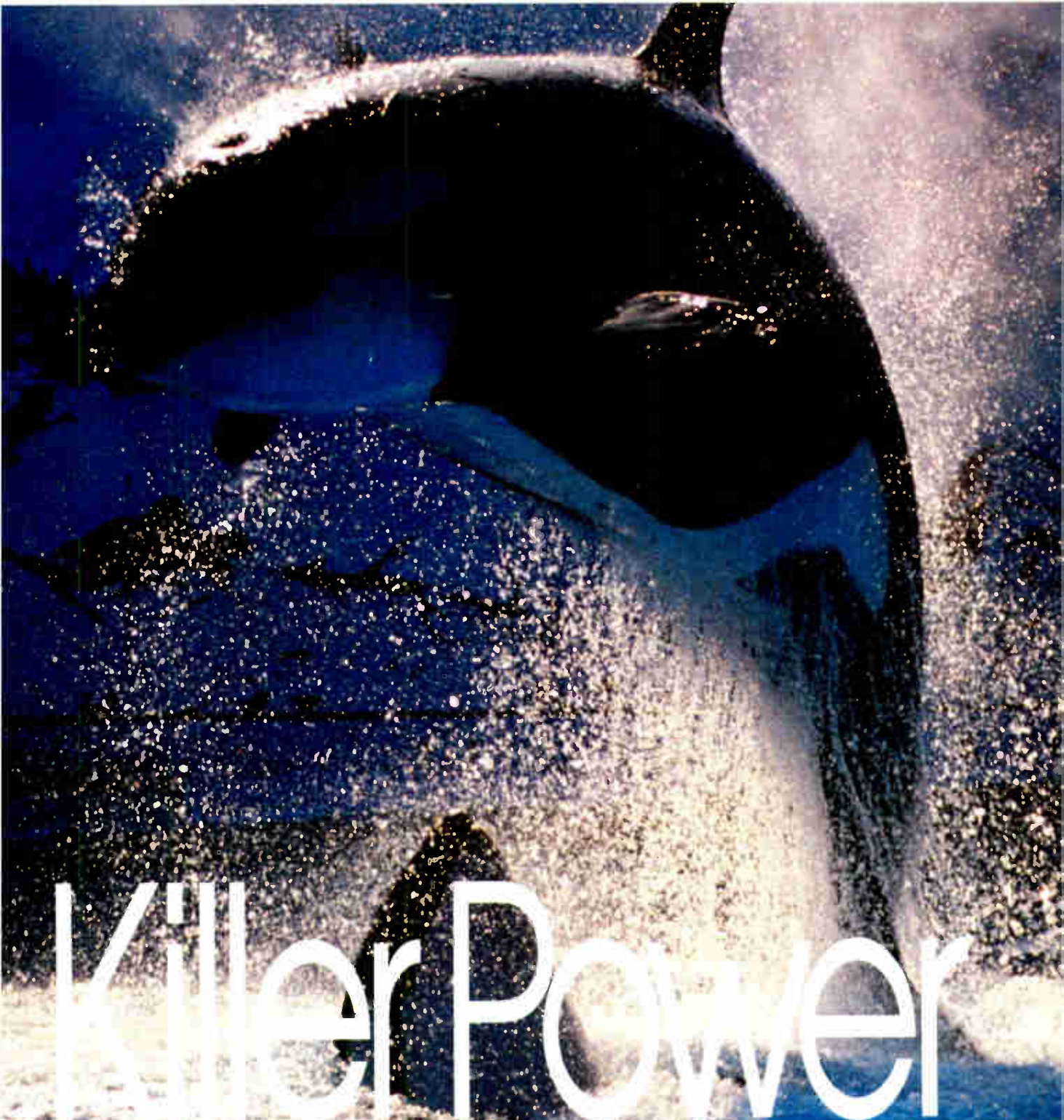
KillerPower

ered with Crown 3600 and 2400 amps, and the reaction to the sound of this show has been very positive.

Drawmer/Genelec importer QMI is distributing product from the French speaker manufacturer NEXO. The speakers feature Ferrofluid cooling, processor-controlled behavior through use of amplifier sense inputs, and an asymmetrical dispersion, constant-directivity HF horn. Two models of full-range speakers were displayed, each with an accompanying subwoofer. Both are modified trapezoidal designs with a fifth side angled so the box can be used as a stage monitor. The smaller full-range speaker is the PS10, with a 10 and a 1-inch compression driver passively crossed over at 2 kHz. The sound of these 33-pound speakers was impressive. They were powered with Crown 3600s and were run up to the limit of the processor with no audible deterioration or spectral shift.

The larger system, the PS15, uses a 15 and a 2-inch compression driver and has a companion 18-inch subwoofer.

NEXO PS10

The TOA crew dressed in Star Trek uniforms for an informative and theatrical demonstration of their new products, including the MediaLink P-1000 Series ampli-

fiers. There was heavy interest in the new DACsys II Digital Audio Controller. The DACsysII DP-0204 must be programmed and controlled using a PC running Windows, but once you program the system, it can be disconnected and it runs without the computer. Macintosh and MS-DOS software are said to be in the works. In addition to the computer port, the back ports for its two inputs and four outputs. The 20-bit DACs and ADCs provide a dynamic range of 107 dB; the sampling rate is 48 kHz. Sixteen presets can be recalled from the front panel. A wide variety of algorithms can be combined, and when crossover functions are employed, you can build just about anything. Suggested pricing is $2,595. The DP-0202 is identical with the exception of having only two outputs. The companion DX-0808 is a programmable analog matrix mixer.

A noteworthy development in the Community camp is the new

VHF100 compression driver. It is equipped with a large-format, ferrofluid-cooled voice coil, using a nonmetallic diaphragm and mated to a newly developed low-compression phase plug. The driver has been shipped in RS 880s for the past few months and is being added to new RS 660s and RS 220s. Listening in their demo room, the speakers equipped with this driver exhibited an open, transparent high end, even at high volumes.

Next door in the Altec Lansing room, an interesting product was the single-rackspace 4024A, a two-input, four-output, digital signal processor designed for their DTS loudspeaker system. The functions for individual outputs include shelving and parametric EQ, delay, phase, attenuation, limiting and a master delay that goes up to one second in one-millisecond increments. This unit has a 2x16 character LCD screen and can be programmed from the front panel. It has 24-user RAM memory locations (eight for each of its three configurations), and its sampling frequency is 46.875 kHz, using an 18-bit linear/24-bit internal data format.

There was also a prototype of a Lone Wolf MediaLink module with line in and outs designed as an add-on to non-MediaLink amplifiers. Now, if someone would come up with a multi-channel rack-mount device like this with utility lights on the front and in-line connections for, let's say, eight amplifiers, maybe latches for remote turn-on and perhaps speaker load-monitoring, they could really clean up on the market for retrofitting all those amplifiers out there that are not going to be thrown away just because they are not computer-controlled. Any takers?

BGW and McCauley showed the collaborative BGW model M2200 powered subwoofer, which uses four McCauley long-excursion, 15-inch speakers. A custom stereo GTA power module is in a separate chamber on the back, along with a 24dB/octave crossover that can be set from 63 to 180 Hz. It weighs 330 pounds, and a 1-inch Baltic birch touring version is available. The M2200 is also THX-approved for professional cinema use, and it sounded great.

At the other end of the scale is the Bose Panaray system. The 502A Controlled Array is a small, curved column of five 4.5-inch drivers, with a coverage pattern of 120x70 degrees. The companion 502B Acoustimass houses a 12-inch woofer with a 4-inch voice coil. The 502C is the 2-channel controller/equalizer, which functions as an 18dB/octave crossover at 140 Hz. The system sounded even throughout the listening area and was surprisingly loud.

Until now, speaker technology has remained relatively unchanged in this century. Quantum Sound recently purchased the professional speaker division of Intersonics, a high-tech research and development firm in the Chicago area that specializes in acoustics, containerless materials processing and

noncontact measurement (read "NASA-related R&D"). Intersonics has been building powerful, unique subwoofers for the past eight years.

Quantum is the result of a group of private investors who have seen the potential of Intersonics' technologies and want to take them to a higher level of exposure. They were showing the ServoDrive ContraBass and BassTech 7 speakers, which replaces the conventional mag-netic speaker with a woofer cone driven by a servo motor. In this way, large volumes of air can be moved at very low frequencies. This technology has proven itself with many touring sound companies and installations.

The new TorqueDrive is a direct coupled refinement of the ServoDrive technology. Instead of using a belt assembly to convert the rotational energy of a motor to rectilinear energy as with the ServoDrive, it is a motor that is direct-coupled to vibrate a "blade." This direct-coupled, air-motion propellor is mounted inside a cylinder, which allows the air inside the cylinder to be modulated. This required the motor to be redesigned so that it is a "moving coil"; and this is only one of the radical departures chief scientist Tom Danley and this company have come up with.

Another radical development sprang from the discovery that much higher frequencies could be produced by this new rotational system. The full-range speaker they have developed using this discovery is called FocusField and does not exhibit the narrowing of dispersion at higher frequencies associated with traditional speaker technology. FocusField offers many other benefits, which we don't have space to go into here, but *Mix* will cover this further in the months to come.

Clair Brothers R-4 Series III

Clair Brothers introduced the R-4 Series III three-way speaker system, which features a newly designed Directional Midrange Baffle (DMB). The DMB is not a conventional horn but an extension of the conical shape of the 12-inch midrange speaker. "Most horn-loaded, midrange systems achieve respectable intelligibility; however, they tend to sound harsh," said Clair's Gene Pelland. "The Series III delivers a high 'Q' without the horn-loaded side effects." The three-way system uses a 600-watt 18 on the low

end and a 2-inch driver on a 60x40 CD horn. The 260-pound speaker measures 23.25x47.5x22 inches deep. I can't help wondering, with all the work they've put into it and the recent trends, why it's not a trapezoidal enclosure.

After three days of running around to all the booths and demo rooms, I think I've just about caught up with new developments for a few months. But by the time you read this, another dozen important new products may be hitting the streets. In the months between now and the November AES show, we'll take a closer look at some of these and other new products.

PARTING THOUGHTS...

I'd like to leave you this month with a word about computers. There were computers in almost every corner of this show. In addition to BGW's own model, QSC is offering a computer as part of its line. In the future,

many manufacturers will be in the business of selling computer-intelligent components and systems. In the very near future, the most important piece of equipment a modern sound company or live engineer owns will be the personal computer because of its ability to communicate with other people and other hardware.

Today, used previous-generation personal computers can be had for the price of a quality digital reverb. As the pace of technological change increases, it becomes harder to justify purchasing equipment, but what you must look at in these cases is the opportunity cost of *not* staying involved with advances in technology. Machines that sold for a couple of thousand dollars four years ago can be had for several hundred today.

Since April, there has been an electronic bulletin board service, the Live Mix BBS, at the Seattle office at (206) 933-8478 running at the standard BBS settings of

1200 and 2400 baud, no parity, 8 data bits, 1 stop bit. The Live Mix bulletin board allows communication of press releases, letters, comments and contributions, as well as forums for file sharing, databases, classified ads, private mail and public message centers for live sound topics. Contact Mark Frink for details or just modem in and register. After a validation request has been entered, you will be allowed access.

I'd like to thank Gary Usseglio, William Baltra, Jason Knapp, Sven Garber, Dan Gindin, Jack Boessneck, David Juhre, and of course Dave Stevens for calling in during the first month. As more people become involved, there will be more information available on the system. ■

Sound reinforcement editor Mark Frink can be reached at 4050 Admiral Way S.W. #305, West Seattle WA 98116; BBS (206) 933-8478.

Sound Reinforcement New Products

YAMAHA H SERIES AMPS

From Yamaha Pro Audio (Buena Park, CA) comes the H Series, a line of two-rackspace power amps. The top-of-the-line H7000 weighs just under 60 pounds and delivers 750 watts per channel into 8 ohms; the 53-pound H5000 offers 550 W/ch (into 8 ohms), and the 350 W/ch H3000 is only 23 pounds. All feature a choice of stereo/dual-mono/bridged-mono operation, "thump-less" power-on circuitry, recessed power and dual 31-position attenuator controls, balanced XLR or ¼-inch inputs, forced-air cooling (two-speed), and front-panel muting/clipping/thermal and signal present LEDs. A 15-pin rear-panel computer port offers the ability to remotely control and monitor operational status.
Circle #212 on Reader Service Card

AUDIO LOGIC i SERIES

From Audio Logic (Sandy, UT) comes the i Series, a new line of high-end audio processors. The first in the series is the SCD31/L, a dual ⅓-octave equalizer, which, like all upcoming i products, features torroid power transformers and high-grade components. Each is shipped with an Audio-Precision test plot guaranteeing the individual performance of the unit. To back up its reliability claims, Audio Logic is also initiating a 24-hour turnaround repair service on the i Series.
Circle #213 on Reader Service Card

AUDIX OM5

New from Audix (Tualatin, OR) is OM5, a handheld dynamic microphone retailing at $329. This hypercardioid polar-pattern mic offers a high degree of feedback rejection, while a wide 40 to 20k Hz response and high output is achieved by employing a VLM (very low mass) diaphragm and advanced voice-coil winding technology. Maximum SPL handling is said to be 144 dB.
Circle #214 on Reader Service Card

LEVEL CONTROL SYSTEMS

Already in use on Broadway and in other major productions is LCS from Level Control Systems (Los Angeles), an integrated hardware/software package that offers computer control of complex sound reinforcement systems. Expandable in versions ranging from 16x8x4 to 64x8x64, the Macintosh-based LCS allows the user to control fader level, pan, mute, bus select and matrix assigns with eight aux sends per channel, instantaneous manual cues and/or automated SMPTE triggering. SpaceNodes™ software records and plays X-Y matrix trajectories for routing to multiple speaker locations, allowing creative real-time (mouse, tablet, touchscreen or MIDI controller) programmable playback assignment of complex matrices for spatialization and surround panning effects.
Circle #215 on Reader Service Card

COMMUNITY VHF100 DRIVER

One of the first refinements to appear in the RS Series from Community (Chester, PA) is the new VHF100, a proprietary HF driver designed for use in three-way systems. The VHF100 features a nonmetallic diaphragm and a large-diameter ferrofluid-cooled voice coil coupled to a low-compression phase plug, providing low-distortion response out to 18 kHz.
Circle #216 on Reader Service Card

D&R VISION PA/SR

D&R Electronics (U.S. offices in Montgomery, TX) is now offering the PA and SR versions of its Vision production console. Available in 4- and 8-bus versions with five frame sizes (12 to 100 inputs) and nine modules to choose from, Vision can easily be customized to meet various user requirements. Features include extended (10 Hz to 100 kHz) bandwidth, a choice of 3- or 4-band EQ and a two-year warranty. Optional are three automation packages (VCA, moving fader or MIDI), matrix modules, stereo inputs and PowerMute control with 99 mute presets. The boards are sold factory-direct—typical pricings are from $3,535 (18-input rack) to $22,395 for 72-input (total) version.
Circle #217 on Reader Service Card

BY TOM KENNY

POST·SCRIPT

Live at The Ember

by Larry Blake

Doing a "live" music scene for a film can be as easy as taking a pre-existing studio recording and lip-synching to playback on the set, or as hard (as noted in last month's column) as *The Doors*, where there are varying combinations of studio recordings (in that case, more than 20 years old) and new, live vocals, the latter of which had to be edited for performance and sync.

Recently, I had the opportunity to supervise the recording of some music performance sequences for Steven Soderbergh's *The Underneath*. The film is set in present-day Austin, Texas, although the "club" in the film (The Ember) was built as a set in an old electronics parts warehouse. All told, four groups appear at The Ember—Cowboy Mouth (homeboys from New Orleans), Wheel (friends from L.A.), and Gal's Panic and Herman the German, both from Austin. Although studio recordings

existed for much of the music, we decided to record everything *in situ* a few days before the scenes would be shot.

This proved to be a straightforward way of getting the job done. The bands could take their time with a smaller "meter" than would have been running if we had recorded everything "live" in front of camera, cast, crew and extras. (Each day of shooting on a movie of this size costs about $50,000, while the direct costs of recording the band were no more than $5,000 a day.) And, of course, because we were there (as opposed to most music prerecording, which is done

The Nagra IV-S

in a studio), hopefully we will be able to sell the sound of The Ember via carefully placed room mics. (By the bye, the session was engineered by Leanne Ungar in the Reelsound Recording Company remote truck out of Manchaca, Texas.)

What follows are some notes I made about the logistics and organization of the project that might be

helpful should you find yourself recording music for eventual playback on location.

1. Do not use a DAT (with or without time code) for playback. A Nagra IV-S with center-track time code remains your first, best and last choice. Let me be very presumptuous and attempt to answer the questions that made the express train from your brain to your mouth. "DATs play back at precisely the same speed that they were recorded at. Isn't that what I want?" Yes, true on both counts, but there are times when you don't want that to happen. The classic example is when shooting a music video on film: Your master music recording that would be on your offline and online NTSC "blacked and coded" videotapes awaiting the edit would play back at "correct speed" when referenced to an NTSC sync generator (i.e., a field rate of 59.94 Hz). However, if you will be shooting on film, your playback tape would have to be playing back slightly faster (.01%) to match the 60Hz-based, 24-frames-per-second camera rate that will be slowed down in telecine to the 59.94Hz video rate. Still with me?

Now, if you were to make a non-time code DAT from your music master that was resolved to NTSC sync, you would be playing back too slowly, and you would slowly (no pun intended) but surely creep out of sync at a rate of 1.8 frames a minute. And you won't know it until you get to

Location Sound Recording

TIPS AND TALES FROM ROB YOUNG

by Tim Moshansky

Location sound mixer Rob Young remembers his first job on the set. "It was a TV movie," he recalls, "and we were shooting in a public square, and there were these fans that were computer-controlled to go off every five minutes. So I told the assistant director I needed five minutes lead time before we went. But he didn't do that, and I was watching the time. We needed three more minutes, and they said, 'We're gonna go,' and the director said, 'We're going,' and I said, 'I need three minutes for the fans to turn off.' Well, the director just lit into me. I said, 'I told the AD, everybody knows this,' and we get into a great screaming match on the set. We argued until the fans stopped, and then we rolled. At lunchtime the producer showed up, and he called for me, and I thought, 'This is my first week on my first show,

Rob Young (left) working on **Hideaway**, *pictured here with boom operator Don Brown*

tomandandy: Faster, Pussycat! Edit! Edit! Edit!

by Dan Daley

There is a quaint notion that the concept of quick-cut visuals and audio in commercial television and film is a development of the '80s and MTV. Although the all-pop-culture network did much to promote the fast-edit approach to visuals and audio, and in doing so accommodated a generation with short attention spans, the first significant example of what now runs 24 hours a day on cable happened in 1969 on *The Smothers Brothers Comedy Hour.* For those of you too young to recall television that brought us perennial presidential candidate Pat Paulsen before there was a Ross Perot, and made us sick of Glen Campbell before "Rhinestone Cowboy," the program also introduced Mason Williams' single "Classical Gas." The song's early video effort compressed the history of 300 years of art into a two-minutes-and-change clip, with the Mona Lisa and Blue Boy getting equal billing at about ten frames each.

Quick cut to 1994, and quick cuts are all we see, from MTV promos to Reebok commercials to episodic television programming. Music got smaller, in that it got shorter. But it got bigger in that more elements and genres are now crowded into a single 30-second spot as the audio equivalent of multi-culturalism and busy lives demanded that we get more stuff in less space.

This is the milieu that Andy Milburn and Tom Hajdu, who work under the collective rubric of tomandandy, were raised in. At 30 years of age, they are admittedly prime candidates to have fallen under the spell of the quick edit. Their work, for

editing. If you're doing quick cuts only, then you might get lucky. But don't count on MTV-style editing to save your sync ass on your MTV video.

While it is possible to do everything by the book and correct with a time code DAT machine, it's just that so much happens "in the dark" with digital synchronization, especially DAT time code, that I don't believe even the most knowledgeable person can sign off on it as quickly as one can with center-track time code. The frame rate is set in the Nagra with a hard-to-get switch on the inside, and it's a simple thing to know that a recording made at 29.97 will play back faster at the 30 position. Digital recordings, however, involve a much more complex formula, including to varying and overlapping degrees, sampling frequency, time code frame rate and sync reference. And to make a confusing situation even more frustrating, the IEC time code format for DATs doesn't even record time code as such on the tape, thus shattering the age-old relationship between linear tape speed and frame rate.

The Nagra even has the DAT system beat with regard to another oft-quoted misconception—that you can cue up DATs faster. The only example where this might be the case would be if you were to shoot a whole take of a long song and want to start again within seconds. But I can't remember ever not being back to heads by the time the talent caught his/her/their breath. And if you'll be going back and forth in smaller sections, then Nagras are infinitely easier to rewind on a dime since you probably won't have program numbers for every verse on the DAT, whereas it's very easy to use Editall splicing tape to mark your place on (unedited) ¼-inch tape.

Trust me on this one. Stick with the Nagra.

2. Pull as many recorders as possible during the original recordings. I should make something clear: Our first goal in Austin was to capture the groups "live," and although we were set up to mix down, we were trying to capture everything—multitrack masters and Nagra playback master— live. (Should your project have you doing separate overdubs and mixdown, then apply what I'm saying to the mixdown stage.) The Nagra tape would be used both for playback and for temp dubs during editing. Of course, we will go back to the multitrack masters during the final mix.

As a result, when we were going for a take, we rolled two first-generation Dolby SR-encoded 24-track tapes (to save both the generation loss and cost/time/trouble of making protection backups before shipping them); an ADAT to record the off-stage microphones; the Nagra playback master; two DATs (no time code, although I would have used it had it been available); and two cassettes. The cassettes were a crucial part of this equation because they could be given to the bands right after they recorded so that they could know what versions they would be lip-synching to and so that they could make comments on their performances while everything was fresh in their minds.

My master list is now full of notes such as "guitar solo better on take two," when take three might have been the best overall take and was

used for playback. (Uncut ¼-inch time code is a must for gracious living.) Once I get into the fine points of sound editing on a workstation prior to final mixing, I will indeed try out all of their ideas.

We recorded 60Hz/30fps, non-drop-frame time code during the recordings, and would thus be playing back at that same speed during 24 fps film photography. Had we been shooting on videotape, I would have set everything to 59.94/29.97 during both recording and playback. One of the benefits of matching recording and playback speed/frame rate is that had the Nagra or its tape gone down, I could have used the DATs as a backup. (Yes, Virginia, DATs really do play back at speed.) We wouldn't have had code, but the lips would be in sync.

3. Make sure that you have at least 30 seconds pre-roll and post-roll. This is to ensure that on playback you have plenty of time for the camera to photograph the time code slate with playback code either as head or tail "sticks." However, since your code has to be continuous up to downbeat, make sure that your procedures for getting the pre-roll are "musician-friendly." Try to anticipate the whole procedure, and start rolling the multi-tracks and the Nagra first, then start your miscellaneous DATs and cassettes. Try to avoid having the musi-

cians freeze onstage waiting for the pre-roll to end. Remind the groups that the playback nature of these tapes will require their giving a countdown, especially important if a song starts with a vocal.

In the event of a false start of an unusable incomplete take, we would rewind only the expensive multitrack tapes, since the trouble of rewinding the others would be much greater than the money saved. After the recording session, you should edit and leader out the "print" take of each song. You can do this on 7-inch reels, but be aware that a Nagra will come up to speed faster with 3.5-inch reels with large hubs.

It should go without saying that a master log should be kept of all takes, noting reel changes and anything else that might be of use in wading through the morass of material later on.

If wading through this article has proved problematic for you in any way, drop me a line at PO Box 24609, New Orleans LA 70184. ∎

Larry Blake is a sound editor/re-recording mixer who lives in New Orleans because of reasons too numerous to mention, although being able to pass up going to the Jazzfest, knowing that you can go there "anytime" because you live there, would be a good start.

and I'm fired.' So he called me into the hall and said, 'I heard what happened this morning, and you were absolutely right. That guy in there probably won't finish this show, but you will for sure.'

"We were shooting once at night in downtown Vancouver," Young says of another shoot, "and there was a guy sandblasting a building across the street, and he couldn't stop. He had to get the job done that night. So, we're caught. Nobody looked into this. There's always that frantic thing of time versus money when you're shooting. So I try to nip all of those things in the bud."

Young points out that the world is getting noisier. Controlling the noise is a key thing he has to deal with on any shoot. "Basically what you do when you're doing location recording is listening to background," he explains, "and it's sur-

prising, because your brain filters out background. But when you do it year after year like I do, you realize how much higher that level is getting. You have to learn to control the background as much as possible. Vancouver's still pretty good—if someone's mowing their lawn you can go over and politely say, 'Can you hold off a half hour?' and people always stop. Whereas in L.A., it's like, 'Give me a couple of hundred bucks and I'll stop.' We haven't run into that yet. But it'll happen."

Young bought his first reel-to-reel tape recorder at age 13. After a stint in film school, he worked briefly in post-production, then got a job with the Canadian Broadcasting Corporation, recording on location for the news feature W-5. After about 60 episodes of traveling to locations all over the country, Young experienced burnout and decided to pack it in and move to Vancouver, B.C.

There, he worked as a boom operator for 15 or 16 shows until securing his place as a sound mixer in a city that has become one of the top shooting locations in North America. Young's feature film credits are impressive, including *Rambo: First Blood Part II, Roxanne, Look Who's Talking Now, White Fang Part II* and *Unforgiven*, for which he was nominated for an Academy Award for best achievement in sound.

At the time of this writing, Young was working on *Hideaway*, a psychological horror film directed by Brett Leonard (*Lawnmower Man*) and starring Jeff Goldblum and Christine Lahti. *Mix* caught up with him on a Vancouver location to discuss sound, movies and his dedication to his craft.

Part of the job of being a good sound mixer, Young says, is making sure that you get enough usable sound to make the post-production crew's job easier and save money in the process. On *The Fly II*, Young kept in contact with sound designer Leslie Shatz. "A lot of *Fly II* was shot on one big stage," he says, "which was the telepod room. I got as many stereo effects as I could by using the actual props in the room, like the elevator on the set, a lot of computer sounds and many other things. Shatz used all of the stereo effects we gave him, but he created a lot of stuff—he's an extremely talented guy. He created a wonderful ambience for the room that just wasn't there—like he mixed machine noises with a very subtle human scream slowed down in the background for a really eerie effect. So it worked out really well, but only because we communicated. I wish every show was like that.

"I always think of those guys because I worked in post-production," he adds, "and I worked on a lot of low-budget things where the location recordist is not very experienced and you end up working until four in the morning to piece together what they've done. The way I work now is, if there's any kind of a problem during a take, I ask the director if we can do three or four wild takes right after, while the actor's hot and you've got the print. That's one of the methods [Shatz] uses as well, and he used those takes as opposed to looping the actors later on. You still have the background there, the ambience, you

don't have to build anything. We saved a lot of post-production time, and it sounds better. It's not six months or a year later when the actor's played two other parts and you have to build that background again.

"Sometimes you get inexperienced ADs who don't understand the value of getting that wild line or getting that quick effect, which only takes a minute or two minutes of production time," Young continues. "Or an ambience track. I'll say give me 20 seconds of ambience, and they'll say they're too busy to do it. They'll argue with me for two minutes—I could have done 10 tracks by the time the discussion's over. That kind of thing. You're always running into new people who don't understand the importance of post-production."

Of all his varied production experience, Young says that working on *Unforgiven* was his best experience, mainly because director Clint Eastwood had faith in him, going so far as to refuse a set of headphones and saying, "I don't need those, you're listening." But the set was not without its difficulties. "Wind was the biggest problem we had on *Unforgiven*, a really bad problem," Young says. "A couple of times they did sunset shots of them riding off into the distance, pretty shots, and we'd be wrapped. So we'd drive off to a really quiet location and do stereo wind tracks. I wish I had kept copies of them. It really saved a lot of post-production because there's always wind blowing in the movie. What you hear a lot of times in that film is not added, it's real. That scene near the beginning when they're in that cabin, I thought they were going to loop it because the wind was just howling outside. But it worked with the movie.

"Of course, when you're doing dialog, you want it to be as quiet as possible," Young details. "I remember we had this stagecoach-type thing in one scene. We had to tape down the reins and everything that rattled with black tape, which took a good half-hour of taping to get rid of that noise and taping everybody's spurs. You can add all of that stuff later, but it's very hard to get rid of it if it's there. I often work very closely with the costume people and the prop people. Experienced costume and prop people can save us so

much stress. And that's the thing about film—it's really a cooperative venture. You can't go around saying, 'I'm just doing sound and that's all that's important, and I need to do this and do that.' It's a real give and take. It's a compromise."

Besides working extensively in Vancouver's booming production scene, Young has taken time to give lectures at local universities and film schools, offering advice and lessons to rookie sound mixers.

"Don't leave any holes," he says. "If there's a problem with the dialog, and you can do it with a wild line, fight for it. There's an old expression, 'Love me in shooting and hate me in post, or hate me in shooting and love me in post.' And I've often gotten feedback from directors after I've raised a bit of shit, saying, 'Hey I'm glad you did that; it really saved it.' It's easier in a way with features because the director sees it all the way through. For a lot of TV, these people are just hired guns—they're in for a week, they direct an episode and they move on—and they don't really care. They're making so much a week, and they spend most of the week talking about the next project they're doing.

"Also, take time to make sure the ambience is covered," he cautions. "Sometimes it is very difficult to build tracks later without a good ambient track." Finally, Young stresses the importance of set protocol. "I always tell new people that the director is always right, even when he's wrong. That's something that's hard to accept, but that's the way it is. Almost all of the problems in our business come down to a lack of communication, in one way or another. You've got all these people thrown together trying to work together, and you get some that don't really care.

"When somebody's looking at something in post-production they don't know what went on that day on the set. Sometimes something horrendous will happen during a take and I'll ask for another one. I just keep at the director, and he'll make a big deal about the fact that this take is for sound. I don't care; we got it done. I know that somewhere down the road it will all pay off." ∎

Tim Moshansky is a freelance writer and musician based in Vancouver, British Columbia, who got his first tape recorder at age 12.

MTV promos and that network's *Liquid Television*; for AT&T, Reebok and Pepsi spots; and for fast-paced editorial cinematic sequences like the assassination scene in Oliver Stone's *JFK*, is redolent of the technique.

However, these are not a couple of guys who wear their baseball caps backward just because they saw it in a Spike Lee movie. No, you gotta *pay* 'em to do that. Because tomandandy, while they like fast cuts, also know that it's what the industry wants at the moment. Once the fashion changes, as it's already doing, they're ready to adjust.

Their background should help. Milburn, from Texas, and Hajdu, a Canadian, are graduates of Princeton University's computer music program, where they met in 1985. Both stayed for four years of post-graduate work there, even as they cold-called their way onto the MTV audio logo rotation. Andy Milburn is quite urbane-sounding on the phone, as befits a Princeton grad. He is speaking from the duo's newly minted project studio in Los Angeles, which was created to accommodate their burgeoning film clientele and to complement their SoHo-based studio in Manhattan, where they work on MTV, commercials and an assortment of other audio projects.

"There's no question, the technology came first," says Milburn of the group's genesis and their methodology. "But we got into shorter music pieces mainly because of the constraints of the technology," referring to the NeXT computer platform that they worked on at Princeton, for which they wrote their own software. "We started making shorter pieces—five and ten seconds in length—at school. But they didn't sit well with the traditional concepts of music. It was weird to have a five-second piece sandwiched between two 25-minute oboe concertos."

But a reel of those pieces did get them onto MTV in 1985; not a lot of money initially, but a lot of experience and a credit they rode to higher-profile gigs. This in an advertising and artistic environment that was embracing the MTV vision of fast, fast, fast editing. "Our nonlinear music comes from the world we were living in," Milburn says. "Cable was just starting to happen, we were just learning to channel-surf. And

MTV is, in a way, the best of all places to do [commercial] music: It has big budgets, lots of people watching and [the music] is anonymous. I like the anonymity of commercial music. It's an intrusion into life. It's insidious."

In that sense, he acknowledges, the methodology was inevitable. Western music has been getting shorter all the time—while there is a strain of miniatures that runs throughout the history, pieces measured in three- and four-minute spans didn't become common and popular until the 20th century. Which is just as well, since it would be hell getting the Brandenburg Concertos by plunking a quarter in a jukebox.

But that's the point: Consumers want more for their money, and they want it in smaller, more digestible packages, the perfect recipe for MTV. But the advertising agencies that are fueling this trend want the same thing, and Milburn and Hajdu are already starting to feel the pinch, as the large-scale budgets that helped them get off the ground begin to shrink.

"As advertising campaigns become more highly targeted, it's inevitable that the budgets will get smaller, and there'll be more work for less money," Milburn explains. But, he adds, the technology base has, in a sense, anticipated that. tomandandy are working off the epitome of that platform, and always have. The NeXT computers have given way to Macs, using Opcode StudioVision, and multitrack storage is on relatively affordable Roland DM-80 hard drive systems, which have internal SMPTE lockup. They sync MIDI with the Opcode Studio 5. They work through an old but very serviceable Amek Angela and a pair of Mackie 32 mixers, one on each coast. Sufficient, as Milburn says, for "visual creatures in a visual world, where audio gets a lot of lip service but is still considered last in the food chain."

While tomandandy have been moving toward longer pieces, like the trance-ish dance tracks they used in last year's Lexus spots, fast-cut music is still very much in demand. Their approach involves a series of cuts and recuts against picture. "Often, we don't just strive to make the audio work with an initial cut," Milburn says. "It might come from

New Products For Film/Video Sound

SHURE FP32A MIXER

Shure (Evanston, IL) released the FP32A, an updated version of its popular FP32 portable stereo mixer, with more than 40 new features and improvements. The new 3.5-pound model offers a 1kHz tone oscillator; peak limiting on the main outputs; a choice of 48V, 12V or 12V T (A-B) phantom power; two VU meters; and "soft touch" knobs with raised position indicators. The headphone output can be set to monitor stereo, summed (L+R) mono, or the right or left output channels, and a -30dB reduction in noise (over the original FP32) makes the unit suitable for digital recording formats.

Circle #190 on Reader Service Card

NVISION DIGITAL AUDIO TOOL BOX

NVision (Nevada City, CA) offers the "Digital Audio Tool Box," a set of three modules that form an easy-to-use system for solving common interface, conversion and sync problems at video and audio post facilities. The NV1050 4-channel sample rate converter accepts any AES/EBU signal from 32 to 50 kHz; the NV1060 provides up to 20 video fields (330 ms) of audio delay on two AES-format signals; and the NV1055 mix-minus/routing module allows four channels of AES I/O to be intermixed and phase-inverted. A remote controller for the NV1055 is also available.

Circle #191 on Reader Service Card

FOSTEX D-30 DAT

New from Fostex (Norwalk, CA) is the D-30, a new-generation, four-head/four-motor studio DAT machine with an internal SMPTE time code generator, high-speed time code reader, onboard chase-lock synchronizer, and two RS-422 ports with Sony 9-pin protocol and BVU-950 emulation. Among the D-30's other features are pull-up/down facilities for film/video resync, 16MB RAM buffer for instant start and insert editing, jog/shuttle/scrub wheel, in-rack access to tape heads and pathway, auto-punch mode with rehearse function, analog and digital I/O, 44.1/48kHz recording, emphasis switching, and a large (4x5-inch) backlit active matrix display of operating status. Retail is $10,995.

Circle #192 on Reader Service Card

RANE AVA 22 DELAY

Rane (Mukilteo, WA) unveiled the AVA 22, a 2-channel audio delay line designed for matching audio to delayed pictures caused by satellite up-links, or video processing. The single-rackspace AVA 22 has two balanced analog XLR inputs and outputs, and the amount of delay is adjusted and displayed on a bright front-panel readout, for a maximum of 9.5 frames (NTSC) or eight frames (PAL/SECAM), in half-frame steps. Alternatively, the unit can be used as a mono in/out device with up to 19 NTSC frames of delay. Other features include a fail-safe bypass relay, a rear-panel lockout switch and front-panel recall of any two delay settings in nonvolatile memory.

Circle #193 on Reader Service Card

DIGICART/TC

360 Systems (Westlake Village, CA) has introduced DigiCart/TC, a stand-alone, nonlinear audio hard disk recorder designed for synching to any SMPTE time code source. DigiCart/TC features chase-lock, transport control, playlist generation, insert editing, P2 VTR emulation, jog/shuttle control, AES/EBU and S/PDIF digital I/O, and synched cue list playback. The unit supports stand-

ard frame rates as well as film sync, pilotone and biphase sync, and VITC and LTC inputs are standard. Recordings are 16-bit stereo digital in linear or Dolby AC-2 data compression. Pricing begins at $5,995 for a unit with two hours of compressed (or 30 minutes linear) audio storage.

Circle #194 on Reader Service Card
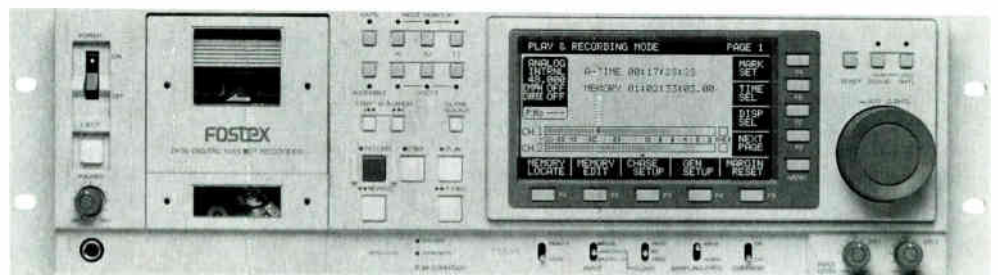
someplace completely different than what a director had in mind. And when you try to get audio to follow picture too closely, it tends to bump behind it somewhat and it gets very noticeable, especially when you're cutting to very fast edits. The audio isn't ever completely divorced from the visuals, but we do take some liberties as to where the cuts lie."

Their work on the *JFK* assassination sequence—very much indicative of their quick-cut style—came about when a friend and one of the film's several editors, Hank Corwin, put them together with Stone's music supervisor, Bud Carr. "We built most of the music for that scene before we had seen the picture," Milburn explains. "We constructed it kind of abstractly. Bud and Hank then went through what we gave them, and we made modifications to it as they requested. It was less post scoring than using us almost as source music."

The same sort of off-the-cuff approach seemed to work rather well for their European and Asian Nike spots. The advertising agency came to tomandandy with a rough cut of the commercial and some vague notions involving "energy" and other adspeak conceptualizations. "We had been working on some underground-type dance tracks, and we decided to try cross-pollinating them," says Milburn. The result was another set of somewhat abstractly cut tracks that sparked a re-edit of the picture, followed by more musical edits. Nike then brought the whole piece full circle when the company released the commercial's audio tracks as a 12-inch dance single in Europe. The track actually made it to the charts. What does this tell us?

"What this tells us is that the lines are blurring," Milburn observes. "That a lot of the information that people get today, they get from commercials, for better or for worse."

And what does that tell us? Perhaps that there's really not a lot to say in the first place. But to question that is to question the whole point of advertising's existence. There is a lot to miss, however, at warp speeds, and Milburn believes that commercial music may be slowing down to a "lugubrious" pace. That also may be a function of money in the final analysis, for the same reason it's less expensive to make a Yanni record than a Nike commercial: fewer notes, more legato.

But if tomandandy seem ready-made for contemporary commercial stardom, it's not only because of the music, but also because they grew up in a very commercial time. Product placement is commonplace in films and baseball games; commercials and programming content have drawn so heavily from each other that for anyone subjected to an adolescence of it, as these two were, the blurring of lines is understandable. And the plasticity with which Milburn says they can adapt their style to the next wave of commercial trends supports that view. But even if their oeuvre does indeed become more lugubrious, it will never approximate the extended pieces they were exposed to in a liberal arts program at the mother of all liberal arts schools. As Milburn puts it, "The culture of long musical pieces is dead. However meritorious the effort and the heritage, it's useless if no one hears it." ∎

World Radio History

by Philip De Lancie

TAPE &
DISC NEWS

MAJORS MAKE MULTIMEDIA MOVES
The major record label groups continue to signal their interest in music-related interactive multimedia. Based on reports in *Billboard,* several moves formalizing organizational commitment to the new field have been undertaken in recent weeks.

The EMI Records Group, which includes Capitol and Angel Records, has reportedly formed a high-level "emerging technologies team" to initiate and coordinate multimedia activities by its labels. Among the projects currently in the works at EMI are interactive liner notes (available from Angel for a mere $5 per CD-ROM), a Beach Boys retrospective, and a Queensryche CD-ROM slated for simultaneous release with the group's forthcoming CD-Audio album. EMI has also agreed to a strategic alliance with Bell Atlantic under which long-form videos by EMI artists will be available on the latter's Stargazer interactive TV system.

The EMI action is similar to recent activities at MCA, where the position of VP of interactive media has been created to direct the identification and exploitation of multimedia opportunities for MCA's Music Group. Filling the post will be Alex Melnyk, whose job will also include working with MCA's UNI Distribution to get the titles into retail channels. According to *Billboard,* no specific projects have been announced.

Also reported in *Billboard* is the formation of a new division at WEA Corp. to handle manufacturing and distribution of multimedia products generated within the Warner Music Group or by outside publishers. Vice president David Archambault, who heads the new division, expects the pipeline to begin delivering product in late summer or early fall.
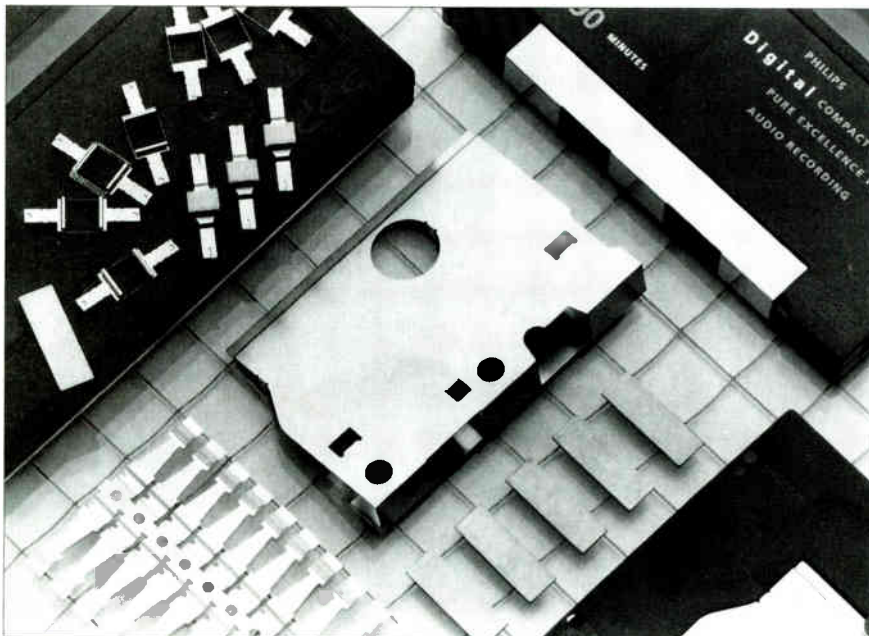
Mecoma offers a new range of precision metal components for the production of DCC cassettes.

Sony Breaks Ground for Disc Manufacturing in Oregon

On May 10, 1994, nearly 200 local dignitaries, state officials, press and top Sony executives gathered under a tent in an open field near Springfield, Ore., to break ground for Sony's first West Coast optical disc-manufacturing facility. Construction began the following week.

Slated for opening in late summer of 1995, the new plant—officially part of the Sony Disc Manufacturing division—will employ 300 people and will come online with an initial capacity of about 3 million discs per month. Manufacturing modules will be configured for rapid changeover of formats, allowing the plant to strategically allocate production capacity among the three formats to be made here—Compact Disc, LaserDisc and MiniDisc—in response to changing demands.

According to Sony officials, increased demand for CD-ROM product heavily influenced both the decision to build a new plant and the choice of the Oregon site. "CD-ROM is our fastest-growing product right now," commented Russ Kunz, director of engineering for Sony Disc Manufacturing. "We have roughly a 50 percent share of the U.S. market now, and we need more capacity, in both replication and mastering, if we want to sustain that growth. Since about 60 percent of the CD-ROM product made at our Indiana facility now goes to the West Coast, it made sense to add that new capacity out here."

Kunz also noted that the Springfield plant will come online with a complete mastering facility on site, making it the first Sony-built facility outside Japan to offer full-service capabilities from the first day of manufacturing operations. As far as new technologies anticipated for the facility, Kunz remarked that "there will be a lot of new equipment, though basic technologies remain the same. We will have new generations of just about everything, including mastering equipment, molding machines and printers." Roughly half of the equipment will be of Sony manufacture (primarily for mastering and inspection), with most of the balance supplied by American firms.

"Some of the Sony equipment coming here is so new that it's still on the drawing boards," elaborated Thomas Costabile, senior vice president of operations for Sony Disc Manufacturing and principal executive for the new facility. "Production will be all straight line, with automated stamping equipment. Cycle times are still confidential, but at DADC [in Terre Haute, Ind.], we are producing the same amount of discs with significantly less equipment, and that trend will continue at Springfield."

Also on hand for the festivities in Springfield were Oregon's governor Barbara Roberts; Michael Shulhof, president and CEO of Sony Corporation of America; James Frische, president of Sony Disc Manufacturing and president and CEO of Digital Audio Disc Corporation; and the mayors of the cities of Springfield and Eugene.

— *Bruce Borgerson*

CD-R MARKET GROWING

Optical and magnetic media manufacturer Verbatim reports that it has increased its CD-Recordable production capacity in response to growing market demand. Jim Riggs, optical product engineer, attributes the growth to a drop in prices for CD recorders to the $3,000 to $3,500 range. Riggs also notes that a new Yamaha recorder that sells for $6,500 and writes at four-times real-time has changed the equation for deciding whether to record or go to a replicator. Riggs believes that recording is now economically viable for up to 300 copies as opposed to 150 copies before. Verbatim offers blank discs with custom-printed labels for businesses and institutions. Full-color offset printing adds an additional 5% to 10% to disc pricing.

UNI REPLICATES IN PINCKNEYVILLE

UNI Distribution is adding three CD replication lines to its prerecorded music manufacturing facility in Pinckneyville, Ill. The lines are currently under installation. The company, which manufactures CDs, cassettes and vinyl for parent MCA and outside clients, expects to have the new CD operations in full swing by the beginning of 1995.

BASF DUPLICATORS GO FOR THE GREEN

Blank tape manufacturer BASF named Sonopress, Nightingale-Conant and Watchtower as winners of its 1994 "Inventor's Award." The companies were honored for their commitment to "green" industrial practices by using the BASF EcoShuttle reusable packaging system at their plants. The EcoShuttle is a reusable/recyclable, polystyrene packaging system for blank audio and video pancakes that is designed to allow empty packaging—including hubs, cores and liners—to be compactly stored and returned to the manufacturer. Use of the packaging considerably reduces waste that would otherwise have to be hauled off to the local landfill.

OTARI REVISES TMD LINE

Otari Corporation (Foster City, Calif.) announced major improvements to its line of video duplication equipment. The model T-700 MkIII TMD duplicator, replacing the MkII, increases running speed to 7 meters per second, yielding potential pro-

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ductivity increases of up to 24%. A new companion mirror master recorder, the R-750, will replace the R-700 model. Otari says the new machine is more compact and less expensive, yet includes many features previously available only as options. The company also has a new video loader, the double-pancake VL-352, which it claims offers the fastest wind time in

Joe Ryan (L), BASF national sales manager for professional audio/video products, presents an "Inventor's Award" to Jim Resing, vice president manufacturing of Nightingale-Conant.

the industry. With a wind speed of 30 meters per second, the VL-352 has a T-120 cycle time of 22 seconds.

TOWER DROPS CD-I FOR CD-ROM
Tower Video, after testing Philips' CD-Interactive for a year at seven of its retail outlets, decided to stop carrying the multimedia format. According to an item in *Billboard*, consumer response to CD-I, a proprietary CD-ROM variant that plays through a TV set, was disappointing, with consumers scared off by the cost of the players (reduced at the end of last year from $700 to $500). Tower has by no means given up on interactive multimedia, however. The report says ten to 15 of the company's video stores will begin stocking 100 CD-ROM titles for computer-hosted (PC and Mac) drives.

ACM MULTIMEDIA CONFERENCE
The Association for Computing Machinery has set the time and place for its 1994 International Conference on Multimedia. The event, targeted toward executives in software and communications, will be held in San Francisco, October 15-20. Call (508) 443-3330 for further information.

SPLICES
The AstralTech Americas plant in Boca Raton, FL, is officially up and running. The $10.5-million facility has a CD replication capacity of 15 million, and will also be duplicating audio and video cassettes by the end of September...**Mecoma**, a subsidiary of Philips, announced the availability of metal components for DCC cassettes. The company, based in Eindhoven, the Netherlands, offers parts including shielding, pressure pads, cleaning units and sliders...A six-drive Koch CDCS 4 CD-quality control system has been installed by **Nimbus Manufacturing** at its plant in Charlottesville, VA...**deVille Integrated** introduced three new CD jewel box handling machines designed to operate in 120 part-per-minute production environments. The machines are a high-speed jewel box unstacker, an automatic jewel box stacking and cartoning machine and a 5,000-CD jewel box buffering machine... Russia's Moscow-based ZeKo Records purchased Europe's first MAX digital duplicating bin from Gauss (Sun Valley, CA), as well as other duplication systems for its expansion into high-speed audio duplication... Hauppauge, New York's **HMG** created a "one-stop" service for independent labels. The "CD Vision" service will offer packaging, graphics, printing, fulfillment, inventory, warehousing and distribution...**Troisi Inc.** (Westford, MA) expanded its Digital Companion line with the introduction of a 20-bit A/D converter. The unit is available as a stand-alone or as a plug-in upgrade to existing 16- and 18-bit models...Recent mastering work at **Barry Diament Audio** (New York City) includes albums by Mercury artist Milo Z, as well as outings from Serious Pilgrim, Jayne Cortez and Rob Church...New York City's **Digital Domain** expanded its Sonic Solutions mastering gear with the addition of a SCSI-based CD-R allowing frame-accurate encoding of track and index points...**CMS Digital** reports that Keiko Mutsui's latest release was mastered at the Pasadena, CA, facility by Robert Vosgien...Michael Urbaniak was at **Trutone** in Hackensack, NJ, mastering his latest with Ray Janos, while Sony Discos artists Oscar D'Leon and Tony Vega mastered with Phil Austin. ■

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but with DMS, we can record multi-channel in both directions. But we don't use one or the other based on technical superiority; we do what it takes to get the job done."

EDnet offers a bridge between DMS, DPS and 3D2 sites called EDlink. This is possible because the Dolby AC-2 and CCS CDQ2000 MU-SICAM codecs offer AES/EBU I/Os. The compressed audio stream is converted back to PCM at one codec and re-encoded by the other. According to EDlink manager of engineering, David L. Haynes, the trick is not the audio transfer per se but its synchronization. "Each of the phone companies always wants to be the master, so we have developed some proprietary technology to handle the clock issues," says Haynes.

THE TANDEM CODING QUESTION
Although EDlink avoids further degradation of the audio stream by eliminating an unnecessary A/D/A pass, it does subject the audio stream to multiple encode/decode passes, otherwise known as "tandem coding." Tandem coding tends to strike fear in the hearts of otherwise rational audio pros because of the way that low-bit-rate, or "lossy," compression algorithms work. One way or another, they all throw away information that the ear theoretically ignores anyway. This process creates quantization noise that is masked by significant high-amplitude audio signals.

Repeated encode and decode stages will increase the quantization noise until at a certain point, the noise punches through the masking threshold and artifacts become audible. How soon this happens depends on the lowest-bit-rate compression stage used in the tandem passes. For example, MPEG-1, layer 2 tests show that a 16-bit, 48kHz source compressed to 384 Kb/sec can sustain approximately 15 codings before noise becomes significant. At half that rate, 192 Kb/sec, the number is only two.

According to Fred Wylie, a technical writer for *Audio Processing Technology*, the secret to minimizing problems in multiple-stage compression chains is to use the highest bit rate possible at each step. "In any chain," Wylie states, "the lowest-bit-rate stage, wherever it is in the chain, will determine where the noise floor is for

the whole chain. Likewise, the lowest bandwidth used at any stage will define the actual audio bandwidth that you can get out of the system.

"For example, if you have an ISDN link at 128 Kb/sec and you want to use APT-X," Wylie adds, "this will give you one single, mono 13kHz circuit. Now, if you follow that by a Dolby STL, which is capable of operating at 256 Kb/sec and 20kHz stereo, you are nevertheless constrained to 13kHz mono because of the stage that preceded it. In general, for high-quality applications 128 Kb/sec per mono channel should be the minimum bit rate for any stage in the audio chain if you're going to apply any more compression subsequently."

THE ALLURE OF TRANSCODING, THE PENALTY OF COMPATIBILITY
Given the problematic nature of tandem coding, some hopes have been placed on the concept of "transcoding," i.e., conversion between compressed digital audio streams in the digital domain. EDnet's Haynes cautions against holding your breath waiting for this one: "Since most lossy coding schemes are similar, based on sub-band or transform coding schemes," he says, "there's really no reason why you can't do transcoding. But nobody is doing it because a product that has that capability would be bought only by a handful of people. It's not a technical issue, it's a product issue. Another hurdle is that I have yet to see a codec that has an I/O in the compressed domain. So for starters, we would need to agree upon a standard for a compressed I/O."

With the goal of achieving compatibility at least within the MPEG family, the MPEG-2 audio committee was chartered to deliver a multichannel surround standard that would not only decode stereo MPEG-1 streams but play back acceptably on existing stereo MPEG-1 decoders as well—forward and backward compatibility, in effect. While this was, and is, a laudable goal, the reality, according to Dolby vice president of engineering Steve Forshay, is that "compatibility has a bit-rate overhead associated with it. So you either accept lower quality for a given bit rate, or you have to go to a higher bit rate to achieve the same quality."

In the end, compatibility was what sunk MPEG-2 in the HDTV tests: Dolby AC-3 sounded better for a given

bit rate. Subsequently, in listening tests sponsored by the MPEG-2 committee, both noncompatible coders submitted (AC-3 and AT&T MPAC) performed better than any of the compatible choices. MPEG agreed, at a meeting held last March in Paris, to standardize a noncompatible codec as an addendum to the MPEG-2 standard and has invited submissions (both Dolby and AT&T are participating). So, in the future, we will no doubt have to carefully specify MPEG-2 BC (backward compatible) or MPEG-2 NBC when discussing multichannel compression algorithms.

THE PROMISE OF LOSSLESS
Though compression is becoming a fixture in professional recording studios as the enabling technology for wide-area networks, so far it has made a limited impact in the other area where bandwidth is always at a premium: storage. Most manufacturers remain skeptical about the professional public's willingness to accept compression, but Studer Editech, which last year introduced a 4:1 AC-2 compression option called Plug 'n' Play, reports that about 50% of Dyaxis II systems are presently configured with the option. And the company expects the number to increase to around 75% by next year.

Still, the advent of true lossless algorithms may at last change the tide of opinion. Unlike lossy sub-band or transform schemes, lossless algorithms do not throw away information, instead removing signal redundancies. Lossless coders have another advantage over the lossy kind: They tend to be less complex and therefore require less DSP horsepower to operate. They also tend to produce less coding delay between the input and output stages, because they need to process fewer samples at a time than their lossy counterparts.

Now for the bad news: A lossless algorithm typically produces compression ratios between 1.5:1 and 3.5:1, with the savings totally dependent on the content of the program material. Relatively predictable sources (Pachibel's "Canon," for example) will produce high compression results; in the worst case, you will get little or no compression. Since the bit-rate reduction attainable with lossless compression continuously changes with the complexity of the program material, it is unsuited for current wide-area networking.

THE COMPETITION
FOR YOUR HARD DISK

Two algorithms are vying for the af-
fections of the pro audio community:
Great Valley Products/Merging Tech-
nologies' H.E.A.R. and Aware's Multi-
Rate. H.E.A.R employs a technique
known as "polynomial predictive
analysis," which looks at the first few
samples in a bitstream and makes a
prediction as to what the next sam-
ple will be. The actual value is then
compared to the predicted value,
and the error, if any, is recorded.

Presuming that the prediction is
on target, the number of bits needed
to represent the error is much small-
er than what would be needed to
represent the corresponding sample.
(In certain cases where the predic-
tion is wide of the mark, the error
may require more bits for represen-
tation, but such occurrences are rel-
atively few and far between.) What
gets transferred from the encoder is
a formula describing the predicted
waveform and a table containing the
prediction errors. The decoder, in
turn, adds or subtracts the errors to
or from the predicted values, and
what comes out is a bit-for-bit repli-
ca of the original.

H.E.A.R. combines computational
efficiency—it currently achieves four
channels on a single DSP (MPEG-1
layer 2 typically requires one DSP
per channel)—with a coding delay
of 22 ms at 44.1 kHz. On tests per-
formed by its developers on the EBU
SQAM test CD, which contains a
wide variety of program material, the
algorithm achieved an average com-
pression ratio of 2.7:1.

The Aware MultiRate algorithm uses
a perfect reconstruction filterbank that,
like MPEG Layer 2, divides the signal
into 32 bands, but at about 50% the
computational complexity. Aware
Multimedia Products vice president
John Stautner explains how it works:
"Each channel of the filterbank se-
lects the energy over a region of the
spectrum and rejects out-of-band en-
ergy," Stautner says. "For each block
of analyzed audio, the output levels
for each channel are related to the
amount of energy present in the cor-
responding frequency range. The
peak output level for each channel
determines how many bits per sam-
ple need to be used to represent the
output samples."

The hallmark of the Aware ap-
proach is scalable output, meaning
that playback can be achieved on a

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wide variety of CPUs by varying frequency response. Thus, for example, a single file that can play back losslessly at 16-bit, 44kHz stereo on a DSP-accelerated machine can also play at 8-bit, 11kHz on a stock 386-class CPU. The MultiRate algorithm can also be used in a near-lossless mode, which may alter the least significant bit of the audio while achieving compression ratios in the 2.25:1 to 4:1 range.

Studer Editech, not surprisingly, is the first to jump on the lossless bandwagon and is developing a parallel implementation of the H.E.A.R. algorithm. According to director of engineering Al Wegener, lossless compression will work similarly to the Dyaxis II's current AC-2 implementation: The user selects lossless compression during recording, but the compressed audio is always decoded as it streams off the hard disk, allowing for full editability. "If you try to edit compressed audio," Wegener explains, "you are limited to whatever the compressed block size is. What we do is uncompress the entire block and throw away whatever samples we don't need. If I want to get to sample number 500 halfway into a compressed block, I send a command to uncompress all 1,000 samples; the processor throws away the first 499 samples it sees and begins to process sample number 500."

Other manufacturers are adopting a wait-and-see approach. For example, Digidesign chief technologist Evan Brooks, comments, "I don't think 2-to-1 compression is going to excite people enough. We're in an era where every year disk drives double in capacity and come down 30 percent in price, and every time that happens, the arguments for compression diminish." Great Valley Products' director of sales and marketing for audio/video workstations, Ron Franklin, rebuts, "Where compression really comes into its own is MO drives. People want the concept of removability but don't want to pay the penalty in terms of slower drive speeds and lower capacities. Two-to-one lossless compression puts MO performance on a par with many hard drives."

THE FUTURE OF COMPRESSION
Apart from storage, compression algorithms are finding their way into the studio in the guise of multimedia

authoring tools. Digidesign has long offered an ADPCM storage option in its Sound Designer software for CD-I, and Sonic Solutions' new Sonic Cinema system offers both MPEG-1 audio and video compression for mastering White Book standard CD-Video discs.

Meanwhile, two major compression battles are looming in the consumer market: the U.S. DAB standard and the TV-set-top standard for delivery of digital video on-demand. Both are up for grabs; MPEG-I, Layer 2 and AT&T PAC have each been incorporated into rival DAB systems, while on the TV set top, General Instruments has committed to the AC-3 DigiCipher II system, scheduled for roll-out this fall. Competing systems are evaluating MPEG-2.

With the prospect of billion-dollar markets driving continuing refinements in the state of the art, the goal of worldwide compression standardization remains elusive. After all, even the MPEG-1 standard was intentionally left open to interpretation on the encoder side, with the only requirement being that an encoder output a standard MPEG stream that is compatible with all decoders built to the MPEG standard.

According to Larry Hinderks, president of CCS Audio Products, a preeminent manufacturer of MUSICAM codecs, this was done deliberately to encourage innovation and improvement. "As far as algorithms go, the real money is in digital audio broadcasting," Hinderks explains. "You'll have a few transmitters and hundreds of millions of receivers worldwide: Thirty million receivers a year is the worldwide forecast. So you want the decoders to be stable, but you want to encourage innovation on the transmission side."

Nevertheless, some argue that current compression techniques may be reaching a plateau. AT&T technical staff member Jim Johnston contends, "We will need a new understanding of filter banks and psychoacoustics to make the next leap. But where we went from 16 bits to 1.6 bits in the first step, it will take just as long to get another factor of two."

Already, MPEG has convened an MPEG-4 committee to look at breakthrough compression techniques beyond current DSP or sample-coding approaches for transmitting audio and video at very low bit rates (10 to 40 Kb/sec). According to Dr. Cliff

Reader, MPEG-4 subgroup chairman and senior strategic marketing specialist with Samsung, such techniques might be object- or semantic-based.

"As an example, you might imagine a voice-recognition system at the encoder that would recognize what was being said and transmit it as ASCII text," Reader says. "Simultaneously, it would perform an analysis of the speaker's voice so you could transmit [the voice's] attributes. Then the decoder could reconstruct the speech based upon the model and the text. As far as I know, no such sophisticated approach exists.

"Given the audience that you have," Reader adds, "we would be very grateful if you made it clear that we very much want to invite advanced researchers in audio and speech-coding activity to participate."

Hey! You over there complaining! Don't like the current state of the art? Here's your chance to do something about it! ∎

Ted Pine stands up well to multiple compression passes but has been known to repeatedly punch through his own noise floor.

tion/commentary using internal audio while music plays from the CD.

HYPERCARD'S FUTURE
While HyperCard and its XCMDs offer a lot of interesting possibilities for integrating and manipulating audio, the very "English-ness" that makes HyperTalk easier to use than most programming languages also makes it substantially slower in execution. HyperCard also does not have native support for color text and graphics—a must in today's multimedia—though color may be added with XCMDs. And it does not currently support cross-platform compatibility, meaning that programs authored in HyperCard will run only on Macs—a big problem for developers who need to sell to both the Mac and Windows platforms to survive.

Because of these and other shortcomings it is evident that HyperCard, though it was used to develop many of the first consumer CD-ROM titles, is not currently aimed at the high-end of the development community. Still, the accessibility of the HyperTalk scripting language makes it a useful prototyping tool for non-programmers, while text-handling/searching capa-

bilities that exceed those of most other off-the-shelf authoring tools are welcome for heavily text-oriented titles such as Voyager's Expanded Books series ("annotated" with music, movies, etc.). Thus it was hoped that Version 2.2, introduced in January, would resolve some of the limitations that had frustrated developers over the years.

Version 2.2 did include several important advances, including the ability to convert a stack into a standalone application (as opposed to a HyperCard document) distributable without paying licensing fees to Apple. A second scripting language, AppleScript, is also included, easing the use of HyperCard to control other AppleScript enabled applications. And yes, there is a built-in colorizing tool, but it does not work fast enough to use on objects that are hidden or shown in response to user actions.

Apple is aware that Version 2.2 did not address all of the program's shortcomings. Engineering manager Clark Warner explains that the company did the most it could within the time allotted after retrieving the product from software subsidiary Claris. Warner says he is not allowed to forecast specific plans, but that Apple is committed to serving its HyperCard customer base, and that the three most commonly expressed needs he hears involve color, speed and cross-platform compatibility. Apple is currently in discussion with Kaleida regarding the use of ScriptX to bring that compatibility to HyperCard.

There are third-party workarounds for some HyperCard weaknesses, including CompileIt! from Heizer software, which converts some HyperTalk scripts into XCMDs for faster execution. Heizer is also working on InColor, an improved colorizing tool with better performance and additional options, including textures, that should ship this summer. But to truly revitalize interest in HyperCard as a serious authoring tool, Apple will have to integrate all the necessary features into a cohesive, powerful whole in Version 3.0.

Meanwhile, in part two, we'll look at the audio handling capabilities of some of HyperCard's competitors. The programs are slicker and billed as being more powerful, but do they allow you to explore the same audio possibilities, or do they limit your options? Stay tuned... ∎

Philip De Lancie is a mastering engineer at Fantasy Studios in Berkeley, Calif.

COAS To

L.A. GRAPEVINE

by Maureen Droney

One on One Studios, situated in the artsy NOHO section of North Hollywood, has undergone some changes in the past year. New ownership has brought with it a studio bau:ton-redesigned Control Room A and a new 80-input SSL 4000 G. The room now boasts two Sony 3348 machines, along with two Studer A800s and a wide selection of outboard gear, including vintage Neve mic pre's.

One on One was among the first studios to offer a large number of Neve mod-

Ken Scott and Colleen Reynolds listen to a Duran Duran playback at El Dorado Studios in Hollywood.

SESSIONS & STUDIO NEWS

by Jeff Forlenza

SOUTHEAST

Latest in the growing list of tribute albums is a tribute to songwriter Doc Pomus. New Orleans' Ultrasonic Studios had '60s pop icon Dion in the studio recording "Turn Me Loose" and golden-throated yodeller Aaron Neville tracking "Save the Last Dance for Me." Producer Joel Dorn super-

Atlantic recording artists Testament were at Studio D Recording (Sausalito, CA) working on their latest release with producer GGGarth and engineer Kill Bennedy. (L to R) Bennedy, studio owner Dan Godfrey, Chuck Billy, GGGarth, Eric Peterson and Paul DeCali.

vised the Pomus-tribute sessions, and Ultrasonic engineer David Farrell manned the console...Stephanie Mills, who recently signed with Gospocentric Records, was at Reflection Sound Studios (Charlotte, NC) with producer Donald Lawrence recording a gospel album for the L.A.-based label. Mills began production in Reflection's Studio B, a MIDI-production room, with engineers Dave Harris and Mike Lawler, and then sequenced tracks were transferred via tielines to one of Re-

flection's Sony APR-24 analog recorders by Tracey Shroeder. Acoustic overdubs and mixing were handled by Mark Williams from a Sony MXP-3036 console...

NORTHEAST

Jazz guitarist Zachary Breaux was at Riversound Studios (Manhattan) tracking his latest release for NYC Records, *Laid Back*, with NYC president/jazz vibraphonist Mike Manieri and engineer Elliott Scheiner. Guest musicians on the jazz sessions included Toots Thielemans on harmonica and Will Calhoun on drums...Straight from Ireland, The Chieftains were at Clinton Recording (New York City) recording their latest album with help from guest vo-

COAST

At Brielle Music in New York City, producer Jerry Harrison (seated) was mixing Black 47 for SBK Records. From left: digital editor Doug McKeon, lead vocalist Larry Kirwan, chief engineer Jay Mark and assistant Randy Whiteman.

calist Sinead O'Conner and guitarist Ry Cooder. In Clinton's Studio A, bandleader Paddy Moloney produced the Celtic sessions with engineer Jeffrey Lesser…Hot alternative engineer/producer John Agnello was at Manhattan's Sear Sound engineering J. Mascis and Dinosaur Jr. doing string overdubs for their latest release…

SOUTHERN CALIFORNIA

Sound City in Van Nuys, which is celebrating its 25th anniversary, was taken over recently by Rick Rubin as he produced a variety of sessions for his American Records label: In Studio A, Rubin produced Tom Petty with engineer Jim Scott and assistant Jeff Sheehan; in Studio B, Rubin produced Danzig with engineer Jim Champagne and assistant Billy Bowers; and he produced Slayer with engineer Jim Scott…Blues innovator Otis Rush recorded and mixed his latest CD for Mercury, *Ain't Enough Comin' In*, with producer John Porter, engineer Joe McGrath and assistant Rich Veltrop at Burbank's Red Zone Studios. Guest musicians on the sessions included Little Feat keyboardist Bill Payne…At Image Recording in Hollywood, Chris Lord-Alge produced and mixed the new Joe Cocker album. Bonnie Raitt added her guitar and voice to the

tune "Strongest Weakness" from the album due out on Epic Records. Roger Davis was the executive producer, and Ben Wallach assisted on the sessions…

SOUTHWEST

Bluesmaster Buddy Guy was at Arlyn Studios in Austin, TX, working with producer/engineer Eddie Kramer on a project for Silvertone Records. Guest musicians for the sessions included Chris Layton and Tommy Shannon

PHOTO: RUDY ARIAS

NASHVILLE SKYLINE

by Dan Daley

Scene Three opened Nashville's first all-digital film/television audio suite in March. Scene Three Audio, which will be headed by newly named president of audio Nick Palladino, is based around a 32-channel AMS Logic 3 console and will feature Dolby Surround sound, an AMS AudioFile and other digital editing and processing systems. "Nothing here ever leaves the digital world," Palladino said. "Nashville's popularity as a production and post-production location for film and television has been increasing. This move was done to accommodate that."

Sound Stage has a new manager. Michael Koreiba, former manager at Omni, took over from Ron Treat in February. Treat has resumed independent engineering, including dates at Sound Stage. Patrick Kelly took over at Omni, where he had been an assistant engineer for three years (which gave him plenty of time to learn all the owners' names). Koreiba said recent changes at Sound Stage include the addition of Diskmix automation to the Otari 34C console.

Sixteenth Avenue Sound recently upgraded both studios. Studio A picked up four Neve 1073 mic pre's, four API 312 mic pre's, a Teletronix LA-2A compressor, a TC Electronic 2290, ASC Tube Traps in both control rooms and other enhancements. Studio B got a new D&R Avalon console with 34 channels of Optifile Tetra automation and extended moving fader emulation software. A recent session of note was Stevie Wonder working with Take 6 on an upcoming release.

Former country crooner Tommy Overstreet, whose "Heaven Is My Woman's Love" sold 4.5 million records on the Dot label back in 1973, has purchased and refurbished a studio in Springfield, Mo. Inside Tracks Recording will have both Otari MTR-90 MkII 24-track analog and three ADAT systems. Overstreet said the studio's proximity to Branson, which is 36 miles away, would provide a client base. "This is also a good area for bluegrass and gospel, so I think the region can support us even without Branson," Overstreet said. There are currently two com-

A&M recording artist Amy Grant was recently at Nashville's Secret Sound mixing her latest album. From left: engineer Terry Christian, producer Michael Omartian, Grant, assistant Keith Robichaux, engineer Mick Guzauski and Secret Sound owner Chas Sandford.

mercial studios in Branson and two more in the Springfield area.

Reba McEntire's Starstruck Entertainment broke ground earlier this year on a multimillion-dollar, 9,000-square-foot complex of offices and studios on Music Row. The studios will be designed by Neil Grant of Harris, Grant Associates. Studio A will be a major facility, according to Richard Barrow, creative director of Starstruck's publishing company and the project supervisor for the studio construction. The second room will be smaller, with three isolation booths, and it will be dedicated to demos and other ancillary projects but will be tielined to the main room.

As to whether the studio plans to derive revenue from open-hire bookings, Barrow noted that Starstruck has several management clients, including Linda Davis and Aaron Tippin, who would likely use the studios. Completion of the studios is scheduled for sometime in 1995. In addition to breaking ground, the construction process is breaking a few hearts. Pile driving on the two-lot site has been reportedly interfering with sessions at studios along the Row, putting a few extra kick drums on tracks. Sources at the site say they have been asked to speed things up whenever possible.

Music Mill Studios is contemplating a complete studio and control room rebuild sometime this year. "The studio was built ten years ago, and it seems like it might be time to think about that," said chief engineer Todd Culross. The studio now has a third-party-owned Sonic Solutions system available with Culross as operator, and some new outboard equipment has been added, including a TC Electronic 2290.

Palmer Place Studios added a third Tascam DA-88 for a 24-track system in the demo and jingle facility, according to co-owner Ray Methvin. The studio is also in the midst of installing a Mac-based Opcode program to be used as machine control for the decks and editing and librarian functions.

Hey, Nashville! Got upgrades, hot tips, gossip, spare change? Fax Daley at (615) 646-0102. ∎

From left: Rick Blackburn, president of Atlantic/Nashville, talks with Nick Palladino, president of Scene Three Audio, in Scene Three's new all-digital audio suite.

ules in combination with an SSL console and has long been known as a great tracking room. Metallica's legendary *And Justice for All* and *Metallica* records were recorded during long lockouts there.

As a busy artist or producer, you'd probably rather concentrate on chord changes than contracts, right? In the past few years, we've seen a proliferation of record-company-required paperwork along with an increase in recording complications, such as the use of multiple studios, formats and locations.

These complications have led to the rise in importance of the production coordinator. *Mix* spoke with Colleen Reynolds, who runs her own coordination company, at Hollywood's El Dorado Studios, where one of her current projects, Duran Duran, was recording with engineer Ken Scott.

Along with budget development; expense tracking; studio, equipment and musician booking, Reynolds prepares union contracts (a mysterious area to many producers and engineers) for Duran Duran. She says, "Record companies and unions like to get paperwork in a very specific way, and each record company has different requirements. A musician's payments can really bog down and be delayed if things aren't done properly." Reynolds also handles bookings of musicians, cartage, equipment rental and studio time.

An upstart in the Los Angeles engineer/producer management scene is Q Management Group. Formed about a year ago, the company handles a diverse group of clients including veteran Martin Rushent (producer for The Buzzcocks, Human League, and the Go Go's; and engineer for Led Zeppelin, David Bowie, Queen, Depeche Mode and The Clash); newcomer Stoker, who was nominated for a Grammy for his co-production with Sting of *Demolition Man*; and Earle Mankey, who has produced artists from Concrete Blonde to Yoko Ono and The Runaways. The partners in Q are Peter Katsis and Jeffrey Kwatinetz, artist managers for Tuck & Patti and General Public, among others; and John Guarnieri, former North American manager for the UK's China Records and a longtime A&R executive with

stints at Enigma, EMI and IRS Records.

Another upstart company: Mad Dog Studio owners Dusty Wakeman and Michael Dumas have formed a record company with producer Pete Anderson (Dwight Yoakam, Meat Puppets, Michelle Shocked) and Barbara Hein, formerly with Capitol Records and now with Entertainment Management Inc. The label, distributed by Rounder, has been christened Little Dog and is seeing Gavin chart action with its first release, the single "Fit In" from singer/songwriter Anthony Crawford's debut album. Crawford is known for his guitar and vocals on projects by the likes of Neil Young, Steve Winwood and Roseanne Cash.

Mad Dog Studio owners Wakeman and Dumas are engineer/producers in their own right. Wakeman, whose production credits include Lucinda Williams and Jim Lauderdale, has been busy with Pete Anderson's solo LP, also to be released on Little Dog. Dumas, whose engineering credits include Danny Tate, Lucinda Williams and Rosie Flores,

has recently produced albums by Steve Wynn, Giant Sand and Eddie Baytos, and the Nervis Brothers. Included in the Nervis Brothers band are members of New Orleans' legendary Meters: Leo Nocentelli on guitar and Zig Modeliste on drums.

And another one bites the dust: Literally...as Studio 55 on Melrose, the former home of the historic Decca Records Studios, has been demolished to make a new parking lot for Paramount Pictures. Famous as the location where Bing Crosby recorded "White Christmas," the black-tile art deco structure was also the site of classic recordings by Barbra Streisand, the Beach Boys and the Pointer Sisters. Toto recorded their first album there. The space is legendary, and there are those who say that at night, snatches of music can be heard carried on the wind in the parking lot at 5505 Melrose, along with a voice that sounds a lot like Richard Perry's saying: "No, no, no! That's not right! Let me hear the *other* conga track!"

Got L.A. news? Fax me at (310) 472-8223. ∎

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(formerly known as Double Trouble, the rhythm section behind Stevie Ray Vaughan)…Also in the Austin area, Buckwheat Zydeco was at Pedernales Studios (Spicewood, TX) working with producer Steve Berlin and engineer Larry Greenhill on a project for Island Records…

NORTHWEST

At Live Oak Recording (Berkeley, CA), Fox recording artist Simple E was working with producer Dwayne Wiggins (of Toni!Tony!Tone!) and engineer Dale Everingham…Up in Vancouver, B.C., wild rockers Mystery Machine were at Mushroom Studios tracking their second album for Nettwerk Records with producer/engineer Glen Reely and assistant Blair Calibaba…

NORTH CENTRAL

At Chicago Recording Company, indie producer Steve Albini tracked the band Mule in Studio 4, and hot R&B artist R. Kelly remixed the latest Janet Jackson single "Any Time, Any Place" in Studio D…Pachyderm Studio (Cannon Falls, MN) had Restless artists ZuZu's Petals in tracking and mixing their latest release with producer Albhy Galuten, engineer Eric Westfall and assistant Brent Sigmeth…

STUDIO NEWS

The City College of New York (CCNY) recently opened its Sonic Arts Center for students interested in recording and sound production. The facility features four MIDI suites and a large control room. Each MIDI suite has its own DDA DMR12 console and two Tascam DA-88 MDMs, and the control room has a DDA AMR24 56-input board to go along with three DA-88 recorders and RC-848 remote control…San Francisco's Robert Berke Sound recently renovated Studio C. The renovation, handled by San Francisco design firm RLS, is in response to increased work from audio-for-video and other post-production clients. New gear includes a Soundcraft Delta 8 console and Audix HRM-3 reference monitors. ∎

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cally increased shortly after the L.A. earthquake in January. "Within a week, the phones began ringing off the hook," Dunn said. "I can't say if these were projects that started in L.A. and moved here, but it would seem like too much of a coincidence for there not to be some connection."

The trend has been toward more analog for Bill Tesar of Toy Specialists, who said he's seen a dramatic increase in the amount of Dolby SR rentals in conjunction with analog machines. Tangential to that are more rentals of analog EQs, compressors and tube microphones, with Avalon EQs being particularly hot. "On the other hand, the MIDI rental business is rather stable," he added.

That could indicate more rock projects in town, which would be consistent with an L.A. exodus. However, there's no shortage of demand for certain types of digital gear, such as ADATs, DA-88s and Mackie 8-bus boards, as well as 48-track digital machines—an indication that the surge is broad, ranging from large studios to project studios. As Dunn noted, "We've had a big chunk of new business that's had nothing to do with studios," adding that many of his high-end rentals are now going to film work in town, and MDMs are heading to extended projects in personal studios.

The increased demand for high-end analog equipment might also represent more than just expanded rock projects. According to Rob Cavicchio, CEO of Soundtrack, more rap acts are beginning to demand higher-quality analog gear for recordings that once were purely low- to mid-end digital.

Frankford Wayne Mastering has completed its move and redesign. Ousted from the Ed Sullivan Theatre when David Letterman's show moved from NBC to CBS, the mastering house consolidated its equipment into three all-digital suites, with a fourth in the planning stages. The old facility had five rooms. According to chief engineer Greg Vaughn, who designed the new suites with owner Tom Steele, a Turtle Beach hard disk editing system was added, and a CD-ROM authoring system is under consideration. The mastering facility continues to occupy a unique niche in New York, specializing mainly in U/C projects, rounded out with some rock mastering jobs.

Fax NY Metro News to Daley at (212) 685-4783. ∎

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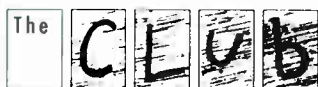
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World Radio History

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specifically, other people's realities. Then photographs came along and offered more convincing, static windows into the realities of others. Until computer alteration came about, people *believed* photographs. If you saw a picture in *National Geographic* of a woman in a far-off jungle with Marie Callender pie plates in her lips, you believed it, even though you were shocked, amazed and amused. Many of us got our first view of human sexuality from photographs—not really even photographs anymore, just mass-produced dots of colored ink on paper, but we knew that they were once photographs. We operated on the educated assumption that for a photograph to exist, somewhere at some time, the photographer was actually standing directly in front of the subject that they captured on film, so it too must have existed, no matter how silly, extreme, shocking or awe-inspiring the image.

The power of the photograph rested in the fact that we all have a basic understanding of the technology involved; we understood that the picture is an image of a once-real event. We believed the awesome first high-res color pictures of our own Earth, even though they were taken from a place that none of us has ever been or ever will be, because we are sophisticated and educated enough to grasp the abstract concept, with the help of the picture as irrefutable proof. And we believe pictures of our own children growing up—pictures that we ourselves took, so we *know* they are real—even though each passing year removes that tiny sample of a past reality from our current one a bit more. Each year, the difference in what we see in the little silver frame and what our minds remember grows a little more. After all, isn't that why we took the picture in the first place: to hold at bay the ravages of time on our poor memories, to freeze an *accurate*, irrefutable image so that we could go back and check on it, compare and waken the memory of being there?

Ah, the simple beauty of a time and technology that we believed in, that we could *trust*.

Then there were tape recorders, 8mm movie cameras: *dynamic* snippets of reality. With movies, records and TV, we began to realize that we

could spend our entire lives learning, experiencing, growing, expanding, as we collected more and more hard, absolute reality, even though it was second-hand.

Then came the damned artists. It didn't take long for them to realize that these very same technologies that brought us accurate realities from far lands and cultures could in fact be *distorted*, altered and modified to bring us realities that have never existed, except in the minds of the distorters themselves, the artists.

From air-brushed bunnies to composite photos showing people in a setting where they have never really been, from film special effects to audio multitrack recording, we slowly lost in believability what we'd gained in creativity. It used to be fun to go to the supermarket and pick up one of those trash tabloids and laugh at the absurd realities portrayed within, to wonder at the horrible little composite "photos," with their matt knife marks and casual mistakes in relative scale or lighting. (Or did you actually believe that Whistling Sea Aliens came down in an elevator and abducted the only two-headed, 400-pound baby in New York who could quote every single address and phone number in the Yellow Pages?)

It used to be full-time work for a division of our government to look at similar composites and try to determine if they were real or not.

How cute, credibility from the limitation of a technology. Well, all that is gone now. I can produce altered photographs myself, with the same computer that I am using to write this column, that neither you nor anyone else could detect. I can produce altered audio on this same computer that could send an innocent man to jail for life. *Anyone* with a little skill and understanding can do this today!

Reality just ain't the same no more. Even Thomas Edison couldn't control his urge to alter reality. His first film (*the* first film), *The Kiss*, shook the world because it was a technical trick that showed reality. In his *second* film which, if my memory is working right, was called *The Barbershop*, he used special effects for artistic shock value; he had the barber remove a living person's head to give its hair a wash in the sink, and then stuck it back on. The victim then happily got up and paid his bill.

The songs of the '60s were great because, like the photos we took, and like old Tom's first film, they captured real images, real performances. They might not have been perfect, but they were *real*. We trusted them—grain, noise, clicks, pops and all.

Today? Well, today, there are still recordings, films and photographs that were done with the intent of accurately capturing corporeal reality, but to be honest, that's not where the money is. The money is in entertainment, illusion and escape: alternate realities. Nobody actually believed the dinosaurs in *Jurassic Park*, but we certainly enjoyed the breakthroughs in high-resolution, (almost) convincingly real images moving before us. As resolution and accuracy of deception increases, so we bite a little harder, we buy in a little more, we begin to almost *believe*. And we are willing to *pay* a little more for the privilege of being fooled a little better. So it comes full circle, the loop is closed: Better illusion produces more revenue, which in turn is poured immediately into new technologies to create even better illusion, to protect market share. What a system!

Nobody believes that modern rock recordings are recorded in one pass, live, unless they are billed as live performances. We have lost that warm, fuzzy, naive, implicit honesty and gained incredible technical ability. New levels of accuracy are available for both truth and illusion. Every contemporary rock recording contains a bit of both: truth and illusion. We know it, and we demand it.

Now we face the next step, and as far as we can perceive today, the final one. We are on the edge of the new level of resolution improvement, and this one will take us over the top. New technological vehicles will dump illusions into us in ways that so totally fool us that we will do what we secretly dream of; we will give up. We will reach that threshold that every serious entertainment company in the world is working night and day to hit: We will succumb to such an organized, correlated, high-resolution multisense assault that our poor, little, basically unchanged caveman bodies and minds will roll over, kick their physical and mental hands and feet in the air like dying cartoon characters and give up. We will believe.

You will live to see this. You will live to experience this. You will live to *be* this. And because this will break down all existing barriers of learning and experiencing, if you have the money, you will live forever.

Remember, it doesn't have to be perfect; it only has to be good enough to work. And given the nature of the human mind, there is a threshold below which we may be impressed and amused, but above which we believe. When this happens, and it will so much sooner than you think, we will find ourselves in a very brave new world, with new definitions of good and bad that will redefine the term "absolute." ∎

Stephen St.Croix wrote and proofread this column through new, surgically altered eyes. He recently went from a lifetime of being legally blind to around 20/25 vision in the span of half an hour, as the result of a doctor sticking a knife into his eyes 16 times. Would you have thought this possible a few years ago?

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