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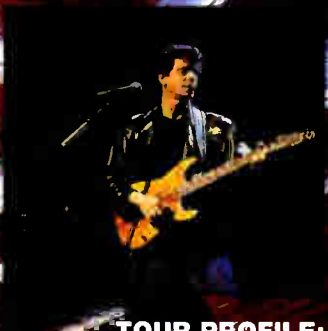
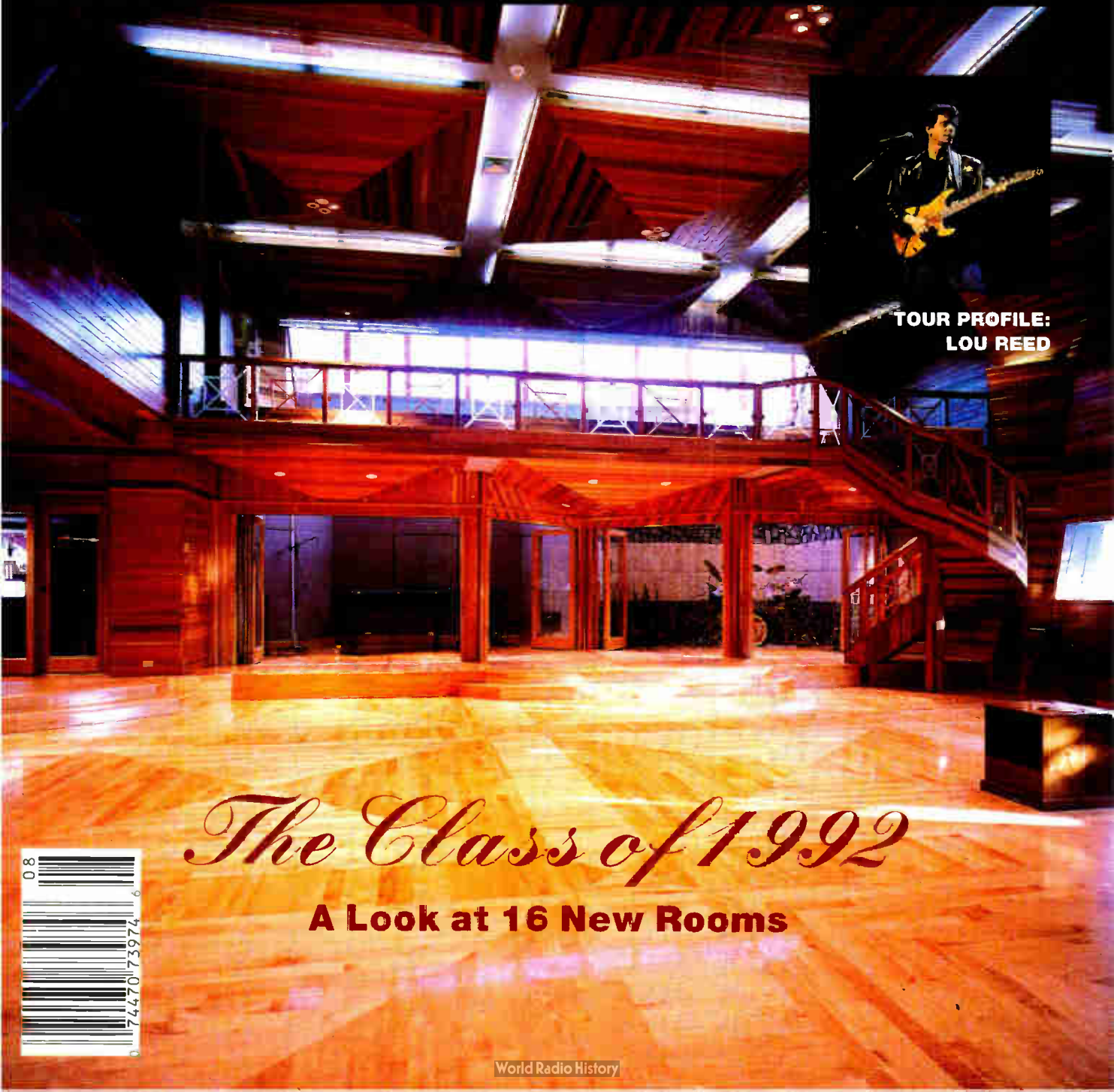
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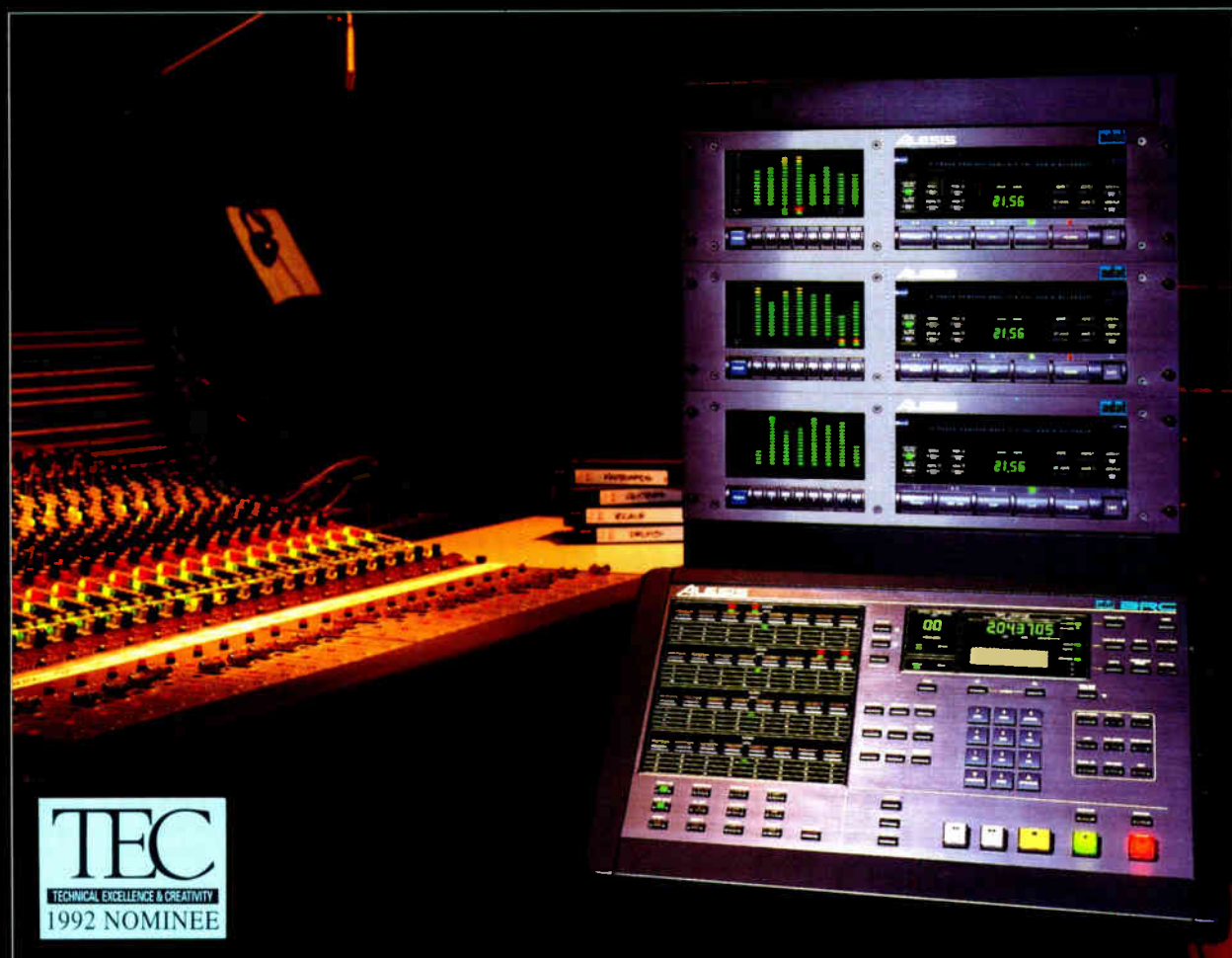
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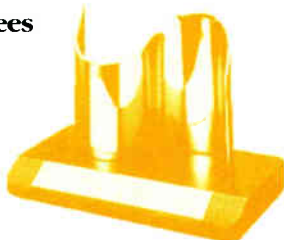


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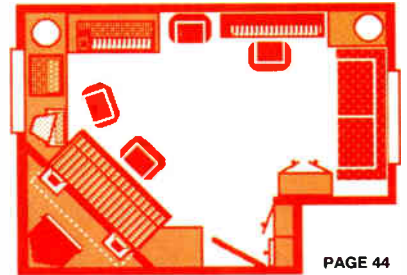
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Cover: Located in the picturesque island country of Trinidad and Tobago is Caribbean Sound Basin, a multimillion-dollar recording complex with two large studios, three MIDI rooms, tape duplication plant, living quarters, pool, tennis courts and more. Designed by Sam Toyoshima and John Flynn of London's Acoustic Design Group, the expansive studio shown here combines glass and wood for a live, natural feel. The control room features a 64-input Solid State Logic G Series console, Mitsubishi 32-track recorder and two Otari analog 24-tracks.
Photo: Mark Lyndersay.





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“At POST EDGE, our clients are our most important asset. We simply wouldn't trust our client's material on any other digital audio system other than Opus.”

JOE MOORE, CHIEF AUDIO ENGINEER, has other accolades: “I immediately felt comfortable with the system. What's particularly impressive is that the Opus Suite has been performing consistently and reliably nearly round-the-clock for the past 6 months.”

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We wanted to list *all* of the features on SOLO consoles but we ran out of space. If you want to find out more about



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FROM THE EDITOR

The studio on our cover this month, Caribbean Sound Basin, represents a rare sight in these troubled economic times: a newly constructed, fully loaded, music recording studio. Designed by Sam Toyoshima and John Flynn of London's Acoustic Design Group, the performance room shown here is not only massive, but its woodwork and appointments are of an intensity and complexity that suggest a religious fervor. The room feels like a shrine to the pan drummers and the calypso rhythms of Trinidad. The owners, committed to building the best recording environment possible, hope that musicians from around the world will rediscover the unique sounds and talent of this tropical island.

Half a world away, just off Italy's Sorrento peninsula, Capri Digital also opened this year in one of nature's most beautiful settings. The studio, a masterpiece of construction and content, is a dream world of its own—a separate reality from the outside world. So much so, in fact, that during a recent windstorm that knocked out all power to the island for several hours, the studio was the one bright spot on Capri, and the recorders kept right on rolling.

Another world away, BOP Studios opened in South Africa's Bophuthatswana homeland, at a reported cost of \$25 million. In an area of cultural contrast and conflict, this has become the world's costliest recording facility.

While these three studios do represent a departure from today's norm of downscaling and cost-cutting, they remind us why each great studio must be a little different from the others. Studios do not conform to the characteristics of franchise businesses, mainly because they are generally conceived from the passionate visions of their owners. They are often made from the same kind of dreams that urge, "If you build it, they will come."

The 15 studios illustrated in the "Class of '92," beginning on page 40, show that studio construction progress continues in *this* country as well, despite the tough times. The continuing challenge for studio owners is to stay on top of the latest technology while staying afloat as a business.

To that end, much of the material in this, our acoustics, design and construction issue, deals with studio-building on a budget. It doesn't always cost a million bucks to look like it, or even sound like it. But a good-sounding room requires great attention to detail and not a penny to be wasted.



Keep reading,

David Schwartz
Editor-in-chief

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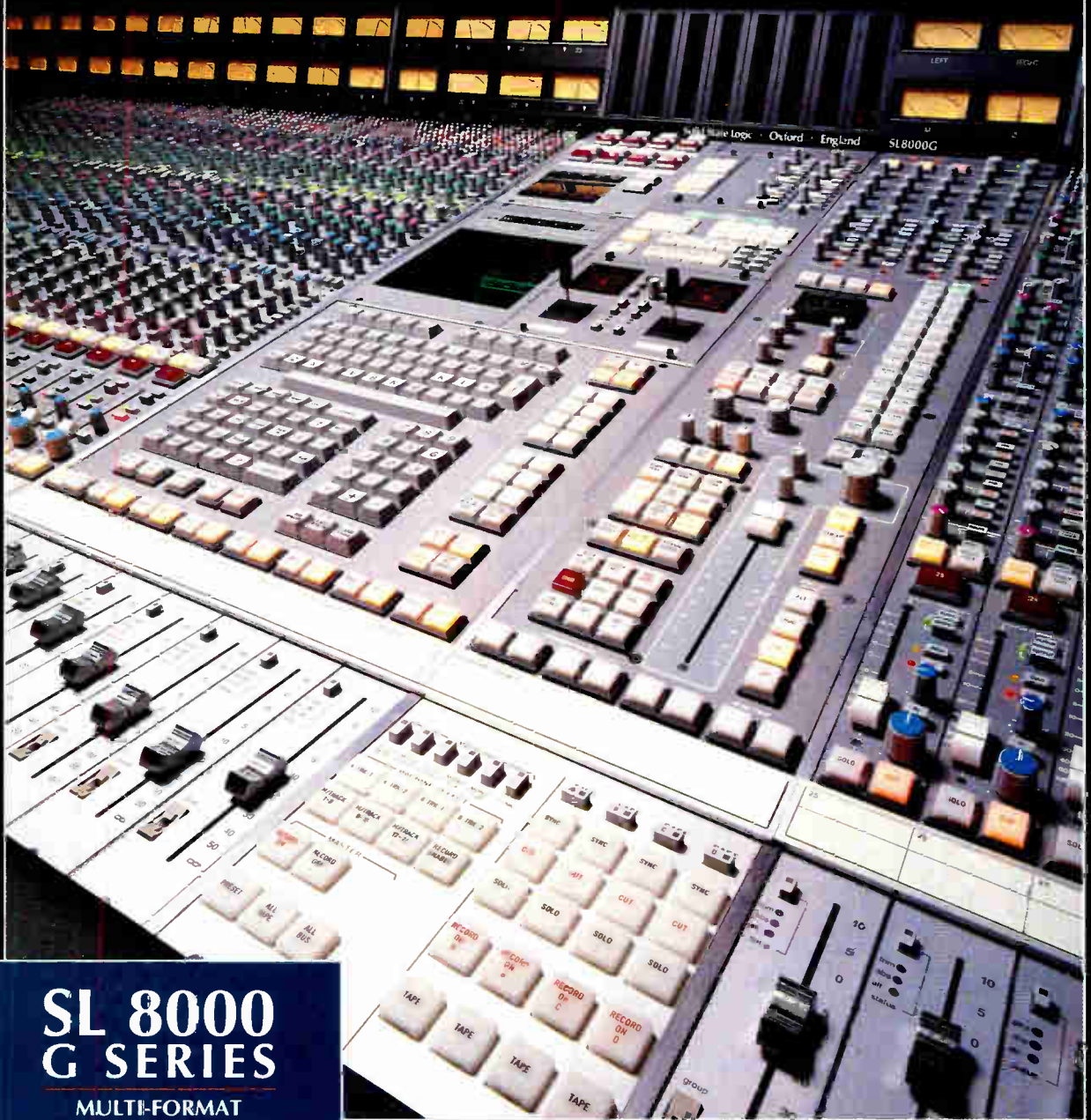
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Business Publications Audit of Circulation since 1985.

Mix magazine is published at 6400 Hollis St. #12, Emeryville, CA 94608 and is ©1992 by Act III Publishing. Mix (ISSN 0164-9957) is published monthly. Subscriptions are available for \$46.00 per year. Single copy price is \$4.95, back issues \$6.00. Mailed issues within the U.S. must be claimed within 45 days of publication date and abroad, within 90 days. Send subscription applications, subscription inquiries and changes of address to Mix magazine, PO Box 41525, Nashville, TN 37204 or call (800) 888-5139. Outside U.S., call (615) 377-3322. POSTMASTER: Send address changes to Mix magazine, PO Box 41525, Nashville, TN 37204. Address all other correspondence to Mix magazine, 6400 Hollis St. #12, Emeryville, CA 94608; (510) 653-3307, Fax: (510) 653-5142. Second class postage paid at Oakland, CA, and additional mailing offices. Editeur Responsable (Belgique), Christian Desmet, Vuurgatstraat 92, 3090 Overse, Belgique. This publication may not be reproduced or quoted in whole or in part by printed or electronic means without written permission of the publishers.

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What noise floor? I don’t hear any noise.

Right!

Hey, this sound’s got everything I need.

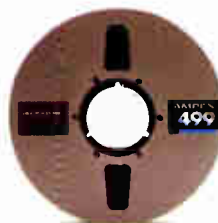
It’s got depth all right. You can hear everything—way back in there.

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CURRENT

APRS '92:

IT WAS 25 YEARS AGO TODAY...

In June, more than 5,000 audio pros packed into London's Olympia 2 Convention Center for APRS '92, the annual exhibition for the UK's Association of Professional Recording Services. With the precarious condition of the world economy, attendees were interested in cost-effective, real-world tools. Guarded optimism.

This year's expo was no ordinary show, as APRS celebrated its 25th birthday with a special exhibit commemorating another audio milestone: the 25th anniversary of the Beatles' *Sgt. Pepper's Lonely Hearts*

duction; other equipment from the period; *Sgt. Pepper* track logs, session notes, handwritten song lyrics and orchestral arrangements; even Ringo's "The Beatles" bass drum head and some of the famous satin coats used on the cover. Fab!

A number of companies reached the 25-year mark in 1992, including fader company Penny & Giles and console manufacturer Calrec. Also in this elite club is Audio+Design, whose analog products such as the Scamp modules, Vocal Stresser, Panscan and Complex limiters have been enormously successful over the years. A+D's ventures into

digital peripherals have fared equally well, and at APRS the company unveiled an under-£3,000 (\$5,500) stand-alone CD recorder and a new Smart-Box that translates DAT IDs to CD-R track IDs.

Besides the A+D unit, two other under-£3,000 CD recorders were displayed, from Marantz and Apex. The CDR-40 from Belgian company Apex should reach U.S. shores later this year, but an American distributor had not been announced at press time.

Importer Gotham Audio of New York City previewed the Gefell UM92S, a switchable, 3-pattern condenser mic combining the large-diaphragm M7 capsule used in its UM70 "Perestroika" mic, with triode-based tube electronics. Availability? Later this year. Retail? \$1,995.

APRS showcased new approaches to mixer design. Consoles attracted the biggest crowds, espe-

cially the first public showing of Neve's all-digital Capricorn (pre-viewed in last month's *Mix*). With the MADI-equipped multi-tracks announced earlier this year at AES Vienna, Capricorn's arrival may be right on time from a technological standpoint. At the other end of the financial spectrum is Allen & Heath's Saber V, which takes the affordable Saber Series to the next logical step by including SMPTE- or MIDI-driven VCA control or moving faders(!), mute automation, dedicated time code display and central Intelligent Digital Display for at-a-glance status monitoring.

A new mid-priced console is Trident's Series 90, which incorporates VCA or moving fader automation,

—CONTINUED ON PAGE 120

NED ON THE BLOCK

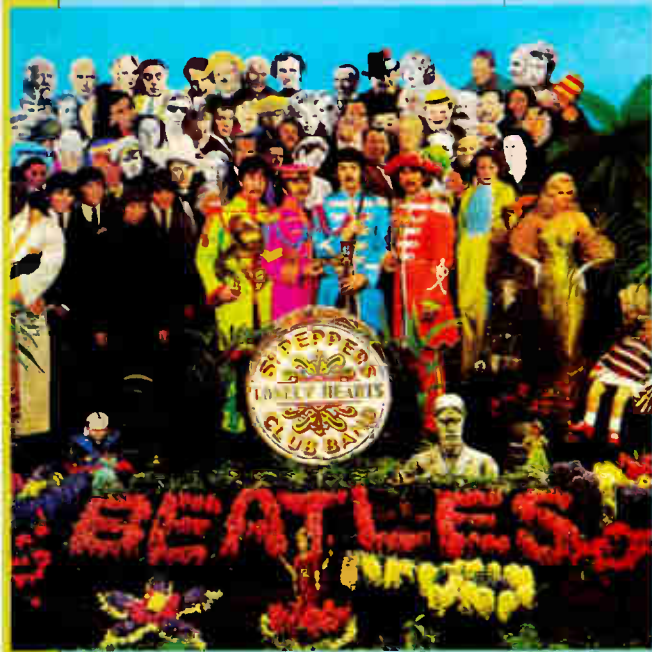
New England Digital Corp. has released its employees and shut down operations, after defaulting on a \$3.5 million loan. Lender Bay Bank of Boston is currently negotiating a secured parties sale with four serious bidders, including a well-known audio manufacturer and a newly formed alliance of NED system users, who hope to revive the financially troubled company.

At press time, it is not known whether the outcome will result in liquidation of NED's assets (including patents and copyrighted software) or the formation of a new company. Former NED VP Ted Pine was not aware of any plans for support or service of Synclavier systems.

GROWING SUPPORT FOR OMF WORKSTATION STANDARD

At press time, Avid Technology announced that six more audio companies have joined the discussion group meeting to develop a non-proprietary Open Media Framework

—CONTINUED ON PAGE 14



Club Band. Producer and former APRS president George Martin was on hand for the opening ceremonies. In conjunction with Sotheby's auction house, PSN Europe, EMI Records, and Abbey Road and Air Studios, APRS assembled an impressive collection of artifacts, including the Fairchild 275 limiter and Studer 1-inch J37 4-track used on the pro-

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INDUSTRY NOTES

Mark Johnson was promoted to acting director of sales and marketing at Meyer Sound Labs (Berkeley, CA) and is now responsible for all aspects of sales and marketing of Meyer's pro SR loudspeaker systems and studio recording products... John F. Phelan was promoted to general manager of international marketing and sales for Shure Brothers Inc. (Evanston, IL)... Boulder, CO-based WaveFrame Corp. welcomed Dan Radford as chief financial officer. Another new hire, Dennis Eveland, joined the company as field service manager... Two appointments at Neotek (Chicago): Joe Hebert is manufacturing director, and Mark Smithivas is a sales coordinator... Opcode Systems Inc. moved to 3950 Fabian Way, Suite 100, Palo Alto, CA 94303. The company's new numbers are (415) 856-3333, fax (415) 856-3332 and technical support (415) 856-3331... Silicon Graphics Inc. (Mountain View, CA) promoted Thomas A. Jermoluk to chief operating officer... Robert Sandell was named VP of marketing for electronic products at Fender Musical Instruments (Scottsdale, AZ). Sandell plans to boost Fender's growth in the pro sound and amp market... Vista, CA-based TimeLine chose Steven Strassberg Associates as the company's reps in the New York tri-state area... Klark-Teknik Electronics changed its name to Pinnacle Audio but kept the same address and phone numbers... East-West Communications moved to 1631 Woods Dr., Los Angeles, CA 90069. The new phone number is (213) 848-8436... Jim Rosenberg joined Gibson USA (Nashville, TN) as product marketing manager... Passport Designs has moved to a different location in Half Moon Bay, CA. Street address is 100 Stone Pine Road; the new phone number is (415) 726-0280, new fax (415) 726-2254... DOD Electronics (Salt Lake City) appointed Jesse Walsh Communications as its ad and PR

agency... Roger Ponto Associates (Kirkland, WA) will represent Bag End Loudspeakers in Washington, Oregon, Idaho, Montana, Alaska and Hawaii... Full Sail Center for the Recording Arts (Winter Park, FL) reached an agreement with Montage that makes the school the official training center for the Montage digital picture processing system... Dave A. Dugdale joined Acoustical Design Group (Mission, KS) as an associate... Michelle Andersen was appointed promotion manager for the Santa Monica, CA-based Welk Music Group... Bertagni Electronic Sound Transducers (Santa Ana, CA) hired R. Randal Riebe to serve as the business development specialist... San Francisco-based Charles M. Salter Associates (a consulting firm for acoustics and A/Y systems) welcomed Kenneth W. Graven as senior consultant... First Choice Marketing will now represent Eastern Acoustic Works (Whitinsville, MA) in Washington, Oregon, Montana and Alaska. Another rep chosen by EAW, Robert Louis Associates, will cover Ohio, Kentucky, West Virginia, Indiana and western Pennsylvania... QSC Audio Products (Costa Mesa, CA) named H.W. International of London as the UK distributor of QSC's pro power amps and compute control technology... Traci Forbes is now customer service manager for University Sound (Sylmar, CA)... The University of Miami (Coral Gables, FL) formed a new undergraduate curriculum option: students may now receive a Bachelor of Science in Electrical Engineering with an emphasis in Audio Engineering (said to be the first program of its kind in the country). For more information, call John Monforte (School of Music) at (305) 284-2439 or Martina Hahn (College of Engineering) at (305) 284-2404... The International Television Association gave the 1992 Technical Achievement Award to Shure Brothers Inc. (Evanston, IL) for its FP410 automatic mixer. ■

—FROM PAGE 12, CURRENT

digital audio file- and data-exchange format. OMF is designed to allow various media, including sound files, graphics, data, video, film and other multimedia elements, to be freely exchanged between systems from different manufacturers.

Joining New England Digital and Digidesign (whose involvement in the OMF project was unveiled during the NAB Convention in April) are Doremi, Fairlight, Lexicon, Otari Corp., Roland Corp., Solid State Logic and Studer-Editech; other firms are expected to join the founding members soon.

According to Avid's Mack Leathurby, these "Partner Participants" will discuss and exchange comments about the draft OMF interchange format. Publication of the Open Media Framework is scheduled to take place by the end of the fall.

Also announced at the recent Seybold Digital World conference (see Paul Potyten's report in next month's *Mix*) was the first licensing of Avid's OMF Engine technologies to Silicon Graphics, developers of the IRIS Indigo. Under the new agreement, Silicon Graphics will license Avid's software and assist in porting OMF onto the Indigo. OMF will become Silicon Graphics' standard digital media platform.

—Mel Lambert

CONVENTION NEWS

The annual NAB Radio Show takes place in New Orleans from September 9-12 at the Convention Center. Call (800) 342-2460 for registration information.

West L.A. Music hosts its sixth annual Music Expo, which includes all major products this year and not just keyboards. The event will be held at the LAX Hilton, August 29-30. Contact Craig Moore at (310) 477-1945.

The Sixth Annual CD-ROM Exposition & Conference will be held at Boston's World Trade Center September 29 through October 2. For further information, contact Mitch Hall Associates, (617) 361-0817. ■

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Figure A. 27x27x10 in.



THE YAMAHA DIGITAL MIXER/20-BIT RECORDER



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THE POSSIBILITIES

The Flex System from Rane: A Powerful New Approach to Modular Signal Processing



F

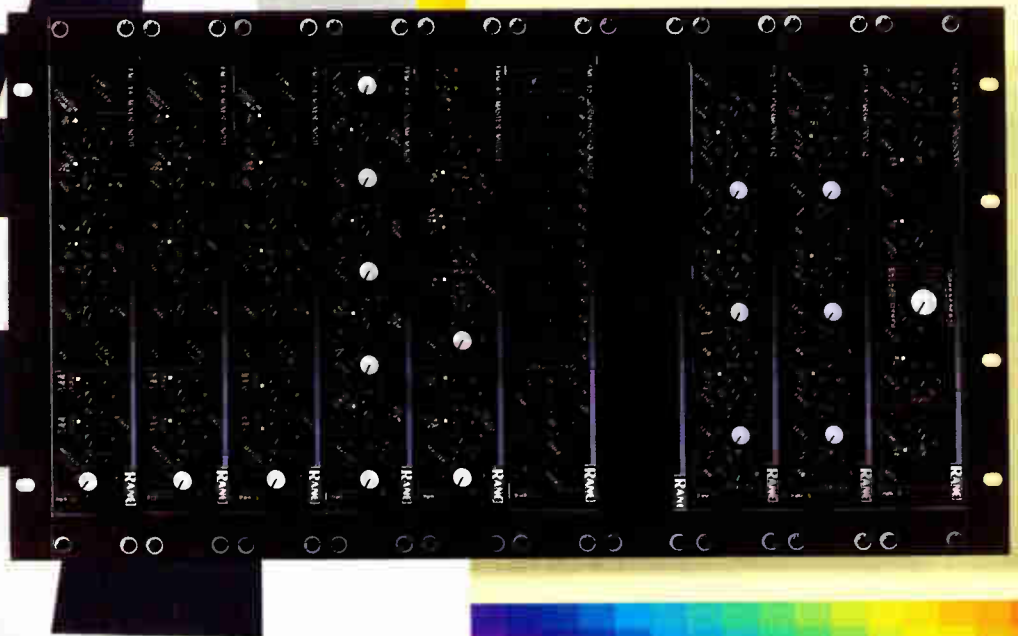
Flexibility, no matter how you spell it, means power. It's the power to meet varied needs. To meet budgets with optimum performance. To efficiently accommodate system growth. Long into the future.

Flexibility is the essence of Rane's new FLEX System. The first universally compatible, cost effective, modular approach to signal processing and routing. With no special requirements. And no dead ends.

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HIGH-POWERED COMPATIBILITY. Using standard 3-pin, ¼" or barrier strip connectors, FLEX modules are directly compatible with professional audio gear. And since they are remote powered—via Rane's proposed power supply standard—troublesome ground loops, hum and agency approval problems are solved up front by design.

ENDLESS POSSIBLE COMBINATIONS FOR CUSTOM DESIGNS. The FLEX non-exclusive modular concept makes it inherently expandable



ARE STAGGERING!



and upgradeable. It boasts a large and growing number of functions and components to choose from. Mixers. Preamps. Splitters. Crossovers. Dynamic controllers. Equalizers. Amplifiers. Line drivers. And much more under development.

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SUPERLATIVE PERFORMANCE, RANE RELIABILITY. The design and performance of each and every Flex module is, in a word, superlative. Every model carries top-grade studio specifications, utilizing the best components available. The result is unsurpassed performance and reliability.

Our HR compatible modules may be compact, but they're stuffed with more top-notch features than you would have thought possible. For example, the **FMI 14 Mixer Input module** measures only 1.75" x 10.5", yet it boasts a -128dB EIN mic stage, switchable phantom power, true 20dB pad, powerful 3-way EQ section, insert loop, two source-selectable Aux sends and balanced master channel outputs. A single DIN cable, supplied with each module, routes the Master and Aux buses from unit to unit for quick and clean hook-up.

+15/-20dB boost/cut, 2-octave down to 1/30th-octave bandwidth range for notch capability, and a full 10Hz-20kHz frequency sweep range for unprecedented flexibility.

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current balanced outputs, and you've got a powerful, flexible new crossover standard.

This is but a sampling of the innovative Flex Modules to be released this year. We encourage you to obtain separate, detailed data sheets on the many FLEX System modules. Then compare these with the best standard equipment available. You'll discover that FLEX offers the best of all worlds: compact, cost effective, flexible, uncompromising performance.



The **FMM 42 Master Module** not only provides Aux returns and mixing, but features extra mic and stereo line inputs with ducking capability for paging and other applications.

For even more mixing flexibility, the **FPM 44 Program Mixer** allows 4 separate mic or line inputs to be mixed to 4 output programs, with pre or post fade switch selection for the Aux sends. Both the direct balanced/unbalanced terminal strip and the DIN Flex bus inputs and outputs can be used simultaneously for easy expansion and integration into larger systems.

Carrying on a fine tradition of innovative equalizer technology, Rane sets yet more new standards with the Flex Series. The **FPE 13 Parametric Equalizer** provides 3 separate bands, each capable of

model which has set new industry standards. Minimized filter interaction, smooth combined response and fully balanced three-pin and terminal strip input/output are but a few of the features. Both the FME 15 and the FPE 13 also provide an exclusive Patch I/O jack which allows direct connection to an insert loop jack with a single 1/4" TRS patch cable.

The **FAC 24 Active Crossover** is the next generation to follow in the respected footsteps of our AC 22 and AC 23 designs. In addition to the proven 24dB/octave Linkwitz-Riley performance, the FAC 24 features a true 24-position frequency selector switch to provide plug-in card accuracy and repeatability with the convenience of a knob. Add to this a built-in CD Horn EQ section, electronic phase alignment, summing LF input and three-pin high-

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Rounded corners and edges greatly inhibit sound reflections and diffractions from cabinet boundaries. These can be major sources of irregularities in the reproduced sound, particularly in terms of the perceived placement of instruments within the sound stage. For the high frequency unit to make an effective job of launching all the detail that it can generate into the listening space, it must be held rigidly in the cabinet throughout its operational frequencies.

This is the key to the Tannoy cabinets. If a 'rigid' cabinet

is used, the redundant energy from the rear of the bass unit and frame cause endless resonance problems within the cabinet. Differential Material Technology provides the answers by using a variety of different adhesives between the rear of the drive unit and brace, the cabinet walls and the brace and within the layers of the MDF laminate.

The lossy couplings effectively transmit and absorb energy in a frequency selective way. Put more simply, at low frequencies the drive unit sees the cabinet as a rigid structure and at higher frequencies as a resonance absorbing/damping structure.

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World Radio History

by Ken Pohlmann and Ted Tanner

ZOLA

There is absolutely no question that digital signal processing will dominate the audio (and video) industries of the future. Indeed, anyone whose jaw dropped over the power and versatility of Digidesign's Pro Tools or other desktop audio recording and production systems will testify that DSP is already here, with plenty of muscle.

Bundled systems such as Pro Tools have brought on a great democratization of digital audio, letting anyone with a few dollars, limited understanding and a personal computer tap into vast possibilities. Yet the science of DSP remains remote and mysterious for most users. Our realm of creativity is limited by the number of icons available to click on,

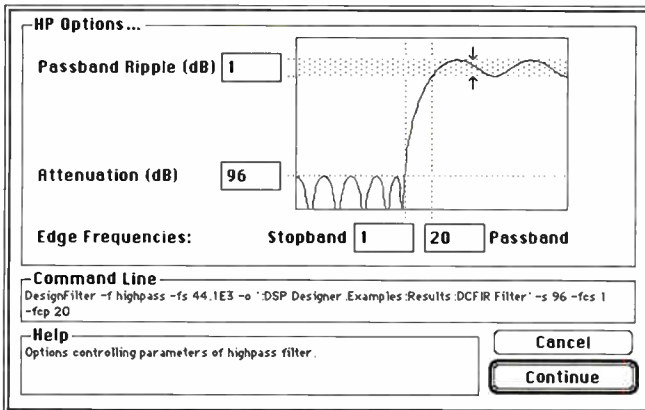


Figure 2

because if there is no icon, there is no way to process our signal.

Formerly, DSP was the exclusive province of graduate-level electrical engineering colleges, and although DSP education has dropped down to the undergraduate course numbers, it is still inaccessible to many in the audio world. In particular, only those skilled in DSP theory and DSP chip assembly language could write useful DSP programs. This has limited the number of DSP authors, as well as their coded output. For the true democratization of digital audio to flourish, we need a bridge so that real-world users can design their

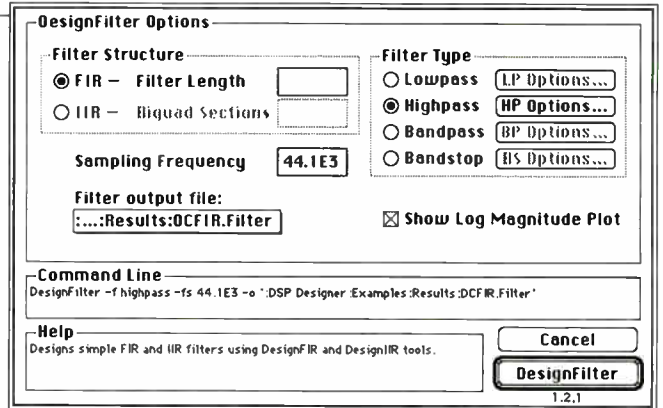


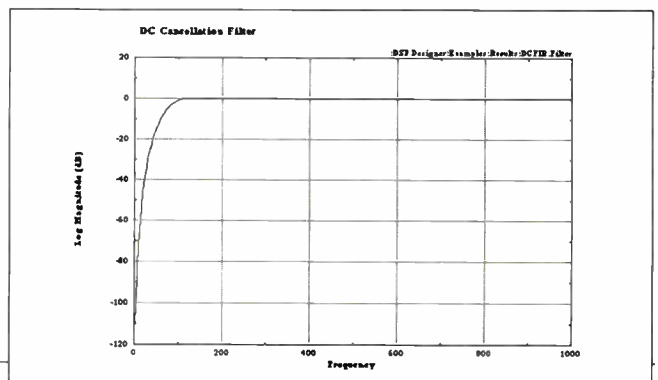
Figure 1

own DSP applications and run them under commercial systems such as Pro Tools. Then, and only then, will DSP truly dominate—and benefit—our industry.

Lester Longley, a former Motorola DSP designer, saw this need and formed Zola Technologies Inc. (Atlanta) to create a software environment that would permit straightforward design of DSP algorithms. With his software package, DSP Designer, anyone with some DSP theory under their belt can develop custom DSP algorithms and software for a wide variety of audio applications; indeed, DSP Designer forms a great laboratory environment to learn DSP theory.

Specifically, DSP Designer is a software package that runs on a Macintosh and works with Macintosh Programmer's Workshop (MPW) text editor and command shell software in a single environment. DSP Designer lets you design, analyze, simulate and implement digital filters;

Figure 3



lets you create, manipulate and display complex test signal waveforms; and, using Motorola development software, lets you generate optimized code applications for the Motorola DSP56001 chip. If you have a Digi-design Audiomedia or Sound Accelerator card, you can record and play back processed audio files in real time.

This Zola/Macintosh/Motorola environment totally integrates the ins and outs of digital signal processing. Both single-band and multiband FIR and IIR filters, as well as arbitrary group delay IIR filters, can be designed, modeling either the filter or the signal itself. Filter order is limited only by available memory. Floating-point filter/systems can be simulated and optimized for speed. Sinusoids, random noise and other signals can be created as input test generators. Several output waveforms may be displayed simultaneously in a variety of formats, including full graphics mode. A variety of signal file formats, such as ASCII text and compressed binary, can be used for signal editing, data storage, import/export, etc. To simplify import/export, format information is stored in the file's resource fork, apart from signal data. Applications can be developed and implemented as DSP56001 macros and executed in real time with audio files.

DSP Designer completely frees the user from the drudgery of assembly language programming. A number of software tools are employed to summarize a variety of tasks. For example, RecordSignal automatically records input signals, and PlaySignal plays signals in real time through an Audiomedia or Sound Accelerator card, with any specified digital filtering or custom DSP56001 programs generated using the Process56k or Build56k tools. CreateFilterDSP quantizes and formats filter coefficients for use with Motorola DSP56001 and DSP96002 assemblers. TransformSignal computes the discrete Fourier transform of a specified input signal using the FFT, with 80-bit accuracy; in addition, windowing and scaling options are provided. CreateSignal creates real or complex signal files using algebraic expressions, which are repeatedly evaluated for each output sample; a library of arithmetic operators and functions is available. FilterSignal filters a signal

stream: PlotSignal displays one or more waveforms; and DesignFilter, DesignClassicalIIR, DesignFIR, DesignIIR, DesignWindowFIR, ExamineFilter and PlotFilter are all used for filter design and analysis. Each of these tools provides its own graphical interface, with online help.

DSP Designer uses its own Z language to model DSP systems: it is similar to the C programming language but is optimized for problems in the Z domain. In general, if you already know C (and some DSP theory), you should have little trouble learning Z, particularly since extensive online help is available. A Z program consists of an algebraic expression that specifies signal processing or calculations used by the DSP Designer CreateSignal tool. For example, the following Z program could be used to digitally dither a signal by adding spectrally shaped Gaussian noise to the audio waveform:

```
p = Gaussian * 0.1;
    Generate noise and adjust
    level
q = filter[h.filter](p);
    Apply shaping filter to
    noise
x = input[x.Signal];
    Read sample from input
    file
y = q + x;
    Add noise to input sample
output[y.Signal](y)
    Write sum to output file
```

To better understand DSP Designer's potential, let's take the software for a test drive through a real-world situation. Suppose you're doing some editing on a piece and you notice a DC component on one of the files. Using DSP Designer, we can design a 1Hz filter to remove the DC component from the source data. We whip out DesignFilter and observe the graphical user interface shown in Fig. 1: all the tools employed in DSP Designer have a similar setup, to accelerate the learning curve. In this case, we go to the Filter Type window and select a high-pass filter, and then select HP options, which brings us to the window shown in Fig. 2. We select a 1Hz stopband frequency and 20Hz passband frequency; the stopband attenuation is set to 96 dB; we select a passband ripple of 1 dB.

Hit the Continue button to return to the filter window. Then select a FIR

filter type, enter a 44.1kHz sampling frequency, and name an output file to hold the processed data, DCFIR.Filter in this case (the file extension is used by DSP Designer). Of course, by selecting a FIR, we are guaranteed linear phase and constant group delay. To execute the design, click the DesignFilter button. The program relates information on the filter order and progress of design, plotting the magnitude response of the filter, as shown in Fig. 3. Satisfied with the result, we could use DSP Designer to compile the filter and create an optimized DSP56001 program, usable for real-world DSP.

Of course, DSP Designer is much more than a filter program; in fact, it allows very creative construction of many signal processing devices. For example, we could use Z language to author a custom delay, using the "var[k]" command. This implements a difference equation where the past value of $x[n]$ is delayed k sample times, where k is a non-negative integer value. The following code would create a delay line for a file named Voice.Signal:

```
Sample = input[Voice.Signal] Input
sample
DelayVoice = Sample + Sample[k]
Original plus delayed
```

For samples at 44.1 kHz, a delay time of 100 milliseconds equates to 4,410 samples: thus, we specify the k variable as 4,410. With simple manipulations such as this, delay, reverb, equalization and other processing tasks can be modeled, tested and constructed in software, then executed courtesy of the Motorola DSP56001.

DSP Designer is relatively easy to grasp and not very expensive, but it isn't for everyone. Generally, if you have a Macintosh with Audiomedia or Sound Accelerator cards, have a need to develop some custom processing tools, and aren't afraid to tackle MPW 3.0 or Z language, then DSP Designer is for you. Clearly, there's a little work involved, but it's nothing compared to the rigors of writing assembly language. In short, DSP design used to be very, very difficult. Not anymore. ■

Ken Poblmann is director of Music Engineering at the University of Miami. Ted Tanner is a recent Master of Science graduate from Miami, now employed by Digidesign. They both have propellers on their heads.

The Top 500



Play the D4 with its onboard trigger inputs.

Alesis drum machines are famous for their sounds. The HR-16's natural acoustic drums are still the standard for transparent rhythm tracks. The punchy aggressive samples of the HR16:B redefine how to make rhythm tracks burn. The SR-16 is an instant hit with its sampled reverb and ambience techniques.

Now you can have all this and more with the new **Alesis D4 Drum Sound Module**. There's an incredible 500 sounds in all. Right at your fingertips.

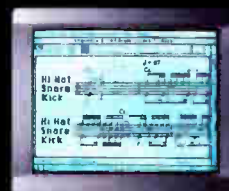
The D4's sounds are unparalleled for their realism. For example, when you hit a D4 sound harder, the tone *and* pitch change just like a real drum, thanks to the D4's Enhanced Dynamic Articulation.TM Plus, stereo reverb and ambience are built into many of

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1	2	208	HONEST SNARE HR-16	ALL WOOD-BRASS RIM	302	NEW	▶	RAW HIDE BRAND NEW D4	CUSTOM
2	NEW	▶	STUDIO TOM BRAND NEW D4	16" MAPLE TOM w/VERB	303	450	52	HI ROOM TOM SR-16	10" MAP
3	NEW	▶	BIG "O" BRAND NEW D4	DOUBLE HEAD KICK w/VERB	304	NEW	▶	WET HALF BRAND NEW D4	HALF OPEN F
4	5	52	RIM SHOT ROOM SR-16	BRASS PICCOLO w/VERB	305	327	52	RIM 2 CENTER SR-16	ARTI
5	10	156	BIG FOOT HR-16:B	SINGLE HEAD 26" MAPLE	306	123	208	DOUBLE F HEAD	DOUBLE HEAD K
6	NEW	▶	SLAM BRAND NEW D4	POWER TOM w/VERB	307	223	150		
7	23	156	COMBO SNARE HR-16:B	PICCOLO PLUS WOOD	308	401	5'		
8	NEW	▶	BIG BALLAD BRAND NEW D4	WOOD SNARE w/BIG VERB	309	NEW	▶		
9	NEW	▶	FAT CITY BRAND NEW D4	SUPER FAT SNARE	310	175	1		
			ARTICULATED HI HAT		311	NEW	▶		
					312	171			



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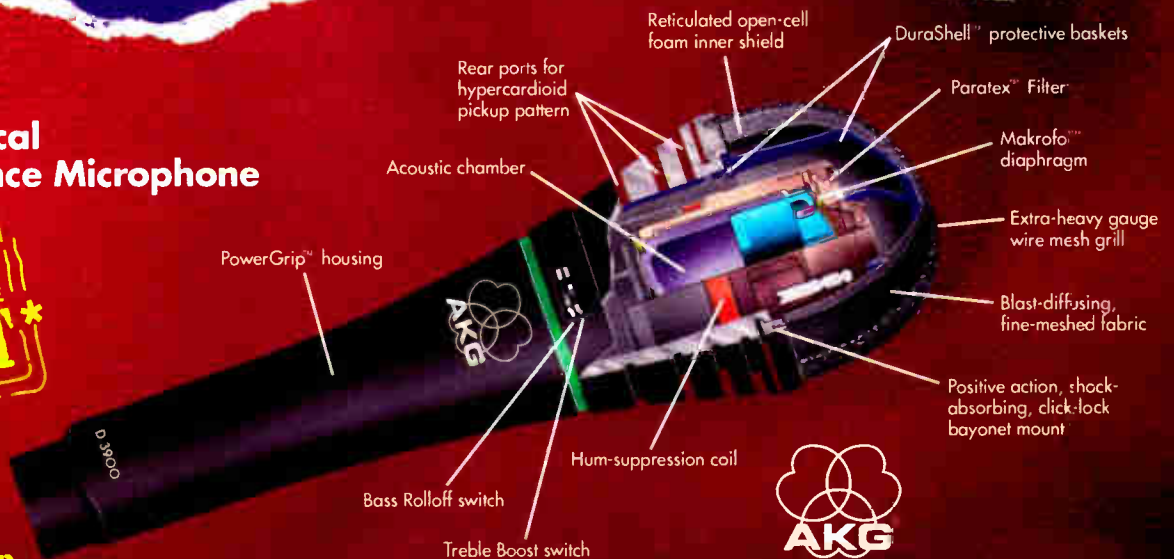
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by Stephen St. Croix

STUDIO CATS

Scientifically speaking, everything was fine for a while in the Garden of Eden (Latin name: *Inna Gada Da Vida*). Everything was warm and safe...well, *almost* everything. But that was the last time.

Now nothing is safe. In fact, the world that we have made for ourselves is so complex and so loaded with invisible traps that we have developed an incredible variety of systems to extend our senses, to expand our awareness in the hope of avoiding said traps.

I'm not talking Leary's mind expansion, or even Hormel's contribution to the '60s: mind expansion. I am talking about the stuff we do to test our world with accuracy and dependability beyond what we are inherently capable of as the carbon-based life forms that we are.

Let me give you a few simple examples. Any adult with more than a few years driving experience can pretty much tell how fast they are driving, yet we still need speedometers because we really *can't* tell worth dirt. Any professional engineer can, of course, tell when he clips, yet we need meters everywhere because he really can't tell. Not when he is busy thinking about how the reverb is making the snare drum sound like a tin can full of 1-inch steel balls.

Okay. So we develop mechanical devices to expand our sensing abilities. We have been doing that for a long time. A candle is a mechanical device that extends our ability to see in low-light situations. So is a photon-multiplier.

We also have learned that other life forms can be useful, as many have more sensitive, or more precise, sensing abilities than we humans do.

There are two basic lifeform categories here: sacrificial and not. Let's do the sacrificial one first.

Miners used to take cages of canaries into the mines. Not because

they missed their pets, but for life insurance. You see, canaries have two interesting traits: they talk a lot, and they are very sensitive to changes in ratios of oxygen, carbon dioxide, carbon monoxide and other gases in the air. In fact, they are *much* more sensitive than humans.

So into the mines these birds went, talking loudly as they descended into the dark unknown. These miner dudes would mine away, stopping every now and then to listen to the canaries' happy little songs of peace-



ful, contented terror. If they *didn't* hear them, they would run over to the cage for a visual inspection. If this visual revealed that the birds were, in fact, quiet—usually *dead* quiet—the miners bolted for the exit, screaming the generic “poison gas” scream.

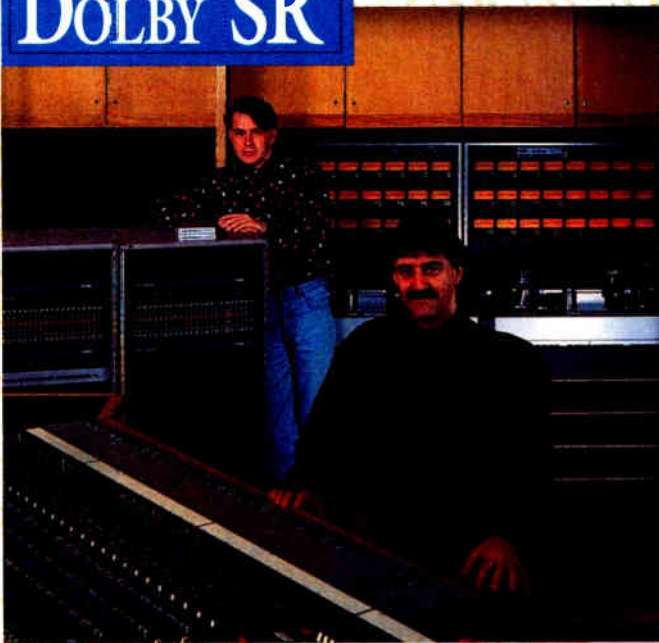
In fact, there were two potential problem areas: gas that we can't breathe if we want to remain alive, and gas that will explode impressively if exposed to flame or sparks. For the two or three of you who might care, here is a complete list of the various bad gases (called damp,

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from the German *dampf*), available for the entertainment of miners. First, there is firedamp: usually methane; then whitedamp: carbon monoxide; blackdamp: carbon dioxide (named because the lamp’s flame will not burn); stinkdamp: hydrogen sulfide; and afterdamp: the mixture of gases found in a mine after an explosion (you probably don’t need no steen-kin’ birds for that one).

Now on to the non-sacrificial category.

Drug dogs. Bomb dogs. Sheep dogs. Seeing-eye dogs. Chimpanzees that help quadraplegics. Carrier pigeons (that no longer help anyone). People learned long ago to use animals when their skills or senses exceed our own, either inherently or because of some handicap.

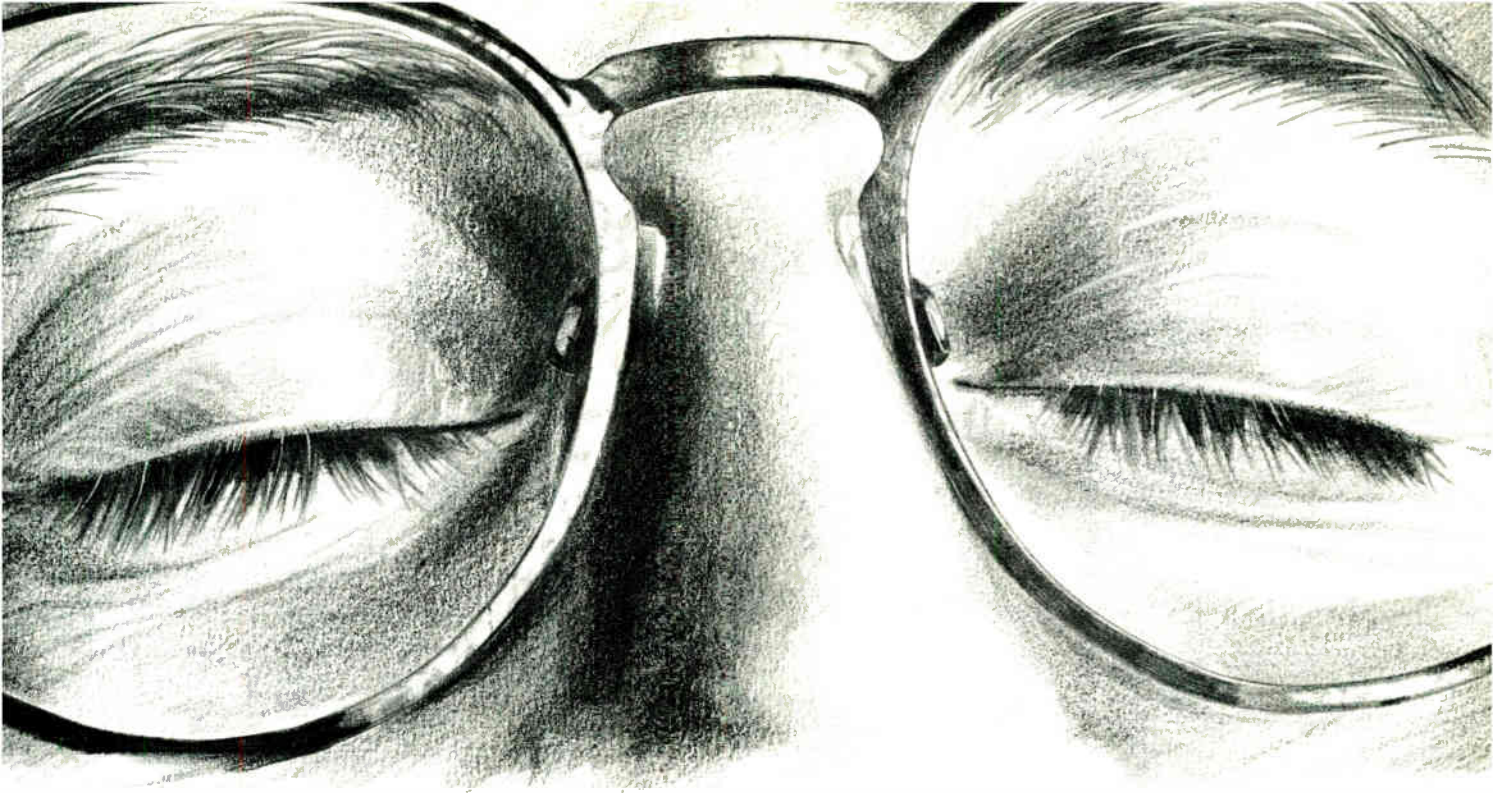
Now cats. First domesticated as mousers, cats have actually displaced dogs as number one in the American Pre-furred Pet Chart. There are now more cats in homes across the USA than dogs.

Just what are people *doing* with all these felines? Those of us currently owned by cats know the answer: not much. We don’t walk them, we don’t wash them. We don’t yank at the opposite ends of rubber pull-toys, and we *never* toss them Frisbees.

So what *do* we do? We appreciate them, we work endlessly to try to get them to notice us, and we are deeply moved when they do. We change their litter and replace our furniture when they are finished with it. We wonder why they have to sleep on our heads instead of quietly beside us. Science *still* can’t figure out how they purr.

But more to the point, why am I talking about cats now? I am currently owned by four cats, but there was once a fifth. His name was Strobe, and I never did a mix without him.

Cats are actually very discriminating when it comes to recorded audio. Usually they either ignore it or leave. They usually leave. They refuse to listen to the Scorpions or Cinderella, but they will listen to Steely Dan or Dire Straits if your playback system is good enough. Though content does make a difference, it seems that it is really a matter of taste, just like it is with humans. It’s recording *quality* that they really seem to care most about.



OPEN YOUR EYES!

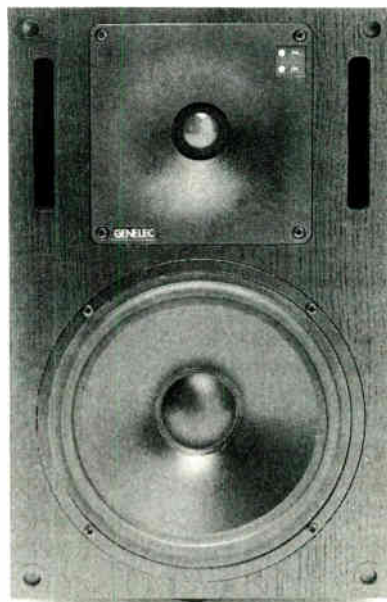
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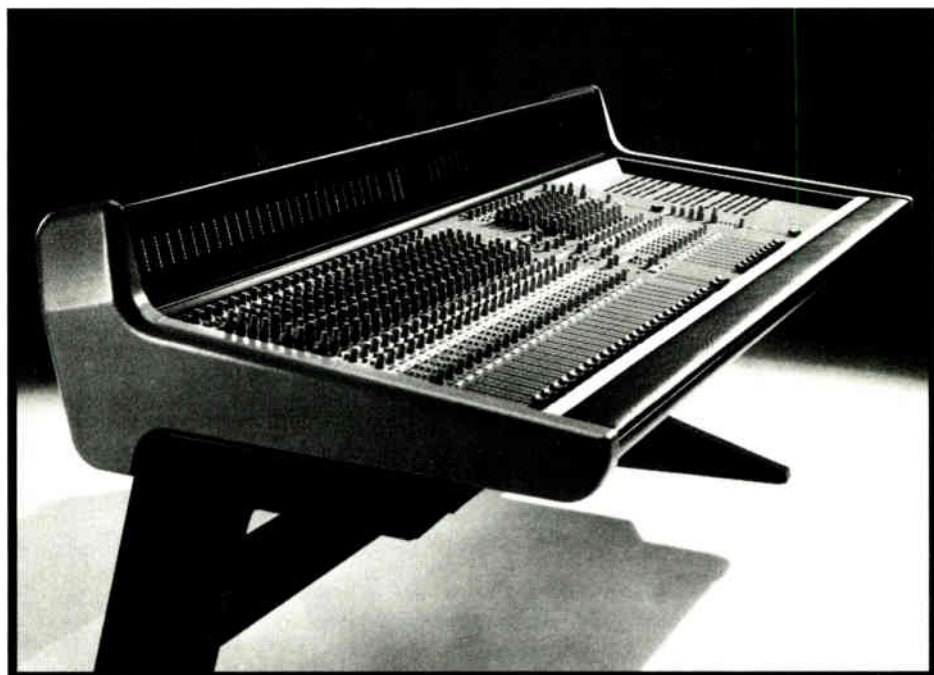
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When portable DATs first came around, I rushed out and recorded some natural sounds from the woods, came home and played them for Strobe in the studio, on the finest gear I could find. He left. This is a cat who used to sit *in* the kick drum during sessions (presumably because he felt that no microphone could accurately capture the performance).

Years later, when converters and other bits of DAT magic had been sorted out to a much more acceptable level, I tried it again. This time he stayed. He listened. He got interested. He purred, and he looked for birds and chipmunks that his professional ears told him were real. He forgave them for having been converted to numbers and back again. He started talking to them.

I felt that this may have been that landmark day, that day we all hope for, when we leave the realm of Fi and actually achieve Hi-Fi, a mere two decades after the term itself has given up and died.

I rushed over to my archive, pulled the original tape, got the original DAT deck, and played it for him. He got down off the console meter bridge (where he had gone to get a good stereo image), adjusted some LF EQ, turned his back to the monitors, played with a grease pencil for a few seconds, and...left. He hit the monitor mute button on his way out.

I went back and played the new DAT setup and he returned.

While I was pretty sure that I could hear some difference in the two setups, Strobe was *real* sure. He was consistent, and his judgment was totally unaffected by specs and numbers, labels, ads, and even gold-plated connectors.

It didn't take me long to figure out that the tracks (and even the mixes) I did that he liked were much better than the ones that he didn't. He spent a lot of nights on the meter bridge after that, and over the years I got much better with his help.

I know that a few of you out there have Studio Cats of your own, but most of you are suffering through life without them. Too bad. ■

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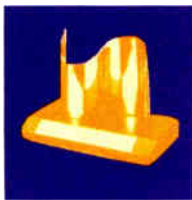
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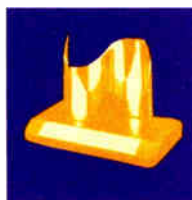
I HAVE A THEORY about how the field of acoustic design got started. Back when prehistoric people got the bright idea of getting out of the rain and inhabiting nice, dry caves, some cavewife probably noticed that when she stood in one particular spot and clacked two bones together, a rather interesting sound resulted. When her husband returned from hunting in the perfect, reflection-free zone of the flat, open veldt, he was impressed.

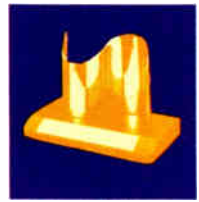
The upwardly mobile cavecouple immediately recognized this as something that would make the neighbors turn green with envy, inviting them over for a listen. Unfortunately, once the cave was filled with curious hominids, the effect disappeared, and they were pelted with fruit pits and scorned in other unmentionable ways. Nonetheless, pretty soon everybody was picking and choosing their caves not on the basis of view or plumbing facilities, but mean reverberation time. *Voilà!* The first control rooms and the first real estate boom. We've been showing off our sound systems and buy-

ing fixer-uppers in the best neighborhoods ever since.

The point here (although I admit it's a stretch) is that when it comes to monitoring, it helps to remember that the control room environment is highly artificial. It seems as if every object, every activity—in fact the very presence of humans in the control room—is hostile to accurate sound reproduction. After talking to this year's TEC Award-nominated studio designers about the “ideal” listening space and the obstacles to building good-sounding control rooms, it's amazing that any get built at all.

“There is no perfect monitoring environment, and there never will be.” George Augspurger says. “In the film industry, exhibition theaters can be held to certain standards. But a music album will be heard on a Sony Walkman, a bass-pounding auto sound system, a home theater installation and who knows what else.” Likewise for advertising or a video soundtrack: Reproduction varies widely according to the consumer.





BY AMY ZIFFER

TORS

"A mixdown room does not *aspire* to be an ideal listening environment," he continues. "Instead, it is a working tool that enables a recording engineer to produce an album that retains its integrity under a wide variety of listening conditions. Ergonomics and pure acoustics are equally important. The rooms that top-ranking engineers like to work in meet both criteria." This, perhaps, is why some "old" music rooms never seem to become obsolete.

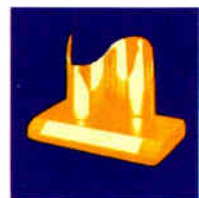
While this general goal for control rooms remains relatively unchanged, the specifics of how to accomplish it do evolve, with fashion and function. In the '80s, Augspurger points out, "Rooms grew larger to accommodate more people, more recording equipment and large collections of keyboards and synthesizers. Instead of a sweet spot at the console, designers were asked to provide good stereo balance almost everywhere in the room."

In the '90s, as studios branch out into new areas in order to stay booked, he predicts the standard will become large, multiformat

rooms that can simultaneously meet the requirements of album production, TV audio, home theater releases and motion picture sound. This is tough, since there's evidence indicating that different types of rooms are subjectively preferred depending on the listening material.

There is general agreement about the foundation of good control room design. With some variation, geometry and orientation of the main monitors are accepted standards. Those standards are a bilaterally symmetrical room, with main speakers placed just above seated ear level, about 11 feet from the console center, forming an equilateral triangle (or nearly so) with the listener. Some designers shoot for an "average" liveness, with mean reverberation times typically just above .3 seconds.

Despite its prevalence, an aversion for the front control room window is almost universal among designers. "A lot of [clients] assume there has to be a front glass wall," says John Storyk, "and I've changed their minds. It's not really the best way to look out of a space, and





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TASCAM II.

most studios require a couple of large TVs in the front, anyway. Everybody wants transparency between the two rooms, but on the other hand you need control. The alternative is glass about 30 degrees on either side through a side-splayed wall."

A room's dimensions are the most limiting—or liberating—factor. "Architecturally, the most serious limitation is usually lack of sufficient space, especially ceiling height," says George Augspurger. "No one should think they are going to improve bass response by angling walls or tilting the ceiling. The problem is with cubic volume."

But room dimensions are often dictated by the size of the exterior structure, and there is always an economic pressure to conserve expensive commercial property. (There are exceptions, of course. Peter Grueneisen of studio bau:ton says his partners and he have been talking to one client about building a control room with free-standing, audiophile speakers.) In general, designers have more control over other factors.

"Creatively integrating the monitoring system with all the other requirements of control surfaces, video monitoring and sight lines is the real art in room design," says Russ Berger. "One great challenge is practical mounting and enclosure design. The monitor wall should accommodate a wide range of boxes and should allow the users to swap out monitors with a minimum of downtime. We've developed a series of enclosure details where the monitor supports can be quickly modified for a particular cabinet size, and where the attachment between the monitor and the enclosure is easily adaptable. But the whole assembly performs just like a monitor wall that is custom-designed for a specific box."

There has always been a great deal of experimentation with materials. "Lately," Storyk says, "I've been having very good results with what I'm coining a 'soft-baffle' front environment. By that I mean a soft-baffled front wall for low frequencies (typically a few layers of plywood) covered with a mid- and high-frequency absorber (typically 4- or 5-

pound density fiberglass), very similar to what the THX monitoring system calls for."

The studio bau:ton folks have been using a concrete front wall to eliminate vibration from wood framing, and to provide a more solid backing for the speakers. In a recent installation (Bad Animals in Seattle, co-owned by producer Steve Lawson and Heart's Ann and Nancy Wilson), they used cavities in the concrete as speaker cabinets. "We just have front baffles mounted to the concrete itself," Grueneisen says. "Pretty much all the energy goes into the room rather than being absorbed by the wall."

The room is, of course, only half the equation. "Functionally," says Augspurger, who has been intimately involved in speaker design, "the most daunting problem is to find matched pairs of high-power, high-quality monitor speakers." The choice is usually a joint decision between client and designer, with the client expressing a preference and the designer advising for or against based on the particulars of the installation.

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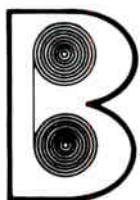
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"In U.S. mixdown rooms, you typically find UREI 813s," he says, "followed by JBL, Tannoy and Westlake models, with a smattering of others such as Meyer and Queded. Custom designs using JBL and TAD components are also popular. Console-top speakers are usually Yamaha NS-10s, but Tannoy, KRK, and some new specialized designs are also found. Television and production studios seem to like Electro-Voice speakers." Storyk adds Genlec to this list.

"Monitors are like the stage the performance is put on," says Vincent Van Haaff. "The room is like the theater. If there is a perfect match, it is as if they can hear each other and react accordingly." One problem with getting that match, however, is the fact that each client is likely to use the room and the monitors differently.

"If you want to monitor loud in a full-sized control room [600 square feet or larger]," says Storyk as an example, "near-field monitoring will prove unsuccessful. You've got to put in a lot of monitor—and amps that won't clip. Thankfully, though, I

see a trend toward lower-level monitoring. When I started, the industry was really driven by the pop/rock business. Those are by no means the majority of the studios being built now. I'm more and more involved in non-rock facilities, places that do industrial, post work, educational audio. Those worlds do not require things to be loud. In fact, they almost frown on it."

Peter Grueneisen observes that many people really like to be close to speakers, to have a very direct image. "It's as if they want near-field monitoring, but with the big speakers...sort of like huge headphones."

Finally, there is the question of equalizing monitors. "I'm always hoping that I don't need it," Storyk says, "but as a realist, I don't have a problem with it. Installed and used correctly, it can be valuable. Lately, with more complicated monitoring systems, instead of putting a whole pile of 1/3-octave EQs in, I use a smaller number of parametrics and use them only if and when they're needed."

Looking to the future of control room monitoring, all five designers

alluded to a similar wish: getting rid of equipment. It blocks sound, creates unwanted and sometimes unpredictable reflections, and produces noise and heat. Specifically, everyone would like to see bulky consoles disappear from the scene. "We've suggested to clients that they not put the console in the control room, but they seem to resist that idea," Russ Berger jokes.

Van Haaff praises the Euphonix board as "the first one to be actually sensible in this way. It's thin and light." It's so light, in fact, that it may need a stiffer cradle to make it less resonant.

Everyone expressed pleasure at the emergence of digital workstations because of their smaller, slimmer shapes, but Berger bemoans what he terms "the button and knob factor," an opposing trend toward more devices and control surfaces that have to be accessed by operators.

Van Haaff has a vision in which the console really would be absent from the control room. "It would be possible," he says, "to create 3-D

—CONTINUED ON PAGE 154

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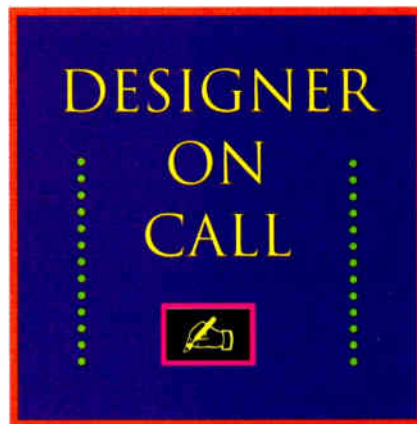
TED ROTHSTEIN

BY JOE SCHICK

Way back in the late '60s, when recording studios rode the crest of psychedelia into the multitrack, multichannel great new millennium, a strange breed of studio cat appeared. These people, who often had monikers like Doctor Decibel or Gonzo Solder Man, were not really of this Earth. But they could rewire a temperamental console in an hour and a half, or make a direct box out of aluminum foil and Chinese food

cartons. There was a famous one in New York named Duffy, who looked like the professor in *Back to the Future* and once powered a session during a blackout with stolen car batteries. And then there was Ted Rothstein.

Ted Rothstein was the greatest of the studio doctors. First of all, he wouldn't go out for lunch and come back Tuesday. Second, he could do much more than fix things; he could



change things. When he arrived at Albert Grossman's Bearsville Studio as chief engineer in the early 1970s, he completely rebuilt Studio B's high-priced console

and top-of-the-line Westlake monitor system, often introducing aerospace components or his own improvised ingredients. "But I was totally intimidated by Albert, who had managed Bob Dylan and Janis Joplin," Rothstein recalls. "[Grossman] had been away for a few months. On the day I finished, he walked in, saw the three-tiered parametric EQ and bar graph VU meters I had built, and said, 'What the hell have you been doing?' I said, 'Um, making some improvements?' Fortunately, when I turned everything on, we had about 12 more dB of headroom and incredible bottom. Instead of firing me, he asked me to redo Studio A, as well."

Today, at 45, Ted Rothstein is a media systems designer and a global enterprise unto himself. He's been involved in the audio and monitor system design of more than 30 studios, including a makeover of Pink Floyd's Britannia Row and his most



PHOTO: BOB GRUEN

Ted Rothstein at work on another design project.

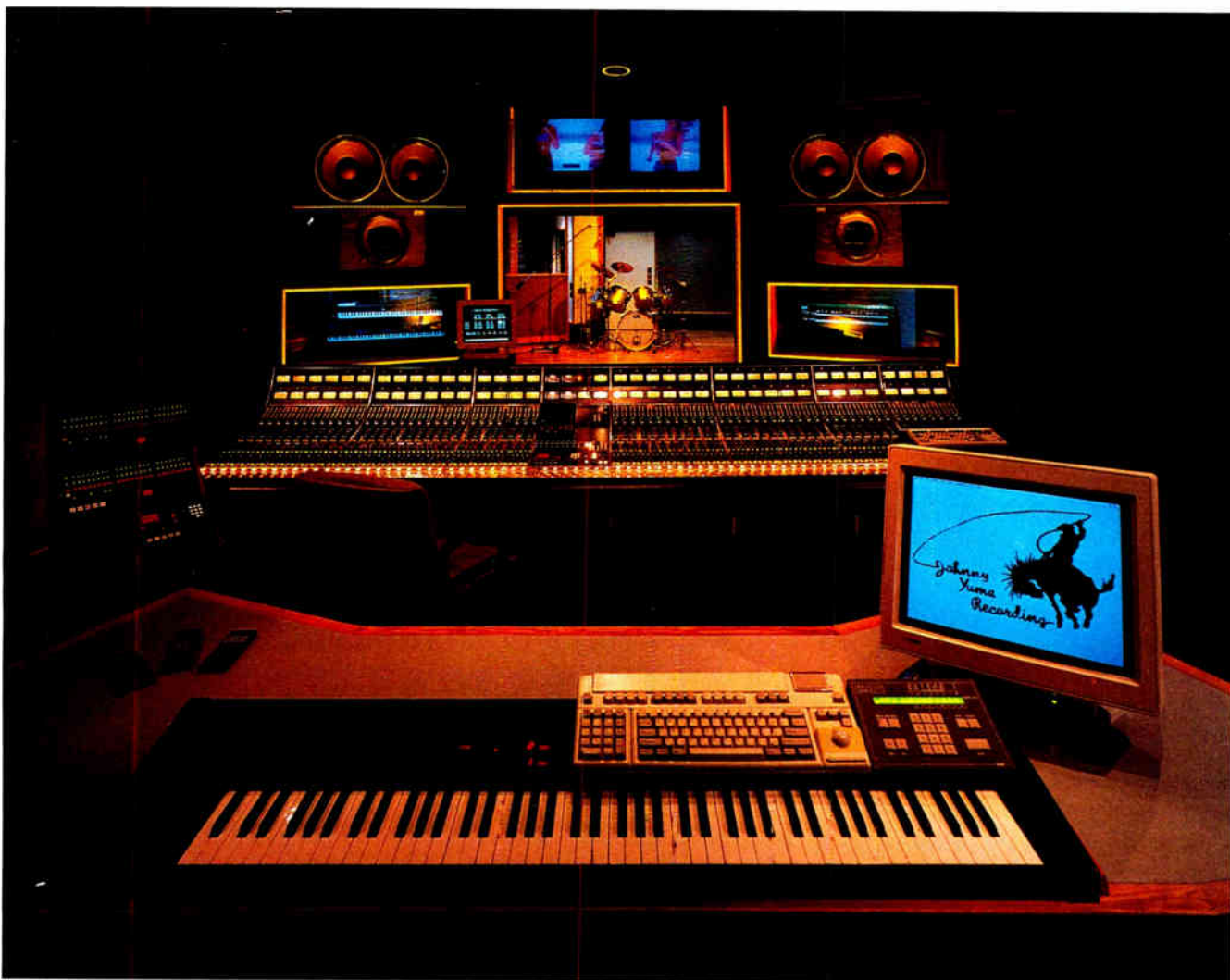


PHOTO: COURTESY OF JOHNNY YUMA STUDIOS

The Johnny Yuma control room, featuring Rothstein's TR-1A monitors and custom Neve 8086 console.

recent, Johnny Yuma Studios in Burbank, Calif., for the ultrahot producer/songwriter Patrick Leonard (Madonna, Brian Ferry). Also, as systems consultant to the Hard Rock Cafe empire, Rothstein is putting the finishing touches on the Berlin Hard Rock and beginning the next three Planet Hollywoods. He is just back from three days in Paris, consulting for Euro Disney, and he's prepping his veteran tech crew for a week in Hong Kong.

The project board in his Park Avenue apartment/laboratory already shows a few assignments for early 1993, and his personal assistant is urgently looking for him to approve a revised AutoCAD drawing for his meeting tomorrow in L.A. But at the moment, Ted Rothstein is in a friend's apartment in Greenwich Village, wrestling with a \$90 amplifier. "I know I can fix this puppy," he says, "just give me ten more minutes."

Dr. Rothstein, paging Dr. Roth-

stein...

Mix: You have a reputation as a studio doctor, of being able to make studios sound better and of getting the most out of equipment. How did you acquire your reputation? If you can lift the veil of confidentiality, tell us about some of your patients.

Rothstein: Well, a lot of this studio magician thing comes from the fact that in the late '60s very few people knew what they were doing, and the technology was pretty new. Studios were putting in the first generations of multitrack recorders, multichannel consoles and powerful monitor systems, and then discovering that all this gear didn't always work right.

I had come out of the aerospace industry, and I had a handle on sophisticated circuit technology, which gave me a bit of an advantage. When I started at Media Sound in 1969, I was working with Bob Margoueff and Malcolm Cecil, who were doing all of Stevie Wonder's recordings. At that time, Stevie was

as advanced as anybody in his technical requirements, so I started to dig into Media's console and tape machines to modify the system and reduce the noise. I just got fascinated with the idea of making the sound as quiet and clean as it could be, and trying to make the equipment do more.

In 1971, I moved over to Electric Lady, Jimi Hendrix's studio, which was the absolute state of the art in those days. Eddie Kramer was there doing Led Zeppelin, Kiss and the Stones. As good as the Lady was, there were always problems. I remember that I spent months creating the perfect pan pot so that Kramer could do these full-spectrum pans without losing gain across the spectrum. Later, while I was at Bearsville, I started to get calls from other studios, from engineers and producers who knew something was wrong with their system but didn't know how to fix it. I developed a methodology for testing rooms so that I can

walk in and within about an hour tell you what's wrong. Nine times out of ten, studios are underpowering their monitor system, or building too much noise into their audio chain with excess EQ.

Mix: Did you ever lose a patient?

Rothstein: Not really, but I was once called into A&R to consult on their monitor systems. At that time, their main room, I think it was Studio R2, was pretty much being used exclusively by Phil Ramone, who was working with Billy Joel, people like that. He was the hottest producer in the world, turning out incredible-sounding records. I discovered that acoustically the room was a nightmare. An analysis of the room equalization looked like a stock market chart. But it was working for Phil; he just instinctively knew how to compensate for its idiosyncracies. I decided not to tinker with greatness.

Mix: It's always interesting to know what different people use to establish a reference point for control rooms. What do you listen to, to get the feel of a room?

Rothstein: I used to listen to Hen-

drix and some Todd Rundgren, both of whom used a lot of the audio spectrum. Lately, I've been using Thomas Dolby's *Aliens Ate My Buick* and Kim Wilde's version of "You Keep Me Hanging On." Also, Dave Sanborn's *A Change of Heart*, Roger Waters' *The Wall Live in Berlin*, and Patrick Leonard's group, Toy Matinee.

Mix: How did you get involved with Pink Floyd and Roger Waters?

Rothstein: I met Nick Mason, Pink Floyd's drummer, in Woodstock in 1979, at a little studio I had done for jazz musicians Carla Bley and Mike Mantler. They had a first-generation MCI 440 console, which I had extensively modified—creating extra sends, panning between buses, things like that. Pink Floyd had the same console at their Britannia Row Studio in London, and Nick asked me to "have a peek" at it. I saw that they weren't getting very much out of their console; they were pretty much using it as it had come out of the box. So I kind of kidnapped their console for the next two days. I walked out on the third day, handed Nick Griffiths, their producer, a

bag of parts I had removed, and said, "Try it now." It seemed like a parlor trick, but I'd increased their dynamic range by about 15 dB. Over the next three years, I continued to customize their room, and I think helped them to create some of the resources they used on their records.

When Roger Waters left Floyd in 1986, I did a complete upgrade on his home studio monitor system. It involved taking his existing Westlake monitors, pulling out the stock crossover network and creating a "tuned" crossover by customizing a Rane three-way variable electronic system with circuits I designed, adding my own highpass filters. I augmented the system below 150 cycles with low-frequency reinforcement cabinets, into which I put two dissimilar JBL woofers, loaded to get the best of each. For the high end, I used a JBL 2405 tweeter and kept the classic Westlake midrange wooden horns. I then retuned the existing White 1/3-octave EQs, drove that signal through the new crossover system and then into the power amplifiers, which I beefed up with additional Yamaha amps. We

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ended up with considerably wider bandwidth, better stereo imaging and better clarity. I think the first project Roger did afterward was *Radio Kaos*.

Mix: Describe your most recent project, Johnny Yuma Studios, in the context of recording trends of the '90s.

Rothstein: The clear trend of the '80s and '90s is toward smaller studios and larger control rooms, in many cases more than 2,000 cubic feet. Johnny Yuma, for example, is almost 4,000 cubic feet.

At Yuma, more direct recording is occurring in the control room. There is both more equipment—synths and such—in the room and more people who need to be hearing the same thing. It used to be the case that I'd be aiming for a narrowly dispersed, very focused sound, to create a sweet spot—an optimal listening position for the engineer and producer near the center of the console. Yuma's existing UREI 813s, with their highly directional configuration, were fine for that. But you need to get the same accuracy of sound to people who may be ten feet away from the console at a MIDI mixing station or a secondary console. Johnny Yuma's main console, two Neve 8086 consoles custom-fitted together, is almost 12-feet long. So the requirements are for a monitor system that delivers wider dispersion, a room that's capable of maintaining smooth diffusion and minimal reflection characteristics, and a power capability that can fill a large area. For Patrick Leonard, who monitors at a very wide range of levels and who is all over the control room, the challenge was to make the room totally transparent, everywhere.

Mix: How was this accomplished?

Rothstein: I started with the front wall, most of which had to be rebuilt to accommodate the larger physical dimensions of the monitor system. I wanted the speakers down on the wall, closer to optimal ear level, and the wall had to be very solid and not absorptive at all in the lower frequencies. By the way, although many people like to mount speakers on rubber isolators, I've found that isolation of the speaker from the wall hurts low-frequency response. Some Fiberglas is incorporated in the wall as a mid- and high-frequency absorber, to soak up any bounce.

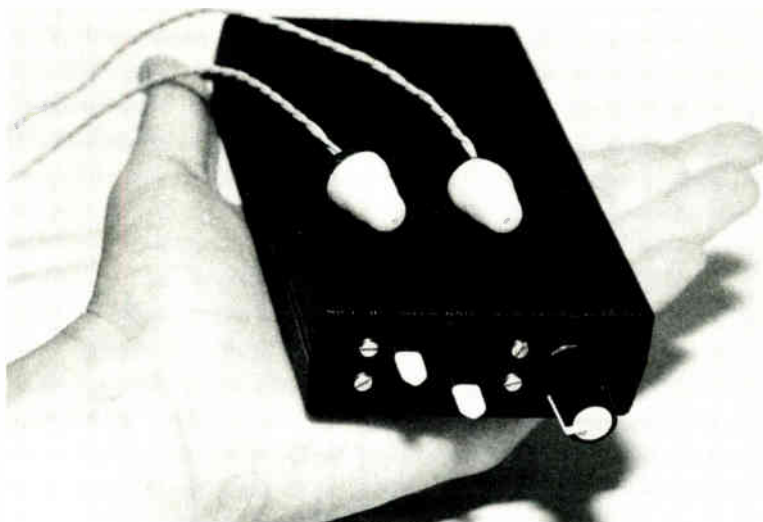
The system is a highly customized speaker matrix, mostly using JBL components and my customized crossovers, which I pre-curved. I chose UREI 6290s as the power source.

There's a bit of controversy about control room windows these days. Those big, sexy glass windows look great, but they can create all kinds of acoustic problems. Basically, I think it's a question of visibility vs. monitor placement, and, ultimately, it's the owner's choice. Patrick wanted to keep the original window, which is a sliding glass door, but I reduced the side windows and lowered them

beneath the speakers.

After the front wall was pretty much done—live at low frequencies and dead at high frequencies—I invited John Storyk to work with me on the ceiling and the side and rear walls. You see, I've always had the idea that the whole control room is really an extension of the monitoring system; all the wall treatments, the placement of equipment, even the look of the room is governed by the monitor system. John used a new configuration of RPG Diffusers and other materials to create the exact distribution of reflection, absorption and diffusion that we wanted. When

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we tested the room, it was, ahem, perfect.

Mix: How do you feel about near-field, console-top speakers?

Rothstein: They have their value, but I can't get into the current hype. Meyers, Auratones, NS-10s, KRKs—ultimately, they're all too small to let you hear the full frequency range. You never get an accurate picture, especially of the bass. Studios forgoing big, serious monitors are making a mistake.

A more interesting question is whether to use point-source, directional monitors, such as UREI 813s, Tannoys and Altec 604s, or multiway systems with high-power handling characteristics, like Westlakes and JBLs. The point-source option gives you precise imaging and mixing control but can't handle level without distortion, so they're fatiguing; the multiways have plenty of headroom, but who knows what you're hearing. The TR-1A system I created for Johnny Yuma synthesized the two schools of thought: It's accurate across a wide listening area with precise imaging, handles power easily and doesn't get harsh after a couple of hours of listening. Patrick Leonard calls it "the friendly monitor system."

Mix: How about auxiliary machine rooms? Pro or con?

Rothstein: Pro, definitely. Get the noise, the heat, the hum and the reflective surfaces out of the room. The sensitivity of digitally recorded information makes us pay more attention to every noise source, because nuances, or problems, at the ends of the audio spectrum can be masked by extraneous noise.

Mix: You've been creating media systems for Hard Rock Cafes around the world. What's the sound philosophy of the Hard Rock Cafe?

Rothstein: The Hard Rocks are about music, and the attitude of the organization is to create a quality listening environment for people. Consequently, I'm using the same approach I use in studios; no matter where you are in the restaurant, you're going to hear stereo, and it's going to be as close to the original mix as we can get. I've designed a system that uses about 10,000 watts of power and between 80 to 120 speakers, usually the JBL Control 1 or S-4, with woofers strategically hidden throughout the room and a very complex interfacing network,

which I've designed to allow the house engineer to control sound. And we're using studio tricks to smoothly disperse sound and eliminate standing waves. It's really very sophisticated, much closer to a studio than to a jukebox.

Mix: How many Hard Rocks have you done?

Rothstein: I think Berlin is my twelfth in the last five years. St. Thomas and Dublin are on deck, and we've got Planet Hollywoods in Barcelona, Chicago and Cancun in the design phase. My passport is in its second printing. It's a good thing I like working abroad.

Mix: Any special problems working overseas?

Rothstein: The travel and the logistics are the greatest challenges. Local currencies, voltage irregularities and contractors can all drive you crazy. I've designed systems for studios in Bogota and Reykjavik, and sometimes it's easier to use local materials like lava or hardwoods (non-endangered), but for the Hard Rocks we try to use American-sourced products wherever possible. This leads to some intriguing customs maneuvers. Most interesting countries for customs? Thailand and Mexico, definitely.

Mix: With all the changes in recording technology and the audio business, is it still as much fun as it was when you were digging into consoles at three in the morning?

Rothstein: It's much more of a business. Until a couple of years ago, it was just me running around with a Hewlett Packard analyzer and a toolkit. Now I have a design team, traveling road technicians, a bad back and an enormous fax bill. Actually, I enjoy it more now. I've always been obsessed by audio fidelity, and that hasn't changed.

For me, every project is about making signal move through electronics as cleanly and as accurately as possible, so that people can hear music at its best. Because the science that goes into that equation is better now than it used to be, I'm closer to my goal. And I still like to drop into studios, unannounced, and point out to the engineer that the monitors are out-of-phase. ■

Joe Schick is a New York communications consultant and writer. He's trying to get Ted Rothstein to modify the graphics board in his computer.

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THE CLASS



PHOTO: JIANWEI BINEL

Studio Marko, Montreal, Quebec. Housed in what was once an old church, Studio Marko's new film mixing theater features a Euphonix CSII digitally controlled audio mixing system and custom high-performance monitoring. Designed by Daniel Seguin of Montreal's Dan Audio, the room opened in April 1992.



PHOTO: TOM GATLIN

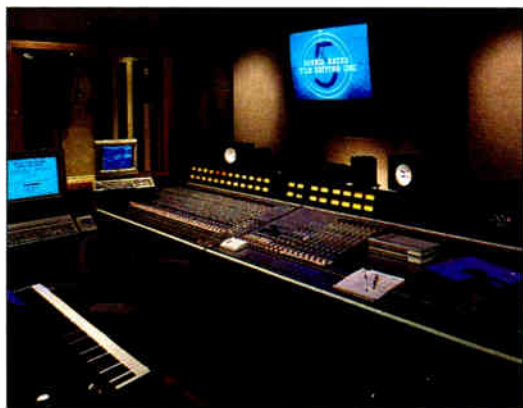
The Studio at Mole End, Franklin, Tenn. This room by Russ Berger Design Group opened in March 1992. It houses an automated Neve V3 featuring Flying Faders, and UREI 813 monitors. Unique to the facility are the sound-rated, full-height glass windows installed in the control room to allow visual communication between the engineer and musicians.



PHOTO: TOM GIBSON - FOUR EYES PHOTOGRAPHY

Fortunate Sun Recording Studios, Honolulu. Featuring an Otari Series 54 console and TAD TSM-1 and Meyer HD-1 monitors, this room was designed by Jim Linkner, owner Dave Tucciarone and Wei Chen, and it opened in March 1992. The system was designed and installed by John Gibson of EAR, Phoenix, Ariz.

PHOTO: PETER EDSON



Dennis Hayes Associates, New York City. Design consultant Richard Alderson chose the DDA DCM224V console with Uptown automation to serve as the heart of the new audio room at this audio and video production facility. The room opened in January 1992, featuring Quested and Yamaha NS-10 monitors.

PHOTO: DAVE ARONSON



Multivision Inc., Needham, Mass. The Yamaha DMC1000 digital mixing console is the centerpiece of this D-1 video digital component serial editing room, which opened in April 1992. Designed by Alactronics, the room includes Genelec S30 monitors, actively crossed over to servo-driven, contra-bassed subwoofers.

OF 1992

**A Look
at Some
of This
Year's
Hottest
New
Rooms**



PHOTO: STEVE GORALIM

Integrity Studios, Mobile, Ala. To incorporate the beauty of Integrity's setting, George Augspurger designed specially angled floor-to-ceiling windows along the entire length of the rear wall. The room is equipped with an SSL 6000 G Series console; monitors include Meyer 833s, HD-1s and Genelec 1031As. The studio opened in August 1991.



PHOTO: JOHN ARIOSA

Imagine Recording Studio, Nashville, Tenn. Designed by co-owner Steven Durr, this facility opened in March 1992. It features Steven Durr custom monitors with TAD woofers and horns. The emphasis throughout the facility is on vintage analog gear. The console is a 44-input API, used on recordings by Elvis and the Everly Brothers.

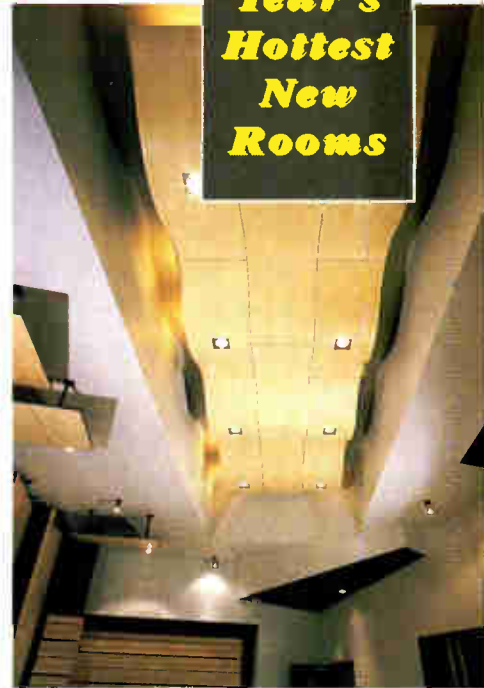


PHOTO: JANT JAMALEY/PHOTOGRAPHY

Bad Animals, Studio X, Seattle. This is a view of the ceiling by designers at studio bau:ton, who also worked closely with TAD on the design of the room's custom monitors. The room features an SSL 4064 G Series console with Ultimatic; the facility opened in March 1992.

Sheffield Audio, remote truck, Phoenix, Md. Designed by owner John Ariosa and crew chief Garth Michael, the 48-foot tractor-trailer houses SSL 48-input 4000 E and Neve 5104 consoles, with UREI 815C and Yamaha NS-10M monitors. The truck started rolling in April 1992.



PHOTO: BETH GWINN

Dajhelon, Rochester, N.Y. This is Studio A of this three-studio facility that opened in January 1992. The main console is a 56-input Amek Mozart with Supertrue automation. Designer Bill Morrison of Acoustical Physics Laboratories incorporated a large, reflection-free monitoring area to get the most from the room's Tannoy System 215-DMT and Meyer HD-1 monitors.

PHOTO: TIM BURRIS/AMERICAN PHOTOGRAPHY



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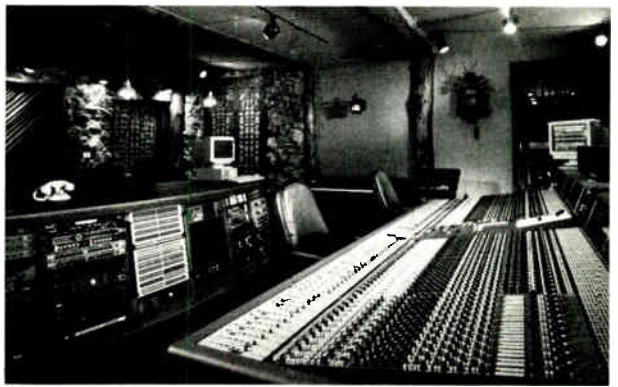
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World Radio History



Quartz Recording Studios, Massapequa, N.Y. Danny Vitallo of Personal Recording Environments re-designed an existing space, adding new ceilings and new front-wall speaker soffits, among other renovations. Opened in the summer of 1991, the studio features a Soundtracs Quartz console with Tracmix II automation and UREI 813C and Yamaha NS-10 monitors.



Manhattan Center Studios, New York City. Studio 4 houses a Neve VR 84 console and Tannoy 215 and Genelec 1031A monitors. Designed by the staff in consultation with Ed Evans, the room opened in December 1991.



JSM Music, New York City. This new John Storyk-designed facility opened its doors in late-April 1992. Studio A contains an SSL 6000 E console with G Series computer and Yamaha NS-10 monitors. The room makes extensive use of complex geometry and 3-D diffusing element design.



MTV Networks, New York City. This Sony Select™ system turnkey editing suite incorporates a Sony MXP-2926 Edit Suite Mixer interfaced with a BVE-9100 Video Editor. The BVE-9100 also controls a PCM-7030 time code DAT recorder. Audio monitors include the Tannoy System 8 NFM and Auratone Soundcubes. The system was installed by Sony's Communications Systems Division and was completed in June 1992.



Woodland Digital, Nashville, Tenn. This room opened in the summer of 1991, and the console was recently upgraded to a Neve VR 60. The Westlake monitors are customized with TAD hardware by facility designer Steven Durr.



Posthorn Recording, New York City. Designed by the New York-based firm Arcoustics Inc. for digital editing, playback monitoring and classical music recording, this room opened in January 1992. It is equipped with a Sonosax SX-S8 console, and the monitors are tri-amplified Sota CF 750s with subwoofers.

Designing The Project Studio



by JJ Jenkins and George Petersen

This story actually began a decade ago when we started assembling a private-use facility to handle a variety of production needs, ranging from acoustic recording to radio production, jingle work and a steady stream of film/video scoring dates. Over the years, a seemingly endless parade of equipment has gone into—and out of—this quirky, little L-shaped room. About five years ago, we decided to do something about the control room layout, which was appropriate for rock recording but ergonomically unsuitable for the needs of the modern project studio.

The design outlined in this article does not include any acoustical changes to the room itself. It is well-known that when listening to monitors placed in the near-field (within five feet of the listener), the acoustic effects of the room are substantially reduced—although not entirely eliminated. If acoustical treatment is required, a number of products, such as ASC's Tube Traps, may prove sufficient to "touch up" any minor anomalies. Also, since the monitors are placed over the console at 45° angles (relative to the rest of the room) there is less chance of any hard echoes caused by slap from the back wall.

After some soul-searching and a couple hundred sketches on rum-stained

cocktail napkins, we came up with the floor plan shown in Fig.1. But before any gloom and doomsayers in the audience out there start hurling stones about this room design, keep a few facts in mind:

First of all, this control room layout works very well for the types of projects we produce. It may or may not be suited to your situation, although we know of at least five other rooms that have adapted our approach, with excellent results. And besides a project studio, this design could also be used for a mastering suite, a digital edit/premastering room or a video editing bay. Secondly, like most project studios, the room had to be constructed within the confines of an existing space. In our case, the control room is an 11x16-foot, L-shaped space above the recording room, so we needed to make the most from the space we had. And as with everything else in life, cost was a deciding factor: All the counters and cabinets used were assembled from commonly available, low-cost materials such as 3/4-inch CDX plywood, 2x4s, 2x6s, and a roll of high-tech-looking, charcoal-gray indoor/outdoor carpet.

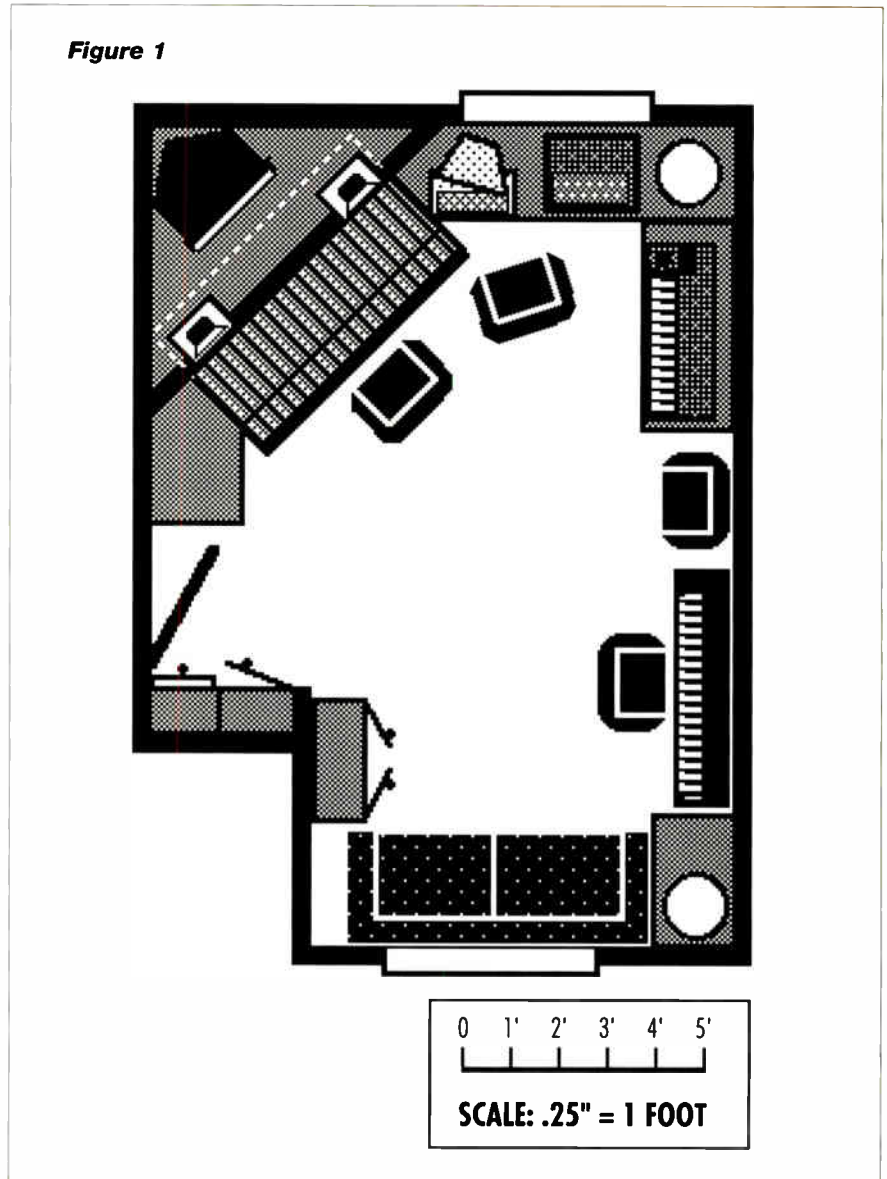
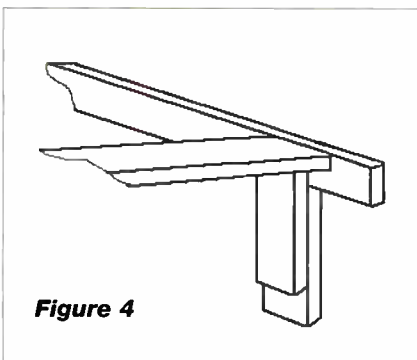
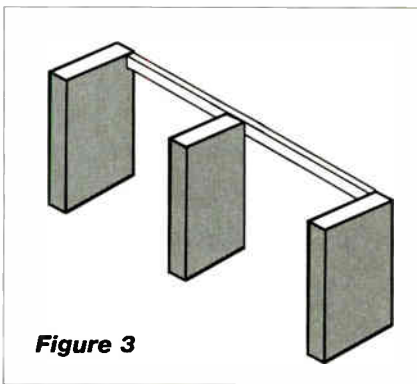
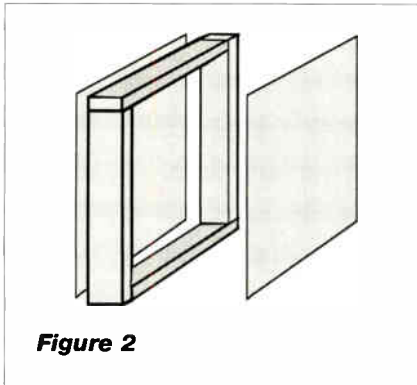
Photo far left: Authors relax in completed studio. Note wall-mounted synths at right.

Fig. 1: Studio floor plan; corner-facing console extends below triangular shelf with video and audio monitors.

Fig. 2: Column construction.

Fig. 3: Column placement.

Fig. 4: Right-side detail of corner shelf support.



The total bill for materials—including new floor carpeting to complement the I/O-covered countertops—was under \$300.

The key to this design is the rather unique positioning of the console, facing directly into a corner. From this point, counters extend to the right and left of the engineer, providing immediate access to computers (Macintosh, Atari and IBM), outboard gear, autolocators, sync devices and MIDI toys.

Rather than build equipment racks for signal processing and MIDI modules, however, we opted for some manufactured units: slant-

faced, nine-space racks, which fit neatly under the 29-inch-high counter tops. Mounted on casters, these can be pulled out easily for reconfiguring. The 29-inch counter height proved to be just right for playing MIDI keyboards or entering computer data. The counter tops are supported by columns placed 46 inches apart, so two racks sit comfortably side-by-side under each counter.

A large triangular shelf—4 feet deep and 90 inches wide—supports a 20-inch video monitor and accommodates most near-field studio speakers. The lip of the shelf ex-

tends just over the console's meter bridge, thus creating a built-in look, while its 40-inch height offers ear-level placement of the monitors. The dotted lines on the shelf in Fig. 1 indicate how far the console protrudes—its corners nearly touching the walls on both sides. The width of the monitor shelf is sufficient to accommodate several pieces of outboard gear between the speakers for those sessions when extra gear is brought in, or as a convenient location for tweaking presets or programming without having to move outside the listening sweet spot.

This design requires placing studio monitors into a corner space, so be aware that the intersecting walls can play havoc with bass response, particularly with rear-ported monitors. The acoustical effect of such speakers in this application varies widely, depending on the size and placement of the ports, the free-air resonance of the woofers and the speaker-to-corner distance. This can result in acoustical coupling or phase cancellation, yielding summation or attenuation of LF energy in the studio, with an outcome that's difficult to predict. Rear-ported monitors *can* be used on the corner shelf; however, front-ported or sealed-cabinet monitors are more predictable when used near corner walls.

The counter area to the left of the console is kept intentionally vacant, as another location for placing temporary gear, bringing in a second computer, etc. Just below the monitor shelf, to the left of the console, we installed a "guest" patch bay. It's basically a one-foot sheet of Masonite with a variety of 1/4-inch and XLR jacks connected to the console's large TT patch bay, with access to sends, returns, tielines, mic inputs and even a couple of MIDI and SMPTE jacks. The guest patch bay really speeds things up when we need to bring in additional gear or rental items for a session.

Speaking of patch bays, we built an extensive MIDI patch bay, comprising some 1x8 MIDI thru box circuits (adapted from a simple, two-chip PC-900 optoisolator project published in the March 1986 issue of *Electronic Musician*) combined with a *passive* MIDI patch bay using 1/4-inch TRS jacks and 3-conductor patch cords. It's not high-tech or

—CONTINUED ON PAGE 51

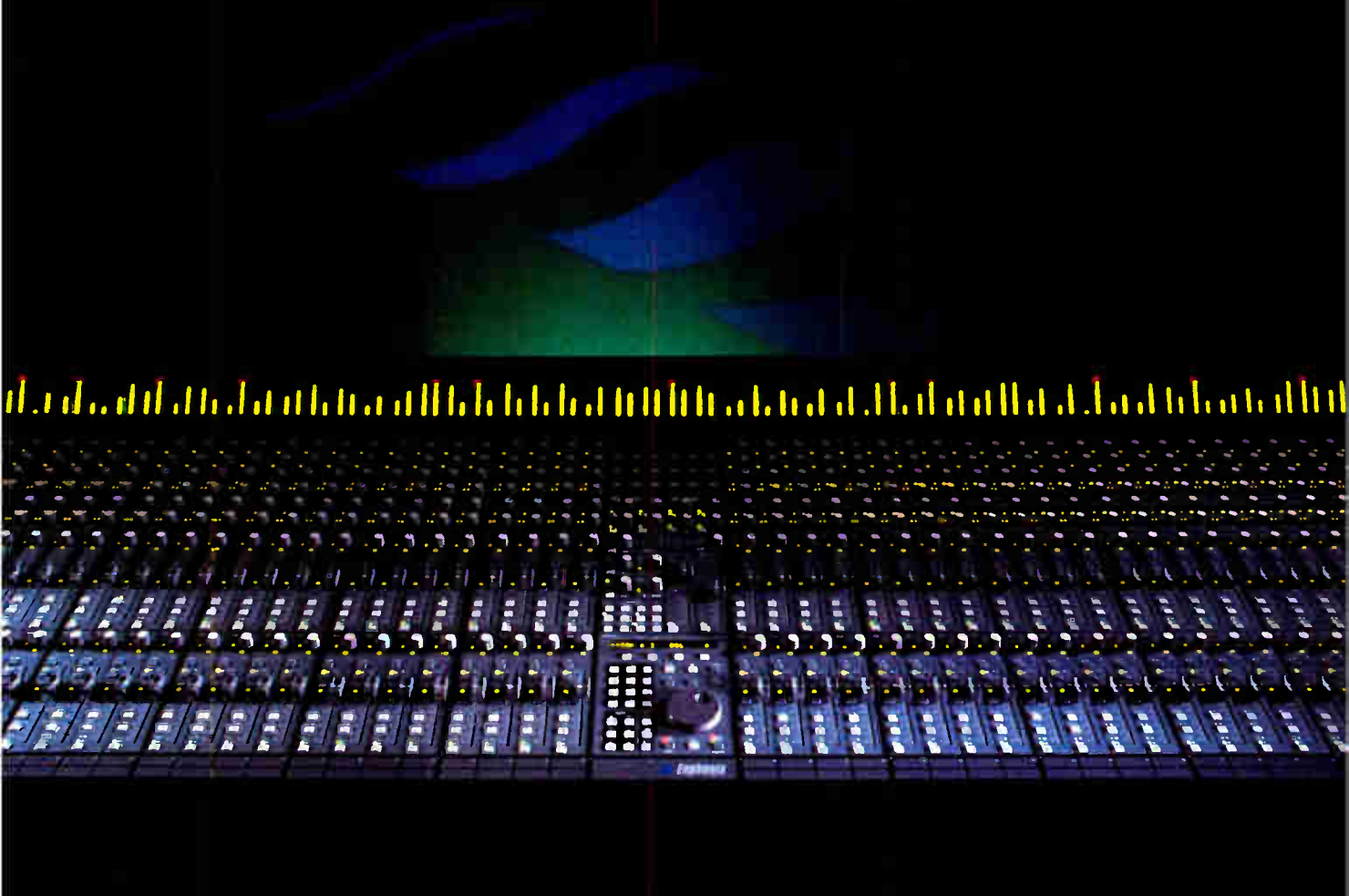
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Modular Alternatives

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PHOTO: MICHAEL BLOOM

skeptics such as Stephen St. Croix saw the possibilities in the system's futuristic approach. The rest of the industry waited until early 1991, when the prototypes became reality and units started rolling off the pro-

duction line.

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—CONTINUED ON PAGE 152



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—FROM PAGE 46, PROJECT STUDIO
programmable, but it *works*.

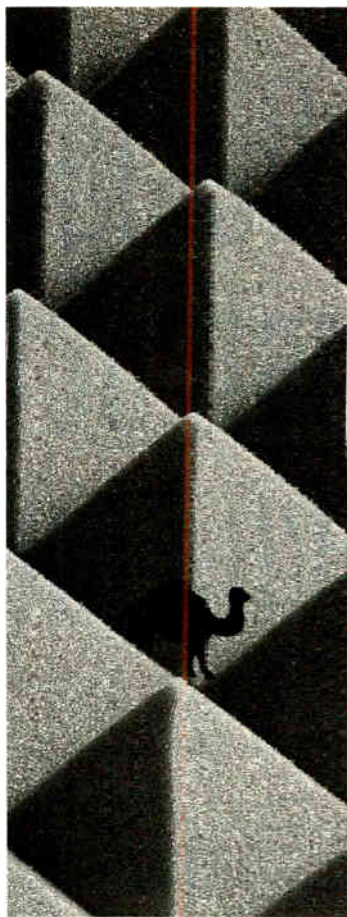
We designed a custom stand (26 inches tall) for a Yamaha KX88 88-key MIDI controller. Placed near the rear wall, it can be readily moved throughout the control room, as MIDI jacks tied to the MIDI patch bay are located at various points in the room.

Space (or a lack of space) is always a major consideration in any control room, and ours is no exception. So rather than putting cumbersome synth stands in the control room, we used a wall-mount keyboard stand from Standtastic (Anderson, IN). Designed primarily for displaying electronic keyboards at music stores, the wall stand works equally well in control rooms and provides secure, adjustable mounting. We have two synths mounted at 45° for easy playing. Below this we added an extra pair of 90° arms with a plywood shelf that supports two drum machines and a non-rack synth module.

Behind the door, a built-in cabinet has three drawers (for cables, supplies, tools, stomp boxes, etc.) and a bookshelf for manuals and books. About 4 feet tall, the cabinet's top provides an out-of-the-way place for beverages—no liquids are allowed near the console or electronics. Another small cabinet stores music software, sample libraries and documentation. There's nothing worse than not being able to find a manual when something decides not to work during a session. We have also developed a "Studio Book"—a binder filled with information such as patch bay maps, reverb presets, drum machine note numbers, MIDI assignments and listings of CD production music and EFX libraries. The studio book is a great timesaver.

A couch in the back of the room affords a comfortable haven for catching some shut-eye during all-night editing or mixing sessions. A coffee table next to the couch provides another safe place for food or drinks, with a phone for cutting those all-important Andalusian record distribution deals—or at least ordering a pizza. We eliminated plans for *moderne* recessed cove lighting, instead settling for matching table lamps (with 3-way sockets) in each corner. It had something to do with the budget.

—CONTINUED ON PAGE 151



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Since a control room's reflections can't be eliminated, they have to be managed so as to avoid messing up the monitor sound. That we know how to do. In fact, we've been doing it for as long as we've been recording.

A case in point: I worked for

some years in a control room built in 1932 that did nothing about as well as possible. It was monaural, of course, but it was a dandy. The room was around 30 feet wide and about 20 deep, with a 16-foot ceiling. The front wall and ceiling were very dead, and the back and side walls had been left untreated and reflective.

At eight feet, the speakers were too close to the mixer, but otherwise, that 60-year-old room would probably meet the current standards for a high-tech monaural environment. It sounded good for the same

reason that a lot of old control rooms sound good. They're enormous, and dimensions are critical to control room acoustics. Room dimensions—and geometry—control reflection times, which are *the* primary design parameter for modern rooms.

While excellent (although huge) control rooms have been built since the '30s, putting together good small ones was a terrible problem until a few years ago. They sounded cluttered, the stereo positioning was fuzzy-to-nonexistent, and they were tiring to work in.

Then, about ten years ago, there was a revolution. Several researchers exchanged a raft of data from differing fields. They discovered that small rooms sounded lousy due to the difference in time between the arrival of the direct sound from the speakers and the arrival of the first strong reflection from a wall. A short reflective second path to the mixer's ears generates a comb filter that the hearing mechanism confuses with its own method for determining the elevation of a source signal: a series of comb filters generated in the fleshy outer ear. This confusion raises hell with hearing as the brain tries to make sense of false elevation cues. Very muddled, very tiring.

The solution to the problem was obvious. Eliminate the short reflection paths. A design that would actually accomplish this was not obvious at all. In fact, the solution required a room that was totally different from anything that had been built up to that time.

The first designer/builder to come up with a room that worked was Chips Davis. By mutual agreement, Synergistic Audio Concepts, which was largely responsible for the information exchange, trademarked the performance specs as Live-End/Dead-End™. The purpose of the trademark was mostly to keep unethical types from building the same old bad rooms and calling them the hip new name.

Davis built many LEIDE studios, as did a few others, since Syn-Aud-Con published the design parameters in considerable detail. Davis' own rooms worked every time. Other designers had less luck, particularly when they only followed the shape of the Davis rooms rather than designing to the theory. There were several bears in those woods, the

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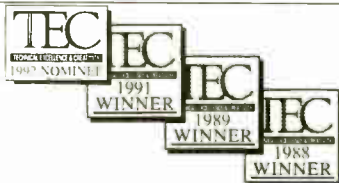


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meanest of which was back wall geometry.

The back wall problem was solved a few years later when Peter D'Antonio marketed his Quadratic Residue Diffusers™, which were based on the Schroeder formulas. The Diffusers made back wall treatment both simple and reliable, and everybody started building Davis lookalikes. Many people still do. Some of them are thoroughly competent designers whose rooms meet all the Davis specifications and can be certified as LEDEs, but mostly they're studio owners trying to save a few bucks by doing their own design work. Unfortunately, they often call their rooms "LEDEs," as they're not aware of either the trademark or the licensing involved in the term.

There is no substitute for professional help. Designer/builders not only supervise the construction work, they guarantee the results. They also know enough tricks to save a client most of their fees.

However, for the dedicated do-it-yourself types who plan to put something together in the future, or fix a not-so-bad room, the rest of this article should prove helpful.

As huge control rooms are a past luxury, we'll assume you have minimum space available.

The first critical dimension is from the mixer's ears to the back wall, which has to fall into a real world Haas zone at about 20 milliseconds: 18 ms is known to be okay, 15 ms may be adequate, but why gamble? Don't go too long, as you'll start to hear double attacks at 40 to 50 ms.

To achieve the nominal 20 milliseconds, the back wall should be 11'3" away from the mixer's ears. The distance is determined by the formula:

$$\frac{\text{time} \times 1,127}{2} = \text{Distance to Back Wall}$$

where the time is in seconds (20 milliseconds equals 0.02 seconds) and 1,127 feet/second is the speed of sound at room temperature. A 10-foot distance to the back wall yields a reflection at about 18 milliseconds, and it would be nice if the mixer could push away from the console, so 11.5 to 12.5 feet is reasonable.

There are at least four ways to handle the back wall, ranging from Chips Davis' first design with care-

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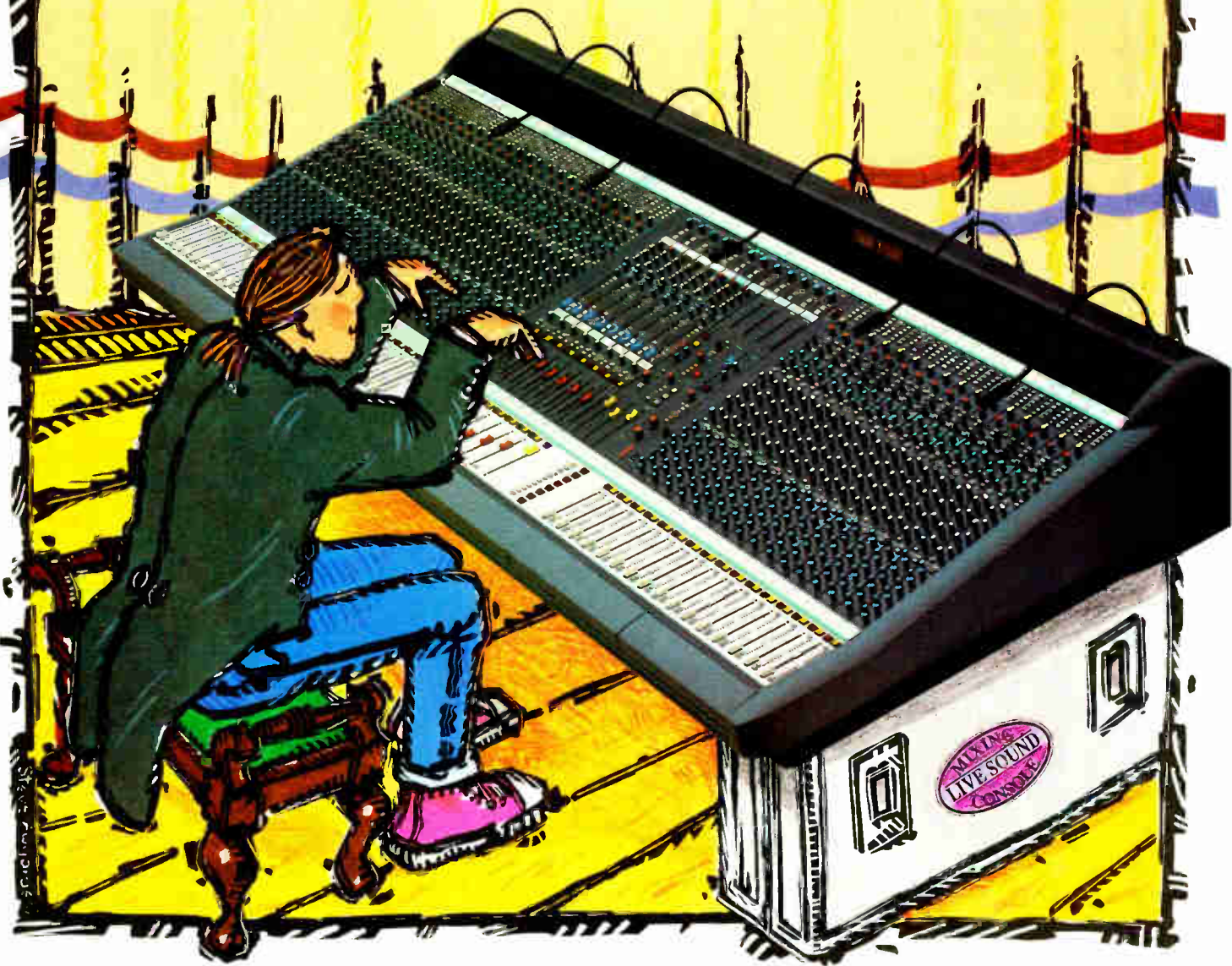
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fully angled zigzag panels to Peter D'Antonio's curved wall tastefully decorated in RPGs.

All of the treatments work, because they all disperse most of the speaker sound reflecting off the back wall while bouncing a smaller amount of flat smack directly into the mixer's ears from the back corners. This combination of diffuse and direct reflected sound puts the mixer in an aurally live space with a clear sense of position in the room, while the 20ms delay leaves the sound clean and uncluttered. When it's right, the sound seems to come through the walls *behind* the monitors rather than from the speakers. There's no feeling that the sound is somewhere in back of you, as happens with a dead back wall. No effort, no fatigue, no clutter.

Of course, commercially available diffusion units are not the only way to disperse sound; just the most practical. Any irregularity in a wall will break up sound down to a frequency of its depth under 560 Hz. That comes to 15 inches for 400 Hz, which is the commonly used low point for dispersion. Human ears are relatively insensitive to direction at low frequencies, so there's no point in dispersing them. In fact, ordinary cardboard boxes taped bottom out on a wall will disperse nicely down to 400 Hz or better and soak up gobs of excess bass to boot. Good for basement practice rooms, and they function far better than egg cartons.

Old auditoriums used niches with statues and vases for the same purpose (without the bass absorption). There's nothing new about using dispersion to improve the sound of a room. What *is* new is the QRD-RPG design, which makes dispersers small and efficient. QRDs reflect near-perfect dispersed sound at about half the depth of an equivalent box or wall, and they are so effective that it's usually cheaper to buy them than to construct the alternatives. They're also guaranteed to work.

The flat smack reflection to the mixer comes from flat panels at the back corners. They can be 3- to 4-foot panels mounted on ball joints for aiming, or they can be built into the room as 45-degree corner killers. In either case, they are called Haas Kickers. No letters, please—I didn't invent it. I just use the term.

There are legitimate arguments about using flat smack Haas Kickers, but I like to use 45-degree back walls as kickers, partly to eliminate back corners and to even up the reflection time, but mostly because they provide a *lot* of storage space. There's no place to keep anything in a control room, and with solidly latched doors, a pair of 45s will give you enough room to hide a body—maybe two or three. 45s are also handy for HVAC ducts or even a small air conditioner. The kickers don't have to reach the ceiling; eight feet up is plenty, but everything in

back must be absolutely rigid or the bass won't bounce.

If you don't like the reflections from the hard, flat surface, put QRDs or other diffusion materials on the doors. I learned about that approach while doing sessions in a control room with a flimsy back wall of Masonite over 2x4s. It reflected the top end perfectly, but the bass thundered past like a freight train and vanished into nothingness. I found myself continually looking over one shoulder to see where it was going. Spooky.

Some thoughts concerning non-

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the monitors into the walls, they have to be unhoused in order to do anything with them.

The advantages of doghouses are that the bass response is improved, the monitors take up less room space, you gain about 18 inches of mixer-speaker distance, and the result looks professional. However, bear in mind that you'll probably be in business awhile, and this year's king of the hill is likely to be next year's turkey. Build doghouses big enough not only to accommodate different speakers, but to change positions and angles as well. A new

console will probably shift the mixing position, and the monitors will have to be moved to restore the geometry.

Back to the walls. There are two good reasons for not building speaker walls at 45 degrees. One is that they would play directly into the back corners of the room (if any) and the other concerns the stereo monitor horizon. If only one person in a control room needs to hear the monitors properly, they can be pointed directly at that person. However, there is usually one other pair of ears that needs feeding: the pro-

ducer's. There are limits as to how wide a near-perfect field can be spread, but the only thing that will spread it at all is over-convergence of the speakers: As listeners move closer to one monitor, they also move a little out of its axis and into the axis of the other.

I'm not going to debate the merits of monitor types here. Monitor choice generally involves the preferences of both studio personnel and clients, and whatever a studio uses is probably optimum for its working situation. Nonetheless, monitor horizon is partly a function of tweeter Q, so the monitor type affects control room design. For example, I know one very competent designer who crosseyes UREIs and then hides them behind big cloth panels. They sound terrific, but the angle would be wrong for any number of other speakers. Among others, Tannoy's need so little convergence that simply pointing them at the presumptive producer works very well. If you don't know the angle for your monitors, experiment before you commit to a mounting angle. It's also important to allow for changes in the angles if you doghouse the monitors. Very big doghouses with equally big front plates will do it. Want a different speaker? Make a new plate. Mainframe system.

The only remaining speaker dimension is height, which should be as low as possible and is in many cases related to the position of the window.

First, the window(s). Not whether, but how big. A window ending six feet above the control room floor will permit a standing mixer to look a standing vocalist square in the eye. That's high enough. The window's low edge should be where the seated mixer's sight line is interrupted by the top of the console, usually about two feet up. That's a 4 ft. window, and while it ain't cheap, it beats the hell out of a 6- or 8-footer. It also transmits less bass.

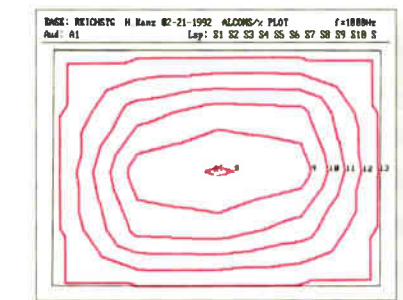
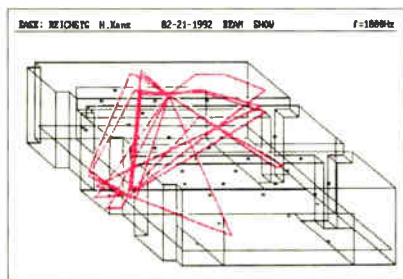
The glass is generally 1/4-inch thick with the outside pane mounted dead vertical and the inside tilted down at eight to nine degrees for a 12-foot mixer-to-front wall distance, to keep the inside glass from bouncing rear wall reflections into the mixer's ears. The offset distance is eight inches for a 4 ft. window.

If the front wall is further away, a

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By Alfred W.
D'Alessio

PREFABRICATED

STUDIO MODULES

DIGITAL NOISE CONTROL

PHOTO: ROBERT WOLSCH



WOGL in Philadelphia: The mirrored "ceiling" is actually a wide-band acoustical chamber.

A Veteran studio designer plays a technical trump card for meeting digital noise standards in the acoustical environment, saving construction time and dollars as a spin-off.

Guaranteed—Better—Simpler—Faster—Cheaper. Five words that don't often appear in articles written about noise control. Most of the information published about control room and studio isolation subliminally suggests that you issue a blank check for the construction budget to cover the costs of designing, documenting and building overly complicated structures, which are your only hope of managing recording studio acoustics. And by the time you've spent your last nickel on noise control, you're still faced with the formidable task of financing the room's tuning and aesthetics.

The rising cost of consultation and construction comes at a time when demand for acoustical sophistication is increasing to match up to digital quality. Just as you wouldn't dream of designing and building your own digital workstation, you shouldn't have to invent any acoustical isolation structures that you can buy off the shelf. Using laboratory-tested, prefabricated noise and vibration control modules, you can save a small fortune by not reinventing the

acoustical isolation wheel. Then you can spend your savings where it really shows—on honing the interior acoustical tuning to perfection.

Prefab acoustical isolation technology is not new. It actually predates the extensive use of drywall construction in studio work by al-

PHOTO: JEFF BOLZBERG



NYC's WQXR features RPG Diffusors.

most 20 years. Originally developed in the early 1950s for controlling industrial noise, prefab technology found an initial application in the film industry and sporadically appeared on budget, fast-track audio projects. It was never taken seriously by studio designers.

UGLY AND EXPENSIVE

Prefabricated module technology has remained obscure in the audio world for a host of reasons. Its industrial, meat-locker appearance is repugnant to the creative world. The fact that acoustical consultants viewed the concept of prefabricated modules as a threat to their existence did little to promote the technology. But the limiting factor on an acoustical consultant's involvement in a project is usually the client's budget, not the consultant's ability.

As consultants, we spend our client's dollars much more responsibly by focusing on matters that cannot be handled elsewhere more easily or economically. Designing isolation structures is often a waste of time and money. This questionable, yet common, practice ignores the thousands of research and development hours spent by the developers of acoustical isolation modules to pack the most attenuation into the most economical package possible.

Even seasoned studio designers have a difficult time getting acoustical isolation designs properly built in

the field. As designer Vin Gizzi says, "Studio construction is so fraught with problems, I often wonder why anyone takes it on." This puts acoustical consultants in a tenuous position. If they don't spend a lot of their time and their client's money supervising the construction of sound and vibration structures in the field, the designs could be improperly built. Even well-meaning contractors sometimes miss the acoustical significance of building rooms that stop just short of being waterproof and gas-tight.

In addition to playing the role of watchdog, many designers resort to overdesign as a hedge against the acoustical deterioration that can result from hidden construction errors. Either way, the net result is extra cost to the studio owner, which could be more productively applied in other areas of a project.

Initially, we were surprised that these modular structures could not only be built in any size from a 3-foot-square phone booth to a basketball court, but also they didn't have to be rectangular. Pentagons, octagons and decagons are a snap, as are asymmetrical shapes and splayed ceilings. The Northeastern Communications Concepts design for the WQXR performance studio is one example of an asymmetrical, ten-sided enclosure (see photo).

Bear in mind that modular components are as ugly today as they were in 1955, which brings us to the first of three important design principles for using prefabricated structures.

First, the interior of a modular room should be acoustically treated just as if it were masonry or drywall. Gone are the days when perforated metal walls were acceptable either acoustically or aesthetically.

Second, whenever floating construction is desired, only the interior floating chamber should be prefabricated. Early designs attempted to fit prefabricated modules between

the existing floors and ceilings of the host building structure in order to envelop the floating room. Attempts to get a perfect acoustical fit around beams, pipes and obstructions, while compensating for uneven and out-of-plumb building construction, met with disappointing results. This problem was a major factor in shelving the modular approach. Enclosing an internal-floating and prefabricated chamber within a field-built acoustical envelope is referred to as *hybrid construction*.

The third consideration for modular design is financial. While it is cost-effective, it is not cheap. Too many designers have only considered employing prefabricated rooms for budget projects. While it yields the biggest acoustical bang for the construction buck, don't attempt to incorporate it into a budget project. On the other side of the fiscal coin, modular construction is only more expensive when compared to field-built structures that often yield less acoustical performance.

Here, then, are some advantages and trade-offs in hybrid construction.

CONSTRUCTION TIME

A typical prefabricated recording studio control room can be erected on site in one week or less. Because each modular panel can be built to an engineering tolerance of 1/16-inch, a typical room finishes no more

PHOTO: WILLIAM HARRIS



Disk-based post room at Kamen Studios, NYC.

than 1/4-inch larger or smaller than planned, perfectly plumb and square. Acoustical treatments and built-in loudspeaker soffits can be fabricated at the same time that the rooms are manufactured at the plant. There's no need to wait until the room is finished to take field dimensions for fitting

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TAKE IT WITH YOU

Try this with standard construction: Your lease is up, and the landlord is holding your expensive studio construction hostage with a hefty rent increase as ransom. If your studios were prefabricated, they could be relocated for about 30% of the cost of starting from scratch. Modular components can also be re-engineered into a different configuration to fit into a different space. Once your landlord understands that you can take your studios with you to another building, he or she will most likely become more cooperative at the bargaining table.

TELL THE BANK AND UNCLE SAM, "NO THANKS"

Planning new studios requires a substantial capital investment. The traditional source of funding for leasehold improvements is usually a bank loan. But since prefabricated structures are not a physical part of the building in which they are erected, they can be classified legally as equipment. As such, they can be leased from a variety of acceptance companies just like your consoles, tape machines and other studio equipment.

THE SPECS

One of the most popular modular building blocks is the Acoustic Systems 4-inch-thick Type 8 panel, which provides as much sound attenuation as eight inches of filled concrete block and provides a fair amount of sound absorption. This can substantially reduce the cost of acoustic wall treatments to further tune the room, particularly where low frequencies are a problem.

And speaking of low frequencies, if partition stiffness is important to your design, a solid Acoustic Systems Type 6 panel has less than a 15% absorption coefficient at 63 Hz. There isn't a studio or control room in existence that couldn't benefit from at least this much absorption.

To employ modular construction, all you have to do is select one of several different types of panels from a manufacturer, providing them with the dimensions you require, along with the locations of the doors, vision panels, and HVAC and electrical layouts. They will return a shop draw-

ing for your approval, detailing exactly how the studio will be fabricated, including the most efficient panel sizes.

Instead of a myriad of architectural details and specifications, one drawing is usually all it takes to specify a room. Using springs, neoprene or a combination of both, the manufacturer engineers the vibration-isolation systems to the resonant frequency of your choice, providing a system of HVAC silencers to match residual noise criterion to your requirements. Some manufacturers will also embed electrical conduit and audio raceways into the panels. The floating modular floor and space beneath it can provide excellent management of audio, power and control cables, saving the cost of installing a computer access floor.

Modular construction is also significantly lighter than field-built construction meeting the same acoustical criteria. It often weighs only half as much, finding use in office buildings that could not support field-built floating rooms without expensive structural reinforcement or in facilities where sound attenuation would have to be compromised in order to meet structural limitations.

SOME ADVICE FROM THE TRENCHES

In the past, discrepancies existed between a manufacturer's acoustical ratings and the actual performance of modular construction in the field. When marketing departments indicated that this was discouraging repeat sales, most manufacturers agreed to submit to a voluntary standardization for laboratory-testing components and completed structures. The program is administered by the National Bureau of Standards and is known as the National Voluntary Laboratory Accreditation Program.

Laboratory tests conducted under NCC supervision indicate that specifications issued without adherence to the NVLAP requirements are subject to question. In addition to limiting your choice to NVLAP-rated components, you will also need to distinguish between three types of tests when selecting the right materials for a specific project. Transmission loss (TL) is the measurement of a panel's or component's ability to attenuate noise when used as a barrier between two spaces. TLs are given in decibels for each full or 1/3-octave band in the audio spectrum. The sin-

gle-number rating derived from these TLs is known as the Sound Transmission Class (STC) of the component.

Noise Reduction (NR) is similar in concept to TL, except that instead of measuring a single component, it measures the attenuation of a noise inside a complete structure. A single number derived from NRs at frequencies in the audio spectrum is referred to as a Noise Isolation Coefficient (NIC). Some manufacturers also publish NICs for attenuation between two complete structures where the noise originates inside one of them and is measured in the other. Bear in mind that when selecting a specific product, comparing any of these three types of data with any of the others is comparing apples and oranges. Always compare STCs from one product with STCs from another, NICs only with NICs, and inter-room NICs only with inter-room NICs. And make sure the data is NVLAP-certified.

If all this sounds complicated, compare it with the guessing game of trying to predict the acoustical performance of field-built structures. While each component of the structure may have been laboratory tested, finding standardized data (as is the case with NVLAP) is virtually impossible since most of it tends to be ten to 20 years old and is sometimes derived from incompatible procedures. It is extremely difficult to estimate how various materials will perform together. Laboratory data on even the most common studio partition types is usually unavailable.

When selecting a manufacturer, don't be tempted to include sophisticated acoustical and aesthetic finishes in the modular enclosure contract any more than you'd trust the masonry contractor who put in your foundation with installing your roof. Take advantage of what the manufacturers do best—making "sound-proof" enclosures—and leave the rest to the specialists in their respective trades.

And now that you've saved a fair amount of money in achieving good sound isolation, spend a little extra on tuning your rooms. You and your clients will be glad you did. ■

Al D'Alessio is a studio designer with Northeastern Communications Concepts Inc. of New York City.

On a Country Road with Michelle Shocked

What a difference a couple of years make. Michelle Shocked first came into the national consciousness with the ultra-low-tech *Campfire Tapes* album, which was just what its name implied: cassette recordings of Shocked singing 'round the old fire. Three albums and a growing cult following later, Shocked's latest, *Arkansas Traveler*, is one of the more elaborate recordings of recent years.

The *music* is disarm-

ingly simple—traditional American country/folk melodies (some derived from such familiar sources as "Cotton Eyed Joe," "Cripple Creek" and "Frankie and Johnny") with original lyrics, also steeped in that same tradition, by Shocked. She's assembled an incredible array of musicians to help her out, including Norman Blake, Doc Watson, Jerry Douglas, Mark O'Connor, Bernie Leadon (the project's musical director), Taj Mahal, Pops Staples, Levon Helm, Garth Hudson, Al-

bert Lee, Gatemouth Brown, the Red Clay Ramblers and even Ireland's Hothouse Flowers.

—CONTINUED ON PAGE 70



Adrian Legg's Sublime Guitar

"I've never regarded myself as simply a 'guitarist,'" says British acoustic guitar phenom Adrian Legg. "I don't go to that particular church. I don't know what the bloody scales are, and I don't really care. The point of the guitar is to play music for people, and that is what I've attempted to do with this record—get away from all this technical stuff and just play tunes."

The disc is *Guitar for Mortals* on Relativity (a label better known for the sonic squeals of Steve Vai, Joe Satriani and that ilk), and it is unquestionably one of the most beautiful solo guitar records I've heard in many moons. As much as

I've enjoyed the compositionally interesting work of Will Ackerman, Alex de Grassi and Michael Hedges through the years, I find the folkish simplicity of Legg's writing and playing sublimely refreshing. I hear echoes of John Fahey's best in some of Legg's tunes, though he



PHOTO: LOUIS STOLL

claims to be more influenced by English guitarists like John Renbourn (match) and Davey Graham.

He plays a plug-in acoustic Adamas (by Ovation) that was made to his own specs. Despite his claims about getting away from technical matters, the fact is he's a world-renowned guitar expert who has built and modified guitars for years. "I was looking for particular tonal qualities out of the instrument," he notes. "I wanted it to be very clear in the high end."

Guitar for Mortals is his fourth album, though

—CONTINUED ON PAGE 146

Waits Works In Mysterious Ways

Those of you who still imagine Tom Waits sleeping in a gutter in a seedy part of L.A. are a few years behind. You missed the part where The Eccentric One got married, straightened up, moved East for a while, made two of the most exciting and unusual records of his distinguished career—*Swordfishtrombones* and *Raindogs*—wrote a successful musical called *Frank's Wild Years*, established himself as a gifted character actor, and relo-

cated to rural Sonoma County, Calif. (north of San Francisco), where he's recorded his last two projects for Island Records: the soundtrack for Jim Jarmusch's latest film, *Night on Earth*, and a new solo album, due in September, tentatively titled *Bone Machine*.

Waits' studio-of-choice these days is Prairie Sun, a one-time chicken ranch that has been a top studio in Sonoma for a number of years now, and which



PHOTO: BRIAN GRAHAM

will doubtless get a nice boost from its involvement with the highly respected Waits. In fact, Waits has his own recording space there, "The Waiting Room."

"They have lots of dif-

ferent rooms here that are interconnected," says engineer Biff Dawes, who first worked with Waits a decade ago on the soundtrack for Francis Coppola's flawed but brilliant

—CONTINUED ON PAGE 146

Megadeth: Built for Speed

Though Megadeth has yet to ascend to the lofty, multiplatinum heights of fellow speedsters Metallica (for whom Megadeth leader Dave Mustaine formerly plied his axe), they are unquestionably on the threshold of mass success, and their last album, *Rust in Peace*, achieved something few discs in its genre have: rave reviews, including a stunning four-star rave from *Rolling Stone's* Robert Palmer. The reason is simple: Megadeth plays very, very well, occasionally even crossing the line into a thrashy, rhythmically sophisticated speed jazz. And their brand of metal also ap-

peals to the brain, not just the adrenal glands.

Contrary to the image that the band's name conjures to many, this isn't some rock 'n' roll equivalent of a *Friday the 13th* movie; rather, Mustaine and company frequently sing about the decay of modern civilization and the "megadeath" we'll all witness if the human race

doesn't learn to live in peace and harmony with the planet. The band's new album, which was set for a July release, continues the desperate, gloomy theme. The title, *Countdown to Extinction*, says it well.

The band has a checkered history when it comes to recording, mainly. Mustaine says, because

PHOTO: ERIK KIRKLAND



Producer Max Norman & Megadeth leader Dave Mustaine at Enterprise Studios in Burbank, Calif.

of years of serious drug abuse in and out of the band. Mustaine explains, "When I started with Megadeth and we did *Killing Is Our Business* at Indigo Ranch [near L.A.], we had an \$8,000 budget from Combat Records, and our manager [since deceased] bought \$6,000 of coke and heroin, so we only had \$2,000 to record on. That's where our drug habits really skyrocketed." For the second album, *Peace Sells...But Who's Buying*, "we hooked up with Randy Burns, who co-produced it with me. It started out okay. But we really progressed in our drug habits, and it got too crazy with all the speed and heroin we were doing in the studio." The next LP, their first for Capitol, *So Far, So Good, So What*, "I co-produced with Paul Lanning, who had remixed the last one,

—CONTINUED ON PAGE 147

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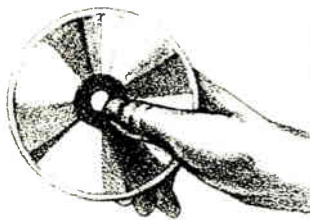
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—FROM PAGE 68, MICHELLE SHOCKED

What's more amazing, though, is that each of the album's 14 tracks was recorded in a different environment, from studios in Los Angeles (Ocean Way, Bill Schnee Studio), Memphis (Sun), Dublin (Windmill Lane), Woodstock (Dreamland), Sydney, Australia (Trafalgar), Chicago (Trax) and Nashville (Bennett House), to such exotic locales as The Piney Woods Pickin' Parlor in Mineola, Texas; Driftwood Barn in Mountain View, Ark.; the Chapel Hill, North Carolina home of Red Clay Ramblers' bassist Jack Herrick; the Spirit of St. Louis Riverboat in Missouri; the Commissary Antique Store in Rising Fawn, Ga.; and the Merl Watson Memorial Festival in Wilkesboro, N.C. That's a lot of traveling—Shocked guesses that the recording covered some 50,000 miles—and therein lies a tale.

"This project was definitely one of those once-in-a-lifetime opportunities," says Glenn Rosenstein, who engineered and co-produced ten of the disc's tracks, including all of the non-studio performances. "Michelle had a real interesting concept—going to the places where the musicians she wanted were—and then the challenge for us was to work out the recording from a logistical standpoint and make it all sound good." Currently based in Nashville, Rosenstein's best-known credits come from working with modern rockers like U2, Tears for Fears, Talking Heads and the Tom Tom Club, and rising reggae superstar Ziggy Marley. In fact, it was his work on Marley's latest record, *Jamaica*, recorded in that country using Randy Ezratty's Effanel mobile recording truck, that led him to suggest using Effanel for Shocked's *Arkansas Traveler* project.

And so, in the spring of '91, the intrepid team set out on their adventures, the Effanel 18-wheeler trailing behind Shocked's Winnebago. The different combinations of musicians who were going to play on each song in each place had been worked out well in advance, but according to Rosenstein, "We'd done only a minimal amount of scouting locations because it just wasn't feasible. Sometimes we'd pull up at these locations without really knowing what we were going to encounter, and it called for some quick thinking. 'Jack's

House' [as the credits read for the song recorded with the Red Clay Ramblers] is basically just where Jack lives, with a living room, dining room, kitchen and a couple of bedrooms. My feeling of how we were going to approach this—and my feeling was confirmed by Michelle—was that it was going to be very organic. She wanted the record to be a good representation of what happened on our trip.

"I approached it very much like a live recording," he continues, "which is exactly what it was, although there was some overdubbing later. We recorded on the [Sony] 3348 digital multitrack, so we had ample tracks to mike things numerous ways. I would tight-mike everything we were working with, and I also put up a bunch of room mics everywhere we went. That way E.T. [mixer Eric Thorngren] would have lots of flexibility later. From the ambient mics, I wanted the sonics of the rooms we were recording in. After all, the point was not to make it sound like we were in a recording studio. We wanted the songs to take on the personality of the environments we were in; otherwise, we could have just flown the musicians to a studio somewhere." For the ambient miking, Rosenstein typically hung up to four stereo pairs, "some traditional PZM types, but also sometimes mics that are not ordinarily used for that, like the Sennheiser 409s, which worked fine with a little EQ."

Shocked and the crew typically spent two to four days in each location. The first day was usually devoted to setting up the recording space and, in the case of Shocked and Bernie Leadon, working out the song with the musicians. Then, typically, the actual recording would take place the next day, with the musicians doing several passes at the tune live. The following day they'd pack up and head out for the next locale. Once the road trip was completed, Shocked hopped on planes for dates in Ireland with the Hothouse Flowers, where Hugh Padgham engineered and co-produced, and Australia, where she played with Paul Kelly's band, The Messengers.

Still, with all this globe-trotting, there is an unmistakable consistency

—CONTINUED ON PAGE 146

THE 1992 TEC AWARDS

VOTER'S GUIDE

The Technical Excellence & Creativity Awards were created in 1985 by the publishers of Mix magazine to recognize and promote outstanding achievement in recording and sound. Proceeds of the TEC Awards benefit organizations involved with the cure and prevention of deafness and hearing impairment, scholarships for students of audio and nonprofit organizations serving the professional audio industry.

In their eight-year history, the TEC Awards have raised nearly \$200,000 for charity and scholarships while offering attendees the opportunity to mingle with celebrities and audio industry heavyweights at what has become one of the most important annual events in the pro audio industry.

The awards are divided into three major categories—Technical, Creative and Institutional achievement—and 23 sub-categories. The TEC Awards nominations are made by the Nominating Panel, comprising approximately 300 prominent audio industry figures. Their choices are tabulated and a voting ballot appears in this issue of Mix. The 35,500 BPA-qualified subscribers are then asked to select the winners. The results will be announced in a gala ceremony on Friday, October 2 at the Westin St. Francis Hotel in San Francisco.

MIX FOUNDATION FOR EXCELLENCE IN AUDIO

The Mix Foundation for Excellence in Audio was formed as a nonprofit, public-benefit corporation in the State of California in 1990, to help realize to the greatest extent possible the objectives of the TEC Awards. Its purpose is to encourage public interest in and understanding of audio, video, music and other communications media arts, and to assist programs such as those benefited by the TEC Awards.

The proceeds of the 1992 TEC Awards ceremony will be distributed by the MFEA to the following organizations: **50%** to the "Hearing Is Priceless" (HIP) campaign, sponsored by Mix magazine and the House Ear Institute of Los Angeles. The HIP campaign educates the public, especially young people, about the danger of noise-induced hearing loss and promotes safe listening habits. • **25%** to be divided between the winning institution and nominees for the TEC Award in the category of Recording School/Program, to establish scholarships for deserving students in the study of recording and communications arts and sciences. • **20%** to nonprofit organizations involved in audio education, including the Audio Engineering Society Educational Foundation and the Society of Professional Audio Recording Services (SPARS). • **5%** to other charities or organizations that meet the criteria set by the board of directors of the Mix Foundation for Excellence in Audio.



Bob Moog



Bill Porter



Phil Ramone

TEC HALL OF FAME

In 1988 the TEC Awards Hall of Fame was created to recognize the contributions of those special individuals, who during their lifetimes, have exemplified the pursuit of excellence in professional audio and music production. Past inductees include Ray Dolby, Wally Heider, Deane Jensen, Quincy Jones, Bob Lefkin, George Martin, George Massenburg, Rupert Neve, Les Paul, Bill Putnam and Bruce Swedien. This year the TEC Awards will honor Bob Moog, inventor of the Moog synthesizer, engineer Bill Porter and producer Phil Ramone.

THE LES PAUL AWARD

The Mix Foundation for Excellence in Audio and the producers of the TEC Awards created the Les Paul Award in 1991 to honor individuals or institutions who have successfully combined art and technology year after year and set the highest standards of excellence in recording and sound production. Their contributions have been widely acknowledged by their peers including, but not limited to, past recognition by the TEC Awards.

This year's recipient is engineer Bob Clearmountain. This highly respected, six-time TEC Award winner has worked with a steady stream of hit makers, including Bruce Springsteen, Bryan Adams, Paul McCartney, David Bowie and The Rolling Stones.

Editor's Note: Beginning on page 73 are six pages of nominee, product and facility descriptions. Please take the time to read the nominee information and vote. (Ballots in subscribers' issues only.) Ballots must be postmarked by **Saturday, August 31, 1992.**



THE 1992 TEC AWARDS

SPONSORS

To help realize to the fullest extent possible the charitable goals of the TEC Awards, the board of directors of the Mix Foundation for Excellence in Audio created a sponsorship program to help support and benefit the TEC Awards. There are three levels of sponsorship: Silver (\$3,000), Gold (\$7,500) and Platinum (\$10,000). For the third consecutive year four companies have elected to support the TEC Awards by becoming Platinum sponsors.

They are Act III Publishing, Ampex Recording Media Corporation, JBL Professional and Siemens Audio Inc. The MFEA and the TEC Awards are grateful for the continued support of these companies, as well as the companies listed below that have purchased Gold or Silver sponsorships.

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ACT III Publishing is the parent company of Mix magazine, Electronic Musician magazine and the Mix Bookshelf. Mix is the leading trade publication for audio and music professionals, with 40,000 subscribers in the U.S. and more than 90 foreign countries. Electronic Musician is devoted to the application of electronic instruments and computers in music performance and production, and has a circulation of more than 50,000. Mix Bookshelf is the largest direct mail source of books and software dealing with audio, video and music production. Act III Publishing is a subsidiary of Act III Communications, a diversified entertainment company with substantial interests in movie theaters, television stations, and TV and motion picture production.

AMPEX

Ampex Recording Media Corporation For the third year, video post-production is being supplied by Ampex Recording Media Corporation with technical support via the Ampex Teleproduction Center at the company's Redwood City, California headquarters. The Ampex Recording Media Corporation manufactures and markets a complete line of professional audio, video and data storage tapes for entertainment, education and government applications. The only magnetic media company dedicated exclusively to meeting the needs of the professional market. Ampex products are engineered to deliver consistently reliable state-of-the-art performance.

JBL

JBL PROFESSIONAL JBL has developed an industry-wide reputation for manufacturing the finest in loudspeaker transducers and systems. Recording studios around the world have relied on JBL studio monitors for many years. Today, JBL holds numerous loudspeaker design patents and registered trademarks, including Bi-Radial[®] as applied to horn design, Vented Gap Cooling[™] as applied to loudspeaker design and Control[®] Series as applied to studio monitor design.

JBL manufactures JBL/UREI signal processing equipment and power amplifiers, UREI Time Align[®] monitors and distributes the Soundcraft line of mixing consoles, including the 32⁽⁸⁾, Europa, Sapphire, Vienna, Delta and Spirit lines. In 1991, JBL Professional acquired the Audio Digital lines of digital delays for the sound contracting market and the Rivera line of tube guitar amplification systems for the musical instrument market.

JBL Professional is a division of Harman International Industries, Inc., a Fortune 500 company, also located in Northridge, California.

Siemens Audio Inc.

SIEMENS AUDIO INC. Siemens Audio Inc. was formed in October 1991 by the merger of Neve and AMS Industries. Neve has designed and manufactured multi-track audio consoles for more than 30 years. The Neve line of professional audio equipment includes digital and digitally controlled audio consoles for music recording and mastering, video post-production, film and film scoring and the television broadcast/production. A pioneer in the design of console automation systems for more than 10 years, Neve is the manufacturer of Flying Faders, a breakthrough in console automation technology.

AMS Industries is a world leader in the design and manufacture of hard disk audio recording and editing systems. The AMS line of professional digital audio products includes digital audio editing systems for video and film post-production, and digital audio consoles for film/video post-production. AMS is also well-known for its digital delays and reverb units, and its SoundField and ST250 stereo microphones.

I. OUTSTANDING INSTITUTIONAL ACHIEVEMENT

Awarded to those companies, facilities or institutions that have contributed most significantly to excellence and innovation in audio during the eligibility year.

A. Acoustics/Facility Design Company

Russ Berger Design Group Inc., Dallas, TX: During the eligibility year RBDG's projects included Sony Music Entertainment, Sterling Sound, ABC-TV and NBC-TV in New York City; National Public Radio and W*USA-TV in Washington, DC; personal recording studios for Michael Bolton, Steve Miller and Mike Galesi; JC Penney's recording/broadcast facilities, Texas; Middle Tennessee State University, Master Mix, Belmont University, Javelina and Creative Trust, Tennessee; KHOU, Houston; SAS Institute, North Carolina; Presence Studio, Connecticut; Dade County Community College, Miami, Florida; WBEZ-FM, Chicago; and WUNC, Chapel Hill, North Carolina.

Perception Inc., Los Angeles, CA: Projects for Perception Inc. during the eligibility year included Sonolux Records, Bogota; Wiley Audio-Video Productions, Mexico City; Water Music, Hoboken, NJ; Snowbound Sound, Pawling, NY; Cavern Studios, Tucson; and Walt Disney Imagineering, Glendale, CA.

studio bau:ton, Los Angeles, CA: During the eligibility year studio bau:ton designed and constructed Studio X, Bad Animals (Seattle, WA), four rooms at 525 Post Production (Hollywood, CA), Post Logic Video facility (Hollywood, CA), Peter Frampton's studio (Hollywood, CA), and a four-studio facility for Dallas Austin (Atlanta, GA); remodeled NRG Studio (North Hollywood, CA); and designed a four-studio facility for Pink Ton Studio (Solothurn, Switzerland), a four-studio facility for LaFace, Inc. (Atlanta, GA), two post-production rooms for Microsoft Corporation (Seattle, WA), and designed two new studios and remodeled two existing studios at The Record Plant (Hollywood, CA).

Walters-Stork Design Group, New Paltz, NY: During the eligibility year design projects for Walters-Stork included facilities for producer Russ Freeman; composer Fred Thayer's Macrose Music; Patrick Leonard's Johnny Yuma Studios—control room, Burbank, CA; Rick Wake's Cove City Studios; National Video—Audio 3, New York City; Red Car New York—10,000-square-foot post facility; Electric Melody Studios, Santa Monica, CA; JSM Music—13,000-square-foot, six-studio complex; Soundshop—Studio A renovation, Nashville, TN; conference rooms for SBK/EMI Records and Mercury Records, New York City; and acoustic design of Planet Hollywood's THX screening room, New York City.

Waterland Design, Los Angeles, CA: During the eligibility period Waterland Design was involved in the design of new recording and mixing facilities for Bryan Adams in Vancouver, Canada, new recording, digital mastering facilities and offices for Sony Music in Santa Monica, CA, and IRC2 Studios in Tokyo, Japan. Ocean Entertainment went online after a three-year construction schedule and Psych Studios (Milan, Italy) saw the start and completion of their Studio B. It was the first studio in Waterland's 15-year history to place two Number One hits in two consecutive months from a studio under construction.

B. Sound Reinforcement Company

Please note: Clair Brothers Audio is not eligible this year, having been awarded the Les Paul Award in 1991.

dB Sound, Inc., Des Plaines, IL: dB Sound boasts the most powerful P.A. system available (MT), along with an equipment-available network throughout the world. Its equipment is primarily Crest-powered Electro-Voice speakers and state-of-the-art electronics. During the eligibility year dB Sound worked with AC/DC (76 box MT system), Metallica (90 box dual delayed MT system), Hammer (112 box triple delayed MT system), Monsters of Rock in Europe (192 box MT system) and Monsters of Rock in Moscow (seven delay towers with microwave transmission and self-contained AC generators, 320 box total, estimated 800,000 watts; 900,000 people in attendance, heavy metal coverage a quarter-mile from the stage).

Electrotec Productions Inc., Canoga Park, CA: In April, 1991, Electrotec introduced its new Q-2 speaker system on the Guns N' Roses tour. Other clients during the eligibility year included Rod Stewart, Rush, Randy Travis, Queensryche, Cher, Elvis Costello, Alabama, Damn Yankees, Bad Company, Tom Petty, Barry Manilow, Tesla, Alan Jackson, Ricky Van Shelton and Great White. Electrotec provides sound services from Canoga Park, CA, Nashville, TN, and London, England. Principals include Rikki Farr, CEO; Pierre D'Asstugues, president; Mick Whelan, research and development; Jim Douglas, operations manager; and David Gautrey, chief service engineer.

Maryland Sound Industries, Inc., Baltimore, MD: Clients during the eligibility year included Pet Shop Boys, Michael Bolton, Gloria Estefan and the Miami Sound Machine, Anita Baker, Color Me Badd, Crosby, Stills & Nash, The Cure, Kenny G, Neil Young, Tracy Chapman, Joe Jackson, Patti LaBelle, Dan Fogelberg, Anne Murray, Simple Minds, John Hiatt, Paula Abdul, Whitney Houston, Neil Diamond, Morrissey, Luther Vandross, Dolly Parton, George Benton, Sheena Easton, Manhattan Transfer, Hall & Oates, Simply Red, Lisa Stansfield, Dire Straits, Oleta Adams and Little Village. MSI was the audio contractor for Anaheim Stadium, Oriole Park and the entire Universal Studios Theme Park in Florida. They also designed and fabricated the audio system for the New York Philharmonic and the Metropolitan Opera.

Showco, Inc., Dallas, TX: During the eligibility period Showco and the Prism* sound system were the worldwide choice of Genesis, ZZ Top, Lisa Stansfield, Black Crowes, Paul McCartney, Reba McEntire, Clint Black, Vince Gill, Harry Connick Jr., INXS, Rolling Stones, Eric Clapton, James Taylor, Extreme, George Michael, Steve Winwood, Soundgarden, Ozzy Osbourne, George Harrison, Diana Ross, Winger, Highwaymen, Linda Ronstadt, Moody Blues, Little Feat, Robert Palmer, Santana, Beach Boys, the Bee Gees, Willie Nelson, Farm Aid V and the Rock in Rio II Festival.

Ultra Sound, San Rafael, CA: During the eligibility year Ultra Sound provided sound for the Grateful Dead, Jerry Garcia Band, Jerry Garcia/David Grisman, Weir/Wasserman, Planet Drum, Gyuto Monks, Primus, David Byrne, Bill Graham Memorial Tribute/Golden Gate Park and Brian Boitano/Katerina Witt Ice Skating Tours II and III.

C. Recording School/Program

Please note: Full Sail Center for the Recording Arts is not eligible this year as they have won the TEC Award for the past three years.

Berklee College of Music, Boston, MA: Berklee College of Music's Technology Division offers training in music production, audio engineering and synthesis, emphasizing hands-on experience in seven recording studios and synthesis labs housing 50 computer/synthesis workstations. Berklee's 1991 Technology Symposium covered digital audio workstations. Berklee just released its fourth CD of student productions, which won the NARAS Student Music Award. Berklee graduates hold key posts at major record companies, studios and equipment manufacturers.

Middle Tennessee State University, Murfreesboro, TN: During the eligibility year Middle Tennessee State University brought online two digital multitrack recording studios with attached classroom labs; a nine-station MIDI lab; a digital audio editing suite; a multi-node digital audio workstation system; and an audio and acoustic test and maintenance lab. The Recording Industry Management Department now offers a more selective and rigorous program, which maintains the traditional broad-based industry core classes along with the ability to specialize in distinct production or management fields.

University of Massachusetts Lowell, Lowell, MA: Three Sound Recording Technology curriculums prepare graduates for a broad range of production and technical positions. Facilities include 24-track, MIDI, video post, 8-track, beginning mixing studios and an equipment design laboratory. A newly constructed critical listening classroom incorporates audio and video connections to all five studios. During the year alumni assisted on projects from Guns N' Roses to

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Northern Exposure, and joined the staffs of New England Digital, *Pro Sound News* and Skywalker Sound. Program director William Moylan's book, *The Art of Recording*, was also published.

University of Miami, Coral Gables, FL: The Music Engineering program has created a sister program in Electrical Engineering—the first true audio engineering undergraduate curriculum in the United States. Just-completed research projects studied window performance in transform coding, noise cancellation and sub-band coding. This year's employers include Digidesign, Motorola, Sony Classical, Doppler Studios, Sync Sound and the FBI. Director Ken Pohlmann was voted to the AES Board of Governors.

University of Southern California, Los Angeles, CA: The Recording Arts Program offers a four-year course leading to a Bachelor of Science degree in Music Recording. Classes are taught in the School of Music's SSL/Studer/Mitsubishi-equipped control room. New classes include scoring for motion picture and hard disk recording/editing. Instructors for these courses are brought in from the professional audio industry based on their areas of expertise.

D. Mastering Facility

Bernie Grundman Mastering, Hollywood, CA: During the eligibility period Bernie Grundman Mastering worked on projects by Michael Jackson, Diana Ross, Wilson Phillips, Yanni, Van Halen, Ton Loc and Boyz II Men. Mastering engineers are Bernie Grundman, Brian Gardner and Chris Bellman.

Georgetown Masters, Inc., Nashville, TN: Some of the projects that passed through Georgetown Masters during the eligibility year included Garth Brooks, Wynonna Judd, Travis Tritt, Doug Stone, Hal Ketchum, John Prine, Dan Fogelberg, Emmylou Harris, Ricky Skaggs, Me Phi Me, Hank Williams Jr., Mary Chapin Carpenter, Pam Tillis, Trisha Yearwood, Ricky Van Shelton, Don Williams, Marty Stuart, Alabama, Kathy Mattea, Dolly Parton, Joe Diffie, Steve Wariner, Restless Heart, Keith Whitley and Martina McBride.

Masterdisk Corporation, New York, NY: During the eligibility period Masterdisk worked on projects by Mariah Carey, Kriss Kross, Dire Straits, John Mellencamp, Nirvana, Lou Reed, Red Hot Chili Peppers, Pearl Jam, Def Leppard, Bruce Springsteen, Sting, Stevie Ray Vaughn, Gloria Estefan, Robbie Robertson, Bryan Adams, Soundgarden, David Sanborn, Genesis, Kate Bush, Tin Machine, Marc Cohn, Rush, LL Cool J, Santana and the Black Crowes. Mastering engineers are Bob Ludwig, Tony Dawsey, Greg Fulginiti, Scott Hull and Andy Van Dette.

Precision Mastering, Hollywood, CA: During the eligibility period Precision Mastering worked on albums by Prince (*Diamonds and Pearls*), Buddy Guy (*Damn Right I've Got The Blues*), Heart (*Live*), Poison (*Live*), Queen (*A Night At The Opera*), Seal, L.A. Guns, Joe Cocker, Rod Stewart, The Sugarcubes, Teenage Fanclub, Melissa Etheridge, Siouxsie and the Banshees, Dramarama, Kid Frost, Latin Alliance, T-Bone Burnett, Emerson, Lake & Palmer, and Neil Diamond's *The Greatest Hits 66-92*, a 37-song collection.

Sterling Sound, New York, NY: Sterling Sound has displayed the versatility and consistency in excellence for nearly 25 years, as is evident in the musical styles mastered during the eligibility period: Guns N' Roses, Eric Clapton, Metallica, Chaka Khan, Heavy D and the Boyz, Roxette, En Vogue, Sophie B. Hawkins, Kitaro and Joe Public.

E. Audio Post-Production Facility

525 Post Production, Los Angeles, CA: The lineup for national commercials mixed by Tom Davis and Damien Wagner this year has included clients such as Budweiser, Chevron, Chrysler-Plymouth, Century 21 and McDonald's. Also included in their schedule was ABC network's fall campaign and work for NBC, CBS and Fox. Music video or concert film credits included artists such as Michael Jackson, Guns N' Roses, Cher, Garth Brooks, The Judds, Randy Travis, Genesis, ZZ Top, Rickie Lee Jones and Hammer.

EFX Systems, Burbank, CA: During the eligibility year, film work included *The Lumatic*, *The Rapine*, *Final Approach* (the first all-digital sound feature) and *Deep Cover*. Wide-screen presentations and specialty projects are currently being seen at Universal Studios, Walt Disney World/Epcot Center, Kennedy Space Center, the World's Fair at Seville (IMAX, Iwerks, simulator systems and Showscan formats), and theme parks from Australia to Japan. Projects for the television world included the Hanna-Barbera live-action animation special *The Last Halloween*, CBS's "Crime Time After Prime Time," and the series *Dark Justice* and *Silk Stalkings*.

Post Logic, Hollywood, CA: During the eligibility year all four networks handled on-air promotion at Post Logic, with Fox booking at least two rooms per week. Series work included *Star Search*, *Showtime at the Apollo*, *Jeopardy*, *The Simpsons* (ADR looping), *Emergency Call* and *The Adventures of Mark and Brian*. TV specials included "Happy Days Reunion," "Muhammad Ali's 50th Birthday," Phil Collins (CBS), Whoopi Goldberg (HBO), Whitney Houston's "I'm Your Baby Tonight" (ABC), Crosby, Stills & Nash, "Party for Richard Pryor" (ABC), Ray Charles, the Scorpions concert and the *MTV Music Awards*. They also did all the music scoring and on-air promos for 20th Century Fox's *Ferraguly*; music videos for Prince, Hammer and Queensryche; and commercials including Coca-Cola, Calvin Klein, Blue Cross and Nike.

Skywalker Sound North, San Rafael, CA: During the eligibility year Skywalker Sound worked on *Bugsy*, *Terminator 2* (two Academy Awards and one British Academy Award), *Backdraft*, *Soapdish*, *The Five Heartbeats*, *FX II*, *Rush*, *Single White Female*, and *Young Indiana Jones Chronicles* (for TV). Other projects included CircleVision "From Time to Time" simulator ride for Disney, Showscan Space Race simulator ride, Muppetvision 3D, and commercials for Miller Beer, Listerine, Life Savers Holes, Nynex (marbles) and BP (elevator).

Sync Sound, New York, NY: Projects posted at Sync Sound during the eligibility year included: "MTV New Years Party featuring Guns N' Roses," Robert Redford's feature film *Incident at Oglala*, *Bugs Bunny's Lunar Toons*, the CBS mini-series "Stephen King's Golden Years," Steven Soderbergh's *Assassins* cast album, Nickelodeon's series *Clarissa Explains It All*, Wynton Marsalis and Kathleen Battle *Duet* (PBS), "Kenny Loggins in Concert" (Disney), "Bob Nelson in Concert" (HBO), "The Beatles' First American Visit" (MPI) and *Carnegie Hall Christmas Gala* (PBS).

F. Remote Recording Facility

Design FX Remote Recording, Culver City, CA: During the eligibility year Design FX worked on the "64th Annual Academy Awards" (ABC), the "MTV Music Video Awards" (MTV), "Natalie Cole Unforgettable" (PBS, *Great Performances*), "MTV 10th Anniversary Special (George Michael)" ABC, "American Music Awards (Guns N' Roses)" ABC, Bill Graham's "Day on the Green" (MTV), "Billboard Awards" (Fox), "Denver Performing Arts Center Opening Gala" (A&E), Foundation Forum Metal Convention, *Great White* (Capitol), and "In Concert (Crowded House)" (ABC).

Effanel Music, New York, NY: Effanel Music celebrated its 25th anniversary with projects including "The Miami Experience Featuring the Miami Jewish Boys Choir, Live in Brooklyn," "Blame it on the Cha Cha Cha" by the Kingman Brothers, and "To Benny with Love" by Walt Levinsky and the Great American Swingin' Big Band. Effanel is the East Coast's only 48-track digital recording facility featuring Dolby SR signal processing.

Le Mobile, North Hollywood, CA: Le Mobile offers dual Studer A800 24-track with Dolby SR, a Neve 8058 board plus outboard Neve Prism mixer (both with Flying Faders automation), along with a full complement of outboard gear for tracking and mixing. Le Mobile's credits encompassed nearly every facet of entertainment from Bill Cosby to Anthrax, Disney's Fourth of July Special to Jane's Addiction. Other projects included Ziggy Marley, Booker T and the MG's, Neil Diamond, EMF, Metallica, The Yellowjackets, Dwight Yoakam, Bloodline, and MTV's *Unplugged* with John Mellencamp and Queensryche.

Remote Recording Services Inc., Lahaska, PA: During the eligibility period Remote Recording Services worked with the Allman Brothers, "An Evening with the Allman Brothers"; Mariah Carey, "MTV Unplugged" EP; Neil Diamond, *Greatest Hits*; Donald Fagen, *Rock & Soul Revue*; Midnight Oil, *Screaming In Blue*; and Neil Young, *Are We Still*.

Westwood One Mobile Recording Division, Culver City, CA: During the eligibility year Westwood One's Remote Recording Division worked with Chris Isaak, Crosby, Stills & Nash, Crowded House, Doobie Brothers, Eddie Money, Foreigner, George Michael, Los Lobos, Morrissey, Nirvana, Red Hot Chili Peppers, Richie Sambora, Scorpions, Skid Row, Sting, Tom Petty, Van Halen and Whitney Houston. They also recorded *Fann Aid I*, "MTV Unplugged featuring Elvis Costello" and the MTV Music Awards.

G. Recording Studio

Please note: Power Station is not eligible this year, having been awarded the Les Paul Award in 1991.

A&M Studios, Hollywood, CA: Founded in 1967 by Herb Alpert and Jerry Moss, A&M Studios includes five recording studios, a post-production duplication facility operating 130 cassette machines in real time and a digital mastering suite featuring the Sonic System. Artist credits were not available.

Conway Recording Studios, Hollywood, CA: During the eligibility year Conway played host to projects by Ringo Starr, Linda Ronstadt, Natalie Cole, Lionel Richie, Diana Ross, Emerson, Lake & Palmer, Tin Machine, Al B. Sure, Lyle Lovett, Sting, The Yellowjackets, Simply Red, George Duke, Guns N' Roses, Flim and the B.B.s, Don Was, Kenny Rogers, Tom Werman, Miles Davis, Quincy Jones, Peter Asher, George Massenburg, Ed Cherney, Stewart Levine, Mick Guzauski, Shawn Murphy, Dennis Sands, James Horner, Maurice Jarre and David Cole. Film score work included *The Prince of Tides*, *For The Boys*, *Billy Bathgate*, *Patriot Games*, *Curly Sue*, *29th St.*, *Dying Young*, *Of Mice and Men* and *Wayne's World* ("Bohemian Rhapsody" remix). Equipment includes a 64-input Focusrite with GML automation and a 60-input and 72-input Neve VR, both fitted with GML automation and graphics recall.

Ocean Way Recording, Hollywood, CA: During the eligibility year Ocean Way worked with Little Village, Michael Jackson, Lyle Lovett, Madonna, Michael Bolton, Was (Not Was), Amy Grant, Natalie Cole, Bonnie Raitt, Lindsey Buckingham, The Zoo, B-52's, Kenny Rogers, Toto, David Benoit, Bette Midler, Joe Satriani, Duran Duran and David Bowie. Film score work included *City Slickers*, *Newsies*, *Baby Talk*, *American Me*, *Power of One*, *Sister Act* and *The Commitments*. Ocean Way has seven tracking/scoring and mixing studios equipped with Neve and API consoles, all with GML automation, and ATR-124, A800 MKIII analog and 3348 (with Apogee), and X-86HS digital machines. The latest addition is an 88-input Focusrite console with GML automation.

Right Track Recording, New York, NY: During the eligibility year Right Track's clients included the B-52's (new LP mixes), Michael Jackson ("Black or White"—various mixes), Prince (*Cream*—various mixes), John Mellencamp ("Love and Happiness" single), Mariah Carey (*Emotions* LP), Celine Dion (LP mixes), C&C Music Factory (*Greatest Re-mixes* LP), New Kids on the Block ("If You Go Away"), Tesla (LP mixes) and Amy Grant ("Baby, Baby" single mix), as well as Don Was, Walter Afanasieff, Shep Pettibone, Russ Titelman, Thompson & Barbiero and Frank Filipetti. In October 1991, Right Track was the first New York studio to upgrade Studio A's 80-input SSL

with Ultimation. At the same time they installed the Genelec 1031 main monitors.

Skyline Studios, New York, NY: Skyline has worked on many projects during the year including Talking Heads, Lou Reed, James Taylor, Corey Hart, Bonham, Roseanne Cash, David Bowie, Garland Jeffries, the B-52's, The Belltower and Frank Zappa. This year Skyline has developed individual cue mixers, allowing musicians to control their own headphone mix. Their MIDI room is currently being updated to provide more varied MIDI and editing capabilities.

II. OUTSTANDING CREATIVE ACHIEVEMENT

Awarded to those individuals or teams who have achieved the highest levels of excellence in their respective areas during the eligibility year.

A. Audio Post-Production Engineer

John Alberts: During the eligibility year John Alberts did audio post-production for *Paul Simon's Concert in the Park* (HBO, Home Video, Laserdisc), *Mambo Mouth* (HBO, Home Video), *Generation* (MTV), *Fan Obsession* (MTV), *Katharine Hepburn—All About Me* (Turner), *Rouven Atkinson—Not Just Another Pretty Face* (HBO, Home Video), *Extreme—Extreme Live* (Home Video), *Saturday Night Live Goes Commercial* (NBC), *Biography* (A&E series) and *Def Comedy Jam* (HBO series); audio post and music mix for *Sting—Live at the Hollywood Bowl* (Disney, NHK Japan); sound design and audio post for *Way Cool* (syndicated series); and audio post for *Saturday Night Live* (NBC), including sound design and mixing for all films and pre-taped video, and shows for rebroadcast (edited and remixed from 48-track digital recordings).

Tom Davis: During the eligibility period Tom Davis worked on "The Very Best of the Ed Sullivan Show, I, II" (CBS), "This is Garth Brooks" (NBC), "In Concert 91" (ABC); the Plymouth "Talking Cars" campaign 1991-1992 and commercials for the 1992 Olympic Games; music videos for Hammer ("Too Legit to Quit"), Genesis ("I Can't Dance"), Madonna ("Like a Virgin" from the film *Truth or Dare*), ZZ Top ("Viva Las Vegas"); and home videos *Cher Live in Las Vegas*, *Cher Total Fitness Workout, Volumes I and II*, *The Judds Farewell Concert* and *Sweetin' to the Oldies IV*.

Ken Hahn: Co-owner of Sync Sound, Ken Hahn worked on the following projects as post-production audio mixer during the eligibility period: "The Beatles—The First U.S. Visit" (MPI), "MTV New Year's featuring Guns N' Roses" (MTV), *Carnegie Hall Christmas Gala* (PBS), The Barbara Walters Specials (ABC), *Everybody Dance Now* (PBS), *Kenny Loggins in Concert* (Disney), Wynton Marsalis and Kathleen Battle *Duet* (PBS), *Fonda on Fonda* (TNT), *Bob Nelson in Concert* (HBO), *Pearl Harbor—Two Hours That Changed the World* (ABC), *Spring Break Weekend Jam* (MTV), and Robert Redford's *Incident at Oglala*.

Joel Moss: During the eligibility period Joel Moss did film score work on *What About Bob*, *The Addams Family*, *Defending Your Life*, *The Super*, *The Omen IV*, *A River Runs Through It*, *City Slickers*, *Dying Young*, *Mobsters*, *He Said, She Said*, *Late for Dinner*, *Sister Act*, *Honeymoon in Vegas*, *Single White Female*, *Housesitter* and *Mr. Saturday Night*.

Gary Rydstrom: During the eligibility period, Gary Rydstrom served as sound designer for *Backdraft*, and was both sound designer and mixer for *Terminator 2: Judgment Day* (for which he won an Academy Award for best achievement in sound and another for best achievement in sound effects editing) and *Rush*.

B. Remote/Broadcast Recording Engineer

Guy Charbonneau: During the eligibility period Guy Charbonneau engineered recordings for Metallica, Jane's Addiction, Ziggy Marley, EMF, Kansas, The Knack, Morrissey, and Bloodline, with Phil Ramone producing. Audio-for-video work included Rickie Lee Jones at the Wilton, Booker T and the MG's, Metallica, and EMF for the AIDS Project. He recorded Bill Cosby at the Celebrity Theater, Disney's Great American Celebration on the 4th of July, and Bowl of Beings at the L.A. Theater.

Biff Dawes: During the eligibility period Biff Dawes worked on *Crosby, Stills & Nash* (PBS), *Farm Aid I* (TNN), *In Concert '91* with the Scorpions, Mr. Big, Poison, etc. (ABC), and Elvis Costello for MTV's *Unplugged*. Dawes was also music mixer for the 1991 *MTV Music Video Awards*, scoring engineer for the movie *Night on Earth* (music by Tom Waits), and various radio specials for Westwood One, including "Yes at Wembley Arena," Nirvana, "Santana—Live in Tijuana, Mexico," Foreigner, the Red Hot Chili Peppers and Cinderella.

Randy Ezratty: During the eligibility period Randy Ezratty worked on the soon-to-be released double album by the Kingman Brothers, *Blame It on the Cha Cha Cha*.

Ed Greene: Credits were not available at presstime.

David Hewitt: David Hewitt is president of Remote Recording Services, a company providing mobile recording studios, portable recording packages, production and engineering services. Among recent recording credits are: Mariah Carey for MTV's *Unplugged*, Don Henley "ABC in Concert," "Live from the Metropolitan Opera, *MTV New Year's Eve Ball*, Neil Young's *Arc World* live album and video, and Frank Zappa's *Universe* live album and video.

C. Sound Reinforcement Engineer

Rob Colby: During the eligibility year Rob Colby was the front of house mixer for the Paula Abdul tour and the current "I Can't Dance" Genesis tour. He also broadcast the Abdul mixdown for Japanese and Chinese simulcast and for a video.

Dave Kob: During the eligibility period Dave Kob was Clair Brothers systems engineer and mixing engineer for Sting's "Soul Cages" tour.

David Morgan: During the eligibility period David Morgan mixed the Paul Simon "Born At The Right Time" tour. The tour went to six of seven continents, including 32 countries in North America, South America, Europe, Asia, Australia and Africa. Among the many shows around the world was the free concert in Central Park, played to 750,000 people and broadcast worldwide by HBO.

M.L. Prociase: In addition to mixing over 120 ZZ Top live shows during the eligibility period, M.L. Prociase provided consultation for the Black Crowes, Harry Connick Jr., INXS, Extreme, Living Colour, Lisa Stansfield, Soundgarden and Salt-n-Pepa

Robert Scovill: Along with his studio work, Robert Scovill designed the sound system and toured with Rush during the eligibility period. He also mixed a live BBC broadcast for Rush in London.

D. Mastering Engineer

Please note: Bob Ludwig is not eligible this year, having been awarded the Les Paul Award in 1991.

Bernie Grundman: During the eligibility period Bernie Grundman mastered work by such artists as Michael Jackson, Patti LaBelle, Barbra Streisand, Lionel Richie, Quincy Jones and Sergio Mendes.

Ted Jensen: A few of the albums and CDs Ted Jensen worked on during the eligibility period include Eric Clapton's *Rush* soundtrack, remastering for James Brown's *Star Time*, Beth Nielsen Chapman, Baby Animals, Steve Forbert and Tall Stories.

George Marino: During the eligibility period George Marino mastered work by Guns N' Roses, Roger Daltrey, The Roches, Sophie B. Hawkins, Metallica, Tora, Tora, Chaka Khan, Roberta Flack, Mozart, Jules Shear and Bryan Loren.

Denny Purcell: During the eligibility year, projects Denny Purcell worked on included those by Garth Brooks, Wynonna Judd, Travis Tritt, Doug Stone, Hal Ketchum, John Prine, Dan Fogelberg, Emmylou Harris, Ricky Skaggs, Me Phi Me, Hank Williams Jr., Mary Chapin Carpenter, Pam Tillis, Trisha Yearwood, Ricky Van Shelton, Don Williams, Marty Stuart, Alabama, Kathy Mattea, Dolly Parton, Joe Diffie, Steve Warner, Restless Heart, Keith Whitley, Martina McBride, and Bela Fleck and the Flecktones.

Doug Sax: During the eligibility period Doug Sax mastered albums for Lyle Lovett (*Joshua Judges Ruth*), Aaron Neville (*Warm Your Heart*), Bonnie Raitt (*Luck of the Draw*), Bette Midler (*Some People's Lives, For the Boys*), Natalie Cole (*Unforgettable*), Huey Lewis (*Hard at Play*), Linda Ronstadt (*Manachi*), Barbra Streisand (*Prince of Tides* soundtrack), Leo Kottke (*Great Big Boy*), Jellyfish (*Bellybutton*), Ronnie Milsap (*Back to the Grindstone*) and Sandi Patti (*Another Time, Another Place*). He also worked with other artists including Julian Lennon, Jordan Chassan, Paul Overstreet, Little Feat, Spent Poets and Flim & the BBs.

E. Record Producer

Walter Afanasieff: During the eligibility period Walter Afanasieff produced ten songs on Michael Bolton's *Time, Love & Tenderness* LP, and co-produced six songs on Mariah Carey's *Emotions* LP, and the single "Can You Stay The Night?" by Peabo Bryson. He also produced the title song from the motion picture *Beauty and the Beast*.

David Foster: During the eligibility period David Foster co-produced Natalie Cole's Grammy-winning *Unforgettable*, a track on Peter Cetera's new album, *Voices That Care* for the Desert Storm troops, and a song for the soundtrack of the movie *Ferris Bueller* and the movie *All I Want for Christmas*.

Daniel Lanois/Brian Eno: During the eligibility period the team of Daniel Lanois and Brian Eno produced U2's *Achtung Baby*.

Butch Vig/Nirvana: During the eligibility period the team of Butch Vig and Nirvana produced Nirvana's *Nevermind*.

Don Was: During the eligibility period Don Was produced Bonnie Raitt's *Luck of the Draw*, two tracks on Bob Seeger's *The Fire Inside*, one track on Neil Diamond's *Lovescape*, one track on Paula Abdul's *Spellbound*, Ofra Haza, The Knack's *Serious Fun* LP, "I Think I Love You" for The Voice of The Beehive, Lyle Lovett's "You Can't Resist It" for the movie soundtrack for *Switch* and Glen Frye's "Part of Me, Part of You" for the movie soundtrack for *Thelma & Louise*.

F. Recording Engineer

Bill Bottrell: During the eligibility period Bill Bottrell engineered Michael Jackson's *Dangerous* LP and mixed Wire Train's *No Soul-No Strain* album.

Ed Cherney: During the eligibility period Ed Cherney was engineer for Bonnie Raitt's *Luck of the Draw* LP, recording engineer for the B-52's, engineer for Eric Clapton's hit single "Tears in Heaven" for the motion picture *Rush*, producer and engineer for new Virgin recording artist Mark Curry, and the Grammy-winning duet by Delbert McClinton and Melissa Etheridge. He also recorded various tracks for the latest Ringo Starr project and mixed the entire record; engineered and co-produced the Pop Staples single "World in Motion," along with Bonnie Raitt and Jackson Browne; and engineered for Ofra Haza.

George Massenburg: During the eligibility period George Massenburg produced and engineered Lyle Lovett's *Joshua Judges Ruth*, Linda Ronstadt's *Mas Canciones* and *Latin Jazz Standards*, Little Feat's *Shake Me Up*, and produced and engineered two tracks on Sheffield's *Pat Cole Live to Two Track*.

Al Schmitt: During the eligibility period Al Schmitt worked on albums by Natalie Cole (*Unforgettable*, for which he won a Grammy), Joe Sample's *Ashes to Ashes*, Tower of Power's *Monster on a Leash*, Diane Schuur's *In Tribute* and Shirley Horn's *Here's to Life*. He also recorded singles by Linda Ronstadt ("I Dream to Dream"), Sheena Easton ("A Dream Worth Keeping") and Natalie Cole ("The Christmas Song").

Bruce Swedien: During the eligibility period Bruce Swedien worked on Michael Jackson's *Dangerous* album and Sergio Mendes' *Brasilero*.

III. OUTSTANDING TECHNICAL ACHIEVEMENT

Awarded to those products or innovations that have made the most significant contributions to the advancement of audio technology during the eligibility year.

A. Recording Devices

Alesis ADAT Digital Multitrack: The ADAT 8-track, 16-bit linear recorder features 64 times oversampling Delta-Sigma converters, variable 48 kHz sample rate and greater than 92 dB dynamic range. It offers 40 minutes of recording time on SVHS cassette tape. The ADAT Proprietary Synchronization Interface (patent pending) permits multiple ADATs to be linked with sample-accurate synchronization independent of the audio tracks. Up to 16 machines can be controlled for a 128-track digital audio system. The ADAT Proprietary MultiChannel Optical Digital Interface (patent pending) sends all eight channels of digital audio out an optical digital interface for perfect digital copies and sample-accurate composite/assembly digital editing under control of the BRC.

Digidesign Pro Tools Workstation: This multi-channel hard disk recording and editing system is expandable from 4 to 16 recording and playback channels, and offers 64 virtual editing tracks. Pro Tools also includes an automated digital mixer with DSP functions and a basic MIDI sequencer as standard features. Pro Tools features 1-bit delta sigma A/D; 18-bit, 64x oversampling, and supports both AES/EBU and S/PDIF digital formats. The Audio Cards use two high-speed Motorola 56001 DSPs for real time audio processing. Editing functions include: the ability to slip tracks and regions, instant spotting to picture, nondestructive trims and crossfades, and grid editing. Mixing functions include: snapshot and dynamic automation, EQ, digital effects and external effects sends.

Roland DM-80 Workstation: The DM-80 is a fully contained 8-track digital recording system with powerful, nondestructive, random access editing and exceptional sound quality. Four DM-80s can be locked together for up to 32-track recording. Features include eight analog ins and outs, two stereo digital ins (one with sample rate conversion), one stereo digital out, SMPTE, MTC, video sync and trigger mode. Also provided are complete MIDI implementation with tempo mapping, 24-bit digital mixer with EQ and full dynamic automation, expandable record time up to 24 hours and 100 layers per track. A DM-80 system provides easy "tape recorder" style recording and overdubbing, flexible music and ambiance looping, automated punch in/out and fast FX spotting to picture.

Sonic Solutions SonicStation Workstation: Designed as an entry-level system, SonicStation is an affordable, Macintosh-based digital audio workstation, offering two channels of digital I/O and is capable of real-time digital mixing of 8 to 12 channels from a single hard disk, along with real-time filtering, seamless waveform editing and nondestructive edits, crossfades and level adjustments.

Studer D740 CD Recorder: A write-once system, the D740 is the first CD recorder available in compact size. The read/write recorder, converter, encoder, decoder, subcode generator and power supply are all packaged into one single, rack-mount unit designed for easy integration into recording and post-production studios. Absolutely no external hardware or PC is needed for operation. The D740 has a dynamic range of nearly 98dB and a flat 20-20k Hz frequency response. The discs may be played back on any standard format professional or consumer CD player.

Yamaha DMR-8 Digital Recorder/Console: This desktop 20-bit recording studio combines a fully integrated digital mixer and multi-track recorder. It allows recording, overdubbing, signal processing and mixdown entirely within the digital realm, with real-time automation of all mixer parameters. The 8-track recorder stores digital audio data on tape with 20-bit resolution. The resulting dynamic range is 16 times greater than that of a compact disc. Onboard synchronization allows the system to be expanded to 24

tracks with the addition of Yamaha DRU8 8-track recorders, and it can also be synced to external recorders and video equipment. Other features include unlimited track combining with no audible signal degradation and Moving Fader Automation.

B. Transducer Technology/Microphones

AKG Tri-Power Series: Tri-Power live performance mics combine the clear sound of AKG's studio mics with ruggedness, feedback rejection, handling noise rejection and ergonomic design. The patented Moving Magnet System allows the transducer system to "float" with the same velocity and direction as the diaphragm when subjected to shocks and vibrations from on-stage handling. It makes the D3900 and D3800 Tri-Power vocal mics as much as 20 dB quieter than previous designs, and a hum-bucking coil fights radiant fields from nearby electrical wiring. The large gauge grill, DuraShell™ inner protective basket and RoadTough™ construction ensure that the mics will withstand the stresses of touring. The PowerGrip™ triangular shape makes it easy to hold.

Audio-Technica AT4033: The AT4033 is a cardioid condenser mic designed primarily for studio work, vocals and voice-overs. It provides a direct-coupled signal path from the condenser element to the mic output. The symmetrical open-air housing minimizes acoustic and phase anomalies, resulting in uniform polar pattern at all frequencies and smooth off-axis response. The low-mass gold vapor-sputtered diaphragm yields reduced distortion with improved frequency and transient response. The element is suspended in the center of the acoustically transparent grille, resulting in nearly perfect 90-degree off-axis response. Other features include 140dB SPL capability, extended low-end response and extremely flat response from 30-20k Hz.

Electro-Voice N/DYM Series III: The N/DYM Series III mics feature a revolutionary AcoustiDYM active vibration isolation system that reduces handling noise through the use of a pneumatic pump first patented by E-V in 1973. A two-point system fights feedback: the equalizer in the mic handle provides better off-axis control of the pickup pattern and the transducer has been moved closer to the grille screen, which increases output and reduces the required loop gain, resisting feedback. Other features include a new filtering system that reduces pop sensitivity by 5dB and higher sensitivity because N/DYM elements provide more magnetic energy for the voice coil.

Groove Tubes Model One: The Model One combines what was best about the old tube condenser mics (the tube) with a modern circuit design using high-grade components. Handmade in California, the Model One side address cardioid pattern mic uses a 12AT7 dual triode. The circuit uses both sides of the tube to produce a dual gain stage condenser mic. One side of the tube tracks the capsule, the other drives the output transformer. Lowering the transformer turns the ratio to just 4:1. The Model One power supply has three additional ports, which reduces the cost of additional mics and other tube components.

Microtech Gefell UM70: The UM70 features a single brass piece backplate with each of the 153 holes hand-drilled for absolute precision; a gold-sputtered membrane fixed to the backplate with lacquer; and a capsule membrane made of PVC. The UM70 amplifier system (MV692) is a modern, solid state design with phantom powering. The condenser mic offers three patterns: omni, figure-8 and cardioid. This mic is ideal for recording studios.

Schoeps KFM-6: The KFM-6's specially engineered twin transducers are flush-mounted on an 8-inch sphere, which incorporates proprietary electronics. The complete electroacoustical design is the first to achieve, in practice, the integration of direct and diffuse sound fields. Whether used on its own or as a main stereo microphone, the KFM-6 brings an uncanny sense of reality to reproduced sound. Stand-mounting or hanging, the KFM offers an LED recessed in the spheres for precisely locating the stereo axis, and an XLR-5M connector that accepts "universal" 12-48V phantom power.

C. Transducer Technology/Loudspeakers

AKG K500 Headphones: The extremely open and natural sound quality of K500's is the result of the development of a large diaphragm transducer that allows ambient sound to pass through it, rather than acting as a deflective or absorptive barrier. Resonances traditionally found or designed into headphone shells for equalization purposes are almost completely eliminated, resulting in dramatically improved clarity, definition and spaciousness. The high-efficiency, rare-earth magnet structures produce a sense of effortless power reserve, while the self-adjusting headband and circumaural cushions virtually eliminate the sense of wearing headphones.

Genelec 1031A Studio Monitors: The 1031A can be used for near field listening in large control rooms, main monitoring in project facilities, edit, post-production rooms and mobile vans, as well as transportable monitoring. A pair of 1031As will produce peak SPL levels of 122 dB at 1 meter. The free field response is 47-22,000Hz +/-2 dB. Each 1031A consists of an enclosure that measures only 10x15x11 inches; a line level crossover at 2,200 Hz; an 8-inch woofer and 1-inch dome tweeter; a Directivity Control Waveguide; two 125 watt power amplifiers; and full logic protection circuits. Each unit weighs 26 pounds. The 1031A employs much of the technology developed for the more expensive 1035A monitor system.

JBL 4200 Series Studio Monitors: The series of 2-way studio monitors include the 6.5-inch 4206 and 8-inch 4208. A unique Multi-Radial™ sculptured baffle directs the axial output of the individual components for optimum summing at the preferred console-top listening distance and provides good imaging and greatly reduced phase distortion, as low and high elements of the frequency spectrum reach the listening position at the same point in time. The curved surface of the baffle serves to direct possible reflections of the shorter wavelengths away from the listening position, virtually eliminating baffle diffraction distortion. Vertical alignment of the transducers across the baffle center produces natural mirror-imaging.

KRK 9000 Studio Monitors: The 9000's 9-inch composite woofer and massive magnet structure maximize transient and low-end frequency response while minimizing distortion. The 9000's Kevlar inverted cone tweeter combines pure highs with the lowest possible distortion. In addition, the driver's off-axis response widens the 9000's "sweet spot." The drivers are built to the highest tolerances, providing perfectly matched stereo imaging and a large depth of field. The phase aligned enclosure is constructed of 1.5-inch MDF, an extremely rigid composite for the lowest possible box resonance and distortion.

Meyer DS-2 Subwoofer: The DS-2 is a high-power, horn-loaded mid-bass unit with two 15-inch Meyer proprietary drivers in a folded horn enclosure. The horn features a hyperbolic flare for maximum energy transfer and minimum resonance ripple. The balanced compression chamber presents a symmetrical load to the drivers for high power handling and low distortion. The DS-2 is designed using vertical steel-reinforced rods for maximum safety and arrayability. These rods allow the DS-2 to be used in compliance with the recommended flying specifications for Meyer Sound Labs MSL-3, offering maximum coverage in a compact array. The rugged, multiple-ply hardwood cabinet can be fitted with aircraft-style rigging pan fittings.

TAD 4002 Compression Driver: The 4002 features a newly developed neodymium magnet optimized by a low-carbon steel top and bottom plate. An oxygen-free copper shorting ring on the center pole prevents impedance increases at high frequencies, for a very flat frequency response and minimal distortion. Utilizing a 100mm beryllium diaphragm and five-slit phase plug technology, the TD-4002 has an increased resonant frequency beyond 20 kHz. Precision diamond tool finishing allow phase plug and diaphragm tolerances of +/- .02mm (+/- .0008 inches). The TD-4002 weighs just over 14 pounds and is rated at 60 watts with a recommended crossover of 600 Hz (-12dB/oct). Sound pressure level is 110dB (lw/lm).

D. Computer Software/Peripherals

Audio Teknology Leap 4.1 Speaker/Enclosure Analysis Program: Leap 4.1 is a complete 1Hz to 100k Hz multi-way design program capable of producing accurate and nonlinear modeling of LF driver response as well as complete passive and active crossover analysis and optimization. Box design types include sealed, vented, passive radiator, and sealed and vented rear-chamber bandpass enclosures, all of which can be configured with single and compound driver-loading SPL. Impedance can be manually entered or imported from computer-based analyzers. Other utilities include calculators for conjugate networks, voltage/current/impedance, cabinet volume, motor impedance and filter networks.

JL Cooper CS-10 Controller: The CS-10 Professional Control Station operates as an integrated component with Digidesign's Pro Tools, and other computer-based recording and editing systems. It provides complete access to transport, automation, and digital signal processing functions without tedious mouse and key commands. Featured are conventional controls that look and feel like a tape recorder transport, plus eight smooth tracking, 100mm faders and six rotary potentiometers.

Mark of the Unicorn Digital Performer Sequencer: Digital Performer™ brings integrated digital audio recording and MIDI sequencing to the Macintosh computer. It allows 16-bit, digital recording direct-to-hard disk simultaneously with MIDI sequencing functions when used with hard disk recording hardware. This allows users to record and edit both audio and MIDI performances without switching applications or using multiple computers. With Digital Performer, musicians can go from sequencing drum machines and MIDI synthesizers, to recording vocals and guitars within the same sequencer file.

Opcodes Studio 5 Interface: Studio 5 combines the functions of a MIDI interface, processor, synchronizer and patchbay with a microprocessor for sophisticated processing, mapping and RAM storage for up to 128 patches. As a MIDI interface, the Studio 5 lets the computer independently communicate with each of the 15 MIDI ins and outs. As a processor, it adds filtering, channelization, note range splitting, controller mapping, and velocity and control value modification. As a patchbay, it can rout MIDI from any combination of MIDI ins to any combination of MIDI outs, store several setups of routing and processing, and recall any of them with a single program change. As a synchronizer, it reads and writes all SMPTE formats, including 29.97 non-drop.

Opcodes Galaxy Editors: The Galaxy Plus Editors is a universal librarian and editing program for MIDI instruments that includes comprehensive, full-featured editors that are compatible with over 50 different MIDI instruments. Galaxy Plus Editors work seamlessly with the Opcode MIDI system, allowing the user to describe the studio setup once. After that, any Opcode core program—including Galaxy Plus Editors and Vision—can access any device in the studio by name. Using OMS, a user can edit a patch in Galaxy Plus Editors while playing a sequence in Vision.

Steinberg Cubase Macintosh V. 1.8.3 Sequencer: Cubase uses ViSP (Visual Song Processing), a graphical display that interprets all aspects of recording and arranging. All editing and manipulation is possible in real-time, even in play or record. Each "song" file can contain up to 16 arrangements; each arrangement can have up to 64 tracks (with support for up to 512 MIDI channels with optional third-party hardware). All styles of sequencing are provided and eight different variations of quantizing are available. Other features include four graphic editing windows; a MIDI processor for creating echo and delay effects; IPS (Interactive Phrase Synthesizer) that acts as a compositional aid; Human Sync (this lets the user control tempo from an external MIDI device); and a MIDI Mixer function.

E. Signal Processing Technology

Demeter VTMP-2a Tube Mic Preamp: The VTMP-2a is an all-tube stereo preamp featuring XLR

mic outputs and 1/4-inch instrument inputs; XLR, 1/4-inch and TT outputs; pad and level controls; peak LED indicators; and 48 volt switchable phantom power—all in a two-rackspace chassis. The VTMP-2a uses classic tube design supported by such modern components as the Jensen JT-13K6C input transformer, polypropylene capacitors, and metal film resistors. The power supply features full regulation of the B+ voltage (250V) and the filament voltage (12.6V) for low noise and quick response. The VTMP-2a can be heard on albums by Sting, Suzanne Vega, Ricky Skaggs, Ry Cooder, Walter Becker, John Prine, Kenny Loggins and Lucinda Williams.

Digitech VHM5 Vocalist: The Vocalist creates natural sounding, human-voice-quality harmonies. It generates up to 5-part harmonies (including the singer's voice), and the Pitch Correction feature ensures that the singer remains on key. In addition, the Vocalist features intelligent and chromatic harmonies, which follow any note bending or vibrato the singer may do. Additional features include a vocoder mode; 128 user programs and 128 factory presents (each with four variations); four additional effects, including chorus, vibrato, portamento and DJ voice effects; full MIDI implementation; onboard synth for cue-in tones; ability to memorize key/chord changes; and an XLR mic input with built-in preamp.

Meyer VX-1 Equalizer: The VX-1 Stereo Program equalizer is a 2-channel signal processor optimized for composite frequency response shaping of stereo program material in recording or reinforcement environments. Ranging from simulation of non-flat playback systems and standardized house curves to CD mastering, the VX-1 offers sonic performance and operational flexibility. Features include two discrete channels with three bands of equalization per channel; variable frequency minimum phase filters; five controls for each input channel (employing Meyer's Virtual Crossover™ implementation); two frequency breakpoint settings; and gain controls for the LF, MF and HF bands.

Roland Sound Space: The Roland Sound Space (RSS) uses the characteristics of the human auditory system to create a three-dimensional sound environment. For the artist, the RSS system provides a broader canvas on which to "paint" a spectrum of sonic experiences for the audience. In the fields of video and film, audio takes its place for the first time as a true complement to the newest and most exciting visual techniques. The three-dimensional sound produced by RSS can be experienced with conventional 2-channel playback equipment. The system provides four channels of processing capabilities with both elevation and azimuth controls for the positioning of sounds anywhere outside the normal stereo spectrum.

Summit DCL-200 Tube Compressor: The DCL-200 combines the warmth of vacuum tubes with the reliability of solid state devices. Transparent compression and limiting are possible with a bandwidth of 5 to 70k Hz and a dynamic range of 105 dB.

Sony DPS-R7 Digital Reverb: With the arrival of the latest 32-bit LSI technology, the Digital Presence Synthesizer II, and the most recent developments in 18-bit and HDLC™ D/A conversion, the R7 allows high-speed effects processing with good sound quality. Features include a variety of versatile reverb effects; a unique three-block design that allows for 23 separate algorithms (users can select different algorithms for each of the blocks to provide a wide range of editable parameters); full MIDI implementation; extensive remote control capabilities; 100 factory and 256 user presets; rotary dial operation; and real-time monitoring for comparable edits to original settings.

F. Ancillary Equipment Technology

Apogee AD-500 Analog-to-Digital Converter: This compact stereo analog-to-digital converter is designed with 18-bit resolution, providing an optimal reference for 16-bit digital audio applications. The AD-500 combines a discrete analog "front end" with delta sigma conversion technology and sample rate outputs of 32, 44.056, 44.1 and 48 kHz. Sync source inputs with continuous sampling coverage between 32 to 54 kHz make it well suited for varispeed applications. It locks to external AES/EBU, S/PDIF, optical and word sync inputs. AES/EBU, S/PDIF, optical and word clock

digital outputs are supported as well. The AD-500 can lock to NTSC, PAL and 60Hz (monochrome) video and is compatible with D1, D2 and D3 digital video machines and HDTV.

Crown 3600VZ Power Amplifier: The Macro-Tech 3600VZ™ uses newly patented variable impedance (VZ) power supply circuitry to pack 3,600 watts into 3.5 inches of vertical rack space. With the VZ design, the entire power supply is in operation at all times, with the signal shifting from high to low impedance in direct sync with the program material. The 3600VZ adapts itself to both signal and load requirements, providing the best power matching to the widest range of loads. Other features include ODEP protection; PIP (Programmable Input Processor) expandability and an advanced IOC that indicates when distortion exceeds 0.05%. With its compact size and relative light weight (56 pounds), the 3600VZ is an ideal touring amp.

Digital Domain™ FCN-1 Digital Format Converter: An audio engineer's "Swiss army knife," the FCN-1 is an economical solution to common digital audio interface problems. Lightweight and portable, it is ideal for remote and studio conditions. The FCN-1 selects from two, three or five digital sources (depending on the model), converts the format and feeds multiple simultaneous outputs to DAT recorders, D/A converters, processors or hard disks. It can enable virtually any digital recorder to talk to any other. The FCN-1 handles AES/EBU, S/PDIF coaxial and Optical formats. Features include low jitter circuitry, interference-reducing transformers and an eight-position format DIP switch. The FCN-1 can substitute for (or supplement) a digital patchbay.

Gold Line DSP-30 Real Time Analyzer: The DSP-30 incorporates, at an affordable price, digital features unavailable in older technologies. These features include an 85dB window, which is not limited by the LED display and a 1/4 dB scale for checking studio machines with standard audio test tapes or swept frequency tones. 1/4 to 5 dB steps allow the user to monitor the mix, equalize the room or service the machines with the same analyzer; and filters are adjustable to either triple tuned or to new sharper filters that cover a full 80dB without interference from the skirts of adjacent frequencies. This lightweight, portable unit is ideal for room analysis in studios, churches, halls or live sound applications.

Lexicon LFI-10 Digital Format Converter: The LFI-10 digital audio format interface simplifies communication between machines using the AES/EBU, S/PDIF or SDIF-2 formats. Placed in-line between two pieces of digital audio equipment, users can convert from one audio format to another, or view and modify auxiliary data embedded in the digital bitstreams. Front panel displays indicate data error types (CRCC, Validity, Parity) with internal error counters for each, and provide access to 24 bytes of channel status and user blocks in the AES/EBU and S/PDIF datastreams. The unit also provides access to the emphasis and dub-prohibit bits in the SDIF-2 stream and allows adjustment of the input and output word clocks relative to input and output serial data on the SDIF-2 interface.

TimeLine Micro Lynx Synchronizer: Micro Lynx is an integrated time code system for the project studio and smaller post-production facility. The system controls up to three audio or video transports and MIDI simultaneously. The standard Micro Lynx has two time code readers, two synchronizers, and a SMPTE and MIDI time code generator. The keyboard has an 80-character LCD display and is fitted with transport controls, jog wheel and a calculator keyboard. It also offers a full edit, rehearse, record and cycle capabilities, 99 memories and programmable macro keys. Options include an expansion card for three machine operation; a digital audio clock card which generates locked word clock or AES/EBU bitstream at any sample rate; and a NTSC/PAL video sync generator.

G. Console Technology

Amek Mozart RN: The Mozart console, originally introduced in 1989 and featuring the Supertrue system, was modified by Rupert Neve when he designed his own input channel for the console. This version, the

Mozart-RN, is the first console to make Rupert's electronics affordable to a wider buying public. Developments of Supertrue led to the introduction of Superloc, a machine control system, and more recently, Virtual Dynamics—providing dynamics processing on each channel. Since the controls of each unit are software-based, the user can currently choose from any of nine dynamics devices. All settings are stored with the mix and reloaded with mix information. There are approximately 160 Mozart placements worldwide, with about a quarter of these in the U.S.

AMS Logic 2: Logic 2 is a completely digital audio console integrated with a familiar analog-style control surface for music recording and TV and film post-production. Features include: Total Dynamic Automation™ of virtually all channel parameters, including Read, Write, Update and Isolate for fader/mute, up to 48 fully automated aux sends; Multilayer In-Line™ operation with each channel strip controlling four completely independent mono or stereo signal paths (27 faders can control up to 108 fully equipped stereo channels, 63 up to 252); completely user-configurable input/output circuitry; a totally configurable desk; and comprehensive signal processing with 4-band, full parametric EQ, 2 band filters and a 4-function dynamics section.

Euphonix CSII: The Crescendo System II (CSII) is a digitally controlled analog audio mixing system. The CSII's control surface is a powerful digital interface that remotely controls the analog circuitry residing in the Audio Tower. SnapShot Recall™ enables all controls and switches on the console to be stored to 100 memories, and instantly recalled within 30 ms. The system also includes Total Automation, allowing every control and switch to be dynamically automated to code. A 56-fader Mix Controller is only 4 feet, 6 inches wide. Basic specifications include: frequency response, 15 Hz-30 kHz, +0.1/-0.25 dB; distortion, <0.005% THD, IMD, SMPTE; crosstalk, <-90 dB at 1 kHz; noise (line in to mix out), <-90 dB at unity gain.

Soundcraft Europa: The Soundcraft Europa is a front-of-house mixing console currently being used on several Broadway shows, in large churches, on major live music tours and with rental companies across the country. Europa consists of eight audio groups, with differentially balanced stereo and mono sends, returns, inputs and outputs. Eight VCA and mute master facilities are standard on the separate fader modules. Soundcraft's Global Solo Clear button universally cancels all active solos and nondestructive VCA Solo is included. Twelve aux sends, a 4-band fully parametric EQ, high and low pass filters and Soundcraft's PA noise gate are featured on every input. A Console Linking System allows two Europa consoles to be linked.

Solid State Logic SL 8000: The SL 8000 G Series is the first mixing console to address the need to mix audio for a variety of release formats—not just stereo, but also to the multi-channel formats used in video and film. SSL's solution, the SL 8000, combines the sound quality, signal processing and Ultimotion automation of SSL's SL 4000 music desks, with many of the advanced features of the SL 5000 film mixers. The SL 8000 is suitable for advanced music formats; TV post-production with up to four stereo stripes; Dolby Surround TV post-production; film post-production, from four-stripe LCRS to multiple DMEF dubs; and 5/6-channel discrete mixes for HDTV, Dolby SR.D or Kodak CDS. Recent installations include Abbey Road, Air Studios, The Enterprise and NTT.

Tascam M3700: The M3700 series automated mixing consoles has an onboard computer for precise automation of VCA fader level, channel mute, auxiliary mute, monitor mute, and EQ on/off. Data can be saved to the internal disk drive in both real time and snapshot mode. An onboard SMPTE reader/generator and MIDI in/out/thru ports allow easy integration in any system. The snapshot mode provides 99 scenes per file with up to 63 files per disk and the real time mode provides up to six mixes containing a total of 30,000 events per mix. Other features include 8-bit, 256-step VCA resolution, in-line monitoring, input channels that provide six aux sends with four send level controls, PFL or stereo in-place solo facilities, and mute switches for channel, monitor and aux 5 and 6.

H. Musical Instrument Technology

Alesis D4 Drum Module: The D4 features the best of the sound libraries of the Alesis HR-16, HR-16B and SR-16, along with new sounds sampled at 48 kHz and 16-voice polyphony. Many of the more than 500 samples incorporate stereo reverb and ambience for a sound directly out of the D4's two pairs of stereo outputs. Expanded Dynamic Articulation™ of tone and pitch modulates both the timbral character and pitch of the samples based on the velocity/intensity of drum hits. Samples can also be triggered through the D4's audio trigger inputs with built-in MIDI conversion. Features include realistic hi-hat footswitch mode, variable sensitivity curves, 21 fully programmable drumsets and a velocity-sensitive audition button.

E-mu Proteus/MPS Keyboard: The Proteus Master Performance System (MPS) keyboard features up to 8 megabytes of CD-quality digital samples selected from the Emulator III library. The MPS Plus offers the 4 megabytes of pop/rock sounds resident in the standard MPS, as well as an additional 4 megabytes of orchestral sounds. Also, the onboard preset capability within the MPS Plus has been increased to 500 locations (300 ROM, 100 RAM and 100 on RAM card). ROM samples may be manipulated to create preset sounds by combining multiple samples and digital signal processing effects. Standard features include 32-voice polyphony, 16-channel multitimbral operation, alternate tuning capability and MIDI Patch Realtime Modulation System.

Korg O1/W Keyboard: Employing more than 250 PCM sounds, 119 drum and percussion samples and Korg's new AI² synthesis, the new instrument offers realistic acoustic sounds while providing a palette for the creation of sounds no other instrument can make. Korg's exclusive WaveShaping technology allows the user to modify the actual harmonic content of PCM sounds quickly and easily. The O1/W has 32 voices, 200 programs and 200 combinations. Its 2-megabyte PCM and program cards, along with the RAM cards, allow the user to access up to 800 sounds, and its 16-track sequencer features 7,000 notes. The O1/W also features a stereo Dynamic Digital multi-effect processor that delivers 47 effect variations with real time control.

Kurzweil K2000 Keyboard: The K2000 is a 61-note synthesizer designed for both the performing musician and the recording studio. Employing VAST™ (Variable Synthesis Technology), and an array of 16-bit samples, the K2000 offers limitless flexibility for creating new sounds. Features include up to 64MB of onboard RAM, sampling options, digital in/out, new 8MB sound blocks and 240MB internal hard disk drive. The K2000 is also available in rackmount format.

Roland JD-800 Synthesizer: The JD-800 contains a new sound source with a 44.1k Hz sampling rate, including 108 preset waveforms. The user can modify wave generator, TVF, TVA, LFO modulation, and pitch, TVF and TVA envelopes for any waveform. A palette function allows modifying a single parameter for up to four tones at once. The TVF includes high-pass, low-pass and band-pass filtering as well as resonance. The TVA features Bias, which allows the user to change the balance of several tones in layered patches according to key range. Two independent LFOs for each tone are also provided. Other features include 64 patches in internal memory (with 64 additional patches on an external memory card), two performance modes and 24-voice polyphony.

Yamaha SY99 Synthesizer: The SY99 synthesizer is designed as both a complete music production keyboard and live performance instrument. With its Yamaha Realtime Convolution and Modulation synthesis, the SY99 incorporates two interactive tone generation systems—advanced frequency modulation (AFM) and second-generation advanced wave memory (AWM2). Features include one, two or four-element voice architecture; an expanded AWM2 wave memory—8MB of ROM containing 267 preset wave forms; two internal digital signal processors providing 63 effects; expandable sample RAM; ROM/RAM cards for voice and waveform storage; 16-track, 27,000-note sequencer, 10-song sequencer; and 76-note, velocity sensitive keyboard with channel and zoned aftertouch.

I. Sound Reinforcement Product of the Year

Circuits Maximus C:Max Wireless Monitors: The C:Max Wireless Monitors (first to be licensed by the FCC) are part of the CMCI Wearable Monitor System. A wireless transmitter/receiver link is coupled to invisible in-the-ear monitors, allowing artists to adjust their overall monitor level while the engineer can create a consistent monitor mix. A simple rotary control on the receiver varies the level of the C:Max Stereo mix independently of the artist's main mix. Genuine left and right stereo can also be transmitted simultaneously. The C:Max System also eliminates the need for multiple stereo mixes. It offers a high-quality crystal-locked receiver designed for live performance.

Crown 3600VZ Power Amplifier: The Macro-Tech 3600VZ™ uses newly patented variable impedance (VZ) power supply circuitry to pack 3,600 watts into 3.5 inches of vertical rack space. With the VZ design, the entire power supply is in operation at all times, with the signal shifting from high to low impedance in direct sync with the program material. The 3600VZ adapts itself to both signal and load requirements, providing the best power matching to the widest range of loads. Other features include ODEP protection, PIP (Programmable Input Processor) expandability and an advanced IOC that indicates when distortion exceeds 0.05%. With its compact size and relative light weight (56 pounds), the 3600VZ is an ideal touring amp.

Future Sonics Ear Monitors™: Ear Monitors are high-fidelity stereo earphones that are custom-fitted to the artist's ears, transforming the ear canal into an acoustical suspension speaker. The monitors eliminate many of the problems associated with monitor feedback and excessive stage monitor levels, while enhancing the quality of sound to the artist and the audience. When properly used, Ear Monitors reduce industry-related risks of hearing and vocal fatigue.

JBL 4892 Array Series Speakers: JBL's Model 4892 is designed for any live sound application requiring high-fidelity music and high intelligibility speech reinforcement at any sound pressure level. Designed to work with the JBL ES52000 Digital Controller, the 4892 offers predictable coverage and smooth response from single box or multiple arrays. Its 14-inch woofer is the first high-power LF transducer in the market to utilize a neodymium magnet structure. A 1.5-inch exit neodymium HF compression driver with Coherent Wave™ phasing plug and 4-inch titanium diaphragm delivers low distortion response to the limits of audibility. A 45 degree horizontal coverage Optimized Aperture Flat-Front Bi-Radial™ horn provides accurate pattern control over the entire bandwidth.

Meyer SIM System II: SIM^{II} System II is a portable, DSP-based instrument for acoustical measurements and sound system alignment. The system is optimized to gather acoustical measurement data for characterizing and correcting loudspeakers and listening environments and is expandable to handle complex sound reinforcement systems. SIM is the only product of its kind that enables engineers to unobtrusively measure response during a musical performance or event, and accurately analyze acoustic spaces in the presence of an audience under conditions of actual use. SIM is optimized for use with music or random noise excitation signals. The system performs transfer function computation between any two of three inputs and handles up to 64 mics via external switchers.

Soundcraft Europa Console: The Soundcraft Europa is a front-of-house mixing console currently being used on several Broadway shows, in large churches, on major live music tours and with rental companies across the country. Europa consists of eight audio groups, with differentially balanced stereo and mono sends, returns, inputs and outputs. Eight VCA and mute master facilities are standard on the separate fader modules. Soundcraft's Global Solo Clear button universally cancels all active solos, and nondestructive VCA Solo is included. Twelve aux sends, a 4-band fully parametric EQ, high and low pass filters and Soundcraft's PA noise gate are featured on every input. A comprehensive Console Linking System allows two Europa consoles to be linked together.

J. Recording Product of the Year

Alesis ADAT Digital Multitrack: The ADAT 8-track, 16-bit linear recorder features 64 times oversampling Delta-Sigma converters, variable 48 kHz sample rate and greater than 92 dB dynamic range. It offers 40 minutes of recording time on SVHS cassette tape. The ADAT Proprietary Synchronization Interface (patent pending) permits multiple ADATs to be linked with sample-accurate synchronization independent of the audio tracks. Up to 16 machines can be controlled for a 128-track digital audio system. The ADAT Proprietary MultiChannel Optical Digital Interface (patent pending) sends all eight channels of digital audio out an optical digital interface for perfect digital copies and sample-accurate composite/assembly digital editing under control of the BRC.

AMS Logic 2 Digital Console: Logic 2 is a completely digital audio console integrated with a familiar analog-style control surface for music recording and TV and film post-production. Features include: Total Dynamic Automation™ of virtually all channel parameters, including Read, Write, Update and Isolate for fader/mute, up to 48 fully automated aux sends; Multilayer In-Line™ operation with each channel strip controlling four completely independent mono or stereo signal paths (27 faders can control up to 108 fully equipped stereo channels, 63 up to 252); completely user-configurable input/output circuitry; a totally configurable desk; and comprehensive signal processing with 4-band, full parametric EQ, 2 band filters and a 4-function dynamics section.

Ampex 499 Analog Recording Tape: This Grand Master[®] Gold Premium analog mastering tape incorporates a non-porous, high energy ferric oxide formulation to provide the lowest noise and distortion, highest output and widest dynamic range of any analog mastering tape, even at operating levels of +9.0 dB and beyond. Ampex 499 provides mechanical stability for high-performance analog machines and is engineered for compatibility with digital delivery systems.

Apogee AD-500 Analog-to-Digital Converter: This compact stereo analog-to-digital converter is designed with 18-bit resolution, providing an optimal reference for 16-bit digital audio applications. The AD-500 combines a discrete analog "front end" with delta sigma conversion technology and sample rate outputs of 32, 44,056, 44.1 and 48 kHz. Sync source inputs with continuous sampling coverage between 32 to 54 kHz, make it well suited for varispeed applications. It locks to external AES/EBU, S/PDIF, optical and word clock digital outputs are supported as well. The AD-500 can lock to NTSC, PAL and 60Hz (monochrome) video and is compatible with D1, D2 and D3 digital video machines and HiDTV.

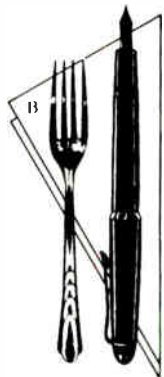
Digidesign Pro Tools Workstation: This multi-channel hard disk recording and editing system is expandable from 4 to 16 recording and playback channels, and offers 64 virtual editing tracks. Pro Tools also includes an automated digital mixer with DSP functions and a basic MIDI sequencer as standard features. Pro Tools features 1-bit delta sigma A/D; 18-bit, 64x oversampling, and supports both AES/EBU and S/PDIF digital formats. The Audio Cards use two high-speed Motorola 56001 DSPs for real time audio processing. Editing functions include: the ability to slip tracks and regions, instant spotting to picture, nondestructive trims and crossfades, and grid editing. Mixing functions include: snapshot and dynamic automation, EQ, digital effects and external effects sends.

Solid State Logic Ultimatum Console Automation: The Ultimatum is a unique dual automation system that allows operation as either a dedicated moving fader system, or as a dedicated VCA system. The engineer is free to switch between modes at any time during the mixing process. Ultimatum also combines the best features of both systems, allowing VCA-style trim updates of moving fader mixes to be carried out without the need to resort to complex off-lines processes. For the first time, engineers can choose whichever automation system is most appropriate without changing studios. Ultimatum-equipped studios include Hit Factory, Electric Lady, Right Track, Abbey Road and Air.

by Mr. Bonzai

MOSE ALLISON

LIGHT ON THE KEYS



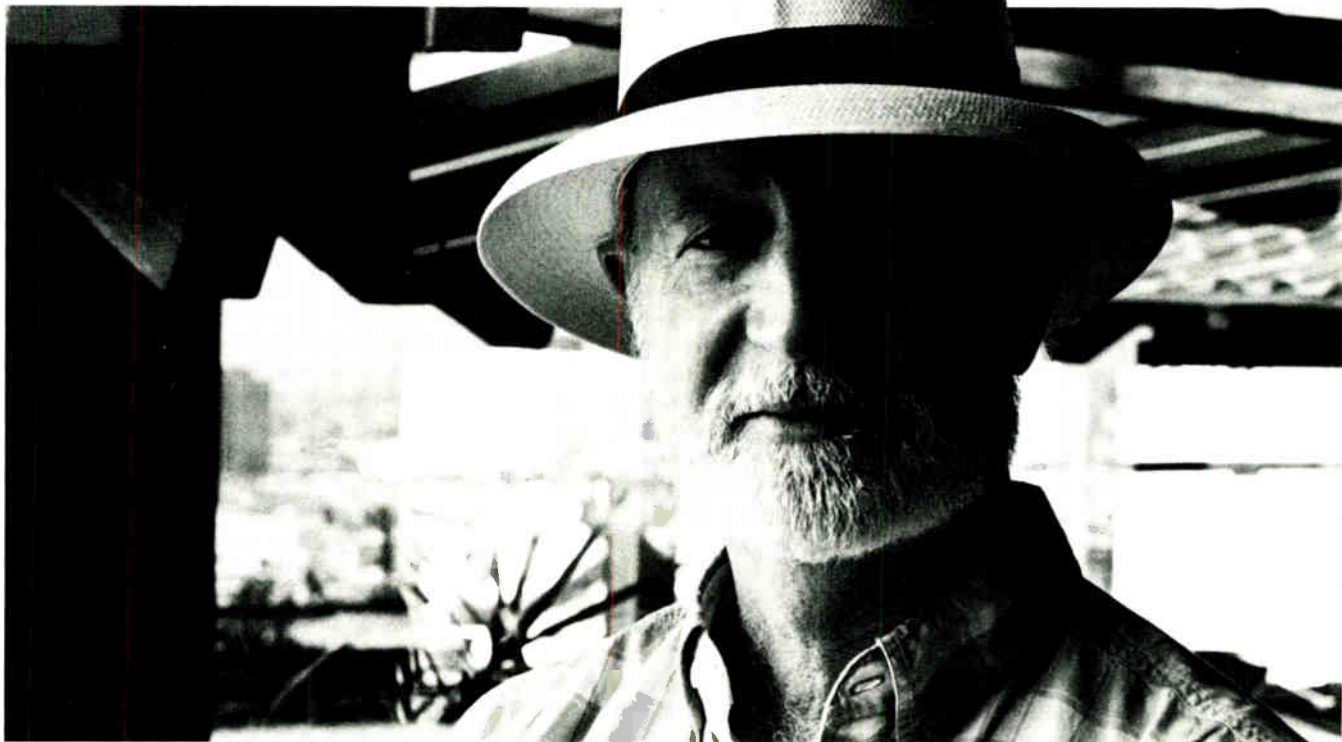
Mose Allison is a living national treasure. At 65, he's in his prime time, treating audiences around the world to his unmistakable gumbo of jazz, blues and skewed humor. One of the friendliest singers around, Allison sneaks up on you with zingers like, "You know, I don't worry 'bout a thing—'cause I know nothin's gonna be all right." His heart is in the right place, and his mind is working overtime.

Allison was born and raised on a farm near the village of Tippo, Mississippi. After boot camp with an army band in the late '40s, he went to Louisiana State University to earn a degree in English and Philosophy. Afterward, he toured with trios and quartets for a few years before his 1957 debut album, *Back Country Suite*. A critically acclaimed collection of songs evoking his birth roots in the Mississippi Delta, the record was the first of his more than

20 albums, in addition to his collaborations with Stan Getz, Al Cohn, Zoot Sims and other innovators.

As a tribute to this unique character in American music, a surprising range of major artists have recorded his songs, including The Who, Bonnie Raitt, The Clash, The Yardbirds, Van Morrison and Robert Palmer. Allison himself is recognized for such unforgettable originals as "Your Mind Is On Vacation" and "Parchman Farm," as well as renditions he has made his own, such as Willie Dixon's "Seventh Son" and "I Love the Life I Live."

I was a pre-hippie teen beatnik in the mid-'60s, and once organized a field trip with my fellow Bohemians to see Mose Allison at the leg-



endary Lighthouse Nightclub just south of L.A. Sipping our Cokes, we did our best to be cool while we worshipped at the feet of His Coolness himself. In the years since, he's never failed to touch us with his easygoing command of mind and music.

I caught up with Mose during one of his recent shows at Hollywood's Vine St. Bar & Grill. On a Thursday night less than a week after the L.A. riots, the club was only half full. Before joining drummer Paul Kreibich and bassist Eric von Essen onstage, he confided to me that some of his best work happens when there's a light crowd and room to move.

On the following Sunday afternoon, we met at Yamashiro, a hill-top restaurant overlooking the city. Over a pot of green tea, the Southern gentleman spoke softly of his life, often chuckling to himself at the way the words came out.

Bonzai: Good crowd last night?

Allison: Yes, we filled the club. Glad to see that, especially after all the recent disturbances in L.A.

Bonzai: How many shows do you do each year?

Allison: I'm doing about 125 dates a year, usually two shows a night. I used to do more than 200 each year, but I've cut back a little.

Bonzai: How long have you been on the road?

Allison: When the club owners ask what they should say before the show, I tell them to say, "Here's a man who is in his 42nd year of on-the-job training." [Laughs]

Bonzai: Forty-two years ago, did you imagine that you'd be doing it this long?

Allison: I never did figure on it. I didn't consciously make a decision to be a musician. It just sort of happened. I've always played music, and I was musical as a child. I wrote songs and sang them in grade school. It's always meant a lot to me, but I never did sit down and say, "That's what I want to be." I just figured that as long as I could make a living with music, I would do it. If I couldn't, then I would do something else.

Bonzai: Do you remember the first song you ever wrote?

Allison: Oh yeah—I had a song that I used to play at parties when I was about 13. It was my local hit, called

"14-Day Palmolive Plan." It was based on a radio slogan for Palmolive soap. My song was a satire on how you couldn't hear any music on the radio because of all the advertisements.

But before that, I used to play songs that I had heard on the jukebox, mostly naughty-type blues songs, like "Let Me Play With Your Poodle." Another one was "She Wants To Sell My Monkey." I thought that song was lost forever, but I heard B.B. King doing it on *The Tonight Show* not long ago. Another of my favorites was "Diggin' My Potatoes."

Bonzai: You had some formal training, didn't you?

Allison: Just the basics. I don't read well, and I'm certainly not a trained pianist. I never learned the runs and all that. I got acquainted with the keyboard at an early age, and I am primarily self-taught. I jokingly say that my whole style is based on the two songs I first learned: "Country Gardens," a pastoral-type song, and "The Indian War Dance," which has a blues tonality with an ethnic sound.

Bonzai: Many terms are used to describe your music—a real melting pot of styles. Can we break that down to the essentials?

Allison: Well, the basic orientation is jazz and blues. I was listening to Louis Armstrong and Fats Waller when I was real young. I heard a lot of the country blues records, since I grew up in the Mississippi Delta. Those are the underlying factors in most of what I do, although there has been some influx over the years from other places.

It's hard to say when modern jazz piano started, but I think the two fathers of modern jazz are Bud Powell and Lenny Tristano. To me, they were the most dynamic of the modern players, and the ones who have influenced everybody since then.

Bonzai: What did you learn from Bud Powell?

Allison: Well, I didn't learn a lot from Bud Powell because he had so much technique and velocity. I didn't have enough command of the piano to copy Bud. A lot of people *did* follow him, but I didn't and maybe I was better off. Many pianists fell under Bud Powell's spell, and they sounded like him for the rest of their lives. I know real talented guys who couldn't get beyond that. In fact, a major figure in the music business used to say, "Bud Powell ruined more

piano players than anybody else."

I was drawn more to Thelonius Monk, John Lewis and Al Haig, who weren't quite as dynamic but still had a lot of invention.

Bonzai: What is "Parchman Farm," and why have you stopped performing it?

Allison: Parchman is a little town in Mississippi where the state penitentiary is. The prison is referred to locally as "Parchman Farm." It wasn't too far from where I grew up, and I remember once as a child seeing a sheriff's posse coming through with the bloodhounds. Most people don't know where the song came from, but it's amazing to me how it caught people's fancy. There's no way of telling why, but for some reason that song stuck.

I don't do it anymore because I've cut out what I call the "cottonsack" songs. These are songs that came from the cotton sharecroppers economy in Mississippi in the '30s and '40s. Those days are gone—all the small farmers have been run out of business. It's all agribusiness now with large companies.

Another reason I don't do "Parchman Farm" anymore is that the punchline is "and all I did was shoot my wife." I decided that I didn't want to sing about anything that referred to violence, even though that line was meant to be ironic and a joke. I don't feel comfortable saying it anymore, and I didn't really expect all the reactions to that line. I think people were overreacting. It wasn't meant to be that funny. [Laughs]

Bonzai: Lyrically, you've carved out your own special niche. I'm curious what your influences were.

Allison: The country blues tradition, people like Willie Dixon, Muddy Waters, Sonny Boy Williamson. And Percy Mayfield, in particular, who wrote a lot of good songs. I really liked his approach because he was a blues singer, but he was writing songs that weren't strictly 12-bar blues. He used different forms, and that appealed to me, like in "Please Send Me Someone to Love" and "Hit the Road Jack." He was one of my major early influences, and after that I listened to all sorts of music: pop songs, so-called European art songs, Charles Ives, ethnic songs. For instance, I looked up some of the music that Bela Bartok taped in Romania and used it for a song of mine called



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Phil Ramone photos by Michael Bloom



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"The Fires of Spring."

Bonzai: With the lyrics, does a song usually start with one line, like "Your mind is on vacation, but your mouth is working overtime"?

Allison: Yes, pretty much. There is a central idea that starts it off, like a punchline or an idea that I can build on.

Bonzai: What about the superstars who've recorded your songs, like The Who?

Allison: They did a song from my first album, called "Blues," from *The Back Country Suite*. The Who called it "Young Man's Blues"—from the line, "A young man ain't nothin' in the world these days." It was on their *Live at Leeds* album, and they played it for quite a while on tours. Pete Townshend used to give me plugs, and I owe a lot to the rockers. They've done my material and they've testified for me, letting folks know about my songs.

Bonzai: The Clash?

Allison: They did one called "Look Here," which I recorded in the mid-'60s.

Bonzai: Van Morrison?

Allison: Van did a good job with "If You Only Knew," and he told me that he also did "One of These Days," but it was never released. And Robert Palmer did a good job last year with "Top 40."

Bonzai: Since you travel alone, how do you find the musicians in each city?

Allison: Well, there's hardly a city where I haven't played, so I know good players all over, from Seattle to Miami and New York to San Diego. I just call 'em up and tell them I'm coming to town. If someone isn't available, I can always count on them to recommend another player.

Occasionally, I go someplace and just play with whomever is there. It can be a pleasant surprise, but sometimes it can be hard work. [Laughs] But you know, there are so many good players out there. During the jazz boom era of the late '40s, the '50s and the early '60s, most of the good players were in major cities like New York, L.A. and Chicago. But it's not like that anymore—there are good players all over.

Bonzai: What's the general mood of the jazz scene these days?

Allison: I have no idea. [Laughs] Some people don't even consider me

part of the jazz scene. It's funny, there are so many viewpoints. We're still waiting for someone to answer the age old question: "What is jazz?" I have my own ideas, but they don't always coincide with the jazz establishment.

Bonzai: In making a living through the years, what has been the most important contribution to your livelihood? Is it the records?

Allison: No, it's singing the songs and working in clubs that has kept me alive. I never made any money on my records. The only money I made from records was from the mechanical licenses when Van Morrison, or The Who, or other artists recorded my songs. According to the record companies, my records have never made money. After 30 years, a few of them may have made it out of the red.

Somebody put out *Mose Allison's Greatest Hits*, which I thought was one of the most ironic titles in the world. Considering I never had a hit, it's quite a collection. But I've sold a few records over the years—the people who like what I'm doing keep buying them in steady numbers—but I've never been a mass sales item.

Bonzai: Well, what's the key to your success?

Allison: The key to my success is the fact that I will get to play again this week. [Laughs] I like playing, and I like what I'm doing. I'm fortunate. Throughout my career, I've run across super-talented people all over the world, and you'll never hear of them. They were never able to make a living, or they gave it up. I know that there is an element of luck, and I've persevered. I've kept at it, and no matter how sentimental and silly it is, I still keep trying to play well. I keep trying to do a good job. In fact, I've got a line that I haven't used yet: "I'm just a sentimental slob. I even try to do a good job."

I enjoy the challenge of trying to do it well. From a certain point of view, you could say that my piano playing and the jazz part of it is an indulgence that is paid for by the vocals and the songs. I do have some fans who like what I'm doing instrumentally as well as vocally. To me, it has more of an impact this way rather than if I just stood up and sang with an orchestra, or just played the piano without singing. I like doing

—CONTINUED ON PAGE 84

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—FROM PAGE 83, MOSE ALLISON

it all as a single unit.

Bonzai: You look like you're in a trance when you're playing.

Allison: I enjoy it. It's a challenge to try to do it like I think it's supposed to be done. It doesn't do itself. Sometimes it seems real easy, and those are the sets when it's all worthwhile. Now and then, you start a set out, and for no reason that you can figure out, no way you can predict, nothing you can do to insure that it will happen—but everything starts clicking right away. It's as if it's happening of its own accord—you have control, but you are not forcing anything. I call it the "spime."

Bonzai: What's that?

Allison: Spime is my word for space-time. People are always talking about the space-time continuum, so I figured, "Look, you need one word for that." That's the spime. When you get into the spime, that's when you feel the flow of things, and there is no effort involved. It just happens.

Bonzai: And you can't predict, you can't create this state?

Allison: There is not a thing you can do to insure that it will happen. And you can't explain why it's happening, or why it happened in the first set but not in the second. You just have to stay ready for it, and keep yourself in shape—mentally and physically able.

When you've been doing it for 42 years, like I have, you know you can get through the set, regardless, even if you are feeling awful and you know it isn't happening. You still get through the set.

And I can't really be the judge. I've recorded live dates and thought one set was the one, but it wasn't. You listen back, and maybe a set where you weren't feeling as good might be the better one.

Bonzai: Have you ever made any big mistakes?

Allison: Who knows? The fact that I'm still here and making a living says something. According to some people, I am just a victim. There are certain people in the music business who consider me someone who just missed out on his chances. I didn't do the right things, or I didn't get the right management, or didn't go in

the direction where I could have made a lot of money. I get that all the time.

Bonzai: Well, there is something to be said for your longevity, your work in the long run.

Allison: Those who make it big, usually make it big for about two years. If you do something that you don't believe in to make it real big, and then the big thing gets little, you're stuck with what you didn't believe in.

I think that what I'm doing is based on sound principles, and I'm doing something that isn't hurting anybody. [Laughs] Fortunately, I have an audience that likes it, and I'm still writing songs and looking forward to playing next week. I've seen so many talented people that didn't get anywhere. I've made a comfortable living, and I do what I want to do.

Bonzai: This sounds like the end of the interview.

Allison: It's hard to go beyond that. [Laughs] The coda will be coming up. ■

Ever since the world ended Mr. Bonzai doesn't go out as much.

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SOUND CAPABILITY IN BARCELONA

Nothing rivals the Olympic Games. Not in terms of athletic competition or television production. On July 25, millions of viewers from around the world will turn on NBC for a look and listen at the XXV Olympiad, on tape

BARCELONA '92



delay from Barcelona. Most will take the sights and sounds for granted. Few will realize the enormous amount of preparation that goes into producing 161 hours of programming over 16 days of competition.

Charles Jablonski, managing director of engineering for NBC Sports' Olympics coverage, began on the project in 1989 by arranging technical

and personnel requirements. NBC staff have been on-site since October 1991, overseeing construction of their portion of the International Broadcast Center—70,000 square feet, comprising three broadcast studios, nine edit rooms, a CD and videotape library, and a host of executive offices. It is the company's third largest production center—following New York and Burbank—and it is temporary; most of the equipment will be sold off to affiliates and other interested parties following the closure of the Games on August 9.

Equipment installation began in December 1991 under the supervision of NBC engineers, implemented by a number of companies, most notably Nexus, a Barcelona firm. Construction of the edit suites at the larger venues—gymnastics, track and field, swimming—took place in May of this year, and the remote trucks were outfitted this spring.

European power, Jablonski admits, "has been a bit of a challenge," though all equipment was converted to the PAL format prior to installation, helping smooth things out.

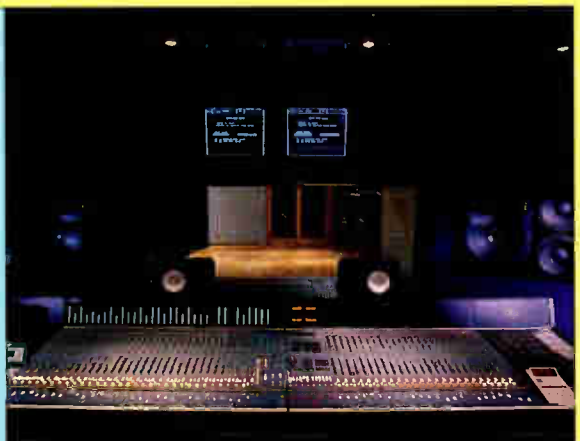
"Working in PAL is an asset," says Joe Cortina, who came onboard in May 1991 as coordinating director for NBC's

Studio Spotlight

Control room A of MG Sound (Vienna, Austria) is a mixing suite outfitted with a 56-channel DDA DCM 232 console and Yamaha NS-10 and Genelec 1034 A monitors. A is linked by 32 tielines to control room B, which has a DDA AMR 24 console.

Equipment kept in a separate room includes a 24-track Sony digital tape machine, a 2-inch Studer analog machine and a TimeLine Lynx sync system.

MG Sound is a mix of old and new. It is set in the city's historic First District with its grand architecture, but the inside of the studio is pure 1990s. Engineer Martin Bohm believes that the studio is "on par with other major European music production centers."



Olympics coverage.

"The host broadcaster, TKO of Spain, will be all-PAL," Cortina adds, "as are most of the other world broadcasters. We'll produce everything in PAL, then convert to NTSC as the signal's sent [to the Intelsat satellite] on its way to New York. If we need a tape from Spanish television, or if we need to share facilities and equipment, we can get a feed from one of the host's cameras and give them a split from a camera we have in a position that they like, not having to worry about formats. It's freed us up from having to do every single thing unilaterally."

Not that NBC couldn't handle it unilaterally if need be. The army of NBC staffers in Barcelona will number well over 1,000, including more than 500 technicians, 50 editors, a team of graphic designers and artists, and 50 or more audio types. Most editors, camera operators and TDs were brought in freelance from Europe and the U.S. Local Spanish crews will be used mostly for lighting and scenic operations.

Unlike Seoul in 1988, this will be a six-hour tape-delay Olympics. Though the network will play it out live (i.e., you will see the events as they happened in Barcelona; host Bob Costas essentially will be live on tape, unlike CBS's coverage of the Winter Games), it means a hell of a lot of editing. Jablonski has been quoted as saying, "We'll have three hours to make six hours into two hours, in terms of taking a day's worth of coverage and collapsing it down."

Editing will take place at the venues whenever possible, then footage will be sent back over tielines (from the major venues: picture will be microwaved back from some of the outlying ones) to the IBC to be incorporated into that day's programming. NBC purchased more than 250 Panasonic D-3 1/2-inch, composite digital videotape recorders for the Games, planning to make use of the 4-channel, 20-bit PCM audio as well as the exceptional picture quality.

"The decision to go with the digital format was so that generation loss would be kept to a minimum," Cortina says. "We wanted the audio and video quality to be as clean as possible when we feed it out to conversion and send it to New York."

All audio mixing will be digital, as

well. Like CBS during the Winter Games, NBC chose the Graham-Patten Systems D/ESAM 800 digital edit suite audio mixer (24 of them!) to interface with the Grass Valley edit system and Tektronix VS-211 PAL frame synchronizers. According to Jablonski, the decision to mix digitally was driven by the direct digital interface to the D-3s; the decision to go with the D/ESAM 800 was because it's the only mixer to control four channels on the VTR through the edit system, not to mention its compact size and low cost.

D/ESAM was designed for videotape editing, allowing edit system control of audio in a manner similar to video switching. The units have found a home in a number of production facilities (Sony even offers one as part of its Select System all-digital package), offering up to 56 inputs, 16-channel mixing and 4-channel monitoring. Editors can assign any audio input as a source to any channel fader and any output on an edit-by-edit basis. All level settings, machine assignments and audio crossfades can be stored as snapshots and recalled instantly.

"Some of the programming will be

—CONTINUED ON PAGE 89



Making International Connections

by Chris Stone

"The Operator" is someone who appreciates his or her market position and takes advantage of every available business opportunity. As someone who was responsible for the building, maintenance and operation of a few studios for a couple of decades, I welcome this opportunity to share some hard-earned insights about survival in the world of professional recording.

Before we launch into this month's topic, I'd first like to explain my hope that this will be an interactive column. Through phone or fax communication with *Mix*, let me know what business questions you would like explored,

—CONTINUED ON PAGE 90



Problems Mount for British Soundtrack Productions

by Colin Paulson

Generally speaking, the orchestral work in Britain is divided into two distinct areas, classical and film. The classical side is more often handled by audiophile engineers who work in chilly churches and town halls with a VW van full of old microphones and tweaked digital recorders. Abbey Road's Number One is one of very few real studios used regularly for classical album work.

The other orchestral area is film,

which is largely handled by CTS Studios, Abbey Road and The Hit Factory London. I say largely, but the word should be taken under advisement, as large is hardly the right description of the amount of soundtrack work available. The problem is that our Musician's Union is playing Russian Roulette, both with its members and with hapless engineers and studios.

Britain has long been seen as the best budget option for film producers, and many of the world's great movie soundtracks were recorded here. But our latest union agreement was based on undercutting the American one, and in these tough times, we are having to fight off additional challenges from Munich, Budapest, Rome, Prague and elsewhere. These European cities have cultivated orchestras with varying degrees of competence but with favorable prices that bring a warm glow to a film producer's wallet.

Every now and then these European orchestras shoot themselves in the foot. Munich lost ten important

—CONTINUED ON PAGE 184

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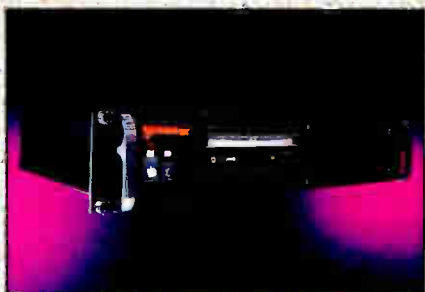
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"The Lawnmower Man" image courtesy of Allied Vision Lane Pringle Productions and New Line Cinema Corporation. "CyberBoogie" created by Angel Studios.

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—FROM PAGE 87, BARCELONA

in true stereo," Cortina explains, "and there will be some places where we need to send the feed back to the IBC discrete—to have international copies of sound. In some areas, the extra channels will be used for separate announce, ambience and full-mix channels. On those events that require heavy editing, there will be some voice-over, and that would be done during editing. But as much as we possibly can, these events will be voiced live."

One other interesting audio feature that wasn't available in Seoul in 1988 is the use of time code DAT machines, in this case the 7000 Series from Sony. According to Jablonski, they will be housed in all the video edit suites under edit control, and they will be used in conjunction with CDs for music library and effects needs.

"In the past," Cortina says, "when music and other audio effects were brought in by CD or tape, quite often they would be bumped down to video-tape for control during editing. Here, the DAT players read time code, so we can save that step and edit right off the DAT machines."

Finally, a word about graphics. To the vast television audience, graphics, more so than sound, set the mood and feel of the coverage. NBC Olympics graphics producer Bill Bonnell has a staff of several designers, operators and animators, working on Quantel Paint Box, Harry, Hal and Picture Box, a Wavefront 3-D modeling system, Grass Valley Kadenza and a Grass Valley KScope. NBC recently won an Emmy for its coverage of the World Track & Field Championships from Tokyo, a look Cortina describes as "our first attempt at revealing a little bit of what we're going for in Barcelona."

"We're taking a lot of chances [graphically]," Cortina adds, "and I think you'll see it on the air. Overall, it's going to be the most exciting Olympics we've had. It's going to be the first Olympics in many years without any countries boycotting, so you'll see competition from around the world. And I think we have a very, very contemporary look...and sound."

—Tom Kenny

INTERNATIONAL NOTES

Europe

Touch Down Studios (Kranzberg, Ger-

many) made several major purchases. A Neve VR Legend console with Flying Faders was installed, and the facility also took delivery of two SSL Screen-Sound systems and a SoundNet digital audio network...Studio de la Grand Armeé (Paris) chose a Neve VR60 with Flying Faders for its Studio A...Brussels facility Studio L'Equipe installed an SSL SL 5000 system in the studio's newly constructed film studio...The Netherlands Broadcast Services chose Studer and Studer Digitec to revamp the corporation's audio department in Hilversum...Zurich's Tonstudios Z bought an SSL ScreenSound system...Finland's Oulu Music Conservatory (located close to the Arctic Circle) had a Quartz 32 and Megas Mix console installed by MS Audiotron, Soundtracs' Finnish distributor...Oslo-based Norwegian Broadcasting purchased a Euphonix CSII console...The National Opera House in Helsinki, Finland, is having all its amplification supplied by QSC Audio Products...New Musik was appointed Danish distributor for Lexicon...Madrid-based Retevisión purchased two Sony PCM-3324A 24-channel recorders in preparation for the Expo '92...Radio Nacional España selected 40 PCL 6020 Studio-to-Transmitter Links...Italian Broadcast Radio ordered 71 Otari MTR15D 2-track master recorders...

UK

London's Air Studios has two new consoles: an SSL 8000 G Series will be installed in the Lyndhurst Hall facility, and a Neve VRP Legend with Flying Faders and Recall will be in the Main Hall...Abbey Road selected an SSL SL 8000 G Series system...Pro audio rental company Hilton Sound (with offices in England, France and The Netherlands) purchased Sony's new 24-track PCM-3324S...Steve Rainford engineered a new George Harrison live album at the Mill (Berkshire) using an SSL Screen-Sound system...Sound Public Relations moved to 12 Colas Mews, Birchington Rd., London NW6 4LH. The new phone is (071) 372-7871...

Japan

Tokyo's Sound Design Studio ordered a Focusrite studio console. Affiliated mobile fleet Audio Rents has a new mobile unit, the "S-1," equipped with an SSL 4048G main console, two Studer subconsoles and twin Sony recorders...

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International Events

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—FROM PAGE 87, THE OPERATOR

and participate with me in a discussion of the challenges facing our industry. Believe me, the headaches never end, but neither do the new chances for success—on whatever business level you wish to operate.

Some studio owners of both large and small operations bristle at the words "world class." The term does suggest a hipper-than-thou attitude, but when I talk about world class in this column, I'll use the term to designate characteristics of recording studios operating at their highest levels of professional performance. While the components of what I describe as a

world-class facility might not apply to your specific situation, many of the attitudes that create a world-class level of operation will.

The Association of Professional Recording Services in the UK recently tackled the world class question by forming the UK Studio Accord as a separate division of the larger group. The Accord is made up of nine cells representing the various types of studios, such as music, post, advertising, project, etc., with high-, medium- or low-volume business. As with most new ideas, it was resisted at first, and just about everyone felt left out of something. Now, after a few monthly meetings of the cell groups and several meetings of the Accord's board of directors, the studio owners are reacting favorably, and even the clients are getting involved.

Here at home, the Society of Professional Audio Recording Services is currently studying the same topic in a different way by attempting to define "ideal professional guidelines." The intent is to help members determine ways to improve their facilities and be certain they are getting the most bang for the buck. Through networking

and debate, it is hoped that studios will learn what is necessary to better their position within their marketplace, in the niche that is best for their business—and receive the proper recognition for their efforts.

Various requirements for excellence are clearly defined in the application to join the UK Studio Accord. The guidelines deal with such requirements as proper business permits, certain types of insurance, a professional rate card, an equipment list with rental rates for gear not included in the basic rate, at least one full-time maintenance technician and designated maintenance area, suitable test equipment, alignment tapes and a preventive maintenance program, experienced studio personnel present at all sessions, proper air conditioning, acoustical studio-to-studio isolation of at least 75 dB, a documented tape library, lounge with kitchen, safe equipment access and daily cleaning of the premises.

These attributes are the basic foundation for comparison of facilities, but cannot include the intangibles of nuance and charisma, which I believe are the key to commercial success in the



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professional studio business. It's the look and the feel, the local and national importance of the clients who have worked there, the recordings that have received substantial attention and most importantly, the attitude of the employees who work there.

People make all the difference. Are they willing to go that extra mile to be sure the client is satisfied? Are they being properly managed and listened to, paid salaries based on the market and the competition, provided with competitive benefits and treated fairly? Are they given the opportunity to learn more about their trade, earn more money and otherwise improve their working life?

In addition, don't overlook those ethereal characteristics such as environmental ambience. Are there amenities such as private lounges, secure parking for clients and employees, off-hours reception and ease of entry? Are there up-to-date accounting services to assist in proper budget realization? And don't forget minimum downtime, on-time starts, competitive tape costs, facility location, free services and quick reaction to client requests. Any of these attributes can make the difference—and allow you to charge more!

Many clients speak of the "cost efficiency ratio": the amount of work they are able to complete in a given period of time vs. how much it costs and the effort they have to expend (leaving artistic temperament aside). This may be measured in cost per minute of completed product, which is then compared to the total budget for the project vs. the expected revenue from the final results. The obvious aim is to achieve profitability. If this is not accomplished, then the budget for the project will have to be reduced. You will get less for your services, or the client will go to a less expensive facility.

A friend of mine who is the senior vice president of A&R for a major label explains that much more recording is being done in the smaller studio markets today. Seattle, Minneapolis-St. Paul and New Orleans are just three that he mentioned. In 1991, he spent more than \$1 million in these and other regional markets. His explanation: "The results were the same, and the costs were lower."

The managing director of a major London studio reported to me that a substantial portion of his business today comes from Japanese clients, be-

cause the rates are lower in England than in the U.S. and Japan. New international resort studios are also competing with U.S. studios by having all the right equipment and services and by charging comparatively low prices for their exotic locations.

Regardless of your location or market niche, it's the feeling that the clients get when they walk in the door for the first time. If you've done your job, the clients feel that it is going to be a comfortable and pleasant place for recording. They are confident that everything will work all the time, and that the desired equipment is on the premises

or readily available to rent on short notice. The results are always better than expected, took less time than what was planned for and cost less than projected. The clients leave the studio content that the job was well-done, and they want to tell their peers what a great place it is.

That's class—*World Class.* ■

Chris Stone, founder of the Record Plant, is a former president of SPARS and is currently president of Filmsonix, a consulting firm serving the professional audio industry.

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by Paul Potyen

IRIS INDIGO

AUDIO (AND A LOT MORE)

The widespread success of MIDI in the mid-'80s went hand-in-hand with the growing awareness of the Macintosh computer as a creative tool. As astute software engineers took advantage of the Mac as an easy-to-use manipulator of MIDI data, composers, engineers and producers rallied to that platform in increasing numbers. With the advent of CD-quality digital audio recording and editing products, the Mac made further inroads into the pro audio community. It seemed a match made in heaven.

As we become accustomed to technological advances, our expectations and appetites increase. We want machines that don't make us wait for them to crunch massive amounts of digital data. This demand for increased processing speed and larger storage—and the inevitable improvement in price/performance ratio—are making room



Exploded view of IRIS Indigo workstation.

eter of Northern California's Silicon Valley in Mountain View, the company was founded in 1982. It has emerged as a leader in visual- and data-intensive graphic applications, with a compound annual growth rate of 67% over the last three years. The company has historically created expensive, powerful supercomputers, servers and workstations. In 1991, Silicon Graphics unveiled the IRIS Indigo, the first Reduced Instruction Set Computing (RISC) personal computer. It is the only family of systems capable of delivering 3-D graphics, DAT-quality audio, video and Advanced Computing Environment (ACE) compatibility beginning at under \$10,000.

It was the IRIS Indigo that made possible some of the fantastic special effects in *Star Trek VI* and the face-morphing sequence in Michael Jackson's recent "Black or White" video. With Silicon Graphics' low-cost Indigo-Video board, IRIS Indigo machines can display video signal directly from a video source (videotape, camera or laserdisc player), capture single 24-bit video images, grab 8-bit RGB images for importing into graphic applications, and run digital video movies. Several third-party vendors currently support the platform with video production tools: Wavefront Technologies is ship-

PHOTO ILLUSTRATION: MONIQUE HODGE-KINSON AND PAUL LACOMB



3-D drawing of a studio environment created on the IRIS Indigo using Alias Animator software, working from an imported AutoCAD file by John M. Storyk Design.

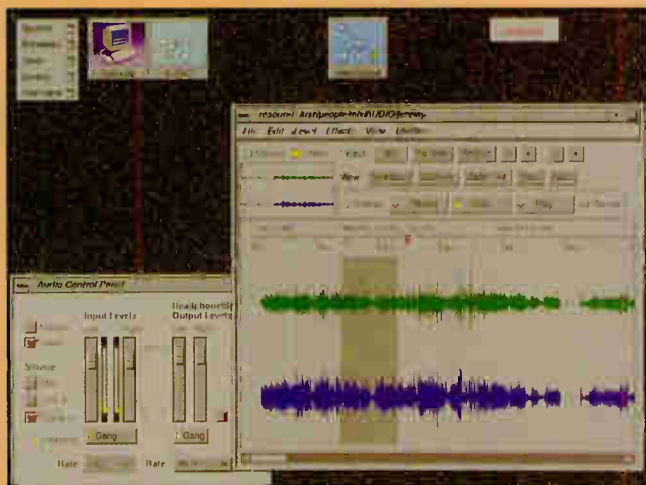
for smarter, faster machines. Sun Microsystems has made a successful go of it with its Sparestation family of computers for programmers, engineers and others who need heavy computing power. According to San Jose-based research firm Dataquest Inc., Sun has captured about 30% of this \$8.7 billion market. Hewlett-Packard and NeXT are also jockeying for market share in the flourishing world of workstation/PCs.

Still another player in the game is Silicon Graphics. Based at the perim-

ping its Video Composer video production software package; Chyron Corporation is at work on a broadcast-quality video adaptor board for the Indigo; and Digital Arts is offering its Rendermanager 3-D modeling, anima-

60 seconds of music from a CD player through a DAT I/O into Digidesign's Sound Tools on a Mac IIci with 8 MB of RAM. I did some editing, then transferred the original file from the Mac into the digital ports of the IRIS Indigo.

Mac from MacroMind-ParaComp, with the added ability of 16-bit resolution and digital I/O. The beta version of the software that I looked at was well-designed and intuitive, despite occasional, inevitable bugs. The company



Screen capture of the Sound Editor software distributed with the IRIS Indigo.

Screen capture of IRIS Indigo workspace.

tion and rendering software package.

But even more important to audio types, the IRIS Indigo is capable of manipulating DAT-quality digital audio with lightning speed. A MIPS RISC CPU running at 33 Mhz, a Motorola 56001 DSP chip, 8 MB of RAM (expandable to 96 MB), digital I/O (both S/PDIF and AES/EBU), extended keyboard and 16-inch color monitor are all standard features of the entry-level \$8,000 machine. (The current Yamaha A/D/A chip will be replaced by Crystal Codec chips in future systems.) The \$16,250

where I performed the same editing tasks. The results are shown in Table 1. Admittedly, this is not a totally fair comparison, since the difference in the amount of RAM between the two machines is significant, and that difference can greatly affect the speed of some tasks. The most dramatic difference was in the amount of time to cut one second of audio from the front of the file: 19 seconds on the Mac vs. about 0.5 seconds on the IRIS Indigo.

The present status of audio software provided by Silicon Graphics for the

has been working with Roger Powell—creator of Texture, one of the first MIDI sequencers for the PC platform and longtime musical associate of Todd Rundgren—to develop a set of audio tools for the platform.

However, the relatively modest audio recording and editing capability is expected to get a strong dose of steroids. While the sound editor is only capable of stereo recording, editing, playback, third-party developer Wave-Frame (Boulder, Colo.) has announced plans to develop a 6-track professional system (four tracks plus two scratch tracks) for the IRIS Indigo. This software-only package, dubbed Tidal Wave, has been tentatively priced at under \$1,000. Tidal Wave Pro will look similar to its sibling, with additional hardware providing an increased number of tracks and I/O, extended signal processing and external synchronization. Both Tidal Wave and Tidal Wave Pro are scheduled to ship early this fall and will be demonstrated at October's AES convention in San Francisco.

Another third-party developer, Blue Ribbon SoundWorks (Atlanta), is also at work on audio-related products for the IRIS Indigo. Already known for its strong position in the Amiga music market, Blue Ribbon recently an-

—CONTINUED ON PAGE 151

	Sound Tools on Mac IIci	Sound Editor on IRIS Indigo
Time to open file	5	2
Time to cut 1 second from beginning of file	19	0.5
Time to undo cut	15	1
Time to normalize file	75	20
Time to draw entire 60-second waveform	15	7
	(in overview mode)	(time in seconds)

Table 1: Timing Tests

system I looked at contained 24 MB of RAM, a 432MB hard drive and a DAT drive that can be used for both audio and data backup.

How fast is it? To find out, I recorded

IRIS Indigo is primitive when compared to that of professional digital audio systems. The audio system Sound Editor resembles more closely those found in SoundEdit Pro for the

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The 414 is available in two models, the C414 B-ULS and the C414 B-TL.

World Radio History

Chip Shots

ARTICULATE SYSTEMS VOICE NAVIGATOR

Recent advancements in voice recognition technology for the Macintosh (see "The Byte Beat," January '91) have resulted in significant price reductions for Articulate Systems' (Woburn, MA) product line. Voice Navigator SW is a software-only voice recognition program that supports any Mac with a built-in microphone. The package, priced at \$399, includes either a unidirectional desktop microphone or a noise-canceling headset mic.

For Macintosh owners who do not have built-in sound digitizers, Voice Navigator II is a hardware version of the product available for \$699. Voice recognition is particularly useful in audio recording, as it leaves both hands free to control a mixing console or a musical instrument.

Circle #201 on Reader Service Card

MODGRAPH VIDEO MONITORS

Modgraph Inc. (Burlington, MA) has added multisyncing to its line of 8.5-inch, Super-VGA color monitors. All standard VGA and Super-



Modgraph

VGA resolutions are now supported, as well as RS-170 video rates, including NTSC and PAL. Available in a standard, industrial 19-inch rack and a variety of enclosures, the monitors use an 800x600-resolution Sony Trinitron CRT.

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AUTOMATIC INSPECTION DEVICES OPTICAL DISC ANALYZER

The Model CD-A Optical Disc Analyzer from Automatic Inspection Devices Inc. (Toledo, OH) is a tool for evaluating CD-Audio, CD-ROM and CD-Recordable discs. The card plugs into IBM PC/XT/AT or compatibles and can be used for production-line quality assurance or in-house quality certification.

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DIGITAL FX VIDEO F/X PLUS INTEGRATED POST-PRODUCTION SYSTEM

The Video F/X Plus System from Digital F/X (Mountain View, CA) brings a full range of video production capabilities to the Macintosh, including storyboarding and scripting; logging, previewing and trimming of clips; creating and keying of graphics over live video; wipes and dissolves; import and export of anti-aliased Macintosh graphics and text; frame-by-frame recording of Mac animation; and auto-assembly of EDLs.

The audio mixer includes two stereo inputs, a stereo preview out, stereo audio program out and software-controlled audio input gain. Users also can trigger MIDI devices from the audio mixer, eliminating the need to go to tape as an intermediate step.

Video F/X Plus requires a Mac IIci or faster and 8MB RAM for applications. Storage for digitized video and audio requires 23MB per minute. The system is priced at \$15,995.

Circle #204 on Reader Service Card

INTERSOUND LIBRARIAN/EDITORS FOR THE ATARI ST/STE

Polystar, Parastar, Wavestar and Unistar are software packages designed for the Atari platform from Intersound (Salerno, Italy). The packages work with a variety of Akai and Roland samplers, as well as MIDI Sample Dump Standard

samplers, allowing wave editing and database management of sound files.

Circle #205 on Reader Service Card

TWELVE TONE SYSTEMS CAKEWALK PROFESSIONAL FOR WINDOWS

Now available from Twelve Tone Systems (Burlington, MA) is Cakewalk Professional for Windows, a 256-track MIDI sequencer for Microsoft Windows 3.1.

Using the Multimedia Extensions in Windows 3.1, users may insert MCI commands in tracks to synchronize



Digital FX Video

MCI-compatible multimedia hardware with MIDI sequences. Digital audio data may also be embedded into a Cakewalk sequence directly from the Windows Clipboard and WAV-format files. Suggested retail price is \$349. Owners of Cakewalk Professional for DOS can upgrade for \$75 plus shipping.

Circle #206 on Reader Service Card

OPCODE SYSTEMS AUDIOSHOP
Opcode Systems Inc. (Menlo Park, CA) has released Audioshop, an 8-bit digital audio editing and management program for the Macintosh. The program uses a CD player-like interface to load and save digital audio tracks in a variety of formats, including AIFF, HyperCard, MacroMind-Paracomp Director, System and QuickTime.

"Cut and Paste" editing of digital waveforms is possible, as are a number of special effects. Digitized sounds and/or tracks from Audio CDs (using a CD-ROM drive) can also be assembled into a playlist. Playlist sequences can then be easily modified. Audioshop is available for \$89.95.

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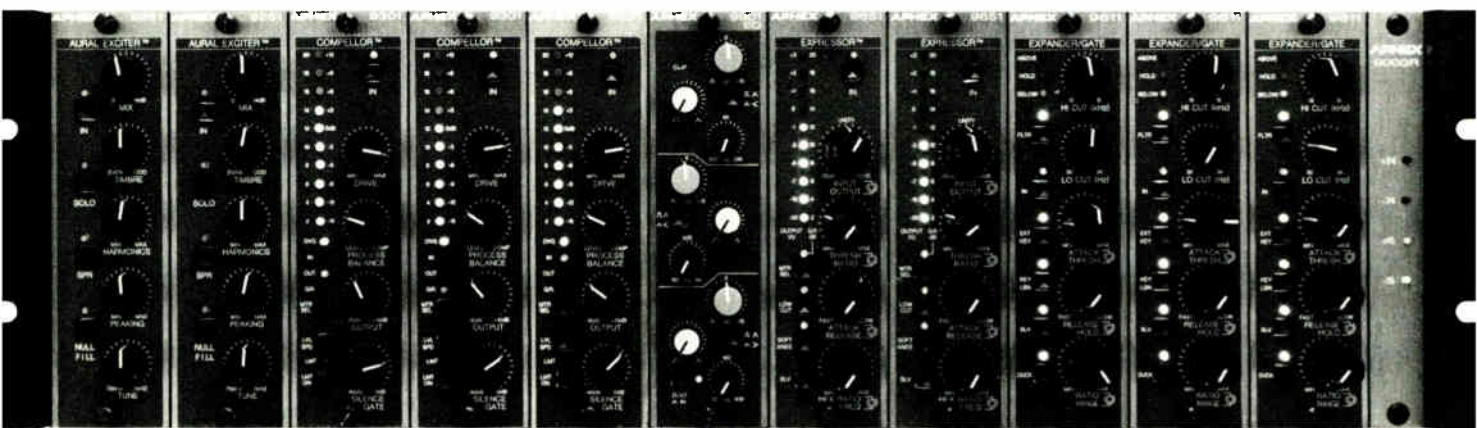
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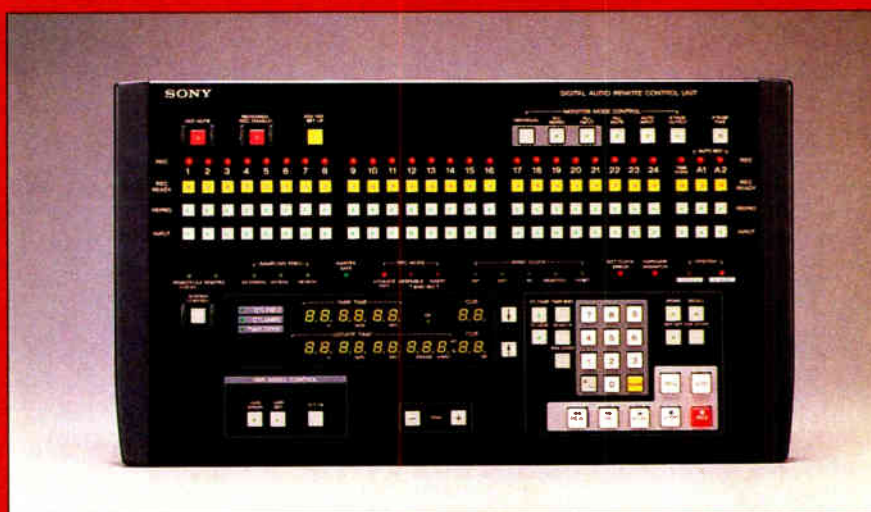
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by Ken Pohlmann and John Monforte

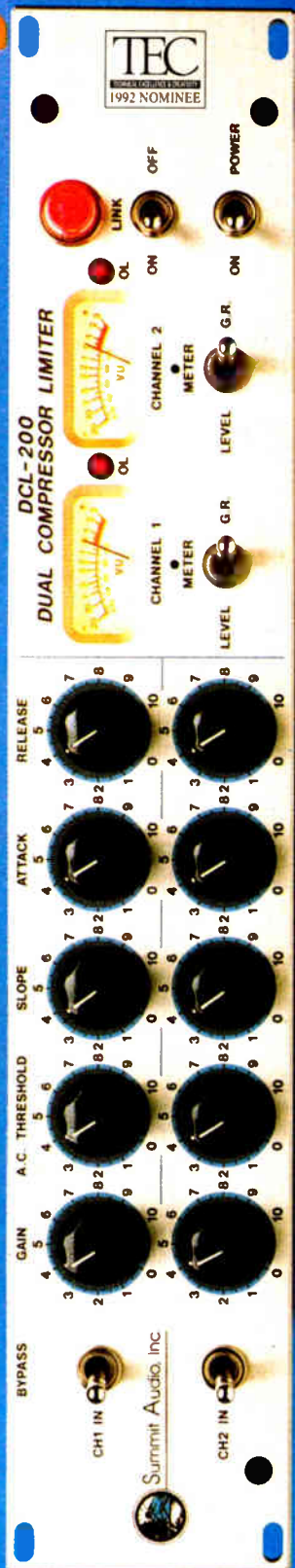
SONY PCM-3324S

Although the world population of digital multitrack tape recorders has passed the three-figure mark, they are still scarce compared to their analog brethren and generally out of reach for the vast majority of studios. The problem, of course, is price; a 24-track digital recorder may cost three times more than an analog model. The Sony PCM-3324S seeks

to narrow that gap, with a price that is higher than, but competitive with, an analog multitrack equipped with noise reduction. Paradoxically, this decrease in price does not entail any sacrifices in quality; indeed, the PCM-3324S uses the same transport as its big brother, the PCM-3348, a machine that is legendary for its smooth and rapid tape handling.



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The PCM-3324S is a digital 24-track tape recorder employing the DASH format. Whereas the PCM-3324A was an upgraded, modified version of the original PCM-3324, the PCM-3324S is an entirely new design, borrowing much more from the PCM-3348 than the PCM-3324A. Today, multitrack recorders are being put to work in a wide range of applications outside the area of music recording. The needs for film and video post-production are specialized, and multimachine lock-ups are becoming more commonplace in all areas.

Older digital multitracks provided a comprehensive array of features to increase the market size for the design. Recognizing the differing needs of facilities, Sony decided to design the PCM-3324S in a modular fashion. This allows the customer to save money by optimizing each machine for maximum cost-effectiveness in every installation. In addition, the components for advanced features are easily changed in the field as the studio's needs grow.

The PCM-3324S can be configured for different applications by choosing among combinations of 13 optional units. The most visible aspects of this approach are the two remote units that can be used with the recorder. Each has a different layout and supports different features, but more on that later.

The PCM-3324S uses the DASH-F (fast speed) format in which normal track density permits recording of 24 digital tracks on a 1/2-inch tape. The tape also contains four auxiliary tracks—two for cue, and one each for CTL and time code. This track format makes the PCM-3324S compatible with the PCM-3324A and PCM-3348. Of course, a PCM-3348 recorder can additionally record tracks 25-48 to an existing tape. The PCM-3324S can be synchronized with up to two other recorders, chase-locking to their CTL tracks; this allows 48-, 72-, 96- or 120-channel operation. Cue tracks employ pulse-width-modulation recording for a dynamic range of 60 dB; bias recordings from PCM-3324A tapes can also be reproduced.

Sophisticated electronic editing can be performed between two recorders

with the DASH format. Each track can have its own edit point and cross-fade—if you so desire—allowing the most complex of edits to be invisible. The DASH format also supports razor blade editing; pieces of tape can be assembled in musical order without any regard to data framing. When the recorder recognizes that all the tracks and the control track have been destroyed simultaneously, it free-wheels the control servo and executes a graceful interpolation of all data on the tracks. The result is sonically equivalent to analog editing but antiquated and barbaric compared to electronic editing.

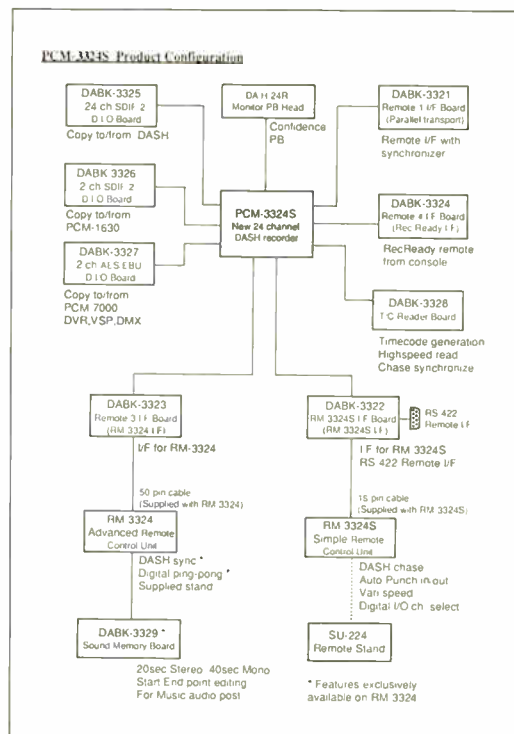


Figure 1: The PCM-3324S Family

The PCM-3324S's transport borrows heavily from the PCM-3348; the capstan motor, clutch and reel motors are identical. The fast-forward time of four minutes, 20 seconds (with a 14-inch reel) equals that of the PCM-3348. The deck casting differs primarily in size, but is as ruggedly built. The electronics are entirely new and very contemporary. One-bit, sigma-delta A/D converters (Crystal Semiconductor CS5326-KP) with 64-times oversampling filters are employed. Playback circuits use 8-times oversampling filters and 18-bit D/A converters (Burr Brown PCM-67P-K). Component quality is excellent; for example, the Burr-Brown D/A converters are -K

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parts—the highest grade available from that company. The manufacturer's specifications call for THD of less than 0.07%, S/N greater than 90 dB, and crosstalk between channels less than -80 dB.

Audio signals are recorded with the DASH linear 16-bit format, with cross interleave error correction. The DASH-F version calls for one track per channel. Recording time is 60 minutes, with 48kHz sampling frequency and 14-inch reel (65 minutes with 44.1kHz sampling frequency). Reel sizes of 14, 12.5 and ten inches are permitted. The heads are identical to those on the PCM-3324A; experience has shown head life of 4,000 to 5,000 hours.

Sampling frequencies of 44.056, 44.1, or 48 kHz can be selected, and a shift mode allows the 44.1 and 48kHz sampling frequencies to be lowered by 0.1% in playback. Tape speed at the three sampling frequencies is 69.94, 70.01 and 76.20 centimeters per second. The recorder supports variable speed playback over a +/- 12.5% (1 semitone) range. The recorder can be synchronized to a variety of external reference signals including composite video, composite sync, black burst, word sync, and AES/EBU sync. A built-in time code generator provides SMPTE/EBU and standard film time codes.

High-speed prestripping is a feature new to the DASH product line. Prestripping is the open-reel equivalent of formatting a computer disk or black-bursting a videotape. It provides continuous time code and an unbroken control track. Subsequent recording is done in an insert mode instead of assemble mode, just as in video recording. The reel servos can locate and lock smoothly when this is done. No matter how beneficial it may be, it is not always practical to tie up a machine for the duration of a tape. Thus, on the PCM-3324S, prestripping can be performed at four-times normal speed, since the data densities of the CTL and time code tracks are low. When prestripping a tape, any existing CTL, time code and cue data is erased, and new CTL and time code data is recorded.

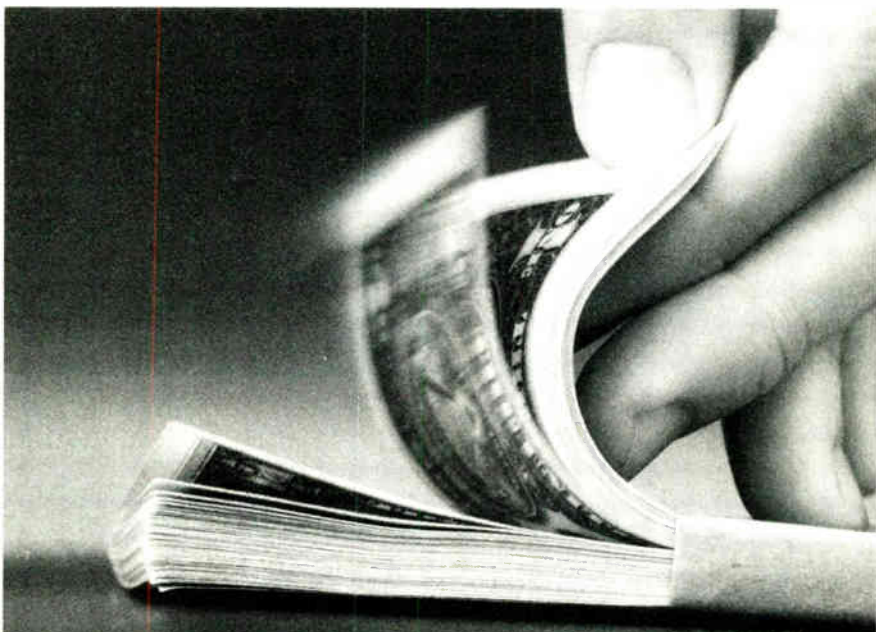
Extensive use of LSIs, many developed specifically for the PCM-3324S and PCM-3348, has decreased

the number of circuit boards, reducing power consumption to a mere 800 watts—less than some hair dryers. The recorder's weight is also reduced to only 265 pounds. If current trends in microelectronics are any indication, when power consumption goes down and integration increases, reliability improves.

A front card cage contains principal circuitry such as A/D/A cards, format encoders and decoders, clocks and servos, and optional cards (described below). There are a number of controls and displays on these cards: error indicators for each chan-

nel, selectable between CRC, interpolate, hold, and mute; input and output level trim for 24 channels; emphasis lights for 24 channels; sound-memory trigger jacks; headphone output with level adjust; and analog track controls selecting bias, PWM, or companded PWM.

The rear of the recorder contains input/output connectors and optional interface cards (described below). Standard connectors include XLR analog inputs and outputs for 24 channels, XLR input/outputs for the two analog cue tracks, XLR inputs and outputs for time code, reference



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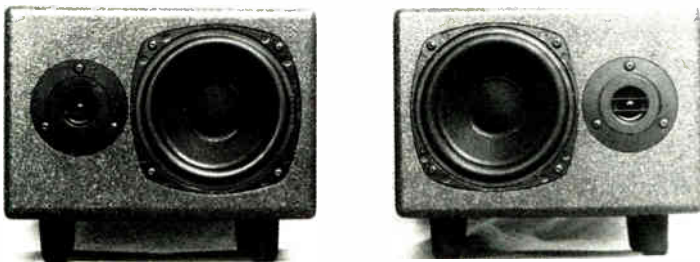
video inputs, a multipin connector for an optional meter bridge, BNC sector address input and output, BNC sector sync input and output and BNC word sync inputs and outputs. The word and sector signals are needed for DASH machine locking and multichannel digital dubbing.

Other optional I/Os are divided into three groups: digital I/O, parallel remote and serial remote. Digital I/O includes your choice of up to four pairs of channels of AES/EBU via the DABK-3327 card and/or unbalanced SDIF-2 (a.k.a., 1630 format) via the DABK-3326 card. The particular channels fed to the interfaces are selected through either one of the remotes. Also optional is a 24-channel, balanced SDIF-2 input and output connection as is found on the older PCM-3324 with the DABK-3325. The MADI format is not currently supported; however, the hooks are there to support an optional card sometime in the future.

Machine remote can take several forms. The REMOTE-1 interface, DABK-3321, is for a parallel remote and also permits a DC voltage to control transport speed. This would be used with an external synchronizer. Another optional parallel interface, DABK-3323, is for the REMOTE-3 format, which allows access to the features offered in the more extensive remote unit. A serial interface, DABK-3322, is also available and supports both the smaller remote option (called REMOTE-2) and the Sony 9-pin format found on other video and audio recorders, as well as editors. There is also an interface option board, DABK-3324, that provides on-console controlled track arming on consoles that support this feature. Any combination of the remote interfaces can be used together.

The PCM-3324S itself provides basic (but very rudimentary) recording and reproduction functions. The recorder's top panel has bar-graph meters for 24 audio channels, time code, A1, A2, and CTL tracks, and a timer counter. Controls include sampling frequency select, emphasis, input select, sync clock, time code-format select and tape-position-display mode. The user can select input, repro and record ready for the digital audio channels here, but not for individual channels. Record ready

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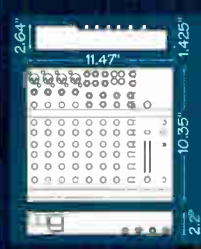
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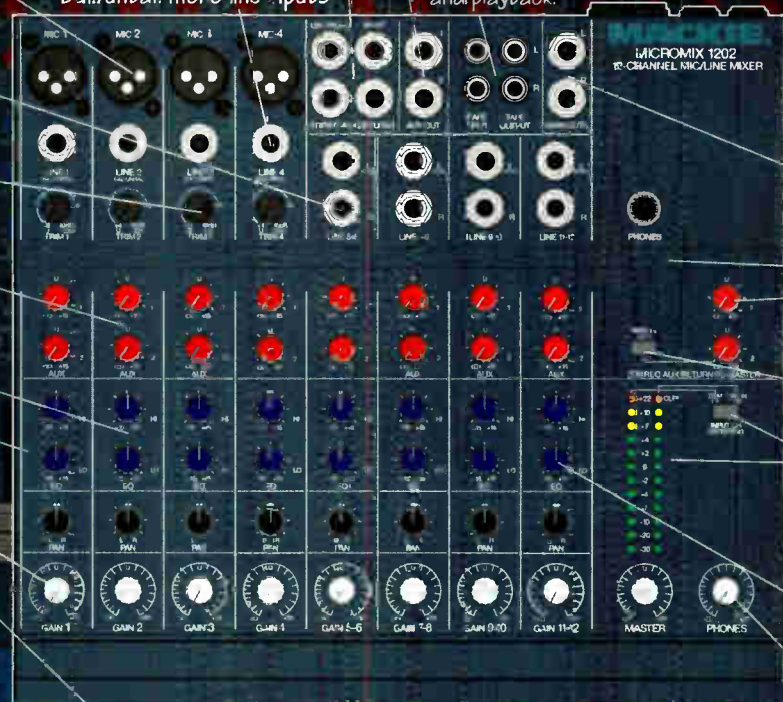
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for time code and the cue tracks can be made here as well. Also available are storage for two cue points and a shuttle wheel for locating. In practice, once tape is loaded and switches are set for formats and sync modes, the transport controls are ignored, and machine control takes place solely from one of the two comprehensive remotes.

The RM-3324S is the smaller remote and is powered from the transport unit. It can be placed up to 30 meters away from the transport. Two floor stands are available as an option. The RM-3324S provides comprehensive, input/record, ready/reproduction control. The punch in/out feature uses crossfading with times variable in 16 steps from 1.5 to 370 milliseconds. If the machine is equipped with one or more of the digital 2-channel I/O options, the track assignments for them can be selected here. Variable speed playback of up to +/-12.5% can be selected in either percentage or semitone quantities. A cue point memory and trim section allows for the storage of up to 100 points or, in the interest of reducing keystrokes, it can be changed to a ten-point system via a switch on the back of the remote unit. Preroll and postroll times can also be stored in a separate register.

The RM-3324 is the larger remote and has a slightly different control layout and a variety of additional features. Unlike the smaller remote, it must be powered from an AC outlet and is provided with its own floor stand. The REMOTE-3 interface allows this remote to be placed up to 120 meters from the transport unit. This remote can memorize complex channel setups with a few keystrokes. With digital ping-pong, any or all of the 24 channels of digital audio can be copied simultaneously in real time to any other track positions. This allows the user to take tapes recorded elsewhere and reassign tracks for easier grouping at the console or for conformity to other tapes used in assembling a project, thus making the mix process a little easier.

This bouncing is done with zero timing error and zero phase error in a manner that is completely transparent to the user. In most applications, the RM-3324 will be joined

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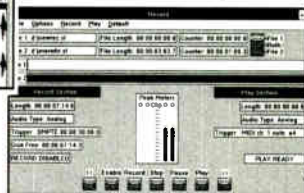
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with a DABK-3329 sound memory board. Its 60Mbit memory stores 20 seconds of stereo audio (or 40 seconds of mono) in memory; start and end points can be trimmed and then dropped into selected tracks at selected cue points. It can also be triggered manually on the remote or with an audio signal presented to the 1/4-inch jack on the recorder front card cage (the memory card, to be exact), or it can be triggered with an audio signal presented to the XLR on the back of the recorder (the remote option card), or by an audio signal applied to the 1/4-inch connector on the back of the remote itself.

The memory can also be played in reverse. Drum replacement is an obvious application. Twenty seconds of stereo makes it easy to fly a chorus around a song or drop long sound effects with extreme precision. This memory can also be used on other machines that are being locked to the multitrack, since the signal can appear on any analog or digital output, even in input mode. The creative power made possible by this feature is enormous.

Of course, any configuration of the recorder is capable of chasing and resolving to time code, and any number of machines can be linked in this manner. They will lock as tightly as one bit of time code data—1/80 of a frame. In fast wind modes, no time code is emitted because tape is lifted from the heads. The recorder relies on its locate ability to track a master. This assumes the master is sending code in the fast mode. The PCM-3324S has an option board, DABK 3328, available for high-speed code reading.

All configurations of the machine are capable of DASH chase, but with the larger remote it is also capable of DASH sync. DASH chase is a refinement of time code lock. Once time code frames agree, the machine locks the control tracks of the recorders. This is equal to one DASH frame, which is 256 samples. In this mode, the machines will remain locked during all transport operations. DASH sync is the tightest lock possible. The machines synchronize the actual sample clocks. In this mode, the machines act electronically as one. You could record one channel of a stereo pair on each ma-

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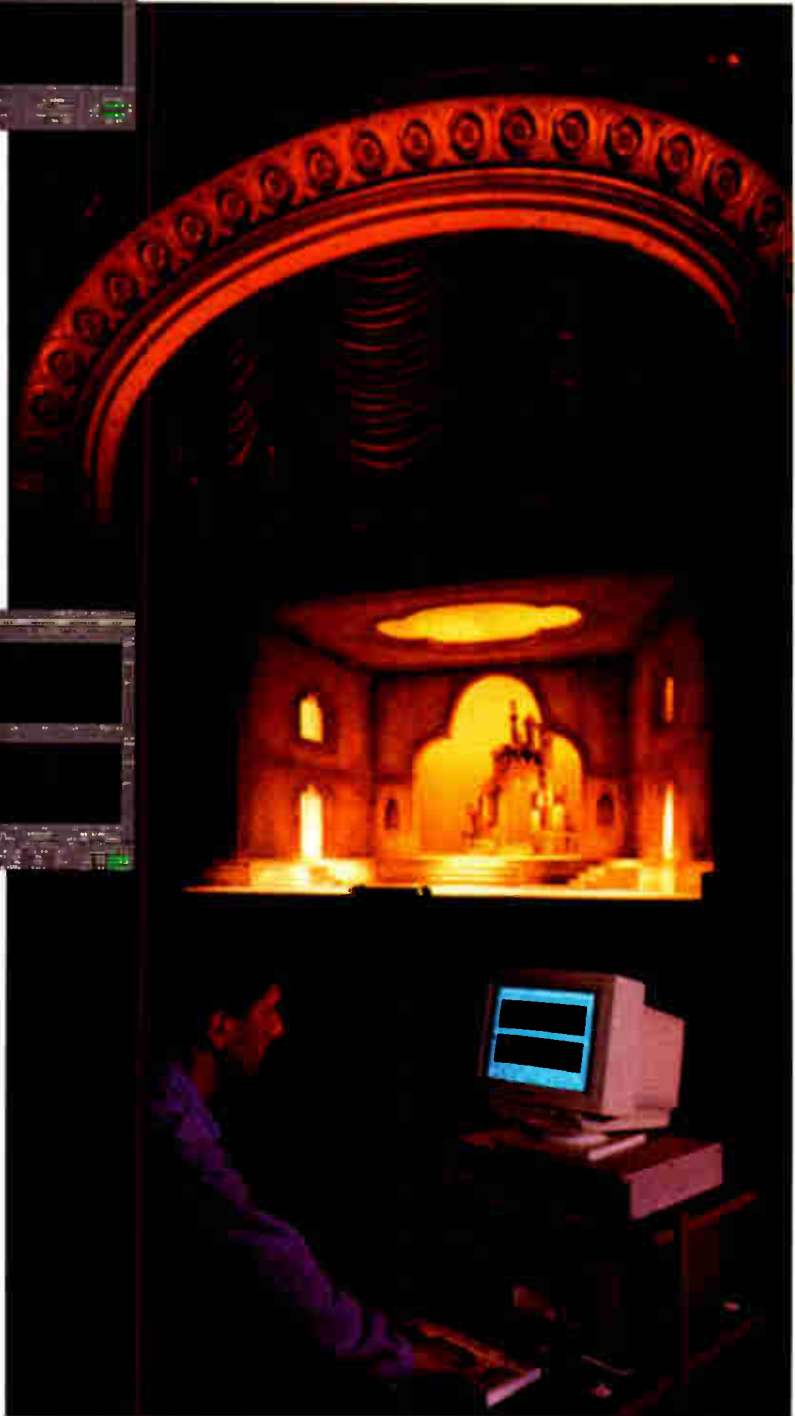
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chine and have no phase error whatsoever. Up to three DASH recorders can be tied together in either DASH chase or sync modes, and the recorders can be any of the Sony models ever made.

A few other options are available: The DAH-24R option provides a monitor playback head (read after write) for the PCM-3324S; the head block does not require modification, and installation can be retroactive and performed in the field. The DMU-3024 is a remote digital meter unit that dis-

plays 24 channels of signal level. The entire PCM-3324S family is shown in Fig. 1.

The machine we tested was configured with all the options, including both remotes. While this is not a very logical arrangement in a regular use situation, we found that each remote was always fully aware of the other one, and there was never any conflict or crashing. This is indicative of the level of testing and thoroughness of design that we found throughout the recorder system. Time code chase, the loosest and sloppiest mode supported on the

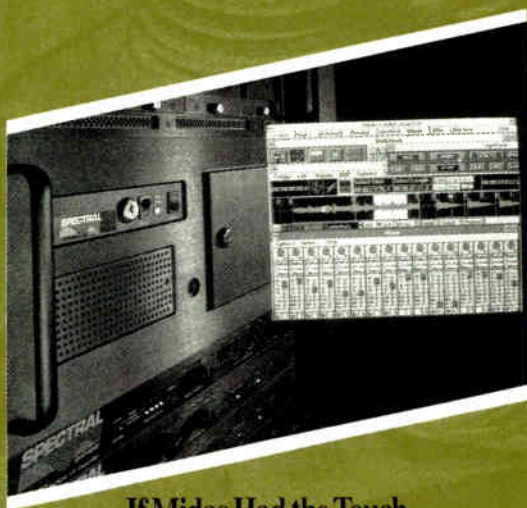
machine, was smoothly and quickly accomplished. When locating to play, the transport would glide down from fast wind and seamlessly enter the play mode. The tape never jerked and danced around as other machines tend to do when under external control.

The list price of the PCM-3324S recorder is \$61,000; the RM-3324 full remote is \$11,000; the DABK-3323 interface is \$1,500; the DABK-3329 sound memory is \$3,000; the RM-3324S simple remote is \$3,000; the DABK-3322 interface is \$1,500; the DAH-24R monitor head is \$9,000; and other options list for \$2,000 or less. The most basic functional recorder package (PCM-3324S, DABK-3322 and RM-3324S) lists for \$65,500, and when it is fully dressed out with the maximum number of options available, the list price would be \$99,000. Most configurations would list below \$80,000. This is a significant drop from the \$139,000 price tag of the PCM-3324A.

As an alternative to a 48-track recorder costing \$240,000, two of these units would provide 48-track capability with enough money to buy a third recorder. This arrangement also allows for two digital 24-track rooms when 48-track capability is not needed. How does the PCM-3324S compare to analog? A Sony APR-24 lists for \$35,000, and Dolby SR adds another \$16,000. However, there are other cost issues to consider. For example, digital tape is cheaper than analog, and no alignments are necessary with a digital machine, saving time that could be used for billable work.

Pound for pound, dollar for dollar, the PCM-3324S is the best multitrack tape recorder on the market today. Its mechanical, electrical and sonic qualities are unsurpassed, and its competitive price could drive a stake through the heart of analog multitrack tape recording. With the arrival of this machine, it is possible to muse that the science of open-reel audio tape recorders has reached its zenith and will be superseded only by entirely different forms of data storage. ■

Ken Pohlmann is the director of Music Engineering at the University of Miami. John Monforte is assistant professor in Music Engineering at the same university.



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NEW PRODUCTS

OTARI PRODISK-464 UPDATE

Otari (Foster City, CA) has unveiled a number of enhancements and options for the ProDisk-464 disk-based audio recording/editing system. The new CB-158 is a compact transport and edit controller that replaces keyboard/mouse data entry routines with an easy-to-use, familiar work surface. Software Version 4.0 adds greater editing flexibility and a CMX-EDL autoconform feature, while an audible fast wind allows monitoring sound files at 2- to 50-times play speed. Options include: VITC or longitudinal time code card; DSP facility (for automated routing, fader, pan, muting and internal multitrack mixing); 2/4-channel AES (or 2-channel S/PDIF) digital outputs; and multichannel digital interface for PD or DASH transfers.

Circle #226 on Reader Service Card

SOUNDTRACS SOLO MIDI CONSOLE

Distributed in the U.S. by Samson Technologies (Hicksville, NY) is the Soundtracs Solo MIDI, an 8-bus, in-line recording console with 16, 24 or 32 inputs. Features include 4-band EQ, six aux sends per channel, four stereo effects returns and 100mm long-throw faders. An onboard MIDI-muting computer stores up to 100 patches for muting channel or tape inputs and group or aux outputs; mutes also can be dynamically controlled via an external MIDI sequencer.

Circle #227 on Reader Service Card

WHISPERROOMS

From WhisperRoom Inc. (Columbia, MD) comes WhisperRooms: portable/modular sound isolation rooms on wheels, in a variety of sizes, up to 8x8 feet. Wall panels are 82 inches tall; options include extra windows, cable passages and Studio Ventilation Silencers. The units can be set up or taken down in a matter of minutes (assembly of large models can take over an hour).

Circle #228 on Reader Service Card

HAFLER 9500

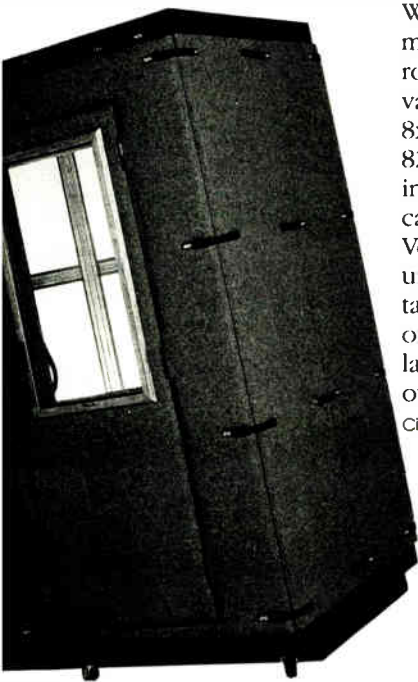
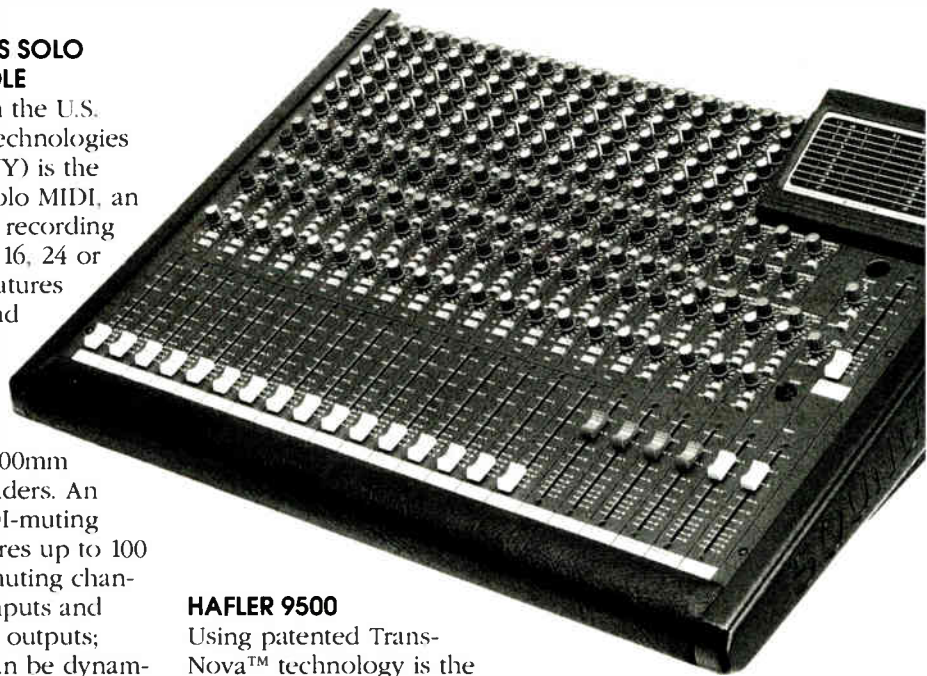
Using patented TransNova™ technology is the Model 9500 power amp from Hafler, a division of Rockford Corp. (Tempe, AZ). The 9500 employs a low-voltage drive (middle) stage, with 16 MOS-FET devices hooked up as a "grounded cathode" output stage yielding both voltage and current gain, as in tube amps. Priced at \$1,800, the 9500 delivers 250 W/channel into an 8-ohm load or 750W bridged mono into 8 ohms; slew rate is said to be 150V/μs, and stated full-power bandwidth is 0.7 to 300k Hz. The \$1,200 model 9300 is 150 W/channel or 450 W/bridged mono.

Circle #229 on Reader Service Card

NEUMANN KFM100

Designed for stereo recording applications is the KFM100 from Neumann USA (Old Lyme, CT). The microphone has two condenser capsules (pressure transducers) mounted on either side of a 20cm (8-inch) diameter, acoustically neutral wooden sphere that houses two transformerless microphone amplifiers. The two mic channels operate independently, each requiring a 48VDC phantom powering source. Cabling and stand and ceiling suspension mounts are included.

Circle #230 on Reader Service Card



DRAWMER DL251 SPECTRAL COMPRESSOR

The DL251 from Drawmer (distributed in the U.S. by QMI of Natick, MA) incorporates Dynamic Spectral Enhancement circuitry that is said to restore the HF energy lost during compression. The 2-channel unit features switchable hard-/soft-knee compression, variable threshold/zero-offshoot limiting, switchable peak/average stereo linking, balanced XLR inputs/outputs, switchable +4/-10 operation and a hard-wire bypass.

Circle #231 on Reader Service Card

SHERMANN MX-SERIES MONITORS

Designed for near-field studio listening is the MX-Series from Shermann UK, distributed in the U.S. by Audio System Design (Northridge, CA). Priced at \$1,200/pair, the MX-208 is the newest in the line, featuring an 8-inch mid/bass driver and 30mm Kevlar-fiber inverted dome tweeter in a compact, ported cabinet. Recommended amplifier power is 200 to 350 watts; maximum SPL is in the 115dB range.

Circle #233 on Reader Service Card



AUDIOCONTROL SUBHARMONIC SYNTH

The PCA-200 from AudioControl (Mountlake Terrace, WA), enhances bass by creating a new fundamental at half the frequency of existing bass signals. Designed for studio mixing, video post or live sound, the one-rack box has 40-80/60-120Hz operating ranges, wet/dry mix control, high/low filters and hardwire bypass.

Circle #235 on Reader Service Card

EVENTIDE H3500

Available in a limited edition is the H3500 Dynamic Ultra-Harmonizer from Eventide (Little Ferry, NJ). Along with pitch shifting and a new group of dynamic effects, the H3500 includes a palette of studio tools such as sampling, delays, flanging and choruses, reverbs, Instant Phasor™ and onboard sound effects. The H3500 is configured with either 11.8 seconds of 44.1kHz stereo sampling (23.7 seconds mono) or 47.5 seconds stereo (95 seconds mono).

Circle #237 on Reader Service Card

WAVEFRAME 401

The WaveFrame 401 (Boulder, CO) is a turn-key 8-track, disk-based recorder/editor. Priced from under \$15,000, the 401 comes with computer, monitor, recorder, analog and digital I/O, hard disks and software. Standard facilities include MIDI, VITC or LTC sync, XLR inputs/outputs, on-the-fly punch-in/out, and file interchangeability to other WaveFrame products.

Circle #232 on Reader Service Card

ARCOUSTICS MATERIALS

ARcoustics, of New York City, debuts new acoustical control products: the Linear 85 Absorber has equal MF/HF attenuation; Reflectsorber, with reflection and absorption; Soft-edge fabric/foam meter bridge "softener"; LiveSide Room, a directional reflector; Modal Mixer for precise LF control; BBC Bass Box LF absorber; and Modal Edge control modes in rectangular rooms.

Circle #234 on Reader Service Card

STUDER DAT

The D780 from Studer/Revox (Nashville, TN) is a pro studio DAT recorder featuring $\pm 10\%$ varispeed operation, spooling rates up to 400-times normal speed and shuttle search with monitoring in either direction. The deck also includes switchable line/line inputs (with switchable phantom power available on the latter), along with AES/EBU and S/PDIF digital I/O. Sigma-delta ADCs with 64x oversampling

and 8x oversampled bitstream DACs are standard; options include a "quick-start" instantaneous play mode and transformer-

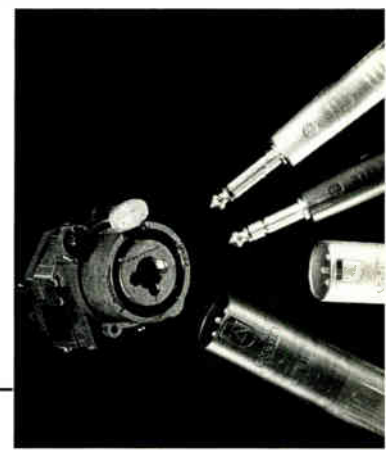
balanced outputs.

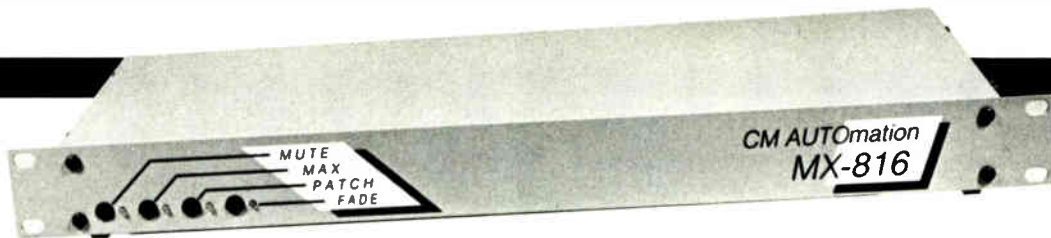
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NEUTRIK COMBO JACK

Neutrik USA (Lakewood, NJ) offers the Combo Series of PC board/panel receptacles, providing a 3-pin XLR-F with a 1/4-inch jack in its center. Perfect for consoles, stage boxes or studio panels, the jack can be fitted with two or three (RTS) gold-plated contacts and up to three normalizing contacts.

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CM AUTOMATION

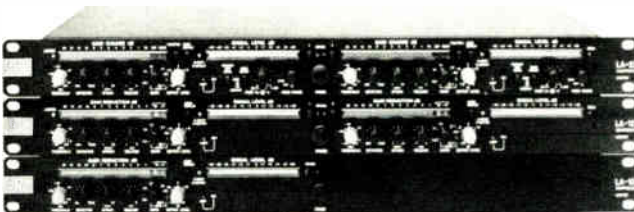
New from CM Automation (Los Angeles) is the MX-816, a MIDI-controllable outboard automation package with mute or level control of up to 16 channels. The single-rack-space unit features dbx 2150 VCA elements for smooth audio fades or muting, gold-plated phono jack inputs/outputs, internal snapshot memory with programmable fade times, and sum outputs for using the system for automated effects sends or as a stand-alone automated mixer. The MX-816 is \$779.95; an 8-channel version is \$489.95.

Circle #239 on Reader Service Card

TASCAM 238S

Tascam (Montebello, CA) is now offering a version of its popular 238 8-track cassette with Dolby S. Based on the technology of the Dolby SR format, Dolby S provides 10 dB of noise reduction at low frequencies, increasing to 24 dB at higher frequencies. The 238S retails at \$2,199; the original 238 with dbx is \$1,849.

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ROOMTUNE™ ACOUSTICAL TREATMENT

RoomTune (Sugar Creek, OH) offers a number of products for the treatment of listening spaces. The RoomTune line is a series of reflection and diffusion units that can be wall-, floor-, corner- or ceiling-mounted. Units are available in blue-gray, ivory or black; prices range from \$39.50 to \$249.

Circle #242 on Reader Service Card

UREI LA SERIES

JBL Professional (Northridge, CA) unveils a new line of UREI processors. In addition to being a 2-channel compressor/limiter, the top-of-the-line LA-22 can compress or expand part of the frequency spectrum (from 1/6 to 3 octaves), without changing the rest of the signal. All units in the series include transformer-balanced outputs and LED displays for gain reduction and signal level. The LA-12 is also 2-channel but lacks the expander and frequency-dependent capabilities; the LA-10 is a single-channel unit.

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HOT OFF THE SHELF

Yamaha's Sound Information Series are data sheets on pro audio topics, such as optimizing gain, mixing bus basics, dynamic range and headroom and many more. Get 'em at your Yamaha Pro Audio dealer...Tascam's 8-channel balanced-to-unbalanced line interfaces are \$525 each. The LA-80 has RCA ins and XLR outs; the LA-81 has XLR ins and RCA outs. At your dealer or call (213) 726-0303...Check out Analog Devices' AD1866 2-channel, 8x oversampling, 16-bit digital-to-analog converter chip in a 16-pin DIP package; a single +5V power supply is required. Call (617) 937-1428...Turbocharge your Eventide H3000 Ultra-Harmonizer with Mod Factory, a software upgrade that adds 100 new presets and dynamic effects based on two new processing algorithms. Call

Crescent Engineering at (201) 746-9417...Frank Beacham's *American Cinematographer Video Manual* (\$34.95) covers all aspects of the video craft: exposure, lighting, lenses, formats, VTRs, battery systems, waveform monitors, time code and audio-for-video. Call (213) 969-4333 or (800) 448-0145...Gepco Number 5524 is low-capacitance cable designed specifically for AES/EBU digital or SMPTE time code data, available in 1-, 4- and 12-channel configurations. Call (800) 966-0069 or (312) 733-9555 for info or a catalog...TRF Music now represents the *Image Music Library*, with orchestral and instrumental CD recordings for TV, radio, film and video productions. Available on per-use or annual licenses. Call (800) 899-MUSIC or (212) 265-8090...TDK's 16-minute DAT tape, DA-R-16, is perfect for studio use and retails at \$8.99;

at your dealer now...The Hollywood Edge "Cartoon Trax" is a collection of restored comedy and cartoon sound effects going back 40 years. The five-CD collection is priced well under \$500, including full cross-referencing. Production pros should call (800) 292-3755 or (213) 466-6723 for a free demo CD...Manhattan Production Music has released two new CD volumes: "Weekend Update" has 75 cuts of news themes; "Bumper to Bumper" has 99 short cuts for bumpers, stingers and tags. Call (800) 227-1954 or (212) 333-5766...Caig DeoxIT is a fast, one-step deoxidizing treatment that cleans and improves conductivity on all metal and contact surfaces—switches, pots, relays, PCB edge connects, plugs, jacks, faders, etc. Available in spray, liquid, wipes and pen applicators. At your dealer or call (619) 451-1799. ■

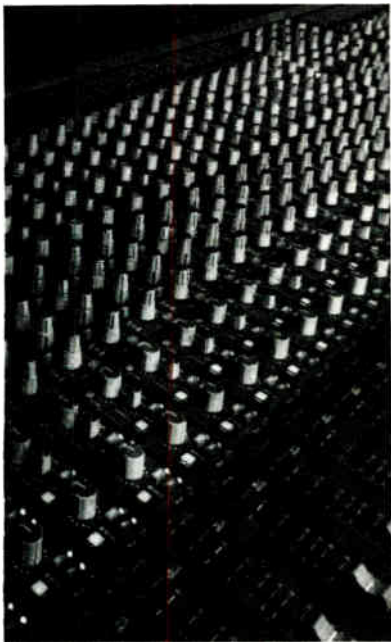
MCM TENMA SOUND LEVEL METER

MCM Electronics (Centerville, OH) offers the Tenma #72-860, a handheld sound level meter with large-digit LCD readout and a choice of A- or C-weightings and fast or slow response times. Maximum SPL is 135 dB; both AC and DC outputs are provided for data analysis or recording.

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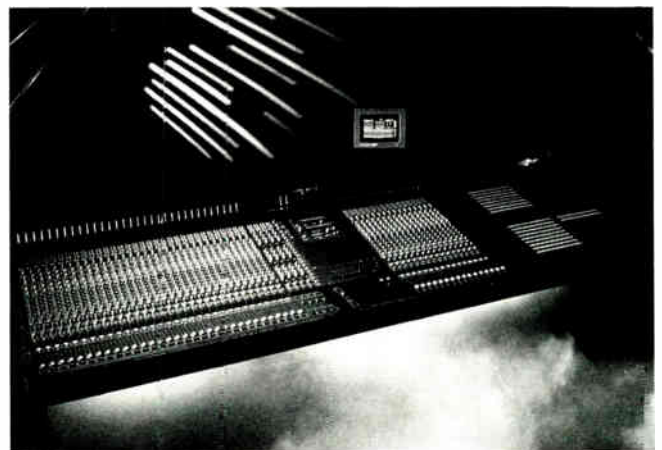
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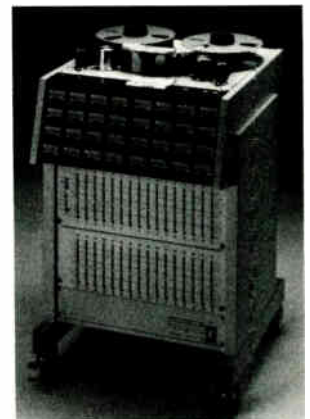
SOUNDTRACS IL3632 (pictured) also available.



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by George Petersen

PRODUCT

CRITIQUES AND COMMENTS

H

HUGHES AK-100 SOUND RETRIEVAL SYSTEM

We all know about 3-D sound processors, such as the Bedini BASE, Roland RSS and Archer Q-Sound. We also know about the pricing of such boxes, which can range from thousands to even tens of thousands of dollars. Such sticker shock has effectively kept 3-D sound processors out of the hands of the masses—until now. Enter the Hughes AK-100 Sound Retrieval System, which, at a rock-bottom retail of \$299, offers spatial control for the rest of us.

A couple of caveats, however. First of all, the AK-100 SRS was designed as

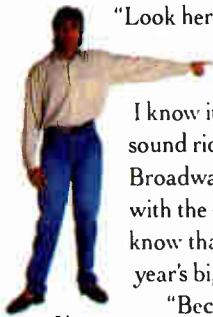
The front panel controls are not what you'd usually find on most outboard processors and require a little explanation. A pushbutton and LED indicator marked with a (●) symbol is SRS processing in/out; the "3D Mono" switch selects a stereo simulation mode from mono sources; a "Rev Trim" switch reduces an over-emphasis of reverb that can occur when SRS is engaged; "Filter" reduces low-frequency rumble (present in video applications) when SRS is engaged; and "Loop Select" routes the audio to a set of loop in/out jacks on the back panel. The loop function is useful when the SRS is connected to a home stereo



a home consumer product, so don't be surprised by the unbalanced, -10dBV RCA phono jack inputs/outputs on the back panel or its lack of rack ears. In fact, SRS is about a half-inch taller (dimensions are 17x4x11.5-inches) than a two-space rack unit (3.5-inches), so rack-mounting the device presents a few problems. And while perfectly suitable for the home environment, its lightweight chassis probably wouldn't adapt well to the harsh realities of pro touring.

system but offers no particular advantage in the studio. Three large rotary knobs control output level, stereo space and center (mono) balance.

The most visually striking feature on the SRS is the unit's display meter, divided into vertical (indicating center strength) and horizontal (left and right space) axes. In bypass mode, the meter displays the unaltered signal; when SRS or 3D Mono is selected, the display indicates the stereo image after processing. Users can switch between bar



Ed
Sound Engineer

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"Because the PM3000 is flexible. Because it's logically put together. Because it performs. Because it's a pleasure to use. Because everyone likes working with it.

"But, here's the news.

"There are two more PM series consoles. And they start at a mere \$5,500 MSRP. So obviously, they're for those situations where you want the best console available. But you don't have the space or the budget to get the 3000.

"The PM1800A was just updated. So it has an improved signal-to-noise ratio (6 dB better). And 0dB insert points for easy gain matching with external processors. It's got 8 groups, 6 aux sends and 4 mix matrices. It even has the same mute grouping feature you find on the 3000. But that's not the end of it.

"The PM1200 has the same roots. But in a more compact format. It's got 4 groups plus stereo, 4 aux buses, and 4 mute groups. You can get 16, 24, or 32 input channels and you still get two additional full-function stereo input channels.

"Obviously, they're both ripoffs of the Yamaha PM3000."

YAMAHA®



"Obviously,
they're both
ripoffs of
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PM3000."



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STUDER

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or dot displays, or defeat the metering entirely, if desired.

I began the SRS evaluation by listening to a number of familiar CDs, both personal favorites and projects I've produced. The results proved spectacular, as the stereo image widened around me, resulting in a huge, thick sound. Stereo drums became massive, while reverbs seemed to envelop the listener, as though sounds were emanating from the back wall of a chamber.

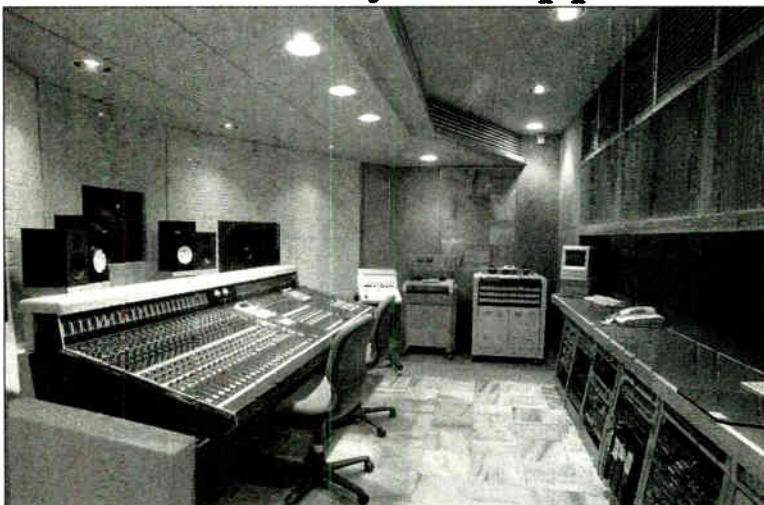
All of the recordings required some tweaking of the stereo space and center controls to restore balance of mono elements in the mix. Vocals were most noticeably affected, and depending on the tune, would either jump out or be attenuated, requiring a touch of the center knob to regain proper levels. On some songs, other mid-panned instruments—such as electric pianos and snares—were similarly altered, although such changes were more related to amplitude than a change in the instrument's character.

After extended experimentation—listening to the system on Meyer, JBL, Tannoy, Genelec, KRK, Yamaha and other monitors—I was unable to find any "set and forget" combination of parameter values that provided optimal results on all types of music. This provides a clue as to why the SRS was not an overwhelming success as a home audio product.

As a studio tool, SRS opens whole new realms of possibilities. As SRS is a single-ended system, no encoding/decoding process is required; effects that SRS adds in the studio will be heard similarly by the intended audience. Any required changes in mono balance, etc., can be accomplished easily during the mix, and the SRS—or multiple SRS units—can be inserted anywhere in the audio chain, either used as an in-line device or taken from channel or subgroup sends and brought back into the mix via channel faders or stereo effects returns. SRS also can be used as an adjunct to reverbs and other stereo effects processors, with excellent results.

Want more? The unit's 3D Mono mode creates a stereo simulation effect that must be heard to be believed—perfect for bringing mono instruments, synths, samplers or drum machine feeds to life. 3D Mono is also useful when working with mono program

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sources in radio production, film/video mixing or mastering. Speaking of the latter, SRS's center control allows the "repair" of mixes that were recorded with vocals or solos that are too loud or too soft.

All in all, this is a remarkable unit, bargain priced at \$299. Check it out. You won't be disappointed.

Hughes Audio Products, 29947 Avenida de las Banderas, Rancho Santa Margarita, CA 92688; (800) 2HEAR3D or (714) 858-6000.

TECH 21 SANSAMP RACK

A tiny revolution took the industry by storm last year, in the form of a compact, pedal-sized processor called SansAmp, from Tech 21. Packed with rotary controls and miniature DIP switches, SansAmp offered the ability to create realistic studio simulations of tube guitar amplifiers, ranging from the up-against-the-wall screaming of an overdriven Marshall 100 stack to the subtle, mellow character of a Fender Twin.

Cool as it was, the SansAmp pedal did have a couple of limitations. Most important, adjusting its matrix of DIP switches could test the skill of the most gifted microsurgeon. Also, the SansAmp pedal was designed to be used directly into consoles, direct boxes or guitar amp inputs; results obtained when driving a guitar cabinet using the pedal and a power amp proved unspectacular.

So, in designing the SansAmp Rack, inventor Andrew Barta addressed these minor concerns and, for good measure, added a dollop of new tricks. Besides housing the unit in a convenient single-rackspace package, the most notable change is KNOBS. A full complement of eight rotary controls allow the user to simulate almost any imaginable guitar amp sound—instantly!

The back panel is home to a variable-output (trimmable via an inset trimpot) balanced XLR out, along with 1/4-inch connections for -10 or +4dB outputs and a footswitch jack for selecting the bypass loop. Also, a "live" switch alters the tone of the 1/4-inch outputs, adding high-end punch when using the SansAmp Rack to drive guitar cabinets directly from any power amp. As another plus, the unit has both front- and rear-panel inputs, with the latter switchable to accommodate ei-

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—FROM PAGE 12, CURRENT

onboard machine control and triple signal path inputs, providing up to 176 mix inputs (on a 56-way frame)—all with EQ, automated muting, level and pan control. Also standard are 31-segment LED meters on each module and ten aux sends. The 90 replaces the popular Series 80, which was in production for nearly a decade.

The extensive use of micro-processors in Soundtracs' Jade mixer provides fader automation on channels and monitors, mute automation on all inputs and Dynamic Gating Processing on all channels. Developed in conjunction with L.A. Audio, DGP offers lightning-speed 5µs attack times and the ability to store and edit dynamics settings along with the automation data. This console's Frequency Dependent Boost Equalizers compensate for the ear's inherent non-linearities by increasing equalizer gain from +15 to +20 dB as frequencies are swept toward the high or low ranges of human hearing.

Proving that big changes can come

in small packages, Amek/TAC unveiled a new model, Big, under a new brand name, Langley. Big by Langley is a compact, in-line mixer with 28 input modules and four routable stereo line inputs that double as fader-controlled subgroups. In mixdown, Big offers 64 equalized inputs (plus four stereo FX returns), and its eight auxes can be rerouted to provide up to 20 sends. SMPTE-based control of fader and mutes (channels, monitors and aux 1 and 2) is standard, as are amenities such as recall of channel and return module settings, 16 VCA groups, 4-band semi-parametrics and optional Virtual Dynamics, with a choice of compressors, gates, limiter, autopanner and expander. A 44-input model is also available.

Overall, APRS '92 was a successful, well-thought-out show, despite a sorry global economy and a sudden 90° heat wave that caught overseas visitors (who packed woolens for the trip) by surprise. Thanks, APRS, for a delightful exhibition—here's to 25 more!

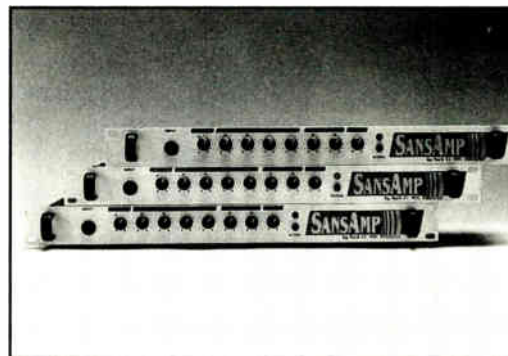
—George Petersen

AUDITIONS

ther line- or instrument-level inputs.

As with most affordable signal processors, the SansAmp Rack is powered by an external AC transformer. This does double duty by keeping manufacturing costs down while reducing power supply hum. However, the SansAmp Rack uses a 2-pin XLR connector that locks in place—no more of the inevitable interruptions that result from less-secure connections. It's a nice, and appreciated, touch that other manufacturers would do well to emulate.

While the SansAmp can create a



Tech 21 SansAmp Rack

diverse palette of tube amp sounds—big, warm, crunching, smooth, and so on—this sucker was born to rock. Getting a great guitar sound literally takes place in a matter of minutes—not hours. This is a terrific time-saver in the studio. Onstage, it offers precise, repeatable, consistent sound night after night, while the XLR output provides the live engineer with a direct box-style feed, but with all the guitar's power and character intact.

In use over a period of months, on all types of studio guitar sessions, the SansAmp Rack proved to be an extremely versatile tool whose sound pleased both engineers and players alike. The only criticism was the unit's lack of programmed memory (although this may be somewhat unfair, since I've never encountered a Marshall stack with RAM-based settings), but one could achieve this sort of effect by adding a second SansAmp Rack (or the original SansAmp pedal), connecting them via the bypass loop jacks and using the footswitch jack to switch between the two. Whether used live or in the studio, the SansAmp Rack is an impressive performer at an affordable price of \$595.

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THE MUSICIAN'S LEGAL AND BUSINESS GUIDE

It's ironic that performers will spend thousands of dollars on equipment, yet when it comes to spending a dime on developing their business acumen, a snakeskin guitar strap or some glow-in-the-dark drumsticks always seem to take precedence. If ever there were a must-have, must-read text for the performing or recording musician, *The Musician's Legal and Business Guide* is it.

Edited by attorney Mark Halloran and published by Prentice-Hall, *The Musician's Guide* provides more than 450 pages of solid information pertaining to every phase of a musician's career, beginning with choosing (and protecting) a group name, business entities (partnerships vs. corporations), business plans, music attorneys, copyrights, club contracts, publicity, managers and agents, unions, ASCAP and BMI, record contracts, understanding royalty statements, music publishing, producer agreements, jingle and film/video music and group breakups. Also included is a resource guide to trade, legal and consumer publications, guilds, and labor and musician's support organizations.

Probably one of the strongest aspects of the book is that it has a collection of chapters written by authorities who specialize in different fields. More than 20 leading attorneys, CPAs and consultants contributed to *The Musician's Legal and Business Guide*, and the text's emphasis on practical advice and real-life examples gives the reader the insider's view of the industry. For example, 50 pages are devoted to the all-important analysis of every detail in a major label record contract. This section alone is easily worth the purchase price. Best of all, the text is designed so the average musician can understand the concepts, without the legalese and razzle-dazzle.

The Musician's Legal and Business Guide is a breakthrough, an oasis of information in an area too crowded with misinformation offered by so-called experts. At \$29.95, this could be the best investment a musician could ever make.

Published by Prentice-Hall Inc., A Simon & Schuster Company, Englewood Cliffs, NJ 07632. Also available through the Mix Bookshelf, (800) 233-

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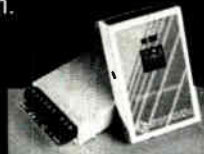


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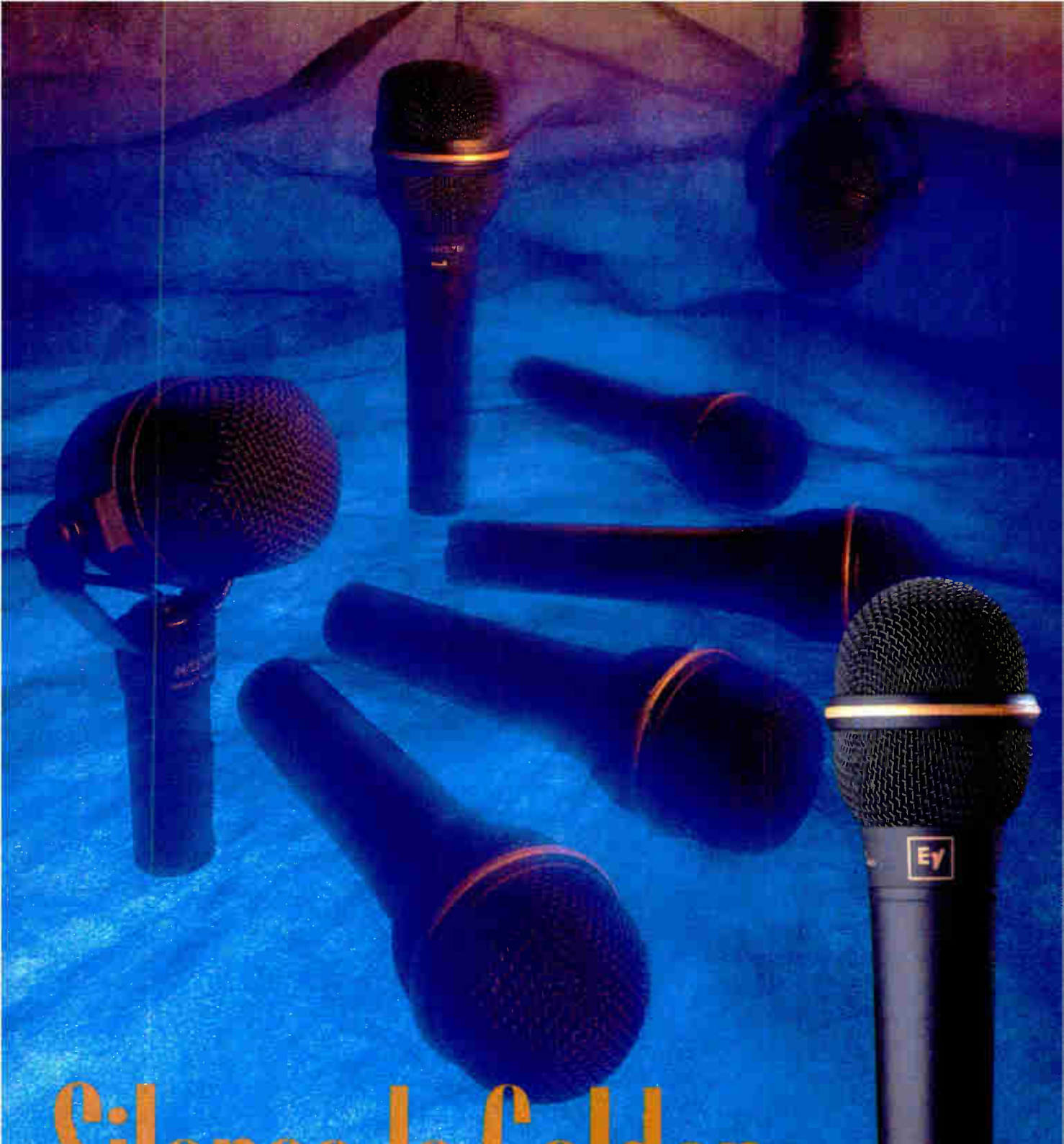
Digital Process DPH-4

middle of a studio or rehearsal room.

The outputs are sufficiently powerful to satisfy even the deafest of players. For my monitoring purposes, the output level was high enough that I almost always used the DPH-4 with the -10dB attenuator switched in. But even more impressive was the quality of the audio, which was superb, with not even a trace of hiss or noise—a refreshing change from some of the headphone amps on the market.

In the control room, the DPH-4 really shines, as few consoles are equipped with headphone circuitry that is this clean or powerful. And the compact size of the unit is certainly a plus in today's packed control rooms. However, if you need more outputs or a more traditional package, Digital Process also offers the DPH-6 (\$320), a six-output headphone amp in a single-rackspace chassis.

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World Radio History



by David (Rudy) Trubitt

SOUND CHECK



SUNDAY MORNING SOUND

In retrospect, Rick Johnson of HSA (Mishawaka, Ind.) feels his work at neighboring Elkhart's Calvary Assembly of God serves as a prime example of what many congregations have come to expect from a sound system in the '90s. "At one end of the spectrum, the system is designed to provide clear, uniform dispersion and intelligible speech regardless of where you're sitting. Conversely, this same system has to be able to blow the hair off your head if need be."

Johnson worked with the church's audio staff (Paul Carlson), and Don Peterson (who is also a Crown technical service rep) in conjunction with architect Don Firth to help design the 1,800-seat octagonal room. "We expressed our acoustical and rigging concerns," Johnson said. "The latter was especially critical

for hanging a half-ton of components from the [55-foot-high] ceiling."

The system uses five of Community's RS880 three-way loudspeakers, six Crown Com-Tech amplifiers, a DDA Q Series 40x8x2 audio console, two Klark-Teknik DN-360 EQs, two Rane DC-24 multi-effects processors, an Ashly SG-35 quad noise gate and an ART SGE effects system. A variety of mics are available, including Crown CM-30s and LM-300s, and, as of this writing, an Audio-Technica 857 was mounted atop the church's "beautiful but acoustically terrifying" Plexiglas pulpit. Johnson notes that the pulpit "has tended to loosen up on us. And when it does, you have this big chunk of Plexiglas which acts like a marimba, especially if you drum on it to emphasize a point!"

—Greg DeTogne

SUMMER TOUR UPDATE

As you are no doubt aware, this summer's tour season looks considerably busier than last year's. The big sound companies seem to have moved the great bulk of their inventory out of the warehouse and onto the road, although ongoing price wars are keeping some margins low.

One happy alternative to price-slashing competition is sharing the work. A prime example is the upcoming Guns N' Roses/Metallica stadium tour. GNR and Metallica are clients of Electrotec and dB Sound, respectively. The two sound companies will pool their resources for the tour. "This is the best solution for everybody," says dB's Barry Dane. "Everybody wins. We're excited about working with GNR and Electrotec, and we think it will benefit all parties concerned."

The technical details are still being tweaked as of press time, but here's the likely scheme: "In a nutshell," says Electrotec's Pierre D'Astagues, "we will provide GNR with complete onstage monitoring and their FOH control. Our monitors will also be provided for Metallica, and dB will probably supplement that with their side-fill and drum-fill systems." dB will provide its EV MT-4 main house system, with Electrotec Q-2 enclosures for delay systems. The tour is anticipating crowds averaging around 60,000 per gig. Load-in for final production rehearsals is slated for July 14 at RFK Stadium, and the approximately 25 shows will finish in Orlando on September 8. Electrotec is also out with Def Leppard as well as Tesla, Lollapalooza 2, Alan Jackson, Randy Travis and Alabama. dB also has its own summer

—CONTINUED ON PAGE 129



PHOTO: STEVE JENNINGS

Left: Tori Amos.
Lower: Ian Thorpe at the house Soundcraft console.

Will you do my London shows? So, I went to a meeting for the London show, and this agent said 'Oh, are you Tori's soundman?' So I said, 'Yeah, I think so,' and he said, 'Well you're going to be a busy man.' The album had just gone straight into the

verb send levels. "Sometimes when she goes up high [and loud] I let her go." Thorpe explains, "and sometimes I pull her back a bit and add reverb to give it the bigness. When I advance the shows, I ask for a Yamaha SPX900 if possible, which I put my own program in. It isn't anything special, just two seconds of reverb, 30 milliseconds of delay, and I take the highs up and down according to the room."

Amos sits sideways on the piano bench, facing the audience, with wedge monitors behind and to her right. And she likes her monitors loud, according to Thorpe. Careful placement keeps the monitor sound from bouncing off the raised piano lid into the piano mics. "On this tour I'm carrying piano mics as well," Thorpe says. "It's my own fairly

TOUR PROFILE: TORI AMOS

American-born, British-made singer/songwriter Tori Amos is on a solo U.S. tour in support of her *Little Earthquakes* album. The show has been playing clubs and small theaters, easily selling out most dates. It is a three-person tour: one artist, one tour manager and one soundman. "It's so simple, it's great," says mixer Ian Thorpe. "To go back to absolute basics, which for me is one woman and a piano...that's why I'm here."

Thorpe is a principal in W&T Ultrasonics, a 31-year-old sound manufacturing and hire company in South Humberston, England. W&T was contracted to provide sound for a local show with Amos on the bill. Having heard her music by chance beforehand, Thorpe decided to mix the set himself. "I really enjoyed the show," he explains, "and Tori said, 'I like what you've done.

charts at Number 15!"

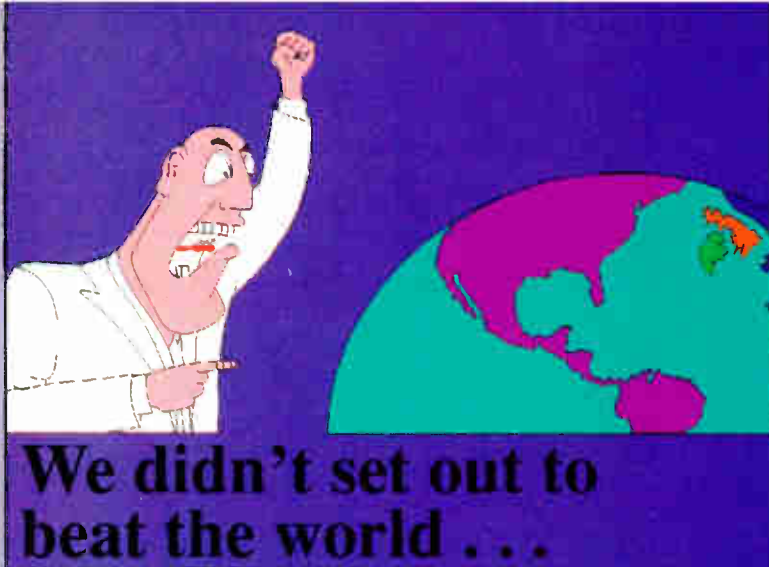
The tour carries only microphones, picking up everything else at each gig. "It's such an intense show," Thorpe continues. "The lyrics are everything, so it's got to be loud and clear. I carry a vocal mic—a Shure Beta 58. I needed a mic that would give me clarity and handle wide sound levels, because Tori can be as quiet as a mouse and then roar like a lion. Also, I need lots of level without feedback."

Thorpe does not use a limiter on her vocal, although he constantly rides the overall and re-



PHOTO: STEVE JENNINGS

unique combination. For the bottom end I use a Shure PZM mic, an SM91, taped to the lid. I've got an SM7 for the mid of the piano and an AKG 451 for the highs. The combination of the three gives me a reasonable sound, although obviously that's dictated by the sound of the



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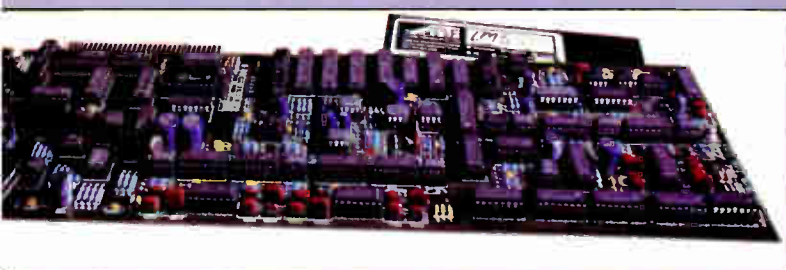
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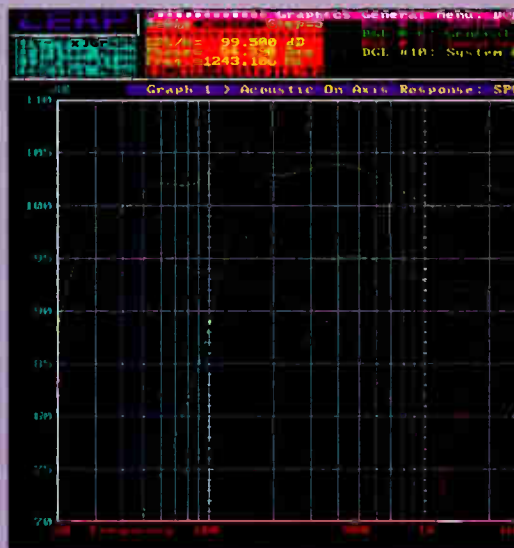
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piano." As far as consoles, "I spec Soundcraft or Amek/TAC," Thorpe adds. "Soundcraft is such an international desk that you're likely to get one anywhere in the world.

"This is the quietest show you'll ever hear," he concludes. "When I say a pin drop, I mean it. I have to sit and not move at the desk in case the chair creaks. The intensity of the lyrics and performance has been described as mesmerizing, and that's why it's so quiet."

TOUR PROFILE: LOU REED

"It's mostly been a theater tour, with a few selected sheds," says Lou Reed's house mixer, Bill Fertig. "He prefers to play to a more intimate audience. The lyrics are a big part of the show, so intelligibility is a factor. Hence, we don't play places with long reverb times."

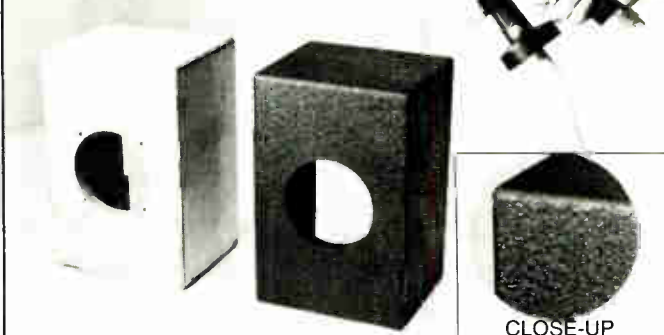
Equipment for the U.S. leg of the tour is being provided by See Factor (Long Island City, N.Y.), including a Crest-powered Meyer loudspeaker rig, using the new DS-2 mid-bass cabinet. "We have 24 MSL-3s, eight DS-2s and four 650s," Fertig says. "This is the first time I've used the DS-2s." Depending on the situation, Fertig adds the DS-2s to various parts of the system. "When we played the [L.A.] Greek Theatre, there was a long-throw system with four MSL-3s, four DS-2s and two 650s per side, and a near-field system with full-range MSL-3s. We tend to work in zones. You have a choice of running the DS-2 down to its full range, or you can cross it over into the 650s. That's one of the reasons we only have the four 650s—they're not handling as much program. It's only been a couple of weeks, but I've been really happy with them. They sound very nice."

The tour is using two different measurement techniques for setting up the P.A., depending on the venue. The

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first makes use of the BSS TCS-804 delay line and remote control. The remote control incorporates a beta version of new software from Signet Sound that implements the SignAlign™ Analysis signal alignment measurement system.

"I delay the system referenced to the band's amp line, which is the loudest thing on the stage," Fertig says. "In measurement mode, the remote emits a signal that comes out of the last output of the delay line. That gets sent back down to [a stage loudspeaker] at the point I want to reference to. It calculates that delay time, then you call up another speaker, and it sets the proper delay time. Sometimes you don't want to reference everything to one point. If you're in a position where you can see [several different sets of speakers], or you're upstairs, you just look for the next loudest source and reference to that. The whole process takes about 20 minutes.

The remote is nice because you now have the controller and the mic in the same package, as opposed to moving the mic and

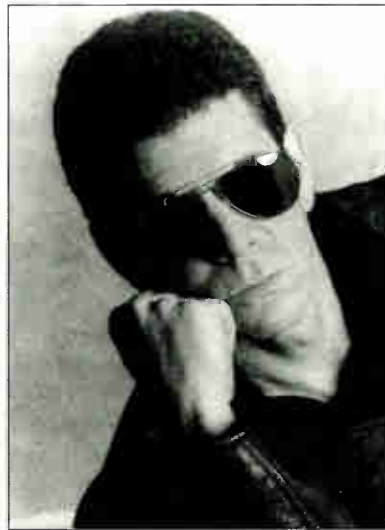


PHOTO: WARING ABBOTT

going back and forth to the delay line."

At selected gigs, the latest incarnation of Meyer's SIM® system, SIM II, is used. The system's delay finder mode calculates

propagation times from loudspeakers to microphones placed at strategic points throughout the venue. "Then," Fertig explains, "it listens to each part of the system and measures the response [at the various mic positions]. You match your parametric EQs to those curves. I have six channels of Meyer CP-10s for that. Then, you go to a matching mode where you match the left side to the right side. If the left and right equalizations are not the same, your image is so weird that it doesn't really work. Lou wants the utmost sound quality, and he knows that it can be had by taking these steps and using SIM. But, because SIM is a fairly expensive process, it comes down to the importance of each gig to the artist. We SIM'ed London, New York and L.A."

Reed's choice of vocal mics is atypical—an AKG 460 with a CK-61 capsule. "It gives us a very revealing sound, as opposed to a dynamic," Fertig says.

—CONTINUED ON PAGE 130

THE FIRST AUTOMATED MIXER THAT WAS COMPOSED, NOT IMPROVISED.

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World Radio History

—FROM PAGE 124. SUMMER TOURS roster, including the Allman Brothers, Skid Row and Hammer.

Audio Analysts has landed a prestigious account: providing sound for Bruce Springsteen in Europe through mid-July, as well as his following U.S. arena tour. In addition, AA has Van Halen wrapping up their run, John Mellencamp, Hank Williams Jr., Ringo Starr and ELP. The company also has systems installed at the Pacific Amphitheater (Costa Mesa, Calif.) and Chene Park in Detroit.

While giants Clair Brothers and Showco won't be working on the same shows together, they are splitting the Elton John/Eric Clapton tour. In Europe, Clair will be fielding a stadium system for John's own tour, where Clive Franks returns to his old spot at the mix position. The Clair rig will accommodate Clapton when he joins up for the European tandem

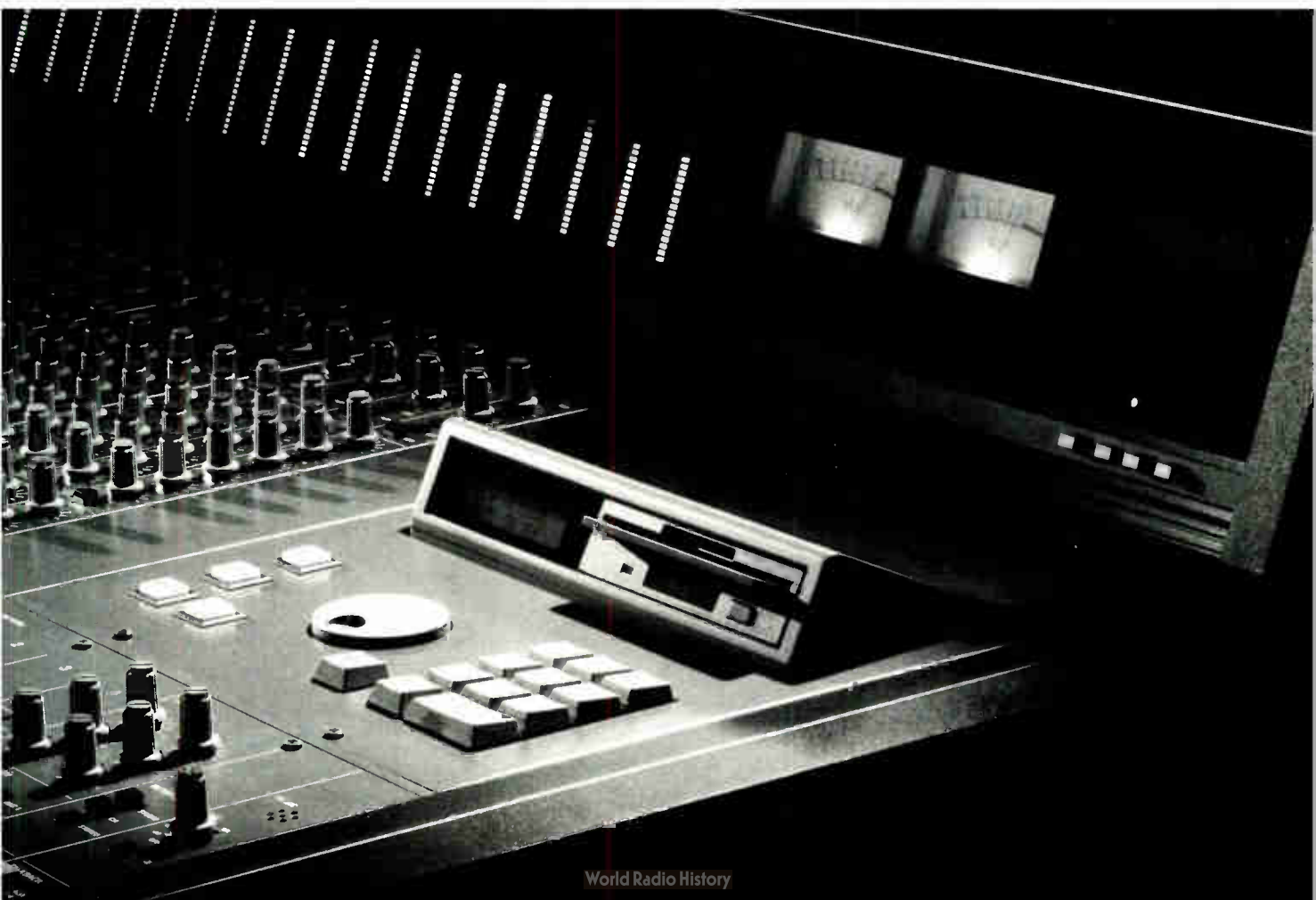
dates. In the U.S., the shoe's on the other foot, with Showco providing sound for the joint venture. Elton John is slated for his own coliseum tour in the fall, which will likely be with Clair. Of course, both companies have their own list of tours, as follows:

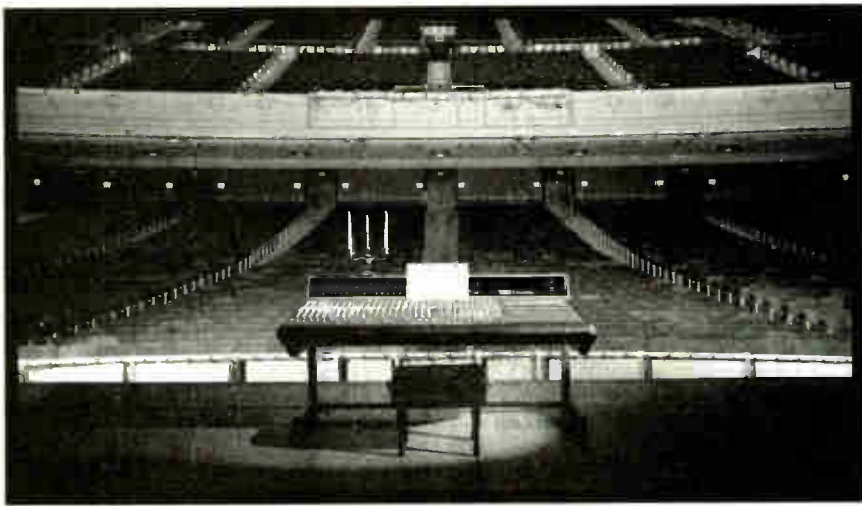
Showco is out with Genesis (more on that tour next month). Other acts on their summer roster include a Chicago/Moody Blues double-bill, Harry Connick Jr., Reba McEntire, Linda Ronstadt, James Taylor, Skinny Puppy, Lisa Stansfield, Santana, Diana Ross. Ozzy Osbourne with Slaughter opening, Spinal Tap, the Beach Boys, Clint Black, Willie Nelson, Vince Gill, Steven Curtis Chapman and the Black Crowes.

Clair is out with the U2 stadium run through '93 (see last month for an account of their spring arena leg). Michael Jackson is doing stadiums in Europe through the fall. Other accounts include Prince, Roxette,

Steve Miller, Mr. Big, Joe Cocker, .38 Special and Rock Train Sweden, a touring festival playing eight weeks all over—you guessed it—Sweden, featuring local acts who can draw anywhere from 10,000 to 20,000 fans per venue.

Maryland Sound Industries continues with Neil Diamond, who left for Europe in mid-June. "We are adding more P.A. for two outdoor dates in Ireland," says Diamond's house mixer Stan Miller. The system will be reconfigured using equipment partly supplied by Ireland's Entec. This will be full circle for that gear, as Entec bought it from MSI in the first place. More amplification is also called for, Miller explains. "We're getting additional Crown amps and taking enough modules so that the whole thing can run on IQ." MSI also has Michael Bolton out, as well as Paula Abdul, Tracy Chapman, Anne Murray, Simply Red and a brief stint with Neil Young. ☺





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LIVE SOUND

—FROM PAGE 128, LOU REED

"Condensers have little idiosyncracies regarding proximity effect and humidity, but we work around everything, and it has gotten us the best vocal sound that he's ever had. The stage level is pretty moderate,

A Walk On The Wild Side

"We played the Greek Theatre in L.A. the day the [police brutality] verdict came in," says Lou Reed's house mixer Bill Fertig. "In the evening when we loaded out, you could smell the smoke, and my eyes were tearing from it. We stayed in L.A. that night. The next morning we had an 8:00 a.m. load-in for *Arsenio Hall*. We set up for our soundcheck, and all the techs were watching things get out of hand on TV—and getting closer and closer. Then somebody came in and said, 'You've got to come up on the roof—it's incredible. I can see 12 fires.' It was intense. The show was pretty intense as well—I think there were only 40 or 50 people in the audience. He had the mayor on and a few guests who came down and wanted to say something. It was pretty emotional. As we left, it was a sad state of affairs. We went outside and the sky was almost black. Our straight truck refused to come back in and pick up our gear, so we had to get our semi driver to drive in. As we left on Highway 101, we were watching kids kick windows in and saw fires on Sunset Boulevard. The freeway is elevated above the city, and it looked like Beirut. I won't forget that for a long time." ☺

and the mic's flat response gives you a good amount of [feedback] control—it hasn't been a problem." Reed avoids the use of limiters on his vocal.

The Midas Pro-40 is the console of choice, but the tour carries stand-alone mic preamplification as well. "We have eight channels of Hardy M1 mic preamps," explains Fertig, "which we use on selected channels: [Reed's] two vocal and two guitar channels, and the other guitar player's two channels and the two bass channels. That gives us a studio-quality mic pre-amp, which is so much more revealing than plugging into the Midas or any other console. Also, you have the option of sending a line-level signal down your 300-foot snake. You do have to trim it properly, but it lives up near the monitor desk so he can keep an eye on it. It has very elaborate metering, both peak and VU. It's a really classy piece of gear. The guitars use SM57s or 58s up close, with a PZM off-center in front of the cone, sitting back about four inches. It gives more of an airy type of sound. There's a lot of nice clean guitar sounds with delays and chorusing—there's not a lot of loud, thrashy guitars in the show."

Speaking of an absence of loud, thrashy guitars, just what are the overall levels for the show? "As low as the crowd will let me," Fertig exclaims. "That's another reason to have the delay lines reference back to the amp lines. When you work at low levels, the stage level can be enough for small venues. Most of the show is at a very low level. It's almost like a poetry reading—he tells stories. We try to make it very intelligible and very comfortable for the audience." ☺

David (Rudy) Trubitt is the Mix sound reinforcement editor.

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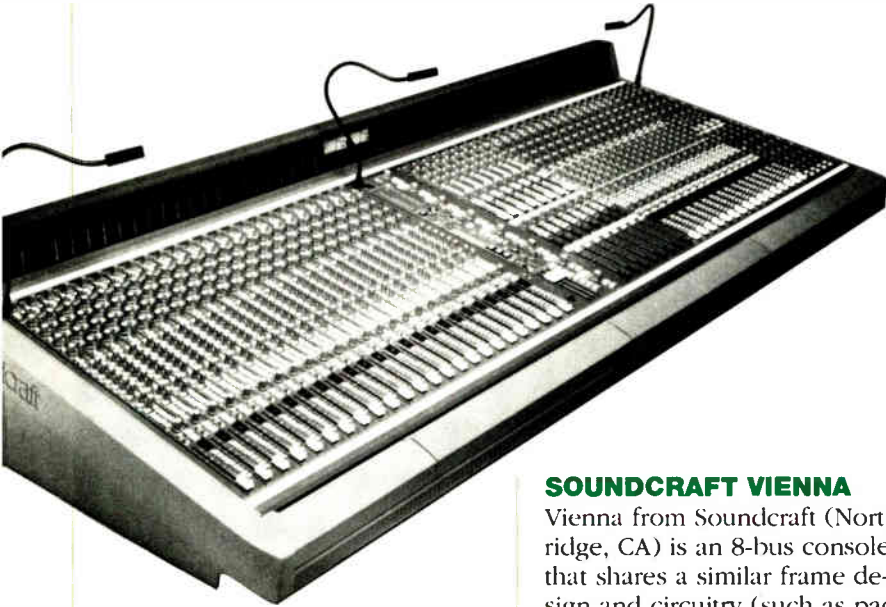
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SOUND REINFORCEMENT NEW PRODUCTS



YORKVILLE FLYS PULSE AND ELITE

Yorkville Sound (Niagara Falls, NY) now offers Aeroquip flying hardware (with fittings rated at up to 6,000 pounds) as a factory-installed option on its Elite and Pulse speakers. Carrying an "F" (flying) designation, the new models are the Elite MX-2000F, MX-401F and M-600F, and the Pulse P-8WHTF and P-12WHTF.

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K-T DN800 CROSSOVER

Distributed in the U.S. by Pinnacle Audio (Farmingdale, NY) is the Klark-Teknik DN800, a 4-in, 8-out crossover, configurable as a stereo four-way, stereo three-way or 4-input, two-way system. Plug-in frequency cards allow a choice of 1-, 18- or 24dB/octave slopes, with Linkwitz-Riley, Butterworth or Bessel responses. Phase-adjust trimmers, phase-reverse switches and electronically balanced inputs/outputs are standard. Output transformers, EQ cards and internal limiting are optional.

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SOUNDCRAFT VIENNA

Vienna from Soundcraft (Northridge, CA) is an 8-bus console that shares a similar frame design and circuitry (such as padless mic preamps, active panpots and differential balanced busing) with the company's Europa console. Vienna comes in versions with up to 40 mono inputs; standard features are eight aux sends, eight VCA subgroups, eight stereo effects returns, 4-band sweep EQ with switchable Q, direct channel outputs, and 16-segment metering on each input. Options include an 11x8 matrix, and a console link function for interconnecting all bus and solo signals between two Viennas or a Vienna used as a sidecar with a Europa.

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CORRECTIONS

The Rock N' Roller equipment cart shown in the May issue is now distributed by Music Industries Corp. (Floral Park, NY); the cart now retails for \$199.95. Also, the listing of Sabine's new FBX-900 Feedback Exterminator (in that same issue) mentions an operating range of 80-15k Hz: This refers to the tuning range of its nine filters and not to the unit's frequency response, which is 20-20k Hz.

RTA SOFTWARE FOR TEF™

Techron (a division of Crown Intl., Elkhart, IN) has released Sound Lab RTA, a \$300 real-time analysis software package for the TEF 20 or TEF 20HI measurement systems. Compatible with IBM-style host computers, Sound Lab RTA meets all ANSI band requirements and allows measurements at 1-, 1/2-, 1/3-, 1/6- and 1/12-octave bands; six sets of data can be stored in nonvolatile memory.

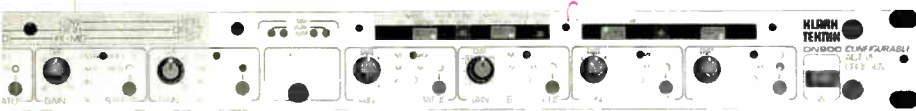
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WHARFEDALE FORCE SERIES

Optim Audio (Stamford, CT) debuts the Wharfedale Force Series, compact loudspeaker systems for pro sound reinforcement applications. The Force 5 is a two-way design with 8-inch mid/bass driver and bullet tweeter; the Force 9 has a coaxial 12-inch with 1-inch throat compression driver. All models feature trapezoidal cabinets and metal grilles. Options include the Force 9SB trapezoidal, 12-inch subwoofer and the Force 9BE sub-bass electronics processor; used in combination, the two are said to provide LF output comparable to some dual-15 systems.

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Metallica - 1992 North American Tour - dB Sound, Des Plaines, Illinois



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by Philip De Lancie

DCC AT ITA

DUPERS CAUTIOUS AS COSTS CLIMB

Video was the new element as the ITA hosted its annual "How and Why" seminar in Atlanta in May. For the first time, the trade group added video-duplication topics to what had been an audio-only event. But with two new prerecorded music formats taxiing for takeoff, the exchange of information and opinions on audio duplication—particularly DCC—continued to be the main drawing card. Featuring a program dominated by DCC panels, the seminar's attendance was up 10% to a record 250.

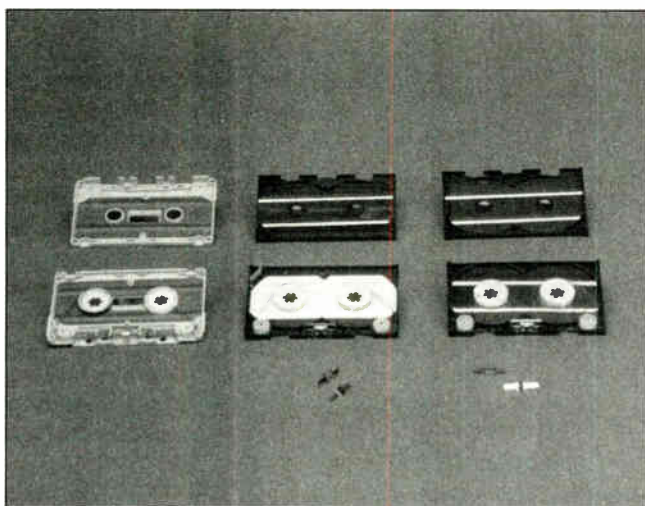
Next issue, we'll take a look at some of the other topics covered, but this month we'll focus on DCC. While much of the talk on the dais at ITA was predicated on the assumption that DCC will fly, the tone of informal talk at the seminar was cautious at best. Most readers are already familiar with the catalog of DCC doubts: the high price of the players, the fact that Philips is launching with home rather than portable hardware, the fact that prerecorded tapes will sell for the same price as CDs (which is too high for many music consumers), the perceived fragility (and perhaps even obsolescence) of tape, the lack of random access and the imminent

arrival of Mini Disc. If the conversation in Atlanta reflects the thinking of the duplication industry at large, these factors are definitely weighing on the minds of many as they wonder how consumers will respond to the new format.

PHILIPS' GEAR

Leading off the series of DCC segments was Koos Middeljans, manager of the Mastering and Duplication Unit at Philips Consumer Electronics in Eindhoven, the Netherlands. Middeljans is Philips' point man for prospective DCC mastering and duplication facilities, as well as the equipment and supplies vendors who will service them. He began by confirming that the simultaneous worldwide (Europe/U.S./Japan) launch is on schedule for September. To support the hardware debut, Philips expects to have over 500 titles available. Production of software is underway at PolyGram's DCC plant in Amersfoort, the Netherlands.

Duplicators who wish to join PolyGram in DCC production initially will be able to purchase their equipment only through Philips. And they can expect to pay dearly for the privilege



(L to R) Interior view of D-0 for prerecorded DCC, D-0 for blank DCC and C-0 for analog cassette.

of being first on the block. Moving through the production process step by step, Middlejans outlined Philips' prices for the gear. (For greater detail on the process itself, see "Tape & Disc," October, 1991.)

Premastering involves the use of specialized word processing-style software to create an ITTS (Interactive Text Transmission System) file. The file includes the text to be stored on the DCC for display on LCDs built into the players or on external TV screens. Certain categories of text (ti-

tle and copyright information, for instance) are a mandatory part of the DCC standard, while others (such as scrolling lyrics) are optional. Creation of auxiliary track data, including PQ codes to define index points within the program, is also done at this stage. Philips' premastering package (PC, PQ Card, software and training) will sell for \$19,000. Software and training only will be available for \$10,000.

In mastering, the digital audio source is a PCM-1630 format master (normally a clone of the CD master, but with a provision made for a

break between sides). The audio is run into DCC electronics that convert the signal from PCM to PASC, the audio data-compression scheme, which reduces the bit rate to the point where the information can be stored on cassette (see "Insider Audio," March, 1992). The PASC audio is then interleaved with the ITTS data into eight main tracks, which are recorded onto a DCC master along with the ninth auxiliary track. The mastering package, including master recorder, DCC electronics and control software, will cost \$82,000 (without PCM-1630/DMR-4000).

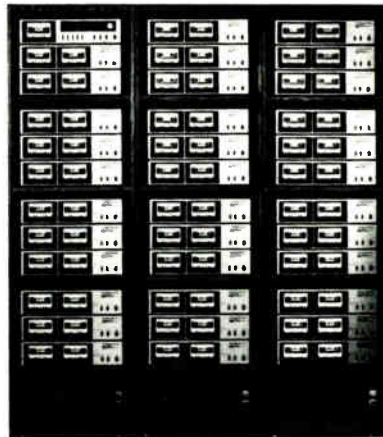
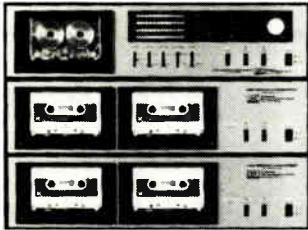
When it's time for duplication, the DCC master is played from a "downloader" (a DCC player and processing electronics) into a digital bin, or SSM (Solid State Master) as Philips calls it. The A and B "sectors" (sides) are downloaded simultaneously in real time, with B-direction data frame-flipped in the process. The downloader and SSM combination will cost \$125,000.

Philips' four-deck DCC slave, which is fed from the SSM at 64x real time, will sell for \$150,000. Based on PolyGram's experience to date, head life-time is only 200-300 hours. The thin-film heads cannot be relapped, and a replacement head set is priced at \$3,000. However, Philips will guarantee 500 hours of head wear, meaning head replacement up to 500 hours will be free of charge. But the prospect of downtime for head replacement, combined with the potential for making marginal tapes as the heads approach failure, was clearly troubling to the assembled duplicators.

After duplication, DCC pancakes are evaluated on a DCC QC checker. Including deck and electronics, the QC setup will cost \$95,000. Thus, a four-slave system from premastering to QC checking—but exclusive of loading, shell assembly, wrapping, etc.—comes to \$476,000. This is actually slightly more reasonable than the prices Philips was estimating in December, when the same system without the QC checker was expected to cost \$470,000. But it is still prohibitively steep for all but a few, especially when one adds in the cost of building and maintaining the class 2000 (dust density) clean room, which is the recommended duplicating environment. Estimates of the

—CONTINUED ON PAGE 142

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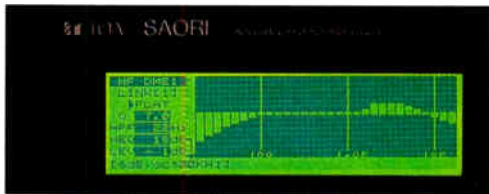


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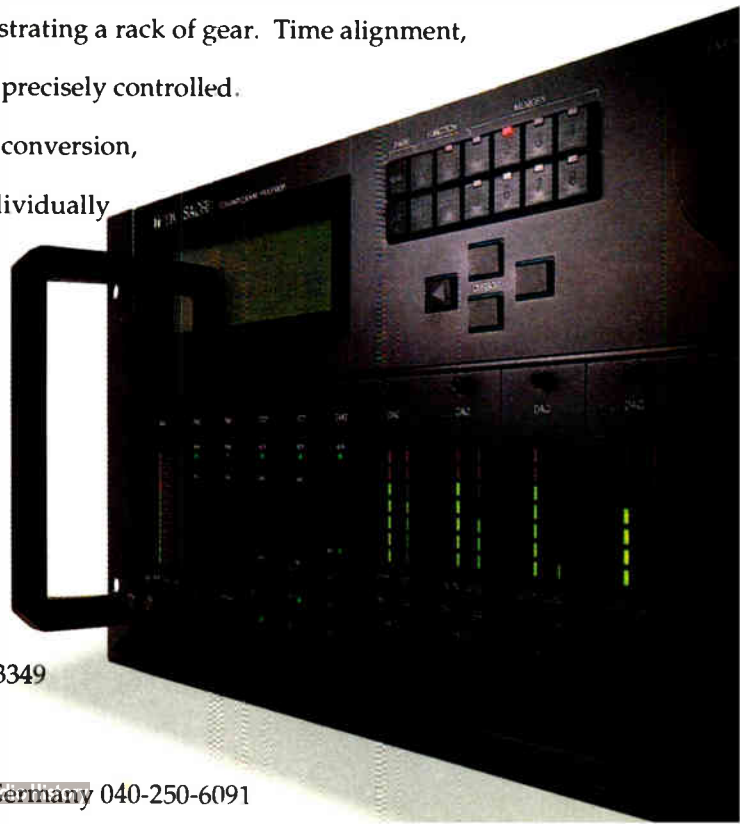
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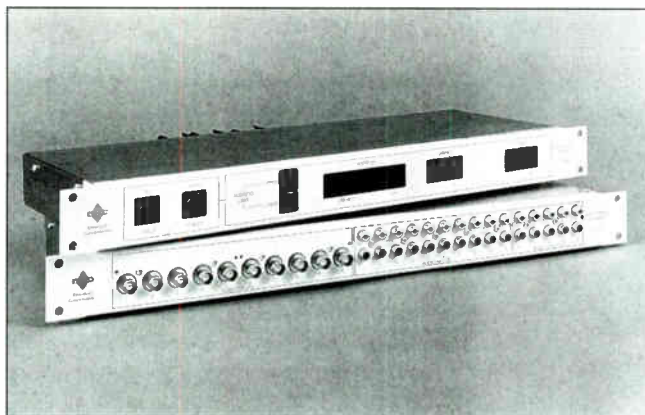
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Tape & Disc News

DCC: TECH SUPPORT, DIGITAL BINS AND LOADERS

Media Technologies Ltd. (Ronkonkoma, NY) has been selected by Philips to provide technical service and support to North American purchasers of DCC duplication gear. The company will offer consultation and technical support for both installation and operation of DCC facilities, and plans a network of trained service technicians throughout the continent. Sales and after-sales training on DCC mastering, primarily targeted to the recording studio community, will also be offered.

Initial pilot plants will be supplied directly by Philips (see Tape & Disc, page 135), but Media Technologies plans to offer an entire turnkey package, which will match Philips' mas-



**Dwight Cavendish
Copymaster
628 (see page
142).**

tering gear with slaves and loaders from Lyrec and a Philips/Lyrec QC system. Media Technologies' Rainer Zopyf also reports that Philips and Duplitronics are negotiating a cross-licensing agreement, under which Duplitronics' planned DHS-2 digital bin would become the sole digital bin licensed for the production of both analog and DCC tapes.

Duplitronics' Jeffrey Binder confirms that negotiations are underway with Philips regarding the marketing of a Philips/Duplitronics bin in North America. According to Binder, Philips has examined Duplitronics' patent

claims, which are currently the subject of a lawsuit between Duplitronics and rival digital bin maker Concept Design. While Binder was reluctant to say that Philips was taking sides in the dispute, an agreement with Duplitronics would signal Philips' belief that the company does in fact own the rights to any use of RAM to store digitized audio for tape duplication. As of press time, details of the cross-licensing agreement were yet to be finalized.

Meanwhile, Otari has announced two new cassette loaders for both analog and DCC use. The AL-662,

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which originated at Otari in Japan, is a new dual-pancake model designed with DCC in mind. The AL-632 is also a dual-pancake loader, based on a King Instruments design, that is field upgradable to DCC. The company is offering similar conversion options for its KL-790 and KL-2790 machines.

RCA VICTOR GOES DOLBY S

While DCC has taken much of the wind out of the sails of Dolby's S-type noise reduction system, the company recently won its first major label commitment to release in the new format. RCA Victor/BMG Classics has announced plans to release a series of S-type-encoded classical titles that will also feature Dolby Surround. According to RCA's Al Lutz, the new series marks the first time that all major new titles from a major label are being released in Dolby Surround.

Consumers without surround equipment will hear normal stereo program from the tapes, which will be sold for the same price as conventional cassettes. And Dolby claims

that listeners can expect "outstanding results" from the Dolby S-type encoding, even on players not equipped with S-type decoders.

SONIC SOLUTIONS SHIPS SONICSTATIONS

Sonic Solutions has begun shipping the SonicStation, a Macintosh-based digital audio workstation designed as an entry-level path into the company's Sonic System. The station includes two channels of digital ins and outs, eight-channel playback from disk, waveform editing, real-time filtering and mixing and background loading. The software/hardware package, without a Mac, starts at \$4,995.

A number of optional system expansions are available for the SonicStation, including A/D and D/A converters, NoNoise, PQ editing and the new Sony/Start Lab CD Printer (\$9,750), which supports double-speed CD recording. A system capable of premastering and recording reference or PreMaster CDs (ready for direct transfer to the glass master) can be purchased for under \$25,000, depending on Mac model and hard disk capacity.

CONCEPT DESIGN LOADERS

Concept Design has revealed further details on its new 9002 cassette loader. Debuted at AES in Vienna, the dual-pancake machine features microprocessor control to minimize moving parts and increase throughput. The loader will load one pancake while spooling to the cue tone of the next, and it incorporates loader upgrades like the Ultra Precision Splicer, the Multistacker and the Fast Feeder.

The company also reports continued sales of its single-pancake loader, the CD-9000. National Audio recently acquired its tenth, while Super Duper purchased its first.

SPLICES

HHB Communications of London has been named sales agent and distributor for CEDAR Audio in 19 countries, primarily in Europe. The first product to be marketed under the new arrangement will be the DC 1 Declicker, a stand-alone, real-time, digital scratch-removal module... EMI expanded its duplication operation in the UK with the purchase of



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World Radio History

an Electro Sound 8000 Duplicating Reproducer. The 8000 operates at 80:1 and features a powered loop bin. Electro Sound (Sun Valley, CA) also has been active in Asia, with high-speed duplicating sales to TDK in Tokyo, as well as to duplicators in Thailand and China...California Magnetics of San Diego added high-speed capability to its existing real-time setup with the purchase of a Versadyne 1500 series system...OceanView Digital Mastering (Los Angeles) reports mastering work by Joe Gastwirt on an Emerson, Lake and Palmer retrospective...Marc Senasac mastered a remix for En Vogue at Rocket Lab (San Francisco), while Kenneth Lee mastered a Mercury project by Kenya Gruv...At Different Fur in San Francisco, John Acoca mastered a Roy Rogers' project for Blind Pig Records...Dwight Cavendish (Lincolnwood, IL) has introduced the Copymaster 628, a video monitoring and remote control system combining monitoring control panels and monitoring interface units for control of up to 2500 VCRs. ■

—FROM PAGE 136, DCC AT ITA

capital outlay required for a full-scale facility are in the \$2 million range.

OUTSIDE EQUIPMENT

Is the high cost of Philips' gear justified by the expense of developing the technology to make the new format work, or is the company exploiting its powerful licensing position? Without knowing Philips' costs, it's impossible to say. But it seems probable that prices will fall as second-generation gear becomes available from various sources, particularly if Philips drops its insistence on being the sole seller to licensed duplicators of DCC duplication gear (except loaders) made by any company.

A half-dozen of the most likely outside suppliers of DCC equipment were on a panel at the seminar. Representatives of Gauss, Tapematic, Concept Design and Duplitratics all referred to the adaptation of existing or previously announced digital bin technologies to the format. And Otari announced its intention to get into the DCC bin market, as well. Some of these proposed DCC bins would allow substantial departures from Phil-

ips' outline of DCC production steps.

Concept Design's Bob Farrow spoke of how the memory-allocation feature of the company's DAAD² bin could be used to run simultaneous analog and DCC cassettes of the same program. The DAAD's VLDS system would also allow creation of a single master tape for both analog and DCC. The VLDS could load the bin at high speed, instead of the real-time downloading envisioned by Philips.

At Duplitratics, meanwhile, the plan is to introduce the DHS-2, a bin specially designed for DCC. According to Duplitratics' Jeff Binder, the bin's remotely controllable onboard computer will incorporate PCM-to-PASC conversion and other mastering features that Philips reserves for its separate mastering station.

Slaves for DCC are expected from several of the companies. Lyrec's Orjan Svedberg said his company plans to concentrate on new gear, with modification of existing slaves for DCC on standby for now. At the time, Lyrec was the only company outside of PolyGram to have shown a slave (see "Tape & Disc News," July 1992). The unit integrates tape clean-

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ing into the machine in an attempt to avoid the clean room requirement.

According to Tapematic's Mark Nevejans, that company also believes that new gear makes more sense than conversion during DCC's start-up phase. Tapematic will be offering a DCC slave for \$32,000, about \$10,000 more than a similar model slave for analog.

Gauss developed a slave based on its existing 2400 transport, while sister company Electro Sound will use the ES 4800 slave as the starting point for its model. The slaves will be supplied with interfacing, write electronics and write heads. Gauss's Jim Williams emphasized that one of the most crucial aspects of slave design has been to ensure the most accurate track alignment during recording. No mention was made of supplying retrofit kits for conversion of existing 2400 or 4800 slaves.

Perhaps the most unusual approach to duplicating DCC was proposed by Otari's John Carey, who spoke of the possibility of adapting the company's TMD high-speed, video-duplication machines. While acknowledging weaknesses in the TMD approach related to the limited life of the "metal mirror master" tape and the cost of power and cooling, Carey noted that the flexibility offered by TMD for short runs would be particularly useful in the start-up stage, where small quantities of a number of titles would likely be needed. And considering the head wear problem mentioned earlier, the absence of tape/head contact would be a plus.

As for loading, Tapematic will be offering a DCC-ready version of its 2002, which will sell for \$28,750. The company's Tapecentre 4000 also has been designed for easy conversion, but with its four loading stations, it is expected to be too big until the format moves past the pilot production phase. Lyrec will also have a loader available, while Concept Design expects to offer conversion kits both for existing King loaders and for its new 9000 Series machines.

The final DCC presentation focusing on equipment came from Bob Coningsby III of Apex, who reviewed various printing options available for DCC shells. Coningsby recommended the rotary silkscreen approach as

offering the highest image quality, and noted that existing rotary silkscreen printers can be modified to handle DCC shells at a very low cost.

TAPE AND SHELLS

The issue of the shells themselves, and the tape to go in them, was addressed in a panel of tape and shell suppliers for analog cassette. BASF appears to be furthest along in the tape department, having collaborated with Philips in DCC's development phase. As expected, the company has settled on a chromium dioxide formulation with a retentivity of 1,500

gauss. Tape will be supplied in a 12-micron thickness (C-90 stock) only, with matte black backcoating. Pancake size will initially be 3,300 meters (10,725 feet). Pricing is expected to be 175% of analog cassette chrome stock.

While BASF's Werner Singhoff emphasized that his company's product is ready to go, Joe Kempler of Sunk-yong talked about being in the "second wave." Sunk-yong expects to supply blank DCC tapes, D-0s (empty DCC shells) and pancake stock. Kempler spoke of the need to evaluate the experience gained early on in real-world duplication settings, and to

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incorporate what is learned into the development of a tape optimized for this specific application.

Asking what it is that makes one DCC tape better than another, Kempler named some criteria that need further study. One factor he mentioned is durability, meaning how many times a recorded tape can be played before developing uncorrectable errors. Another is the abrasivity of the formulation as it relates to slave-head wear. With that in mind, Sunkyong will look into the use of alternatives to chrome, including cobalt.

Lenco, which makes 175 million C-0s annually, was represented by Richard Knaub, who outlined some of the reasons that D-0s will cost substantially more. Shells must meet a "heat soak" requirement of over 200° F, which means they must be made from an expensive ABS/polycarbonate blend. Add to that the fact that D-0s have more components, and you have an overall materials cost that is three times greater than for C-0s. The number of components also con-

tributes to higher automated assembly costs. And the shells for prerecorded tapes have an L-cover that gets sonic-welded over a printed L-card, adding another automated step. Lenco will offer the shells and slip cases by the end of 1992.

Another company hoping to be a major player in the shell market, especially supplying the prerecorded side, is Cinram, which is creating a new division to mold D-0s and slip cases. Cinram president Isidore Philosophie estimated that D-0s will initially have to sell for ten times C-0s, dropping to two-and-a-half or three times as quantities rise. Cinram will be ready to show samples to duplicators in August.

DCC DUPLICATORS

Cinram intends not only to make the shells, but to duplicate DCCs as well. According to Middeljans, other duplicators committed to the format include Capitol/EMI, Sonopress and WEA Manufacturing in the U.S., as well as JVC and TDK in Japan. The four North American outfits had their own panel at ITA, and they described their startup plans.

Sonopress will be duplicating DCC at plants in both Germany and North Carolina. According to Rick Wartzok, production on Philips-supplied gear should be up by August, with an annual capacity of 900,000 units for BMG and outside clients. WEA Manufacturing is expecting to begin production at about the same time of an initial group of 25 titles (2,500-3,000 units each) at its Specialty plant in Olyphant, Pa. The DCC operation will have a capacity of 15,000/day.

Capitol/EMI expects to be up and running at its Jacksonville, Ill., plant in time to offer 100 titles by launch time in September. Company plans call for mastering to be handled in a mastering studio setting, using text files prepared and provided by its label copy department. Start-up capacity is set at 2.2 million annually, and the plant will be accepting outside clients.

Cinram, the only company of the four without major label affiliation, will be operating at a 2.5-million annual capacity by the end of the year in its plant at Richmond, Ind. Industry sources report that the plant will duplicate PolyGram's DCC product

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for the North American market. Philosopher estimated that duplicators will be selling the finished DCCs, including graphic materials, for \$3.50 to \$4.50 each. He projected a North American market of 2 to 2.5 million units in the first year after introduction.

SOUND BUSINESS?

The question of market size is, of course, a key one, both for those who have already committed to duplicating for DCC and those who are considering entering the market. The equipment investment will be substantial. The unit manufacturing costs will be high. But since the combined annual capacity of the four U.S. plants already committed adds up to at least four times the projected demand, competitive pressures will make it hard for the plants to rapidly recoup their investment.

PolyGram reportedly plans to list DCC titles at the same prices as their CD equivalents. Other labels may be expected to follow suit, thus slowing the market growth needed to get the format off the ground. So even if the plants manage to keep their prices up, the short-term profitability of investing in DCC at this stage is questionable. It only makes sense if one is absolutely convinced that the format will eventually take off, and that being in on the ground floor will prove to be an advantage later. That's why at least one of the start-up plants is getting into DCC primarily at the behest of its parent distribution company, rather than out of any firm pro-DCC conviction of its own.

Assuming the format catches on as its proponents hope, the first year's sales will amount to less than one percent of the number of analog music cassettes made last year. As Susan Nunziata of *Billboard* pointed out in her ITA presentation, that hardly qualifies as an immediate threat to analog duplication. If market demand dictates, there should be plenty of time later to gear up with second- or third-generation equipment. So, all things considered, it would seem that the cautious types are right: There's little reason for panic—and little incentive for pioneering. ■

Philip De Lancie is a mastering engineer at Fantasy Studios in Berkeley, Calif.

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—FROM PAGE 70, MICHELLE SHOCKED

cy to the finished product. Part of it is the thread of Shocked's strong, sure lead vocals; part is the fact that so much of the music springs from the same roots. And the sonic consistency can be chalked up to good recording and mixing.

For the latter task, rock 'n' roll/dance mixer Eric "E.T." Thorngren, working at Aire Studios in L.A. (formerly a Yamaha research studio), was brought in. "It was fairly straight-ahead," he says. "The tapes were all together. All of the songs except one were recorded on a Sony 48-track digital machine, and that [non-Sony] one from Ireland came in on Mitsubishi 32-track digital. There were usually four or five versions of each song, so I got two 48-tracks together, and I compiled from the masters digitally to another machine and, in a couple of cases, created some complete performances.

"I tried to keep it as honest and pure-sounding as I could," Thorngren notes, "by maintaining the integrity of the space and letting the music speak for itself. I used a little reverb here and there [mainly Lexicon 480], but the tapes sounded pretty good when I got them. It was a lot of fun. It was really fresh for me." ♪

—FROM PAGE 68, ADRIAN LEGG

only the second to appear Stateside. It was produced and engineered by another guitarist of note, L.A. rocker Bobby Cochran, at Cochran's home studio, "straight down to stereo, bum notes and all," Legg says. "Bobby is an extremely practical, solid, sensitive bloke, which is exactly what I need in the studio at this point. I need someone to help me interface with all this wretched technology, and I need someone to tell me if I'm playing out of tempo."

Legg says he made such a simple record because "I wanted to show what I can play onstage, and if I'd multitracked it, I'm sure it would have gotten too complicated." Asked if he has any sort of home studio setup for demoing, Legg laughs and says, "I have a 4-track somewhere, but I've lost the power supply for it." For this record, the guitar was recorded direct, and Cochran and Legg employed some light reverb for ambience.

Legg has toured some in the U.S., and his following is definitely growing, but this isn't the kind of music that makes it onto the airwaves much these days. Its rewards are subtle, but those who seek out *Guitar for Mortals* will scarcely be disappointed. ♪

—FROM PAGE 69, TOM WAITS

One from the Heart. "But we found this old storage room they had just cleaned out that had a high ceiling, slab floor, wood paneling. It was just what Tom was looking for. Before that we'd talked about recording him at his house onto DAT, but then we put the drums and bass in this room and that was it. It's very live but with a short decay." The room is about 250 feet from Studio A, which is equipped with a Trident TSM (one of three Trident boards the studio owns) but efficiently linked (as are all the rooms) to the main studio building.

Dawes says that Waits likes to track his vocals live while he plays drums (or a drum) and is accompanied by a bass player. "We put up a couple of room mics [usually a Neumann M49] somewhat close to him, and a bass mic [for bass player Larry Taylor], and put them through Neve preamps. It's very natural-sounding; Tom likes room sounds. It would be just him and Larry—Tom calls it a 'power duo'—and then on different days we brought in a guitar player, a regular drummer and a horn player and had them overdub, not listening to what the other guy had put down so they wouldn't be influenced by it. Then, when you start combining them, you can get some interesting results and combinations. It doesn't always work, but when it does, it's great. Like Tom might want to mix an accordion with a marimba, or an accordion and a guitar that sounds like a Ventures guitar." If you've heard *Swordfish* trombones or *Raindogs*, you know what Dawes is talking about—no combination of instruments is too unorthodox for Waits.

"He used to work in a more traditional jazz way, with a band or trio," Dawes continues, "but when he got into *Swordfish* and got to produce himself, he really blossomed into learning about recording and how to layer things and do overdubs and try different things

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with the technology. He likes to try a lot of different ways of arranging things, and he plays a lot of instruments and has quite a collection, too—he's got a Chamberlain, a pump organ, all sorts of old percussion instruments. He's really very musical."

"He has a fierce warrior spirit," adds Prairie Sun owner Mark "Mooka" Rennick. "He's always into trying new things. He'll be there on the floor with these mallets hitting these big kick drums, doing his vocals live, or he'll grab a Marshall amplifier and stick it in one of our live chambers and turn it all the way up. You never know. It's really been an honor to work with him."

"Tom doesn't compromise," says Dawes, whose main gig is working as chief engineer for Westwood One. "He's not in a hurry; he wants it to be right. He'll do overdubs while we mix, and he's not afraid to change things to get what he wants. My goal is to make an environment that's as flexible as possible for him to express himself. He's an amazing writer, whose lyrics and music are constantly challenging you, and that's what makes him so fun to record." ☎

—FROM PAGE 69, MEGADETH

but my heroin habit had become so insane that I slept through most of the project. Except for making some executive calls on performances, I wasn't that aware of what was going on. We spent \$150,000 on mixes that were trash. Paul didn't want me there because he said I was the black cloud of gloom, and he was right. Michael Wagener ended up mixing the record, and he did a good job."

After that near-debacle Mustaine cleaned up, and the resulting album, *Rust in Peace*, co-produced by Mustaine and Mike Clink, and featuring a new guitarist and drummer, nearly went platinum and really, for the first time, showed the depth of the group's music. This time, veteran British producer/engineer Max Norman (Ozzy, Y&T, Loudness) mixed the album at One on One in L.A., and Mustaine was so happy with his work on that and a subsequent recording session for a song for a movie soundtrack, that Norman was enlisted to track and mix their new opus, *Countdown to Extinction*. "I'm not sure why,"

Mustaine says, "but Max really understands what we're trying to do with this music. When we were working on material for this record, he had lots of ideas on how songs could be improved. He came down to rehearsals with his computer, and we worked out which parts were working, which things needed to be speeded up or slowed down, or whatever."

"When you're just mixing something," adds Norman, "there tend to be points where you disagree with what's on the tape—the length of the part, the tempo it's being delivered at—but of course you can't change a thing. It was nice on this to be able to get in there at the beginning and have everyone agree how things were going to be." Most of the recording for *Countdown* was done at The Enterprise in Burbank.

Surprisingly, this band that is so noted for its live power tends to layer meticulously in the studio, sometimes building up from drummer Nick Menza's drum track: "Sometimes [Menza] will use a click to set the tempo and play from there, and then we'll add one instrument at a time on top," Mustaine says. "We weren't that accurate in our tempos last record; they were changing all over the place." And speed, with this band, is paramount. "It's a slamming record," Mustaine crows of the new work. "Instead of having parts in 8/9, it's 7/8, but there are still some that are upward of 150 beats a minute."

Norman is a big digital booster, and Mustaine agrees that the medium (in this case Sony 3348) "has really helped the articulation of our performance because it's not very forgiving. We can finally hear all the nuances that were getting mashed in the analog tracking."

"Digital makes you work a little harder," Norman agrees, "but this is high-accuracy music. You want to get it as tight and accurate as possible, and digital allows you to do that. We've kept the instrumentation pretty simple, almost minimalist, but I wanted people to be able to hear this band play."

"We've always been a musician's band," Mustaine says in summary. "We were never into writing songs about partying in the back of cars and rock 'n' roll tragedy. We write about the humanistic side of life. We're a reality band." ☎

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AUGUST 1992 MIX 147

C O A S T

L.A. GRAPEVINE

by Amy Ziffer

Last month I told you about Johnny Yuma, a formerly private studio that's going commercial, or at least partly so. The change is indicative of a trend that makes sense. A lot of people have built project studios for their own use, only to find that equipment payments are hard to manage. Even if the studio isn't a financial drain, it doesn't make sense for it to be sitting empty while the owner is

—CONTINUED ON PAGE 150

Saban Entertainment, a broad-based entertainment company in Burbank, installed a Euphonix CSII 8048 console in their Studio A. Chief engineer Barron Abramovitch reports that recent work included scoring for hundreds of animated programs.

NASHVILLE SKYLINE

by Dan Daley

Emerald Recording became the first room in town to implement SSL's automation update, Ultimatum. The system,

which was installed in March, had Alabama's latest for its christening run. According to studio manager Anthony Little, the upgrade has brought calls from as far away as L.A. The studio also added eight additional E Series modules, bringing the console to 64 inputs, the largest SSL desk in Nashville.



Fender Musical Instruments recently opened an office and showroom in the former RCA building on Music Row. Country superstars Ricky Skaggs and Marty Stuart (seated, LtoR) visited Fender Nashville. Bruce J. Bolen, VP of marketing services (right), and his assistant, Bruce A. Bolen, are standing behind the artists.



Nightingale Studios, along with Hummingbird and Quad, hosted vocal sessions for the next large-scale, all-star show biz extravaganza, a new recording of Handel's *Messiah* featuring over 20 major black artists. The recording, celebrating the 250th anniversary of the piece and slated for a fall release, will have artists like Diana Ross, Stevie Wonder, Jeffrey Osborne,

C O A S T

Al Jarreau and Patti LaBelle singing at A&M in L.A. Nashville's contribution includes Bobby Jones, Take 6, BeBe and CeCe Winans, Mike E and Bela Fleck & The Flecktones. The overall project is being produced by Quincy Jones, with former Take 6 member Mervyn Warren choreographing the vocals. Former L.A. denizen Tony Sheppard is engineering the project in Nashville. Vocals were cut to a rented Sony 3348, while the music beds—all machine tracks—were cut analog with no N/R, Sheppard says.

Speaking of reverse migration, American engineering dean and A&M Recording Studios honcho Shelley Yakus is spending one week per month in Nashville, cutting Bob Seeger's next recording at the recently refurbished Woodland Digital A room. "Bob's really comfortable there, and he likes the fact that Nashville is a working, no-

distractions atmosphere," notes Yakus, who has previously recorded Seeger in Los Angeles.

Draw your own conclusions dept.: The U.S. Department of Transportation may approve direct flights between Nashville International (BNA in your OAG booklets, otherwise known as "Big New Airport") and underused Stansted Airport near London. The application was made by American Airlines, which made Nashburg a hub several years ago. Runway extensions to accommodate wide-body aircraft are already underway, as is the paperwork to satisfy U.S. Customs and Immigration. While the Nashville business community is pushing the plan for obvious reasons, the implications for the audio and post facilities here are clear. Getting a direct link to European recording artists and producers wouldn't hurt things a bit. ■

N.Y. METRO REPORT

by Dan Daley

It's August. The heat's on. Everyone's in the Hamptons or at the Jersey shore. So we present—The Top Ten Reasons To Record In New York (a drum roll, please, Anton):

10. Vintage API preamps now sold on street corners for \$10 along with \$20 Rolexes.
9. Power Station offering free ham radio certificates signed by Tony Bongiovi with every booking.
8. Local crack dealers have compiled street shooting sounds into convenient CD library.
7. Sanitation workers strike and drop in caterers' rates—definitely unrelated.
6. "Headless Bodies Still to be

—CONTINUED ON PAGE 151

Cellist David Darling (Paul Winter Consort) was at Zedz Music (Malden, MA) recording original music for Wim Wender's film *Until the End of the World*.



The new presentation studio at Charles M. Salter Associates, the San Francisco-based acoustical consulting firm, allows clients to preview specific acoustical considerations for a project—before budgets are finalized. Rear-screen slide and video projection supplement the surround-sound audio simulation. Also shown is the machine room.

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will have to be 1.5 inches (the depth of the 2x4) shallower than the outside columns, which leaves 1.5 inches behind the columns for running cables. The front face of the 2x4 is also handy for attaching AC power strips. In our studio, we route the AC cables up high, while keeping line-level wiring at floor level.

The same 2x4-on-the-wall technique can also be used for securing the corner shelf, although additional bracing is necessary. Two diagonal 2x4s—battered over wall studs as shown in Fig. 4—should suffice. Once the wall and diagonal 2x4s are in place, the carpeted corner shelf can be secured with finishing nails

around the edging. Make sure that any holes for cable drops don't interfere with the placement of the diagonal braces.

The most important thing to remember is that this studio design is a far cry from the ultimate facility. Think of it as a starting point for designing *your* room. Add a bit of creativity and you can create a customized workspace in nearly any room—at an affordable price. The only limit is your imagination. ■

J.J. Jenkins is a San Francisco Bay Area-based engineer, composer and producer. George Petersen is the products editor at Mix.

—FROM PAGE 48, PLAYSTATION

of user-specified designs by combining different modules, such as 19-inch bays for standard rack equipment, 24-inch bays for other gear (such as near-field speakers, computers or video monitors), keyboard or console shelf and slide-out shelves for access to out-of-the-way items. Also provided are three vertical cable troughs for separating AC power, audio/video lines and computer data cables. Options include accommodations for lighting and telephones, and end panels for an uncluttered appearance.

The first production unit went to Tom Seufert of Visual Music in Woodland Hills, Calif. His Playstation is set up as a MIDI-production workstation on the side of his 24-track studio. Over the years, Seufert and his partner, Chris Desmond, have received numerous awards and acclaim for their scoring work on commercial spots for major clients such as Toyota, Mazda, Dodge, Minolta, Ramen, Disneyland, Lego, Sharp and many others. Their feature film and TV credits are no less impressive, the duo having worked on films such as *Jumping Jack Flash* and *The Man With One Red Shoe*, as well as scoring for ABC, CBS, NBC and the BBC.

"Playstation has truly revolutionized my working space—my play-space," says Seufert. "When I first saw the system at the 1989 NAMM show, I was really flabbergasted. I got my first system in February of 1991 and later added two other units where I house all my signal processing, audio gear and video equipment. The three systems give the



Visual Music's Chris Desmond and Tom Seufert at the Playstation.

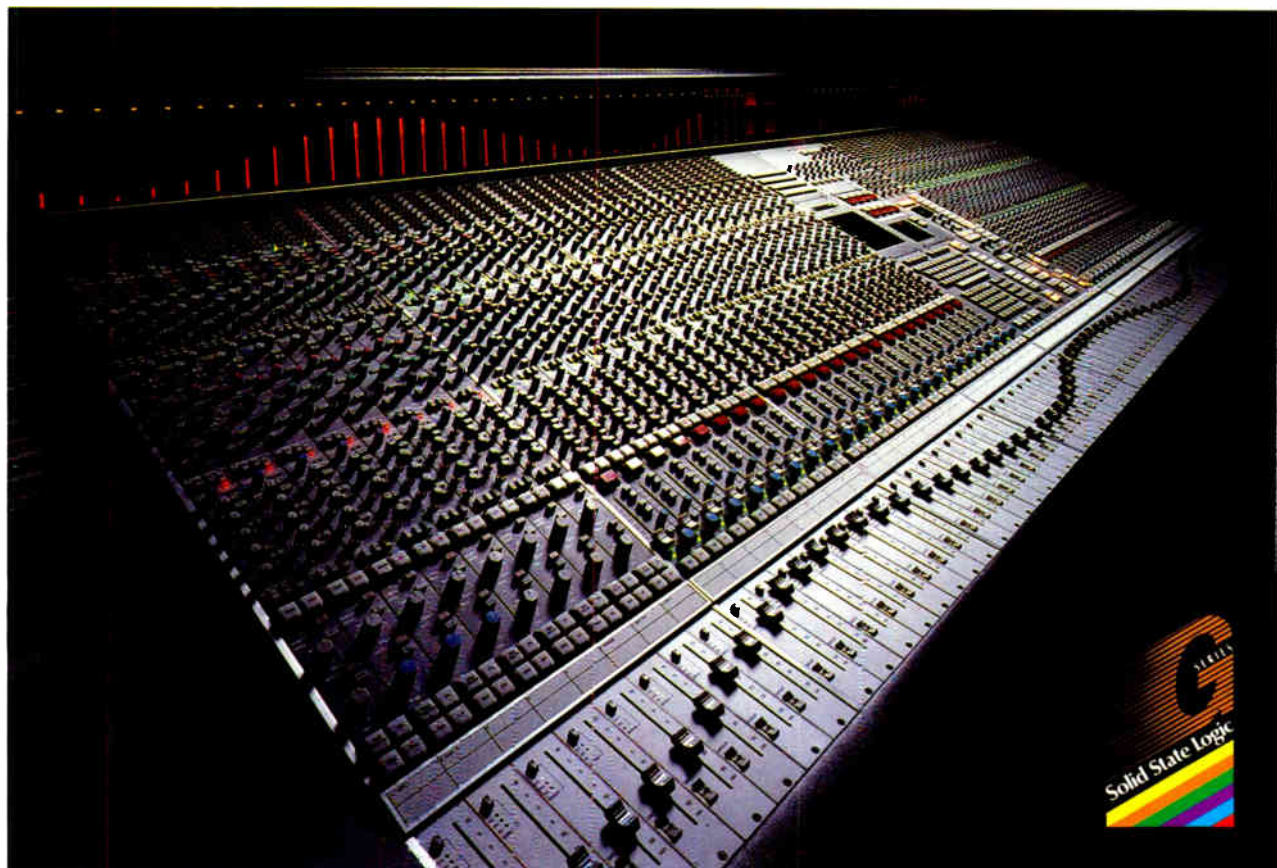
room an integrated, professional look. When the film and TV producers we work with come in and see the setup, they go crazy.

"This really is a garage studio, but it's got a definite vibe when you walk into it—it's very cohesive. Before I got the Playstation," Seufert continues, "I had a couple Ultimate Support keyboard stands and some racks of synths in the back of the room. It didn't look like a system—it just looked like a bunch of junk thrown into the room. Playstation creates a *system* with defined areas to work in. Everything's well-contained and visually very pleasing. I can't say enough about it.

"For small-studio owners like myself—and even people with large studios who need to integrate their gear—Playstation pulls it all together and makes the entire studio feel like a system," he adds. "I can't imagine anything else that's had as much of an effect on the way I work. I can sit in my chair and literally reach anything—it's effortless."

Playstation Products Inc., 4141 Ball Road, Suite 229, Cypress, CA 90630; (310) 598-0505.

—George Petersen



Now the world's favourite recording console has added the ultimate moving fader system

THE SUCCESS of Solid State Logic's SL 4000 Series console is legendary.

The system remains successful by growing alongside the creative individuals who use it. An example of this evolution was the introduction of G Series electronics, where new technology allowed subtle improvements to be made to the entire audio path. Now, SSL has changed the face of console automation by devising an automation system which combines the best features of both moving faders and VCAs.



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Today's G Series consoles, with **Ultimation**, take the art of recording one stage further. Together they set new standards, continuing in the innovative tradition of the world's most respected console system.

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—FROM PAGE 32, MAIN MONITORS

controls in space or on a computer screen, calling up images such as the faceplates of equipment." He also foresees the day when virtual reality will be employed for architectural rendering, and he anticipates beta-testing interface hardware within a year. But he estimates that gathering the data that would allow a designer to predict, say, dispersion as a product of placement, would take half-a-million dollars and two years.

The advance of technology has already improved the monitoring environment through such developments as TEF measuring devices and the subsequent attention paid to the time domain, and it will continue to do so, regardless of the pace of change. "As the gear gets more transparent, more accessible and cheaper," Storyk says, "everybody wakes up and says, 'The only difference between me and the other guy is the room.' I think paying attention to the room is more important than ever." ■

Amy Ziffer is Mix's L.A. editor. Her monthly column appears in the "Coast to Coast" department.

—FROM PAGE 93

nounced plans for a MIDI/music composition package, a MIDI interface, a SMPTE synchronization unit and a multitimbral sound card for Indigo.

Other third-party products permitting cross-platform compatibility are in the works. One will allow files created on the Macintosh and stored on floppies to be read by the IRIS Indigo. A Syquest driver, which would allow the same capability for cartridges, was expected to be available in August.

With the introduction of the IRIS Indigo, Silicon Graphics has positioned itself to compete directly with high-end Macintosh systems such as the Quadra, which have found widespread acceptance in professional media production. And Silicon Graphics has demonstrated a commitment to media integration with its support of Avid Systems' Open Media Framework (see "Universal Connectivity," *Mix*, July '92). This powerful purple box could well become the Mac of the '90s. ■

Mix associate editor Paul Potyten is an Aries. He's had several RAM upgrades.

—FROM PAGE 62, STUDIO CONSTRUCTION

lower angle will work. More usefully, a strong case can be made for raising the console from a standard desk height of 30 inches to 36 or more. The extra altitude reduces the necessary angle on the window, creates more room under the console and fights off the most common control room disaster: monitor sound reflecting off the board into the mixer's head.

When monitors are set high enough on the front wall to bounce off the console control surfaces, they produce a second path time of under 2 ms. Therefore, if the speakers must be mounted above the window, keep them as low as possible or raise the console height. Or, if all else fails, tilt the console, but *avoid monitor-to-console-to-mixer reflections*. I've seen this problem in several rooms, and it is absolutely fatal.

Whether the speakers are put above the window or beside it depends on studio geometry. If the studio is long and thin, a single window will allow decent vision. If it's short and wide or just plain big, the window will have to extend around the speaker walls with the monitors

above the glass.

Don't bother with a seamless wraparound window. If you can see around the front door posts on your car, you can certainly manage the equivalent supports for a control room window. Just sway a little to one side and save some money.

Finally, ceiling height. If it's high, leave it high. There is no acoustical advantage to a low ceiling other than a slight reduction in monitor power requirements. Also, low ceilings require a lot of short path absorption. It's a wash, except that cozy control rooms turn into claustrophobic coffins on long sessions. A mixer can spend a *lot* of time in a control room, so think of it as your home. The bigger, the better.

So much for dimensions and geometry. In the next two parts, we'll move on to floors, windows, acoustical materials, lighting, equipment locations, airflow and (oops) a door. ■

Malcolm Chisholm, a resident of Chicago, has worked as an audio engineer, acoustician and consultant to the recording industry for the past 30 years.

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Hollywood's Music Grinder Studios recently completed construction of Studio B with designer Vincent Van Haaff. Studio B features a Neve 8108 console with Necam 96 automation, a Studer A827 24-track and a custom bi-amped monitoring system with TAD drivers, Northwest horns and TAD woofers. Guitars provided by Andy Bauer Studio Rentals. **Photo:** Ed Freeman.

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Upcoming Directory Deadlines:

North Central & Canadian Studios: **August 10, 1992**

Mastering, Tape Duplication & Replication Facilities: **September 10, 1992**

Sound Reinforcement & Remote Recording: **October 9, 1992**

Mix listings procedure: Every month, *Mix* seeks listing applications to recording studios and/or other mix facilities and services for the recording sound and video production industries. There is a separate charge to list a separate listing (name, address) and an Extended Listing (equipment, credits, special offers and photo or logo) if you would like to be listed in a *Mix* Directory, write or call the *Mix* Directory Department, 6400 Hollywood Blvd., #12, Beverly Hills, CA 90408, toll free 800-344-1027.

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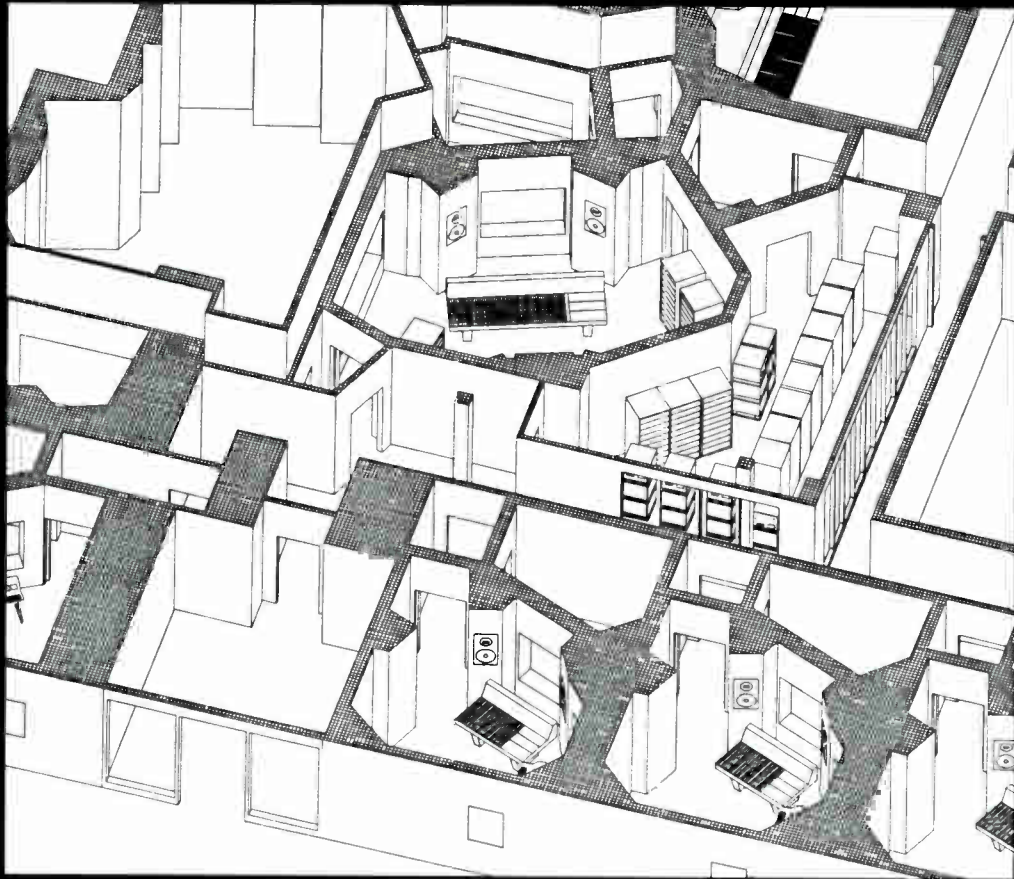
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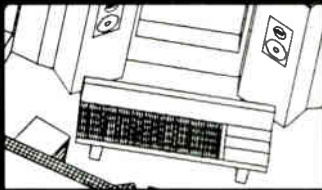
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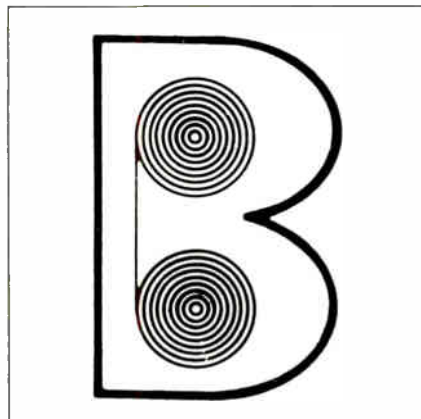
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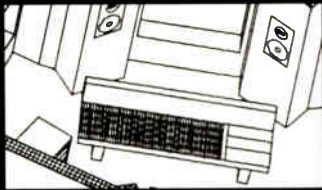
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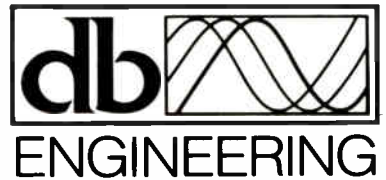
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FRANCIS DANIEL; FD, AC; c/o ARcoustics Inc.; 720 Greenwich St., Ste. 2C; New York, NY 10014; (212) 727-9645. Contact: Francis Daniel, Victor Schwartz. Services/Specialization: Studio design for serious projects of every size. I am a professional acoustical consultant; a Senior Associate in Architectural Acoustics at Shen Milsom & Wilke, and a principal at ARcoustics, working on diverse projects throughout the world. Your needs determine the services we provide: a few hours of consulting by phone, fax and Fedex; custom proprietary acoustical products to tune the room you already have; or a complete turnkey design/build team. In today's tough marketplace, you have no room for mistakes, acoustical mistakes, visual mistakes, ergonomic mistakes or system design errors. We have all the test equipment and computer goodies you expect, but more importantly we have creative solutions to your problems, scaled to your budget, and a track record of projects ranging from multiroom facilities to single project studios. If you have a project you care about, a room that has to work right and look right, we can help.



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THE DOWNTOWN GROUP

THE DOWNTOWN GROUP
New York, NY

THE DOWNTOWN GROUP; FD, AC; 64 N. Moore St.; New York, NY 10013; (212) 226-6059. Contact: Vin Gizzi. Services/Specialization: The Downtown Group (formerly Benchmark Associates/Downtown Design): architectural and acous-

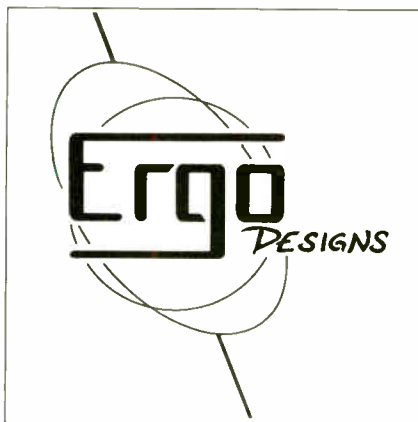
tic design, acoustic consulting and testing, construction management. Design services include preparation of drawings, construction documents and specifications; coordination of structural, mechanical and electrical engineering; building department submissions. Acoustic testing includes noise and isolation; reverb and decay times; monitor systems; room response. Typical projects: recording studios and control rooms, home studios, audio-for-video mix rooms, video production stages and control rooms, radio and television studios.



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DREAMHIRE; 137-139 W. 25th St.; New York, NY 10001; (800) 234-7536; (212) 691-5544 (from NYC); FAX: (212) 627-4763. Contact: Chris Dunn, Donna Winfield. Services/Specialization: Dreamhire carries an extremely extensive inventory of professional audio and MIDI equipment for rental including digital and analog recorders, time code DAT recorders, noise reduction, modern and vintage microphones, microphone preamps, digital reverbs, digital delays, harmonizers, equalizers, compressors, keyboards, sound modules, samplers, drum machines, sequencers, computers, software, hard disk and magneto optical recorders/editors, studio monitors, consoles, etc.

DUTCHESS TEL-AUDIO INC.; FD, EI, MR, ER; 5 Spack-enkill Rd.; Poughkeepsie, NY 12603; (914) 462-1700; FAX: (914) 462-1741. Contact: Lee Walls.



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Brooklyn, NY

ERGO DESIGNS; FD, EI; 275 Vanderbilt Ave.; Brooklyn, NY 11205; (718) 636-0031. Contact: Alex Noyes, Mark Ramsay. Services/Specialization: Ergo Designs is a full-service audio and MIDI design company providing everything from consultation and system design to purchasing and installation contracting. Design services are available for audio recording studios, sound installations, video/film post-production, personal studios and performance systems. Specialties include upgrading existing facilities and complete integrated synchronization systems for SFX and ADR. All work is delivered with a complete customer-support package, including a staff-training program, allowing for seamless expansion and continued operational efficiency. We are not distributors, so we provide independent, unbiased equipment selection. Ergo Designs offers expanding services from consultation to installation of full turnkey systems, within budget, on time and ready for use.

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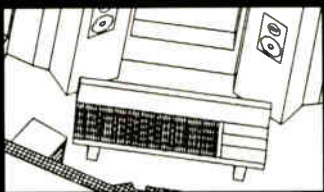
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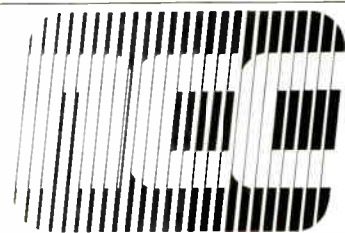


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FRANCIS MANZELLA RECORDING
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FRANCIS MANZELLA RECORDING & TECHNICAL SERVICE; SD, AC, EI, MR; 36-5 Foxwood Dr.; Pleasantville, NY 10570; (914) 769-8764. Contact: Francis Manzella. Services/Specialization: FMRTS offers all audio technical consulting services specializing in computer-aided studio design and systems installations. With ten years of studio experience, we are uniquely qualified to design your facility with an eye for detail and ergonomic often missing from larger firms' designs. Recent designs include Easthill Studios, NYC, a 5,000-sq.-ft. two-studio complex with SSL, Studer and Tannoy main monitoring; also Arthur Baker's SSL-equipped live-in artist's Studio in Jersey City, NJ. Other services include control room tunings and acoustic refurbishing as well as MIDI, synchronizer and multitrack installations. Full-service audio equipment repair and modifications including factory-trained Studer, SSL and Mitsubishi maintenance also available.

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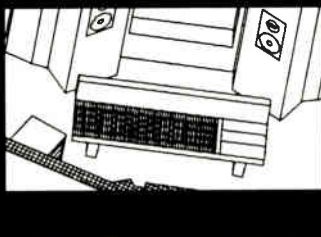


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TED ROTHSTEIN; FD, EI, SES, MR, AC; 280 Park Ave. S.; New York, NY 10010; (212) 475-5064; FAX: (212) 475-4877. Contact: Ted or Eric. Services/Specialization: Ted Rothstein has been designing and installing innovative electronic and acoustic systems since 1970. His TR-1A monitor system, recently installed at Patrick Leonard's Johnny Yuma Studio in Burbank, ends compromising between point source and high power by delivering both. Rothstein's Hard Rock Cafe and Planet Hollywood audio/video installations in over a dozen sites in eight countries deliver sophisticated computerized CD selections, crossfading from track to track with near studio-quality sound. His Planet Hollywood screening room system allows instant switching between certified THX and the higher standard studio control room providing response and head-room normal for cinema and music related formats. Delivering turnkey systems worldwide is one of Rothstein's specialties. Recent projects include: Euro Disney; Roger Waters' Studio, London; Berlin's 1990 "Wall" concert; JSM Music and Planet Hollywood in New York, Hard Rock Cafe in Berlin, Osaka, Paris, Orlando, soon in St. Thomas, Dublin and Planet Hollywood in Barcelona.



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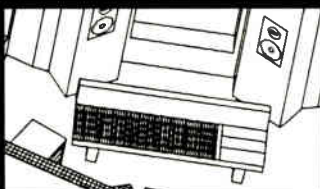
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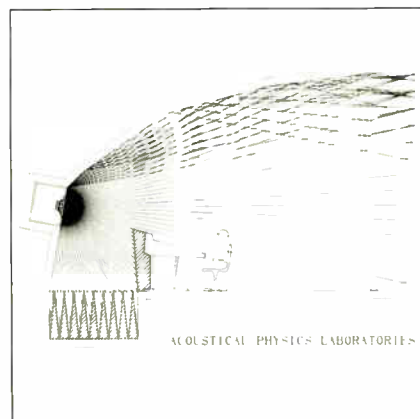
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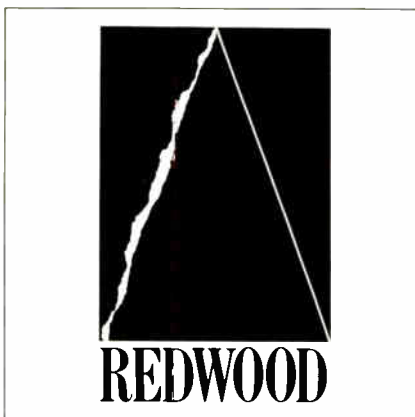
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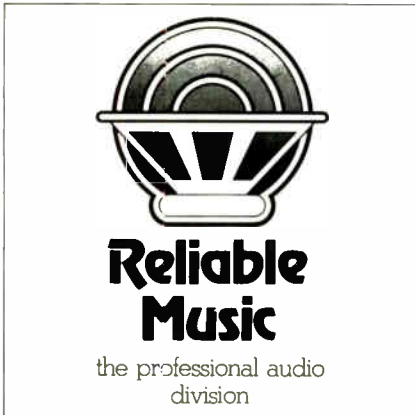
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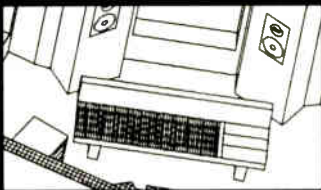
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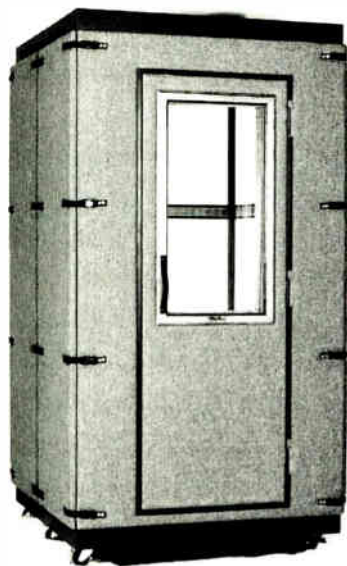
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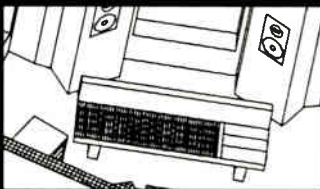
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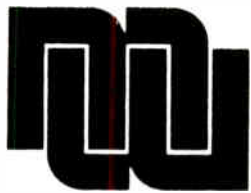
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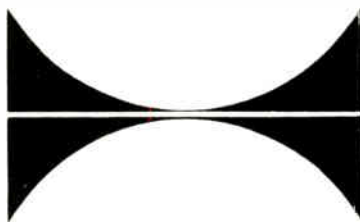
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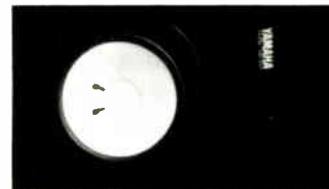
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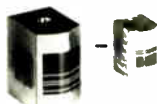
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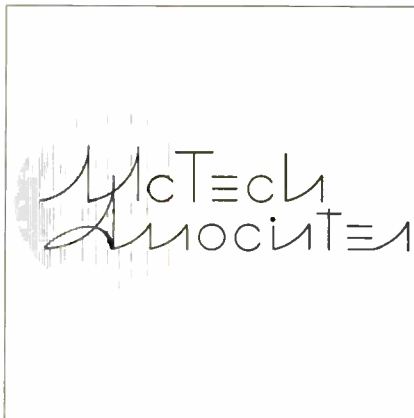
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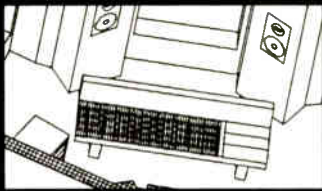
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—LISTING CONTINUED FROM PREVIOUS PAGE

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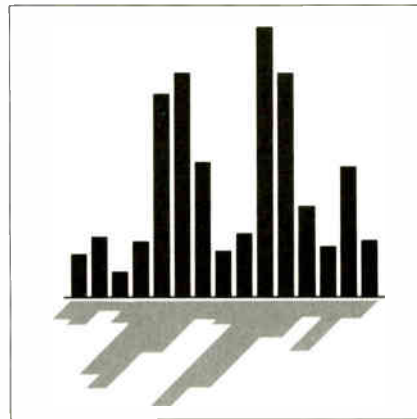
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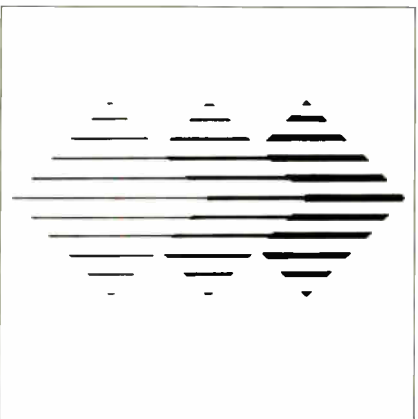
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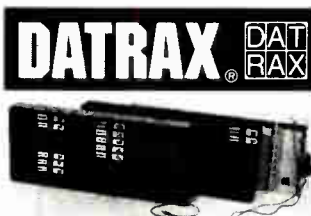
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INTERNATIONAL UPDATE

—FROM PAGE 87, LETTER FROM LONDON

Disney sessions after three tense days of so-so recording in April. Budapest used to have producers tearing their hair out as the work-sharing ethic resulted in a different orchestra tuning up for each session. But on the whole, these people are offering an adequate service and are leaving British studios empty. Yet the union refuses to discuss the matter unless it is to negotiate further increases. The producers want to rationalize the whole system so that, even if they do pay more, they know exactly how much.

For the studios and the engineers, this is exasperating. The owners of CTS, Abbey Road and The Hit Factory London have all spent small fortunes on updating equipment and facilities, but they and the engineers have no say in whether they get international film work or not. Adrian Kerridge of CTS has been the most vociferous critic of the union, but there is little he can do about it. In the end, the matter may only be resolved by a higher body.

The British government has long been keeping an eye on the union and

is considering taking action. If the union is sensible and works out a practical solution, it will survive and gain strength—something that we would all prefer. If it remains intransigent, it may find itself the victim of the draconian anti-union legislation that the government unleashes from time to time with crippling results. Britain without a musicians' union would be even more difficult to operate in than Britain with one.

Under the new laws, the union can no longer operate as a closed shop, although it tries very hard. PACT, the independent TV and film producers' body, has been fighting tooth and nail with the union for three years and is now recommending that its members work to its proposed agreement or work outside Britain. Paramount Pictures in London will not allow union rates to be applied to any of its projects, and others are following suit. Bit by bit, musicians are beginning to drift into sessions where the union has no jurisdiction.

The baffling thing is that many of the session musicians who have been earning healthy incomes from the old agreement do not seem to see that their

union comrades are losing work. On one hand, they want a union to defend their rights. On the other hand, they couldn't give a damn about those musicians who haven't worked in over a year. Their argument, at a recent confrontation with PACT, was that producers still waste money in other areas of film-making but want to pinch pennies over music. Perhaps these musicians are right, but it doesn't stop the flow of work out of Britain. Some of the members are even beefing up the cheaper European orchestras by moonlighting as section leaders in Budapest.

The fact remains that Britain has the best orchestras, arrangers, musical directors, studios and engineers in Europe. They certainly match most American ones and are still cheaper. If the Musicians Union's rules were less complicated and more rationally priced, Britain would have the fertile soundtracking industry it once had. In the meantime, I shall get back to my drum patterns. ■

Colin Paulson observes the British media production industry from his home base in London.

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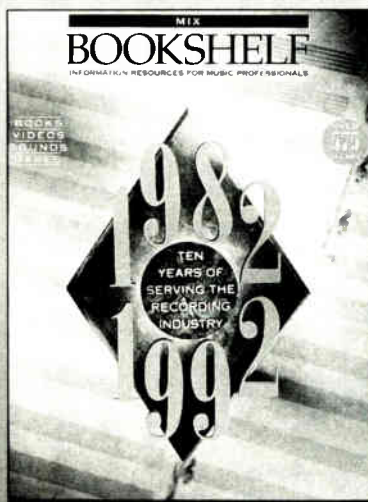
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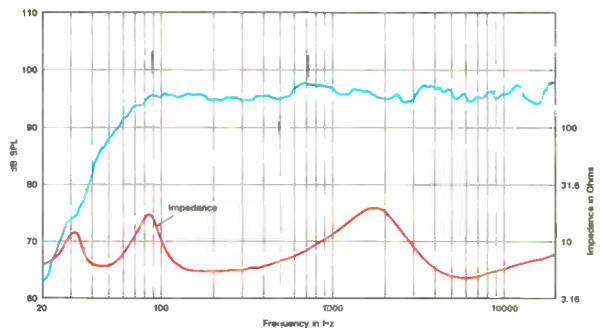
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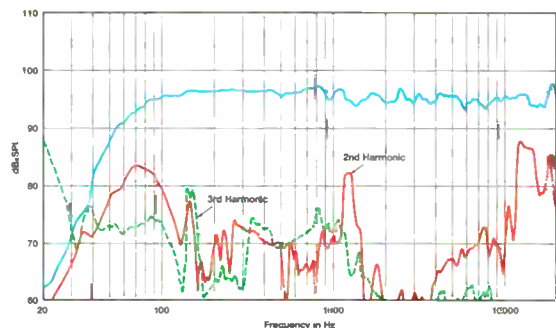


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