REVIEWS: ART CS2 • AMEK BIG • ALESIS QUADRASYNTH • TURTLE BEACH MAUI
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EQ

THE PROJECT RECORDING & SOUND MAGAZINE

SEPTEMBER 1994

INSIDE THE REAL AND THE VIRTUAL

Paisley Park

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EQ

NBC

PROJECT RECORDING
& SOUND TECHNIQUES
VOLUME 5, ISSUE 8
SEPTEMBER 1994

ABOUT OUR COVER

It's a departure, but this month *EQ* has decided to put a non-existent project studio on our cover. The image is actually a virtual view of ♑'s studio as it appears in ♑ Interactive, a new CD-ROM that offers a whimsical look at the artist formerly known as Prince. The image of the studio is a product of the skills of Frank Cordes of the Graphix Zone, an Irvine, California-based company that is planning a series of musician-oriented CD-ROMs.

For this image Cordes relied on form•Z, a 3D modeling package from auto•des•sys, to create the three dimensional model of the studio. Once the model was built he chose a camera postion and lens from which to view it. The model was then imported into Electric Image, the same software that was used extensively for the effects in *Terminator 2*, and rendered at very high quality. The image on our cover (which is super high resolution to meet print production demands) took three hours to render on a Quadra 840av with 48MB of RAM. The same model was used to create the animations on the CD-ROM. For the animations on the disk, Cordes would create a path for the camera to travel and then render 15 frames for each second of the animation.

Cordes also works in audio and was involved in the sound production for the CD-ROM. In the past, his work has been seen at many hi-tech trade shows, the Bay Area Music Awards. He also rendered an upcoming ad campaign for monitor maker, Viewsonic.

FEATURES

INSIDE PAISLEY PARK *By Tom Tucker* 46
Few are more mysterious than the artist formerly known as Prince. Go behind the scenes with Tom Tucker, director of studio operations, and find out what makes the unique project studio work.

PC AND THE PROJECT STUDIO
No, not a treatise on how to act politically correct in the studio, but an in-depth look at how Intel-based personal computers can benefit the project studio owner. Articles include:

TEN THE HARD (DISK) WAY *By David Miles Huber* 58
Which hard-disk recording workstation is right for you? *EQ* takes ten of the hottest PC DAWS and summarizes all the important information you'll need.

WHAT PC TO GET NOW *By Scott Willing* 68
You've heard all the buzz words — Pentium, 486SX, Chicago — now hear the truth about what all this computer-speak means for project studio owners.

AN OUNCE OF PREVENTION *By Craig Anderton* 74
Useful tips and helpful suggestions to let you get more out of your computer investment.

EQ LIVE

SOUNDGARDEN LIVE *By Steve La Cerra* 79
MAX HEADROOM *By Wade McGregor* 86
NEW GEAR FOR YOUR NEXT GIG 92
ROAD TEST: ART CS2 COMPRESSOR/LIMITER/GATE *By Wade McGregor* 94

TECHNIQUES / WORKSHOPS

ALL WALL WARTS MUST DIE! *By Calix Lewis Reneau* 28
FUN WITH SUBWOOFERS *By Eddie Ciletti* 36
DEMO QUEEN FOR A DAY *By C. Reeder* 42

COLUMNS / DEPARTMENTS

MI INSIDER: MIDI SHOW CONTROL *By Craig Anderton* 24
MULTIMEDIA: ELECTRONIC CHAMBER MUSIC *By Murray Allen* 122
DETAILS ONLY: GEOMETRY AND DIMENSIONS, PT. 2 *By John Storyk and Beth Walters* 124
ACROSS THE BOARD: MORE NEW TOYS *By Roger Nichols* 130

LETTERS TO EQ 6
EQ&A 8
PRODUCT VIEWS 12
STUDIOWARE PRODUCTS 16
ROOM WITH A VU: SIR MIX-A-LOT 18
MICRO-PHILE: WESTERN ELECTRIC 600-A 20
IN REVIEW: ALESIS QUADRASYNTH 100
IN REVIEW: AMEK BIG BY LANGLEY 104
REVIEW SHORT: TURTLE BEACH MAUI 120
AD INDEX 99

EQ (ISSN 1050-7868) is published ten times each year by P.S.N. Publications, 2 Park Ave. Ste. 1820, New York, NY 10016. Second class postage paid at New York, NY and additional mailing offices. POSTMASTER: Send address changes to EQ, P.O. Box 0532, Baldwin, NY 11510-0532. SUBSCRIPTIONS: U.S. 1 yr. $24.95, 2 yrs. $39.95, 3 yrs. $59.95; CANADA add $10.00 per year for surface, other countries add $15.00 per yr. for surface. All add $30.00 per yr. for Airmail. Back-issues $5. Printed in the U.S.A.

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A PSN Publication
Vol. 5, No. 8
September 1994

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BPA INTERNATIONAL

EQ (ISSN 1050-7868) is published monthly except for July and November by P.S.N. Publications, 2 Park Avenue, Suite 1820, New York, NY 10016. Second class postage paid at New York, NY and additional mailing offices. POSTMASTER: Send address changes to EQ, P.O. Box 0532, Baldwin, NY 11510-0532. SUBSCRIPTIONS: U.S. 1 yr. $24.95, 2 yrs. $39.95, 3 yrs. $59.95; CANADA add $10 per yr. for surface, other countries add $15 per yr. for surface, All add $30 per yr. for Airmail. Back issues $5. All product information is subject to change; publisher assumes no responsibility for such changes. All listed model numbers and product names are manufacturers' registered trademarks. **Printed in the U.S.A.**

LETTERS TO EQ

BUSTED!

Great interview with Bill Hanley about Woodstock in the August *EQ*, and, of course, really timely with the 25th anniversary concert scheduled for this year. And even I learned something — that there were some JBL's there, below those Altec multicells. But as for the photo of the stage from the audience field at the beginning of the article, you'd better double-check with the Michael Ochs Archives, which supplied the photo. It's a festival all right, but not Woodstock! There were no large bass horns there, and the stacking of the speakers was different. Take a look at your copy of the Woodstock soundtrack album for a good picture from the stage. Joel Makower's book, *Woodstock: An Oral History*, also has some stage shots of the stage from the audience, albeit from quite far away, but it's clear that this photo is from a different festival. The Makower book also has some more background from Bill on arranging for sound for the festival, though nothing much technical.

Anyway, nice to see some history and to see one of the industry's originals get some well-deserved credit.

Mark Gander
V.P. Engineering
JBL Professional

[According to Hanley, the opening picture is of the little-heard-of Woodstock concert that took place the year before the 1969 event.—Ed.]

EQ UNDERGROUND

As an aspiring producer myself, I read each issue of *EQ* with enthusiastic pleasure. Your magazine frequently runs articles that are right on target for me–in terms of musical interest (style) and practical constraints.

I particularly enjoyed Steve Albini's essay (August 1994) on miking guitar amps. It was immensely practical, and guys like me "in the trenches" enjoy hearing from engineers and producers like Steve who are not far removed from our working environment. Any article by Albini would be read with great interest by folks like me in the independent music "underground."

Ray Woods
Wilsonville, OR

BOOK 'EM

In response to the comment by Roy Pritts in your article "Buy the Book" by Steve Schwartz in the August issue of *EQ*, let me say that "This fellow Kefauver" has never claimed to have cowritten *The New Recording Studio Handbook* with John Woram. I don't know to what book Mr. Pritts is referring, since there is no unauthorized version. I was contracted by the publisher, who holds the copyrights, to rewrite Mr. Woram's excellent book after he declined to rewrite it. The original book was published in 1976, as *The Recording Studio Handbook*. It was revised by me in 1989 and was retitled. Mr. Woram's name was retained since the new work was based on the old. The dB hasn't changed, but digital audio, MIDI, SMPTE timecode, and in-line consoles have. As an educator, it is incumbent on Mr. Pritts to make informed statements. If Mr. Pritts had bothered to look at the book and read the preface he would have known these facts.

Alan P. Kefauver
Director
Recording Arts and Sciences

SEE SAW

Howard Massey states in your "Audio for Multimedia" section (April '94) that because of Windows' inherent timing problems, "reliably syncing soundfiles to MIDI sequences is currently virtually impossible." This is no longer correct.

Software Audio Workshop (SAW) bypasses Windows' timing problems, and for more than a year has been proving its MIDI/SMPTE syncing ability by demonstrating, at the major trade shows, six tracks of digital audio with 35 tracks of MIDI, in Windows, on a single PC equipped with a low-cost sound card — all with zero timing inaccuracies.

Perhaps your *EQ* readers would like to read more about SAW, which, slices through Windows' inherent sluggishness and is reasonably priced to boot. *[Readers can check this issue's recorder/editor roundup for more on SAW. A complete review will appear very soon. —Ed.]*

Don Frank
Innovative Quality Software
Las Vegas, NV

CORRECTION

In the "Tour With More Directory" in the August issue, Nady's 950GS UHF wireless system was incorrectly listed as having 40 user-switchable channels, when in actuality it provides 160 user-switchable channels.

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WE TOOK EVERYTHING WE KNOW ABOUT MIXING

You know Yamaha makes some of the best live sound reinforcement consoles. Not to mention some of the best digital mixers.

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ProMix 01 also has motorized faders and is capable of dynamic automation.

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As if that wasn't enough, ProMix also has two internal digital effect processors. Three assignable stereo compressors. Smooth three-band parametric EQ on each channel.

Even an EQ Library where you can store all your favorite settings.

AND CONDENSED IT.

And when it comes to complex mixes, fader grouping lets you control multiple channel levels from a single fader. There also happens to be a stereo "pair" function that allows changes in the left channel (such as EQ and gain) to be automatically mirrored in the right channel.

Sound pretty good?

Actually it sounds pretty great. ProMix 01 boasts more than 100dB of dynamic range. All made possible by the latest 20-bit AD/DA converters. Which virtually eliminate all noise, distortion and crosstalk.

The system also features digital output for flawless audio transfers to R-DAT and other digital mediums.

And has a large backlit LCD screen to help you see all your mix parameters at a glance.

As you can see, ProMix 01 has plenty of things going for it. With its memory, automation capabilities and onboard digital effects, it completely justifies spending $20,000.

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For a demonstration of the remarkable ProMix 01, check your nearest Yamaha dealer.

For more information, call 1-800-937-7171 Ext. 370.

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DOWN UNDER

Q *Our church has a major amplified music-reinforcement system. Under the balcony the bass is loud enough, but it sounds very muddy. I would like to add underbalcony speakers, but how do I match them to the rest of the system?*

Michael Fischer
San Antonio, TX

A Underbalcony speakers should provide a uniform sound quality transition between the main floor area and the underbalcony seating area. The speakers you choose must produce the same sound levels and bandwidth in the underbalcony seats that the main system produces at the seats immediately in front of the balcony. The coverage angle should be quite wide; the off-axis response uniformity is a critical feature in an underbalcony music system. For best effect, the speakers should be placed so that there are no dead spots (or even badly wounded spots) in the seating area. This may require more loudspeakers than you might use in a voice system.

If you have access to a real time analyzer (a MLSSA or Techron TEF analyzer would be even better), have a look at the main system's bandwidth and level just in front of the balcony. Make the same measurement under the balcony. The underbalcony speaker has to make up the difference. The fact that the bass is loud enough under the balcony is a fairly common situation. You don't often need a lot of bass response in an underbalcony system. Select a speaker that can produce the same level at the distance from the intended mounting point to the listeners' ears; take note of how much power it takes to achieve that goal.

You will need an equalizer, digital signal delay, and an amplifier of adequate size to drive them. If there are a large number of speakers, you may need to use 70V transformers (stop cringing; systems with transformers can sound great, if you don't use cheap transformers). Once you are ready to set the EQ and delay (that TEF or MLSSA would make this easier) there are some key things to remember. For instance, don't try to exactly match the delay time from the main system to the test location. Once you have the actual time offset measured or calculated, add 15 to 18 milliseconds. This will "move" the main system back into the precedence position and help make the underbalcony system "disappear."

When setting the EQ for the underbalcony, avoid setting the high-frequency response higher than the one the main system produces just in front of the balcony. There is excess high-frequency attenuation through the air that can reach as high as 10 dB at 10 kHz per 100 feet. The main system will not have as much high-frequency response at the back of the room as it has at the front. If you listen to the underbalcony system alone, it may sound a bit lifeless when EQ'd to match, but it reinforces the effect that the underbalcony system is "invisible."

Barry McKinnon
Acoustic Consultant
Barron Kennedy Lyzun & Assoc,
North Vancouver, B.C.

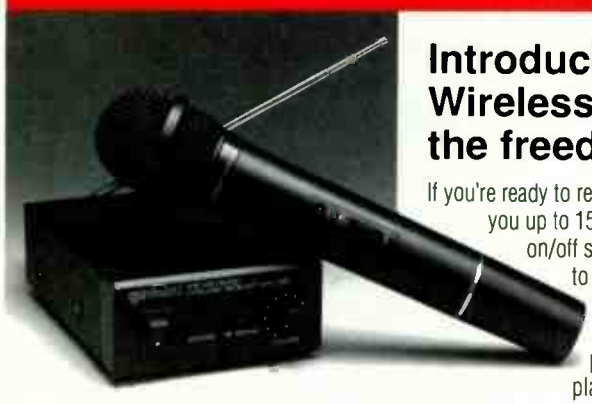
CHOICE TIPS

Q *Are there any basic guidelines for choosing the proper power amplifier for our speakers?*

Eric Nagel
Middletown, CT

A Simply stated: Buy the highest-quality, most-powerful amp you can afford. The more powerful the amp, the more difficult it is to damage your speakers. Small-wattage amps

The mike designed for those of us tired of going nowhere.



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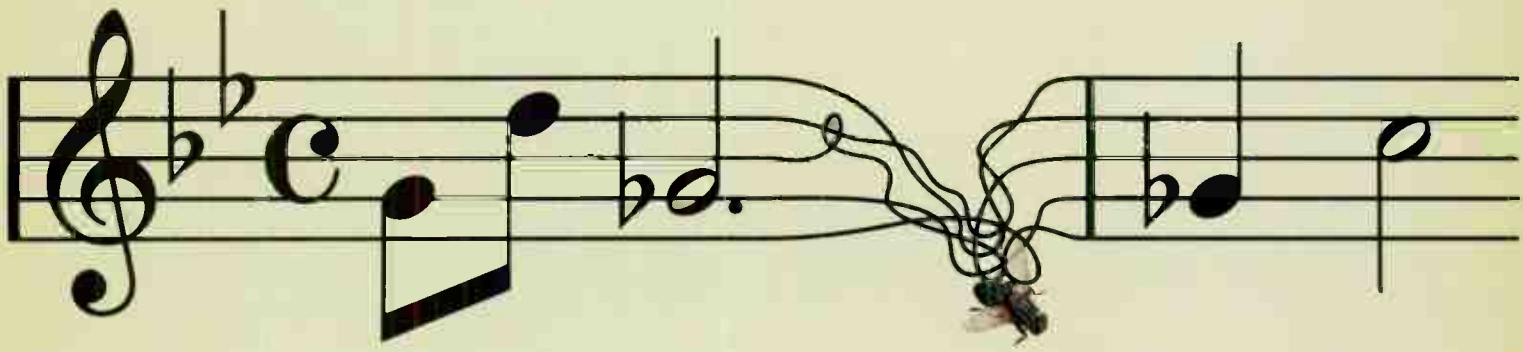

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reach their maximum rated output power more quickly and begin to pass distortion and clipped waveforms. These waveforms are deadly to a speaker because they cause rapid heating of the voice coils, eventually resulting in the coils burning up. Amps with higher power ratings have a greater ability to produce clean power without clipping. If the amp doesn't reach its maximum rated output, it will not clip, and therefore will not pass unwanted waveforms that will lead to failure.

More powerful amps will also provide increased dynamic range and improved transient response (the rate at which an amp responds to sound with quick attack times, e.g., to a snare drum snap). An improvement in dynamic range and transient response is generally noted as amp power is increased. The result is better sound quality, which will become more noticeable as volume levels rise.

No matter what your budget, make sure the amp you choose has a clipping indicator light. It will help you to maintain proper and safe operating levels. Without a clip light, there is no way — short of hearing distortion — that you'll know when the amp has exceeded its safe operating range. Also, remember that different manufacturers use different methods for measuring loudspeaker power handling. Not all companies use the same power test. Look at the spec sheets to determine the test conditions and the type of signal used for the power test of any given product. We at JBL use continuous program power, which is a conservative expression of the speaker's ability to handle typical speech and music program material — which, of course, is what you are going to be amplifying. Rather than use the conventional 1 kHz single frequency test signal, all testing at JBL is done by using the AES continuous pink noise standard, and sensitivity is always measured on a signal swept within a range of frequencies the particular test speaker is designed to be operated in.

Following the testing procedures above, if a speaker can handle 100 watts of pink noise, then it can handle 200 watts of continuous program power (since the pink noise rating is –3 dB from program, which translates to a doubling of the program power). In this example, the proper minimum power amplifier to use would be one that produces 200 watts or more. If, however, because of budget restraints, you had to use an amp under 200 watts, don't worry. As long as the clip light isn't constantly coming on, you can safely operate the amplifier. If you start to run out of headroom (clip light comes on too often), then you know you need a more powerful amplifier for the job.

Nat Hecht
Applications Engineer
JBL Professional

This is where your questions get answered. Send your query with your name and address to:
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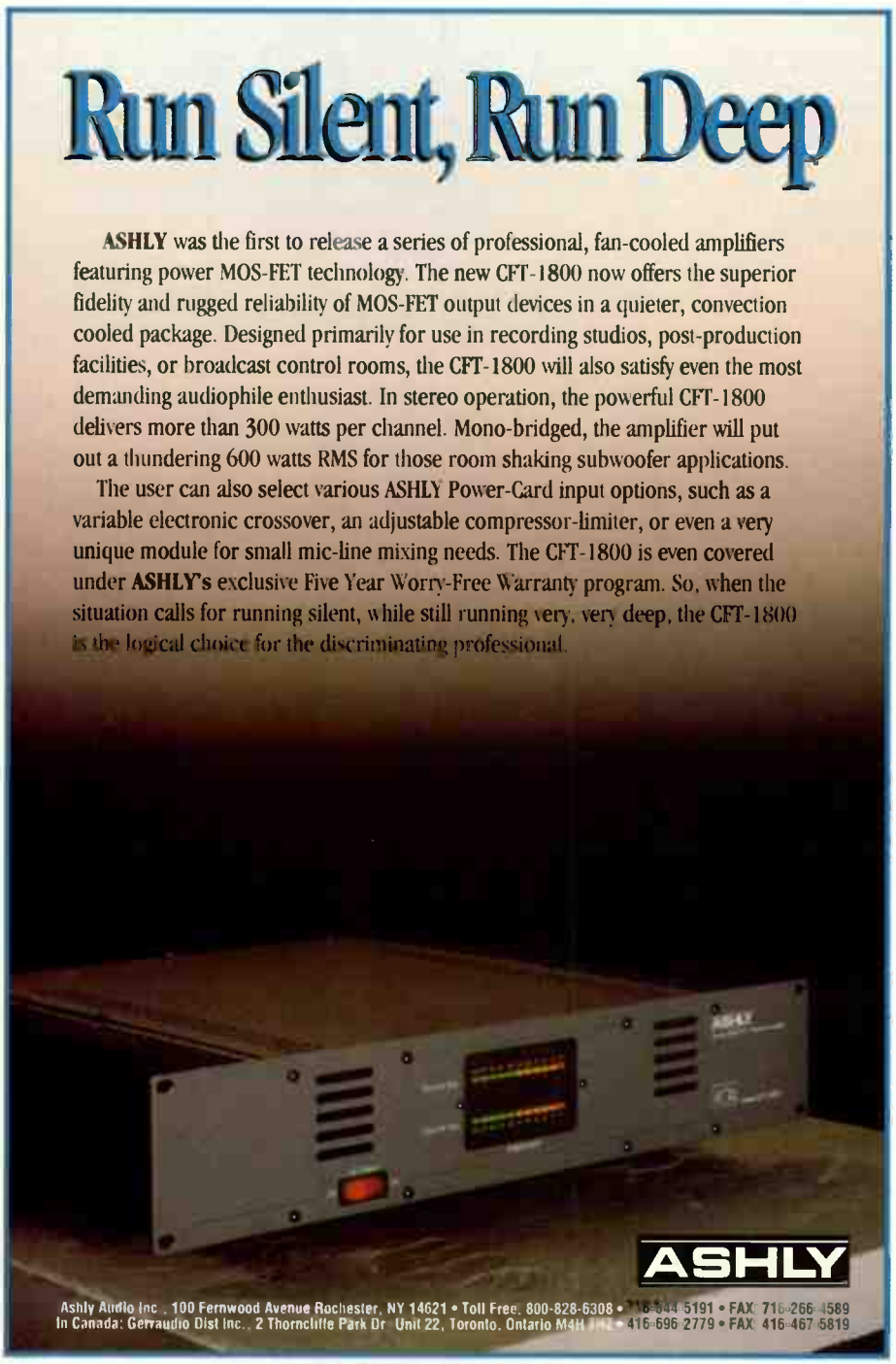
Port Washington, NY 11050



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AMEK

The EQ
The tradition
The pedigree

" The SYSTEM 9098 EQ is a high performance Equalizer and Preamplifier designed to originate microphone signals of the highest quality and to process signals generally in terms of frequency response. The circuitry is based on the research I put into the 9098 console and the approach bears many similarities to that used in the 9098. Paramount importance has been given to the sonic quality of the audio path, taking great care to retain the highly-prized musical character of the famous old designs of this pedigree.

The SYSTEM 9098 EQ embodies the original curve shapes now enhanced by improved circuitry which provides swept frequency bands in place of the discrete switched steps of the past. Thus the EQ has become even more powerful yet remains a subtle and creative tool, using the same basic circuit configurations which have been successful over many years. However, new amplifying devices and better quality components have resulted in lower noise, lower distortion and the ability to handle higher frequencies.

The result is an equalizer which has the solidity and sound of Class A without the cost, heat and weight penalties and thus provides the 'best of both worlds'. We have also left behind cumbersome and expensive hand cabling, noisy connectors, heavy separate power supplies and outdated assembly techniques which contribute nothing but nostalgia. Apart from the robustness, repeatability and reliability, we have now made one of my designs more affordable than ever before."

Rupert Neve

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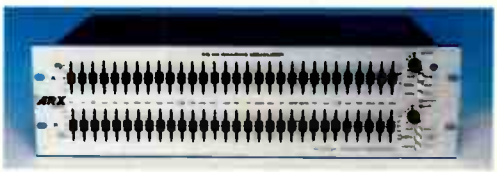
EQ PRODUCT VIEWS

OMNI-POTENT

Audio-Technica has introduced three new Omniphones. The Omniphones features an earpad construction that lifts its drivers away from the ear on a cushion of expanded cellular foam and air. The ATH-P1 produces a frequency response of 30 Hz–20 kHz with a sensitivity of 93 dB. The ATH-P3 features a frequency response of 20 Hz–20 kHz with a 98 dB sensitivity. Model ATH-P5 is similar to the ATH-P3 with the addition of Hi-Energy neodymium magnets and an increased sensitivity of 100 dB. For more information, contact Audio-Technica, 1221 Commerce Dr., Stow, OH 44224. Tel: 216-686-2600. Circle EQ free lit. #101.

DEJA VU

AKG has just reintroduced the classic C12 tube microphone in a modern version called the C12VR. The original C12 was manufactured by AKG between 1954 and 1963. The vintage C12 sound has been re-created with a modern version of the original capsule and the same electronics that proved themselves on the original C12. To maintain the C12's warmth and presence, the original 6072 vacuum tube is at the heart of the circuitry. User control has been enhanced: selectable preattenuation is provided in 10 or 20 dB increments; the 1-inch twin-diaphragm system permits the selection of nine different polar patterns (omni, cardioid, figure-8, and six immediate response steps), which can be adjusted remotely from the N-tube power unit; and nominal sensitivity can be increased with p.c. switches by 10 dB. Frequency response ranges from 30 Hz–20 kHz ±2.5 dB. Price is $3999. For more information, contact AKG, 1525 Alvarado St., San Leandro, CA 94577. Tel: 510-351-3500. Circle EQ free lit. #102.



RIGHT ON Q

ARX Systems recently released the EQ60 Constant Q dual 1/3-octave graphic equalizer. Based on new low-noise topology, the EQ60's signal-to-noise ratio is –94 dB unweighted. Dynamic range is 118 dB and distortion is .004 percent. The unit features a switchable ±15 dB or ±6 dB of equalization on center grounding damped sliders, electronically balanced inputs and outputs, hardwire bypass, switchable high pass filter, and input level controls with up to 6 dB of gain. For more information, contact ARX Systems, 612 Garfield Dr., Petaluma, CA 94954. Tel: 800-ARX SYST. Circle EQ free lit. #103.

ALL THINGS BEING EQ

Rane's new PE 17 parametric EQ/notch filter advances the performance of the PE 15's design. The PE 17 adds separate In and Out gain controls, sweepable low- and high-cut filters, improved dynamic range (120 dB), and improved noise performance. All five parametric bands are identical and offer 100 percent overlap. This allows the unit to be configured one time as a 5-band subwoofer EQ with all bands covering the range of 10 Hz–200 Hz, and another time as a high-frequency unit with each band covering five separate parts of the audio spectrum. Other switchable ranges on all five bands are: 100 Hz–2 kHz and 1 kHz–20 kHz. For more info, contact Rane, 10802 47th Ave. W., Mulkiteo, WA 98275-5098. Tel: 206-355-6000. Circle EQ free lit. #104.

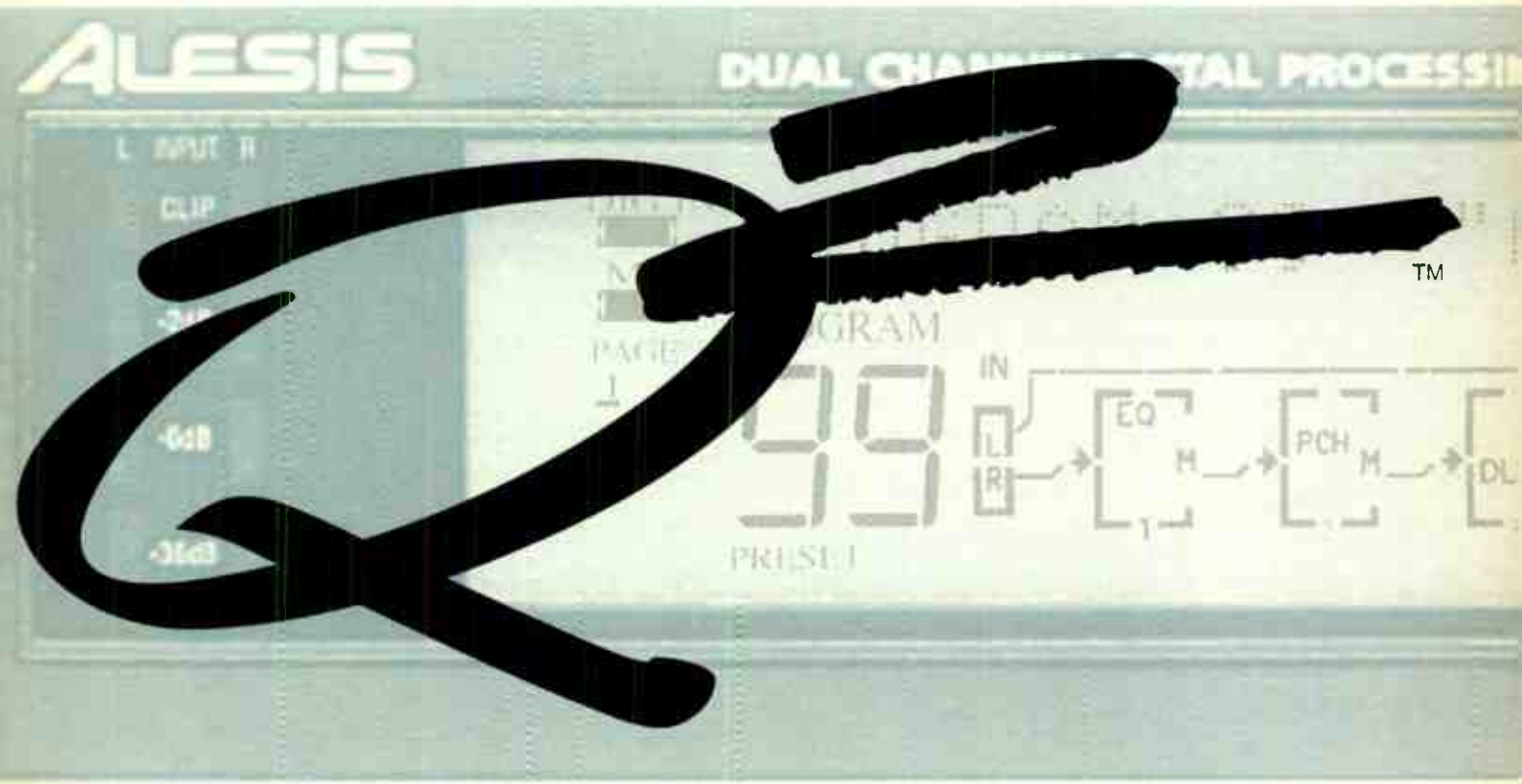
DAT'S THE WAY, UH HUH, UH HUH, I LIKE IT

Panasonic's new Pro-DAT SV-4100 incorporates functions such as instant playback, A-time cue search, and synchronization to external video sync or word clock. New features include external sync capability, software-enhanced digital interface, optical plus AES/IEC digital I/Os, accurate point number/cue assignment, programmable output level control, and enhanced system diagnostics. For more information, contact Ramsa/Panasonic, 6550 Katella Ave., Cypress, CA 90630. Tel: 714-373-7277. Circle EQ free lit. #105.

World Radio History

IN 1947,
CHUCK YEAGER BROKE THE SOUND BARRIER.

IN 1994,
ALESIS ANNIHILATES IT.



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ALESIS
STUDIO ELECTRONICS

CIRCLE 05 ON FREE INFO CARD

World Radio History

EQ PRODUCT VIEWS

GET DISKOVERED

New Sound Music is offering a unique new service to aid musicians in getting their acts and material seen and heard by a wide variety of industry professionals. Now you can have your picture, resume, samples of your lyrics and your own original songs on a computer disk. In addition to being an avenue for marketing your songs, you can actually do auditions from the disk. You can even upload your promo disk to online services such as CompuServe and America Online. Resume On a Disk For Musicians works on all IBM compatible computers with 640k of memory, DOS 3.1 or higher, and either a VGA or Super VGA monitor. The end user who will review your disk will need either a sound card such as the Sound Blaster Pro, Roland SCC1, etc., or a MIDI sound module or keyboard to play your songs. No sequencer is needed by the end user. The charge is $62.95. For complete details, contact New Sound Music, P.O. Box 37363, Oak Park, MI 48237. Tel: 810-424-8619. Circle EQ free lit. #106.

THE WRITE STUFF

TDK is offering a full range of CD-Recordable (CD-R) write-once compact discs. The company is making 74- and 63-minute CD-R discs available with blank, printable surfaces for custom labeling. There are three separate versions of these CD-R74 and CD-R63 discs: one allows you to inscribe handwritten notes using a permanent marker pen, while another features a blank printable surface suited to a special printer or a common water-based marker pen. In addition, a third variation offers users a completely blank surface (without the TDK logo) that accepts silkscreen printing with oil-based inks. The CD-R74 discs offer 650 MB of CD-ROM recording time, or 74 minutes of digital audio. The CD-R63 discs hold 550 MB of data, or 63 minutes of music. The line also includes the 21-minute, 180 MB CD-R21 disc, and the 18-minute, 150 MB CD-R18 disc. For more info, contact TDK, 12 Harbor Pk. Dr., Port Washington, NY 11050. Tel: 516-625-0100. Circle EQ free lit. #107.

IF SILENCE IS GOLDEN, THIS CO

The D&R Orion. From its Hi-Def™ EQs to its fully modular design, from its custom-welded RFI-killing steel frame to its incredibly flexible floating subgroups, the handcrafted Orion is every bit a D&R.

World Radio History

BIG NOISE

KRK Monitoring Systems' new Model 15P-3 is a passive, three-way main monitor system for control room applications. It's a single 15-inch monitor with KRK's proprietary passive crossover. Internal crossover points are set at 400 Hz and 4 kHz, enabling the system to be powered by a single amplifier. The Model 15P-3 utilizes a 15-inch polyglass woofer, 7-inch Kevlar midrange, and 1-inch Kevlar tweeter. Frequency response is 29 Hz–19 kHz (±3 dB), with a maximum power handling of 250 watts. It features a metric sensitivity of 92 dB with a maximum SPL of 115 dB. It comes in KRK's custom grey texture finish. Retail price is $6250 per pair. For complete details, contact KRK, 16462 Gothard St., Huntington Beach, CA 92647. Tel: 714-841-1600. Circle EQ free lit. #108.

FIRM STAND

Atlas/Soundolier's SB Series studio booms are designed to provide optimum microphone positioning and mic protection. These booms feature a variable, piston-type air suspension system. Model SB-36W is equipped with silent-motion, ball-bearing swivel casters made of hard rubber. Stands feature a 62-inch long, two-piece horizontal chrome assembly, die-cast gyromatic swivel, and an adjustable six-pound counterweight. Tubing includes guide clips for cables. Vertical tube assembly is 1 1/8-inch and 7/8-inch diameter cold rolled steel with an adjustable height span of 48 to 72 inches on the MB-36 and 49 to 73 inches for the SB-36W. For additional information, contact Atlas/Soundolier, 1859 Intertech Dr., Fenton, MO 63026. Tel: 800-876-7337. Circle EQ free lit. #109.

BASS-MEANT RECORDING

React Recordings is offering the *Analog Keyboard Bass Sampling CD*. It features a wide variety of samples that allow you to create infinite combinations and to assemble your own customized bass sounds. Each of the 800 sounds was recorded in three octaves and divided into multiple categories. You can grab any particular sound quickly, sample it, and move on. Among the keyboards used are famous in-demand vintage models from Oberheim, Roland, and Moog. Retail price is $99.95. For complete details, contact React Recordings, 9157 Sunset Blvd., Ste. 210, West Hollywood, CA 90069. Tel: 310-550-0233. Circle EQ free lit. #110.

...SOLE SHOULD COST 7486% MORE

Next time you audition a console, from anyone at any price, ask to hear a test for which we're well-known. It goes like this: We select 'mic' across the board, and assign every channel to the mix bus. We crank up the studio monitor amp, all the way. We push up all the channel and master faders, all the way. We turn the console's monitor level up. All the way. Next, we invite each customer to place his or her ear right next to one of the monitor's tweeters.

Gingerly, they listen, to not much at all.

Then, we bring the monitor pot down from what would be a speaker-destroying level to a merely deafening level. Before ears are plugged and music blasts forth, we invite one last, close listen, to confirm the remarkable: Even with everything assigned and cranked up, a D&R console remains effectively — and astonishingly — silent.

Of course, a D&R is much more than the quietest analog board you can buy. So we equip each handcrafted D&R with dozens of unique, high-sonic-performance features. And we back each board with our renowned factory-direct technical support.

How much is all of this worth? Well, if silence is golden, then every D&R is worth its weight in gold.

In which case, until we raise its price about 75 times, the D&R console pictured at left is one truly impressive investment opportunity.

D&R

D&R ELECTRONICA B.V.
Rijnkade 15B, 1382 GS Weesp, The Netherlands
tel (-) 31 2940-18014 • fax (-) 31 2940-16987
D&R WEST: (818) 291-5855 • D&R NASHVILLE: (615) 661-4892
D&R SOUTHWEST: (409) 756-3737 • D&R USA: (409) 588-3411

D&R handcrafts consoles for recording, live sound, theatre, post-production and broadcast, for world-class to project facilities. "Weight in gold" comparisons based upon 11/93 market prices.

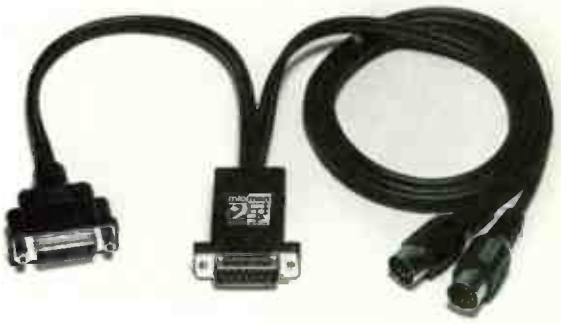
CIRCLE 24 ON FREE INFO CARD

World Radio History

EQ STUDIO WARE

CARD CARRYING CABLE

The newest family of PC sound cards incorporates a standard 15-pin joystick connector, which, when mated with the new MIDIMAN Sound Card MIDI Cable, allows these cards to send and receive MIDI. The MIDIMAN Sound Cards MIDI Cable is Sound Blaster Pro-compatible and four feet long. It has a MIDI In, a MIDI Out, and a separate joystick connector so the joystick can be used while MIDI is being sent or received. The retail price is $39.95. For further details, contact MIDIMAN, 236 W. Mountain St., Ste. 108, Pasadena, CA 91103. Tel: 818-449-8838. Circle EQ free lit. #111.



BETTER EIGHT THAN NEVER

Digidesign has released its new 882 I/O audio interface for the Session 8 PC and Macintosh product lines. The new option provides eight channels of high-quality A/D and D/A conversions at an entry price point for a complete Session 8 system of $2990 (which includes a core system and an I/O), over $1000 less for than the current 882 Studio integrated digital mixer configuration. The Session 8 system has been unbundled; you can now select a Session 8 Core System consisting of the software, manuals, cables, and audio processing card, plus a choice of interfaces dependent upon your budget and requirements. The 882 I/O is a 1U interface box that includes 8-in/8-out, 1/4-inch TRS connectors (selectable between +4 and –10), S/PDIF I/O, and Slave Clock. Converters provide 128X oversampling and 18-bit output. For complete details, contact Digidesign, 1360 Willow Rd., Menlo Park, CA 94025. Tel: 415-688-0600. Circle EQ free lit. #112.

If you think these reviews sound good,

"Alex will find its way into a lot of studio and live performance racks."
George Petersen
Electronic Musician
July, 1993

"...SOUNDS THAT KICK-ASS ON MANY HIGHER-PRICED UNITS...THERE'S NO DENYING ALEX' EXTRAORDINARY SONIC VALUE."
JOE GORE
GUITAR PLAYER
SEPTEMBER, 1993

"A $400 box that sounds good enough to use as a main reverb."
Nick Batzdorf
Home & Studio Recording
October, 1993

"We may not be able to put our fingers on the all-important difference that "makes" a Lexicon sound the way it does, but we know its something special – and Alex is definitely something special."
Ian Masterson
Home & Studio Recording (U.K.)
June, 1993

"We can recommend it for use in any recording or live performance rig for anything that needs crystal-clear processing."
Mark Vail
Keyboard
November, 1993

World Radio History

PAINT WITH AUDIO

Roland's latest entry into its Sound Canvas series of sound cards is the SCB-55. The Sound Canvas DB cards snap onto and upgrade FM-type sound boards. The SCB-55 offers 354 wave-sampled instruments with concert hall digital reverb and chorus. Also included is a collection of nine full drum sets, and an SFX set. The SCB-55 is fully compatible with General MIDI and the Roland GS format. The SCD-15 retails for $299. For further info, contact Roland, 7200 Dominion Circle, Los Angeles, CA 90040-3696. Tel: 213-685-5141. Circle EQ free lit. #113.

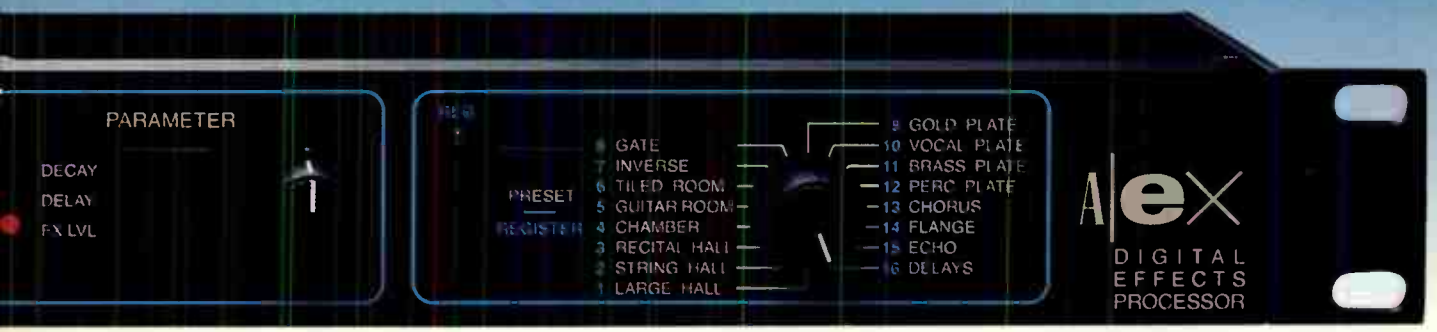
HAVE YOU HEARD...

K.S. Waves has announced that the L1-Ultramiximizer, an Apple plug-in for Digidesign's Sound Designer II and TDM systems, is now available worldwide. The L1 is a transparent brick-wall limiter, integrated with full implementation of Waves's Increased Digital Resolution (IDR) dithering technology options...**Digidesign**'s Session 8 is continuing its expansion into new territories. An ADAT interface has been introduced, as well as Macintosh support for several of its software applications, sequencer support from four manufacturers, a Version 2.0 for Windows, and support from **Mark of the Unicorn** and **Emagic**'s Logic Audio 2.0...**Roland**'s new SC-7 "Band-in-a-Box" for Windows provides onboard studio-quality digital reverb and chorus, 128 instrument sounds and sound effects, and six drum sets. A two-input stereo mixer for sound cards, CD-ROM, VCR, laserdiscs, and other audio sources is supported...**Lone Wolf**'s ML125K chip is a real-time communications controller that offers general-purpose processing and A/D conversion in addition to digital I/O. The ML125K implements the MediaLink protocol at a data transfer rate of 125 Kbps.

MAKE TRACKS

Spectral Synthesis indicates that its AudioPrisma hard-disk recording system will have begun shipping by the time of this publication. The new system features 96 time-aligned tracks, 12-channel mixing with EQ, and up to eight channels of I/O to and from the system. All of this is accomplished on a single PC-AT add-in board that retails for under $4000, including software. The Prismatica software is a Windows-compatible control interface for the Prisma system, and includes many of the features found on Spectral's higher end AudioEngine DAW. For complete details, contact Spectral Synthesis, 19501 144th Ave. NE, #1000 A, Woodinville, WA 98072. Tel: 206-487-2931. Circle EQ free lit. #114.

wait 'til you hear Alex on your music.



"The bottom line: The Lexicon Alex offers excellent sound quality, intuitive operation and superior live performance control at a bargain price. Alex is awesome."
Michael Cooper
MUSICIAN
October, 1993

"Lexicon's Alex is a certain winner. Be assured, they are not trading on their reputation in higher spheres to sell an ordinary product down-market. This is the real thing...I'll take a half a dozen please."
David Lockwood
RECORDING MUSICIAN (U.K.) June, 1993

"There can be few recording enthusiasts who won't jump at the chance of owning a genuine Lexicon reverb unit for this low price, but don't all rush at once, I'm at the front of the queue!"
Paul White
Sound On Sound (U.K.)
April, 1993

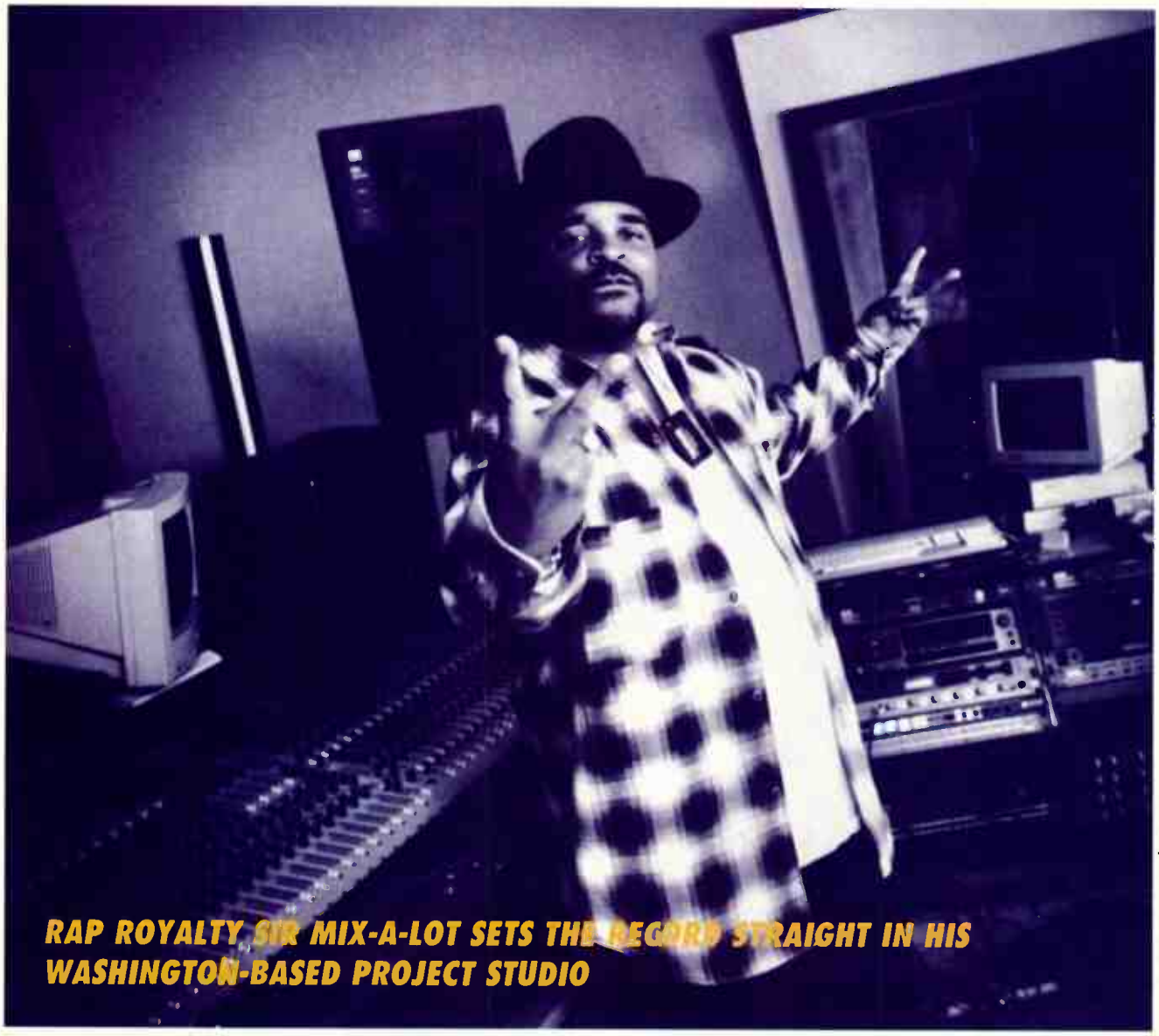
Alex. Only at your authorized Lexicon dealer.

Lexicon
HEARD IN ALL THE RIGHT PLACES
Lexicon, Inc., 100 Beaver Street, Waltham, MA 02154
H A Harman International Company
CIRCLE 92 ON FREE INFO CARD

World Radio History

To Sir With Love

STUDIO NAME: Mix-A-Lot Studios
LOCATION: Black Diamond, WA
MAIN MEN: Sir Mix-A-Lot (owner)
PROJECTS RECORDED: Sir Mix-A-Lot's *Mack Daddy* and *Chief Boot Knocka'* albums; E-Dawg's "Drop Top" and Lil' Locs" singles
CONSOLE: Peavey 2400 Series with Optifile automation system
SYNTHESIZERS: Roland JX8P; Jupiter 8; Juno 106
SAMPLERS: EMAX II [2]
MONITORS: JBL and 4408 [2]; T.O.C studio monitors; 12-inch woofers for 75 Hz and below [4]
AMPLIFIERS: Crown 1200 [5]
COMPUTERS: Macintosh Quadra 950; Atari 1040 ST
SOFTWARE: Digidesign Pro Tools and Sound Tools; Akai ADAM 12-track digital recording system; Mezzo Media storage system
RECORDERS: Panasonic CD recorder
DAT MACHINES: Sony 75ES [2]; Teac DA-P20
DRUM MACHINES: Akai MPC 60II [2]; E-mu SP-1200 [2]
OUTBOARD GEAR: Vocoder; spectrum analyzer; 2-channel noise reduction units [10]; MIDI patchbay; Aphex Aural Exciters [6]
MISCELLANEOUS: Technics 1200 turntable [2]; Mitsubishi 35-inch television
MICROPHONES: AKG 415 [2]
EQUIPMENT NOTES: Mix states: The Akai MPC 60II drum machine is the nucleus for all my music — it's where it starts.
PRODUCTION NOTES: Sir Mix-A-Lot's last album, *Mack Daddy*, was recorded on the Akai ADAM. *Chief Boot Knocka* was recorded entirely on his computer setup.
STUDIO NOTES: The studio is located in Mix's house, right next to his kitchen. EQ



RAP ROYALTY SIR MIX-A-LOT SETS THE RECORD STRAIGHT IN HIS WASHINGTON-BASED PROJECT STUDIO

Photo by Karen Moskowitz

World Radio History

2:00 a.m. The band just found the sound they've been looking for. Everyone's rockin'. Except you. **You're figuring out how to tell them the HIGH OUTPUT master you were using just "crapped out."**

Of course, you wouldn't be having this anxiety attack if you used new **BASF 900 *maxima*** High Output Mastering Tape. With 3 dB more output and 2 dB less noise than standard analogue mastering tapes, it is identical to the MOL and the signal–to–noise ratios of other high output masters. But it has the reel–to–reel reliability and consistency of BASF 911. Low rub off. Precision–manufactured. It's classic BASF. The kind of BASF tape studios have been relying on since 1934. As you turn to face the band (gulp), you make a vow. If you survive the next ten minutes, the first thing you'll do is contact BASF, 1–800–225–4350 (Fax:1–800–446–BASF); Canada 1–800–661–8273.

DEMAND IT.

BASF

CIRCLE 14 ON FREE INFO CARD

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World Radio History

Western Electric 600-A

A blast from broadcasting's far past — from the days when carbon was king

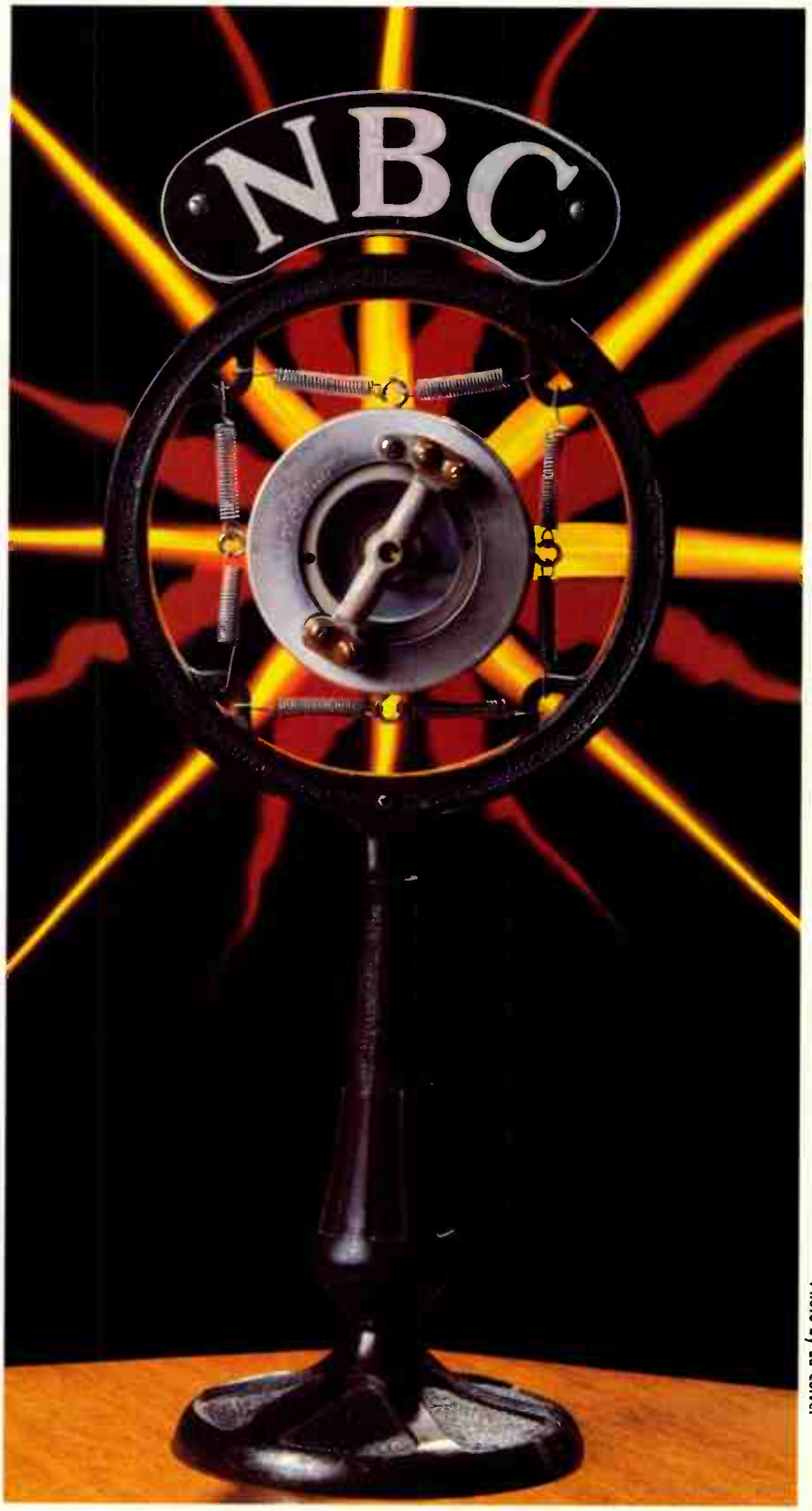

Photo by Ed Colver

MICROPHONE NAME: Western Electric 600-A
TYPE: Carbon Double Button Push Pull
POWERED: 20 to 45 milliamp supply
MANUFACTURED: 1924 to 1931
PRESENT VALUE: Collectors value; never been appraised
POLAR PATTERN: Cardioid
FROM THE COLLECTION OF: The Don Miller Collection — on display at Airborne Audio, Kansas City, KA (originally from the collection of long-time Western Electric employee Walter Turner)
FREQUENCY RESPONSE: 50 – 10,000 Hz
IMPEDANCE: 200 Ohms (The resistance of each button is approximately 100 ohms.)
DESIGNATED USES: According to the original instruction manual, the 600-A was designed for use in "public address systems, speech input equipments, or other similar equipments."
MICROPHONE NOTES: The microphone consists of two heavy metal rings that clamp a thin stretched metallic diaphragm, which actuates two carbon buttons — one mounted on each side. Each button is mounted over a gold-plated spot in the center of the diaphragm. The diaphragm forms an electrode common for both buttons. Movement of the diaphragm held between the two buttons is what created the current.

The instruction manual states: "The chief advantage of the double-button push-pull microphone over the single-button type is that the harmonics are materially reduced."
USER TIPS: When output was low, carbon mics were sometimes pounded on the table top to redistribute the carbon granules in the buttons and bring the mic back to spec. EQ

World Radio History

YOU probably started with a cheap guitar or maybe some parentally-mandated piano lessons. Picked up an entry-level amp and an effects box or two along the way. But as you got deeper into it, you realized that your music was becoming much more than a passing fancy. Maybe a career. Definitely a passion. By now, you've upgraded your instrument, your amp, your mixer and recorder, and above all, your proficiency.

Now you're ready for Eventide

We've got something special for you. It's not another lower-quality, limited bandwidth effects box hiding behind a pro audio brand name. We've done something better. We've lowered the price on our best-selling professional H3000 Eventide Ultra-Harmonizer® brand effects processor, while adding powerful dynamic effects and hundreds of brand new presets from top names such as Joe Satriani, Vernon Reid, Bob Bradshaw, Matt Henderson, Mesa Boogie, Steve Vai and more. And we've taken nothing out... the new H3000D/SX gives you exactly the same no-compromise design and effects quality that has shaped the sound of more pro artists and recording studios than any other. **You get it all:** Diatonic pitch shift, six-octave MultiShift, killer reverbs, and the incredible Mod Factory modular algorithm construction kit.

But you get it all for many hundreds less. The H3000D/SX is the first Eventide Ultra-Harmonizer processor to sell for under $2000.

If you're serious about your music, it's the one machine that can propel your creativity to the next level.

NEVER UNDERESTIMATE THE POWER OF AN EVENTIDE HARMONIZER® brand effects processor

Eventide products are available only at specially selected music stores and pro audio dealers. Call 1-800-446-7878 and we'll point you in the right direction.

Eventide
the next step

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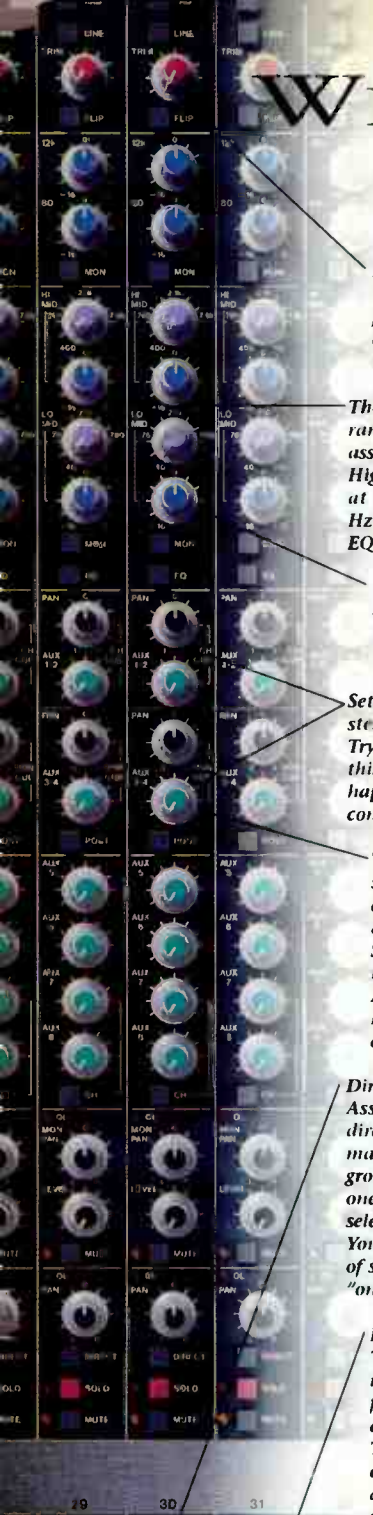
CIRCLE 31 ON FREE INFO CARD

World Radio History

WHEN IT COMES TO RECOR
WILL PUT YOU IN A CO



Balanced mic and unbalanced line inputs with phantom power and 20dB pad accommodate the widest range of input signals.

The only console in this price range with true Split EQ, each assignable to monitor or channel. High-frequency shelving control at 12 kHz, low frequency at 80 Hz for smoother, more musical EQ results.

Dual sweepable mids on each channel let you apply 16dB of boost or cut at critical frequencies.

Setting up two independent stereo cue mixes is no problem. Try this with other mixers in this price range, it just won't happen or you'll have to compromise something.

The most versatile AUX section in its class; rivaling expensive high-end consoles. 8 sends total, 2 in stereo. Send signal in stereo or mono, pre- or post-fader. Available all at once. Return signal through any of 6 stereo paths.

Direct channel input switching. Assign to one of eight busses, or direct to tape or disk, or to the master stereo bus. Because the group and direct-out jacks are one and the same, you can select either without repatching. You won't find this kind of speed or flexibility in a "one-size-fits-all" board.

Feel those 100mm faders! Turn those smooth and responsive knobs! They feel and work better than any other in its class. The M-2600's physical design takes the aggravation out of recording and lets you focus on the process of creating music. Everything is 'right where it ought to be'. Try it for yourself.

Each M-2600 channel features advanced-design mic pre-amps with incredibly low-distortion specs. Plus you get phantom power on each channel. Feed anything into the M-2600 from condenser microphones to line input from synths and sound modules.

For your personal or project studio, don't settle for anything less than a dedicated recording console. Some may try to convince you that a "multi-purpose mixer" works fine for multitrack recording. But don't take their word for it. The compromises, hassles and workarounds just aren't worth it.

Want proof? Ask your salesman how a multipurpose mixer handles these common recording situations. But listen carefully for workarounds, repatching schemes and other compromises. Then compare it to how easily the M-2600, a *true* recording console, sets up and does things.

SITUATION Separate headphone mixes for the talent and the producer. The talent wants a reverb-wet mix, but the producer wants it dry. Everyone wants it in stereo.

Compromise: Multi-purpose mixers require you to sacrifice 4 AUX sends and tape returns to get 2 stereo headphone mixes; but you need those sends/returns for outboard effects! What a dilemma.

M-2600 Solution: With a few buttons, assign up to two, independent stereo AUXs to be used as headphone mixes. Everyone hears the mix they want — and you've still got four AUX sends and returns free for signal processing gear.

SITUATION You're EQing tape tracks to get just the right sound. You're using the shelving EQ for the monitor mix, and the sweepable mids for the channel buss. Still, the drummer wants a certain frequency out of his mix — a job for the sweepable mids.

Available with 16, 24 or 32 inputs, the M-2600 is optimized for digital recording. Don't wait till your first session to discover the compromises and hassles other boards will put you through.

Compromise: Few multi-purpose mixers have EQ assignment. You're stuck with the shelving EQ on the monitor mix, and the sweepable mids on the channels *(if they even have split EQ)*. You've got no choice. Good luck trying to explain this to the drummer.

M-2600 Solution: Assign the shelving EQ, the sweepable EQ, or both to either the monitor or channel buss as necessary. The entire EQ section is splittable and assignable and can work in tandem.

SITUATION Mixdown. You're sending tracks to effects units for added studio polish. You want to take advantage of true stereo effects. How do you do it?

Compromise: Most multi-purpose mixers have fewer AUX sends than the M-2600's eight. Usually only in mono. And, some sends are linked, so you can't send them to different signal paths. So you settle for only a few effects, or forego stereo effects altogether.

M-2600 Solution: Pick one: 8 mono sends or 1 stereo and 6 mono sends or 2 stereo and 4 mono sends. Each with its own level control and separate output jack. So you can use true stereo effects and still have sends left over for effects. Send the effects signals back via 6 stereo returns.

That's not all! The M-2600 doesn't compromise sound, either. You'll appreciate the new TASCAM sound — low-noise circuitry and Absolute Sound Transparency™. It all adds up to the perfect console for any personal or project studio — combining great sound with recording-specific features you'll need when recording, overdubbing and mixing down. Features you can get your hands on for as little as $2,999 *(suggested retail price for the 16-input model).*

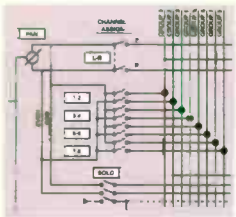
So forget compromises. Invest in a true recording console. The TASCAM M-2600.

World Radio History

DING, MOST OTHER CONSOLES MPROMISING SITUATION.

Only the M-2600 provides two independent stereo cue systems. Demanding performers can hear the submix or scratch tracks the way they want, so they'll perform better. Meanwhile, the control room or producer's mix is unaffected. You can accommodate everyone involved in the production — without interrupting the creative flow. Best of all, using the cue mixes doesn't involve tying up your valuable AUX sends.

Use more effects/signal processing gear on more tracks with the M-2600. Use two (count 'em) true stereo send/returns to support stereo effects units. Plus, you still have 4 fully-assignable AUX sends left over for other gear. A total of 8 AUX sends — more than nearly any other console — anywhere. Better yet, you can use them all at once. No compromises. At mixdown, you can actually double your inputs so you can mix in all those virtual tracks. Just press the "Flip" switch. No repatching. No need to buy expensive and space-eating expansion modules.*



The incredibly flexible design of the M-2600 means signal routing is versatile and accomplished by the touch of a button, instead of a tangle of wire. Our decades of mixer experience has resulted in an ergonomic design that's exactly what you need: a board that speeds and facilitates recording and mixdown. Everything is where you intuitively think it should be. Dedicated solo and mute indicator lights on every channel, on master AUX sends, stereo returns, and each of the 8 busses so you always know exactly what you're monitoring. Plus, SmartSwitches™ protect you against redundant or canceling operations.

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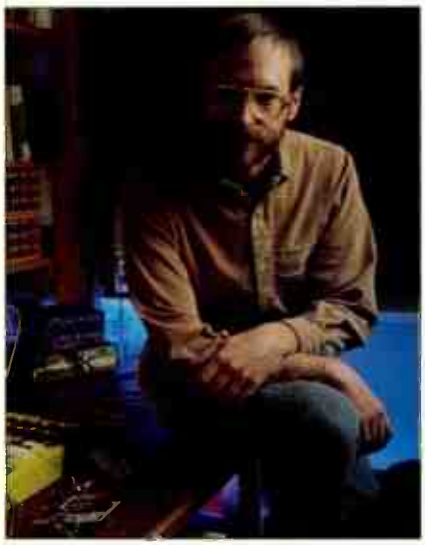
Ultimate Multimedia Protocol?



MIDI Show Control makes it easier to keep a handle on audio/video presentations

BY CRAIG ANDERTON

First MIDI took over live music performance, then the recording studio, then the theater...and now it has the potential to do the same thing with multimedia. The reason: MIDI Show Control (MSC), which does a lot more than the name might indicate.

MSC was initiated by Charlie Richmond of Richmond Sound Design, Ltd., Vancouver. Already, MSC is being used in everything from Broadway shows such as *Miss Saigon* to huge Las Vegas productions such as *Siegfried and Roy*, as well as to control productions and tours at Disney World and Universal Studios. What few people realize, though, is that MSC has all the "nuts and bolts" needed to control multimedia events — whether you define that as corporate presentations using slide projectors and sound, interactive CD-ROM productions, QuickTime movies, or traditional theatrically oriented multimedia.

MSC BASICS

Currently, most people think of multimedia as a computer-based delivery system that combines sound, graphics, text, and (at least some of the time) interactivity. As multimedia matures, however, the computer will probably drive more and more external peripherals. For example, external General MIDI modules have allowed MPC-compatible machines to offer better sound than built-in sound cards; and computer-based multimedia productions are already controlling laserdiscs (for superior video quality), CD players, and similar outboard devices. All that's needed now is a protocol that will allow this to happen in a unified, platform-independent, inexpensive, and universally applicable manner.

MSC, a very comprehensive specification that defines 55 "media elements," has the power to do all this. These media elements fall under seven general categories: sound, video, projection, lighting, pyrotechnics, machinery, and process control. Of these, the first three (and possibly four) are most applicable to multimedia applications. Within each media element, MSC can address up to 15 groups of up to 112 individual devices.

For example, within the "sound" category, MSC can control music, CD players, EPROM playback, audio tape machines, intercoms, amplifiers, audio effects devices, and equalizers. "Video" control options include video tape machines, cassette machines, disc players, switchers, effects, character generators, still stores, and monitors. "Projection" covers devices that are still a mainstay of corporate presentations—film projectors, slide projectors, video projectors, dissolvers, and shutter controls.

Since MIDI has already been well accepted by the computer community, all that's needed is for multimedia-related applications to include the MSC commands needed to control various peripherals. Part of the script for a multimedia production could, for example, trigger a laserdisc player or slide projector if you needed higher quality video than what a given computer platform can provide.

BUT WHAT ABOUT MMC?

MSC and MIDI Machine Control (MMC), though they share some similarities, are optimized to solve different problems. MMC is a "dumber" protocol in the sense that the host does most of the work; MSC is more about interdevice communication, as befits a more "real time" oriented protocol. As peripherals become increasingly intelligent, they will benefit more from being part of an MSC network rather than simply serving as slaves to MMC control. However, MMC still shines in the studio, where the norm is to use a centralized control element (such as a sequencer) to run various studio peripherals.

...AND WHAT ABOUT QUICKTIME?

In theory, QuickTime could take over some of the elements of show control, but QuickTime demands a lot of computer horsepower — there isn't a lot of "headroom" left over to handle the demands of show control. Charlie Richmond suggests that the optimum solution is for QuickTime to receive MSC commands (such as video or projection-related commands) so that its presentations could be controlled remotely via MIDI.

Granted, QuickTime could use MMC to talk to various peripherals, but remember that peripherals are getting smarter as the cost of computer power and memory decreases. It might be more efficient to have MSC communicate directly with these machines instead of having QuickTime control the machines as a subset of MSC. In any event, offloading some of QuickTime's functions via MSC is a simple way to make the whole system run more smoothly.

WHERE DO WE GO FROM HERE?

One of the most intriguing aspects of MSC is that just as MIDI democratized the playing and recording process by lowering prices while offering greater control, MSC has the potential to

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CIRCLE 74 ON FREE INFO CARD

democratize multimedia along with theatrical and show control. Adding a MIDI interface to any piece of gear is trivial. It's certainly a lot cheaper — and less confusing — than implementing custom, incompatible interfaces.

We need CD players, videotape machines, laserdiscs, and so on, that include a MIDI interface and respond to MSC commands. As usual, this is a chicken-and-egg situation; manufacturers won't build in MIDI hardware unless there's software capable of addressing it, and software developers won't include MSC "hooks" unless there's something out there to control.

Fortunately, that situation may soon change. The MIDI Manufacturers Association (MMA), the organization responsible for defining and maintaining the MSC spec, now includes such companies as Apple, IBM, Broderbund, Atari, and WordPerfect. As these large companies see the benefits of including MSC in the multimedia picture, hardware manufacturers will hopefully sense the tremendous growth potential and react accordingly.

This also provides benefits to ordinary consumers — for example, the plethora of custom remotes could be replaced by a simple, universal MIDI remote. Also, the long-awaited fruition of the home computer just might happen if the computer (with its MIDI interface) could interact with all types of consumer electronics.

BACK TO THE THEATER

Despite the exciting multimedia possibilities, it's worth noting that MSC's roots — theatrical control — have also been expanded. The MMA recently ratified an enhancement to MSC that adds "two-phase commit" (2PC) commands for fail-safe operation of potentially dangerous equipment. This requires bidirectional communications between MIDI devices, and determines what will happen if, for example, there is a communications error or power failure. It also means that the system monitors tasks to see if they have been completed, a major difference compared with traditional unidirectional MIDI commands (for example, just because a sequencer sends a note-on, it has no way of knowing if the keyboard actually played the note). 2PC commands are vital for large theatrical productions where the same events must happen in the exact same way every time.

If you're involved in music, multimedia, stage productions, the theater, or even consumer electronics, MSC is in your future. This article merely scratches the surface; for more information, write the International MIDI Association (23634 Emelita St., Woodland Hills, CA 91367; Tel: 310-639-6434, Fax: 310-215-3380) and request the MSC spec ($10 + $1.50 shipping U.S., $2.50 elsewhere; Californians add sales tax).

Craig Anderton is a consulting editor to Guitar Player *magazine, a regular contributor to* Keyboard, *and a monthly columnist for the Dutch magazine* Pro Audio. *Oh yeah, and technology editor for* EQ.

World Radio History

All Wall Warts Must Die

The DC power supply is a fact of life — like it or not

BY CALIX LEWIS RENEAU

Every musician and engineer suffers from wall warts. They're fat, ugly, and impossible to keep in place, they never fit where you want them to, they cover up two outlets while using only one, and those little DC power supplies that feed much of your equipment are always breaking. A dead wart is impossible to fix and useless as a boat anchor; maybe we ought to hold a "Ten Best Uses For a Dead Wall Wart" contest. So why do we have them in the first place? A little history music, maestro...

In the late 1800s people were discovering that electricity could be useful on a grand scale. Thomas Edison had just perfected the light bulb, and on September 4, 1882, turned on the first power grid in New York City at the Pearl Street power station. A scant four years later another industrialist, George Westinghouse, turned on his own power grid in Buffalo, New York. The difference this time was that the Westinghouse grid was designed by Nikola Tesla (before he formed the heavy metal band, Shredheads) and was an alternating current (AC) system as opposed to Edison's direct current (DC) system. Edison fought the Westinghouse standard, going so far as electrocuting small animals on stage and arranging to have the world's first electric-chair execution performed using AC current, all to show that AC was more deadly than the DC system his company, General Electric, was pushing. He lost. AC, coincidentally, ended up being the better choice for power distribution grids, as it travels over long distances much better than DC and is easier to step up or down in voltage.

The difference is a simple one. In alternating current, the voltage fluctuates from a positive value to a negative one, and then back again. Electricity from our wall outlets (in a standard set by Tesla) completes an entire fluctuation, or cycle, 60 times per second over a 117-volt range. In direct current, by contrast, the voltage stays constant.

So what does this have to do with the proliferation of wall warts? Well, even though AC is easy to generate, transmits well over a long distance, and can change voltages with the aid of a simple transformer, its applications are limited to mostly running light bulbs, electric motors, and heater coils. Almost everything else in your life that uses electricity, from your

WART MAKER: Wall warts are here to stay. Make the most of 'em

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Most warts output 9 volts, or at least that's what it says on the face. In reality, a wart rated at 9 volts can easily give you from 7 to 15 volts. This is partly because all warts do is drop the wall voltage by a fixed percentage (wall voltage tends to fluctuate), but more because warts are mass produced to a rather wide tolerance. That's okay, because most equipment looking for DC from a wart isn't too particular about a small overvoltage. You should note that you can also find warts in almost any low-voltage DC range, so make sure that the wart you're buying off of the sale table in the back of the store isn't marked 4 or 6 volts, most gear doesn't like undervoltages.

And of course the plugs that go into your gear are far from standard. There are many different sizes and shapes, from barrel plugs to miniature jacks. When I bought my camcorder a few years back, I gagged at the thought of spending $50 on a standard car battery adaptor, so I went to the supply house only to discover that the only DC adaptor plug that would fit my camera came attached to that $50 adaptor.

Another problem is that the tip and sleeve configuration isn't even standardized. On one wart the tip could be "–" and the sleeve "+," while on another, identical-looking wart the polarity will be reversed. Most gear will have a little diagram to let you know if it wants the ground on the tip or sleeve. The diagram is usually located beside the DC power input, but an amazing amount of gear leaves off this little tidbit of information. If you've got a piece of gear that doesn't tell, write the manufacturer. If you don't have six months to spare waiting for a response, you can try both kinds of wart and see which one lights up the power LED. Most likely you won't damage your gear.

And of course the things never seem to last. Getting ready for a recent gig I decided to take along an extra wart. It took going through ten to find three good ones in my tangled pile of spare warts. (Maybe that's why they're in a pile, eh?) Warts die for a number of reasons. Most often the cord carrying the DC to your gear will separate, the wire breaking inside the insulation. As with a faulty mic or line cable, you can cut off the cord at the break and splice it, but a wall wart power cord usually breaks right where it enters the transformer (the wart part). One reason you'll rarely see a "No User Serviceable Parts Inside" sticker is because a wart is almost impossible to open. If you do manage to crack the shell, all you'll find is the step-down transformer (the large wire-wound section), a collection of diodes (the bridge rectifier), and the filter capacitor. When a wart dies on the inside it's usually the diodes that go, and they're not really worth replacing; it involves more trouble and expense than shelling out ten bucks for a new one. Consider a wart the electronic equivalent of a hamster.

There's really not much you can do to eliminate the wall wart. There are versions available that use a long AC cord instead of blades that plug the transformer section right against the wall. This helps to eliminate the

continued on page 116

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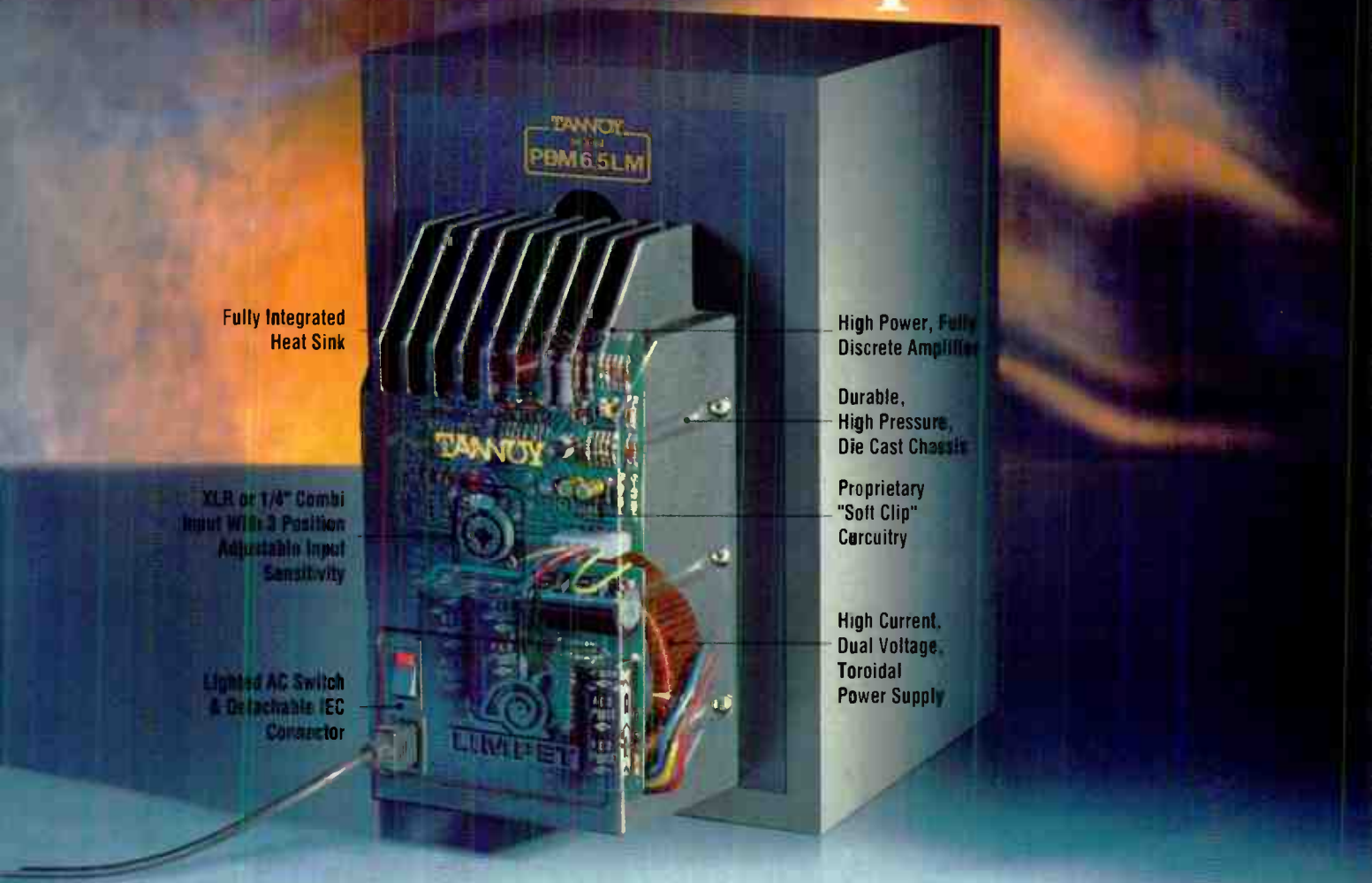

■ Every once in a while a product comes along which not only meets the ever increasing demands of the market, but one whose smooth commercial styling, ergonomics, durability and outstanding performance demands respect. Introducing MR. LIMPET. ■ The LIMPET is a unique, compact design that combines a very high current toroidal power supply, fully discrete amplification stages, and ultra wide (10 Hz to 80 kHz) bandwidth capabilities in a very affordable system. ■ Built using a one piece high pressure die-cast metal housing, the LIMPET is not only very rugged electrically and mechanically, its internal construction takes advantage of the industry's most advanced assembly techniques. ■ The LIMPET amplification system can be used with a wide range of TANNOY professional reference monitor systems, and provides the user with a number of improvements in both the performance of the loudspeaker system, and its flexibility. ■ Each single channel LIMPET system delivers an enhanced stereo image because the channels are fully separated - no power supply sagging due to inter-channel coupling, no crosstalk, no interference. Almost any kind of input level and connector can be used, since the LIMPET offers a balanced or unbalanced "combi" connector that can utilize either 1/4" or 3 pin jacks. ■ The ultra-low noise input section can accommodate either 0.775, 1.0, or 1.5 volt drive levels with no performance sacrifice. ■ The LIMPET's universal power supply, equipped with an industry standard IEC connector easily deals with almost any voltage, making the LIMPET a true global traveler. Finally, you can take your monitors wherever your work takes you, and not have to worry about cumbersome and troublesome adaptors, power converters, or strange electrical systems. ■ In addition, the unique and proprietary soft-clip circuitry and the significant reserves in the power supply ensure that no damage will occur to the drive units while providing the headroom needed for even the most demanding requirements. ■ The LIMPET is ideal for professional recording, broadcast/post production facilities, remote and live recording reinforcement applications, and finally gives the private/home recording studio truly reference quality performance unequaled at twice the price. ■ Instead of settling for the ordinary, get a LIMPET and get a real grip on your reference monitor performance.

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OUR 8•BUS REALLY

We get a lot of calls from folks asking about who's using Mackie 8•Bus Recording/PA consoles.

Good question. After all, a board's only as good as its users.

So we grabbed the latest stack of 8•Bus Warranty Registration cards and hit the phones.

The names in this ad represent a cross section of current 8•Bus users. They range from platinum supergroups tracking new albums to high school choirs, from bar bands to sound designers working on network TV series and feature films. There'd probably be more names but we didn't want to make the type any smaller than it already is — or keep tying up our already clogged phone system.

As our production of 8•Bus boards increases, so does this list.

In a way, it's confirmation of the raves that magazine reviewers have heaped upon the console. Above all, it's proof that the Mackie 8•Bus is a serious tool for professionals. A tool that's getting used day-in and day-out for major projects.

Call our toll-free literature line 8AM-5PM PST and talk to a genuine Mackoid (no voice mail!). We'll send our obsessively-detailed 24-page color brochure on the 8•Bus Series.

Then become a part of this list by visiting your nearest 8•Bus dealer.

Currently in Spain tracking new album on multiple Mackie 24•8 consoles.
Def Leppard

Sound design & mixing of commercials for G.I. Joe, Kenner Toys, Hasbro Toys, Transformers ½-hour show, infomercials.
Lawrence Wakin • Tapestry Productions Inc. • New York, NY

Tracking for Madonna.
Shep Pettibone • Mastermix Productions Ltd. • New York, NY

Recorded Grammy-Nominated "Sunday Morning" off of the album Millenium on 24•8, currently working on new album exclusively on console. "The 24•8 survived the 7.1 San Fernando Valley earthquake. It's definitely built for rock 'n' roll."
Sheldon Reynolds • Earth Wind & Fire • Los Angeles, CA

Music scoring for Pepsi Cola and McDonalds and Six Flags TV & radio commercials.
The Listening Chair • Dallas, TX

Recording and mixing of acoustic music & sounds from the American West. Recent albums include "Charlie Russell's Old Montana Yarns" by Raphael Cristy and "Where the Red-Winged Blackbirds Sing" by Jim Schulz.
Bruce Anfinson • Last Chance Recordings • Helena, MT

Pizza Hut commercial scored to film, scoring of theme presentation for The BaseBall Network, self-produced album "Rick DePofi and the Mels," currently producing NY Noise's 1st solo artist, Aaron Heick (Chaka Kahn's alto player).
Rick DePofi & Craig Bishop
New York Noise • New York, NY

[1] Former posts include quality assurance with Warner Brothers, Sheffield Labs, Rainbow Records, Chief Mastering Engineer at JVC. Quote: "It's a great board, dude. Buy it!"

Concert sound reinforcement at the Showcase Theater.
Bob O'Neill, Manager of Entertainment • Six Flags Great Adventure Theme Park • Jackson NJ

Used by students for learning recording and sound design.
The School of The Art Institute of Chicago, Sound Department
Chicago, IL

Jazz choir sound reinforcement and recording.
Dwayne Pedigo • Plano East Senior High School • Plano, TX

Sound effects, music and voice for Atari arcade games.
Brad Fuller • Atari Games Corporation • Milpitas, CA

Tracking for R&B and rap groups including vocals for Polydor artist T. Max.
Brad Young & Dow Brain
Underground Productions
Boston, MA

Dialog editing for Untouchables, TV series and Movies of the Week. "I work out of my home now. It's quite an achievement to be able to get a higher sound quality than most of the other sound houses in town."
3-time Emmy winner David Scharf
Helix Sound • Los Angeles, CA

Wide range of multimedia projects including major motion pictures (the names of which can't be divulged).
John Acoca[1] • Oracular Multimedia
San Francisco, CA

Albums for alternative groups Twenty-Two Brides and The Cucumbers, demo for Freedomland.
John Williams • Ground Zero Studios • New York, NY

"Praise Songs" contemporary Christian album/CD, "Body Builders" children's album/CD.
Peter Episcopo • Bridge Song Media • Old Bridge NJ

Sound design for Pepsi Cola TV spot aired during last January mondo-bowl.
Hans ten Broeke[2] • Buzz, Inc.
New York, NY

Sound reinforcement for theater presentations and concerts in a 300-seat theater.
Centre Culturel Franco - Manitobain • Winnipeg, MB, Canada

[2] Quote: "It's the only analog component in my room. You hardly know it's there, it's so transparent."

World Radio History

CONSOLES WORK.

In studios...in clubs...in video and film production facilities... on the road: A sample of what satisfied 32•8, 24•8 and 16•8 owners are doing with their consoles (as of late April, 1994).

Frank Serafine, feature movie sound designer/SFX wizard in the Foley Room at his Venice, CA production complex.

Scoring for two Fox Televison NFL promos, theme & scoring for PBS children's series Storytime, song demos & album tracking, TV commercials, infomercials & demos.
John E. Nordstrom II
Love Den Productions
Pacific Palisades, CA

Album/CD tracking and mixing for the groups Mean Solar Day and Product.
Ramsey Gouda • Onion Head
Studio of Chicago • Chicago, IL

Worship service and in-house concert sound reinforcement, recording of sermons.
New Life Assembly of God
Lancaster, PA

MB•E Meter Bridge $695[4]

The Sidecar $395[4]

Sound reinforcement in a live blues club showcasing live, regional & national acts such as Savoy Brown, Jr. Wells, etc.
Manny's Car Wash
New York, NY

Skittles TV commercial, demo for new artist Nita Whitaker, original music for Terpsicorps modern dance company.
Lincoln Adler
Are We Famous Yet? Productions
Los Angeles, CA

Rental for film mixing projects and home studios. "We love them because we never see them. They're great for our business."
Chris Dunn • Dreamhire
New York, NY

DNA sampling CD with mega-drummer Bernard Purdie (3000+ album credits)!
Frank Heller[3] • Weasel Boy Recording • Brooklyn, NY

[3] *Quote: "This job had extremely unusual and demanding monitoring & effects require-ments. Honestly couldn't have done it without the 32•8."*

[4] *Suggested retail price. Slightly higher in Canada.*

OTHER PROFESSIONALS WHO OWN AND USE MACKIE DESIGNS 8•BUS CONSOLES*

Dave Abbruzzese, *drummer for Pearl Jam*
Slash, *guitarist/songwriter, Guns 'N Roses*
Steve Brown, *guitarist/producer for Trixter*
Natalie Cole, *solo artist*
Greg Droman, *Grammy-nominated engineer for Linsey Buckingham*
Gregg Field, *drummer for Frank Sinatra*
Michael Frondelli, *Engineer-Producer (Eric Johnson, Crowded House, etc.), Creative Director for Capitol Records*
Bill Gould, *bassist for Faith No More*
Bashiri Johnson, *percussionist for Whitney Houston, Madonna*
Mick Jones, *producer for Van Halen, guitarist for Foreigner*
Art Neville, *producer, The Meters, keyboardist, Neville Bros.*
David Frangioni, *MIDI specialist/Engineer Aerosmith, Elton John, and Extreme*
Danny Kortchmar, *producer for James Taylor, Billy Joel, Rod Stewart*
Bruce Kulick, *guitarist for Kiss*
Kyle Lenning, *President Asylum Records, Nashville*
Clair Marlo, *Artist, Producer*
Queensryche
Dave "Snake" Sabo, *guitarist for Skid Row*
Ben Sidran, *producer*
Leo Sidran, *songwriter for Steve Miller*
Steven Tyler, *singer for Aerosmith*

**Mention in this list is intended to indicate ownership only and does not in any way denote official endorsement.*

Rroducer Ricky Peterson's Pre/Post Production Room with Mackie Designs 24•8 at Paisley Park.

R&B radio remix of Boz Scaggs' "I'll Be The One" for Virgin Records, recording solo album for the Japanese Go Jazz label.
Ricky Peterson, producer, Paisley Park
Minneapolis, MN

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World Radio History

Fun With Subwoofers

Bring out the best in your bottom end

BY EDDIE CILETTI

At an intense mix session, the client asks to hear more bottom. You explain that there's enough, but your ear is twisted until you grudgingly give in. The next day the same client calls complaining that the track is too "muddy," "boomy," or even "heavy." If it's any conciliation, you're not alone. It's happened to me, too, so I have two recommendations: 1) Don't ever give in. 2) Get a subwoofer!

Most common nearfield monitors utilize 6-inch woofers, which simply cannot move the volume of air that frequencies below 100 Hz demand. (This is especially true if the music you are mixing will ultimately be played in a dance club.) You and your clients need to hear more bottom, not necessarily add it to the mix. A subwoofer could be the most effective way to solve this problem. Let's see what a subwoofer is about, what it can do to improve low-frequency response and, for the curious and budget-conscious, how easy it is to do it yourself.

WHAT IS A SUBWOOFER?

A subwoofer is a standard low-frequency driver. It is mounted in a cabinet designed to the reproduce the lowest possible frequencies. The high-frequency response will rarely exceed 100 Hz, and that is determined by a filter. (More on that, later.) You need a subwoofer to hear that last octave of important information. (Of course you could just get another pair of speakers, preferably something with an eight-inch woofer, like the EV Sentry 100's or the Tannoy NFM-8's. The objective is to hear as much of the music as possible within the limited confines of the average project room.) If price were no object, you might consider purchasing the dual-15-inch combination pant flapper/hair dryer monitors advertised in *Blend* magazine. But that would just rattle your sheet rock and yer wallet a wee bit.

Photo courtesy of Rane

HOW TO CHOOSE A SUBWOOFER

There are a few options available to those interested in a subwoofer system. A Hi-Fi salon is one place to look. There you can listen to a subwoofer that comes with its own black box full of electronic secrets. I highly recommend this if you are not technically inclined. You may even want to bring your own nearfield monitors to see which system complements them best. If this approach works, you won't have to get used to anything but the extra low end.

There are two basic types of subwoofer systems: powered (active) and nonpowered (passive). An integrated, powered system includes an active electronic crossover, a power amplifier, and a woofer. This is the most versatile and effective, albeit expensive, approach. The electronic crossover extracts the real low-frequency information, sends that to the subwoofer, and passes the rest on to the satellite or nearfield monitors. This type of system should provide adjustments for crossover frequency, output level, and phase. Adjust until the subwoofer and the nearfields support each other.

Here's how a passive subwoofer is both possible and affordable. (It can also be connected to the February issue's passive surround system.) The crucial element in selecting a subwoofer is efficiency. In the MCM catalog, for example, check the sensitivity

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World Radio History

IMPROVING CLARITY

The design and size of a speaker system will greatly affect its sound; especially considering the variety of placement options. That is why, no matter what the specs say, listening is the most important measurement method and experimenting with placement the most important approach to achieving optimum response.

Unfortunately, many control rooms are centered around console placement. Typically, this results in the console being misoriented by 90 degrees with a subsequent lack of space to develop real bass. (See fig. 1) Speaker positioning can greatly affect your opinion of a loudspeaker. In fig. 1, the speakers are placed against a wall and as far into the corners as possible in order to achieve maximum low-frequency response. If the room was rectangular, the speakers should be spread across the narrow wall. The depth of the room allows bass to develop. If the rear wall is too close, it will reflect low frequency information back to the front where it will cancel. While great strides have been made in all aspects of speaker, enclosure, and room design, it is still possible to build a room that does not sound good. Aside from blatant oversights and mistakes, the equipment, furniture, temperature, and humidity all combine to increase the complexity of this subject. —*EC*

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spec. It is the amount of sound pressure level (SPL) developed by the speaker when the voice coil dissipates one watt. An SPL of 93 dB is average; 96 to 98 is great. Another spec is free air resonance (FAR), which represents, in Hz, the resonant frequency. For air-suspended (sealed) cabinets, FAR should average around 30 Hz. (It will go up when placed in a cabinet.) For ported cabinets, the resonant frequency could be twice this amount. Excessive level loss due to inefficiency is not recoverable without active components.

LET'S RECYCLE!

You don't have to go out and buy a subwoofer cabinet if a suitable one is sitting in the corner with candle wax dripped all over it. Hey, if it's got a 12-inch woofer and the rest of the drivers are blown, you are almost home! Or, maybe you're handy with wood and a chainsaw...

A quick way to choose the size of your subwoofer is to simply double the diameter of the woofer in your current nearfield monitor. The woofers used in most popular nearfield monitors are typically about 6 inches in diameter, so a 12-inch woofer would be the minimum subwoofer diameter. If your hormones are out of control, try a 15-inch beastie.

Every year, Radio Shack puts its Minimus 7 speakers on sale. These have 4-inch woofers. I bought four to make a surround system, and I just happened to have a very lonely 8-inch woofer hanging around the shop. I built an oversized, sealed cabinet (12 x 12 x 24 inches) out of half-inch plywood. I arbitrarily chose this size, figuring it had to be big enough to not restrict cone movement. I sealed the cracks with wood glue, stuffed the cabinet with foam, mounted a connector, wired and mounted the speaker, and then proceeded to find the parts needed to create a filter network.

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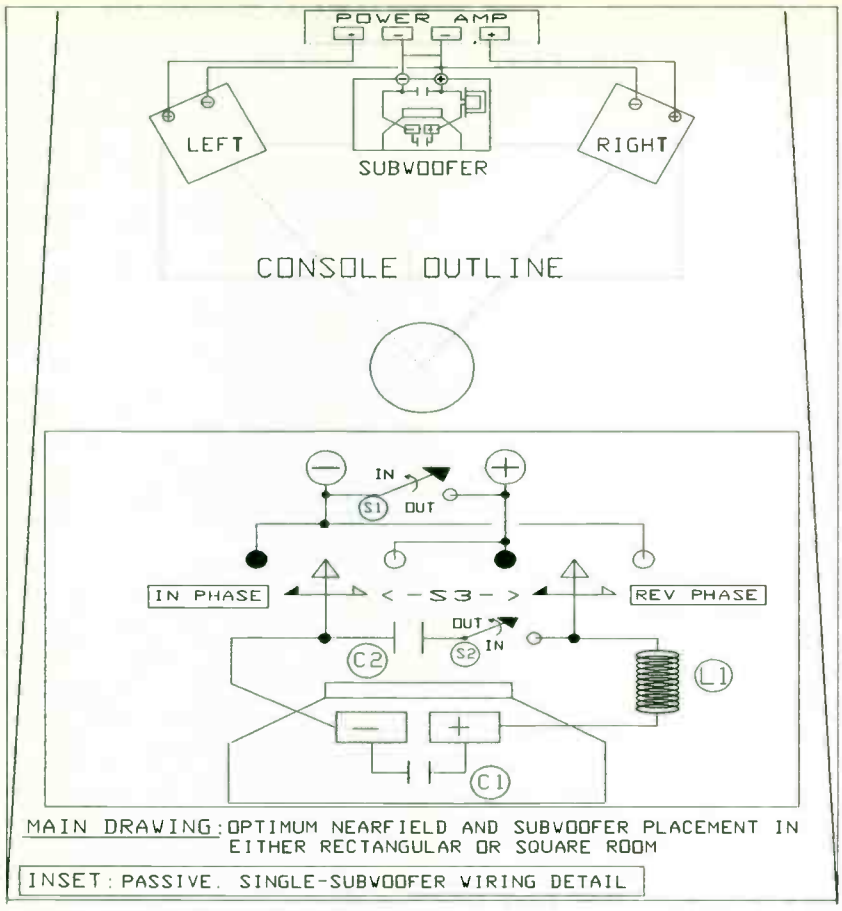

Figure 1

Yeah, I know you are supposed to calculate these things, but did you ever notice how many different sizes of cabinets there are? A little experimentation will give you an organic feel for this testy subject. If you prefer a more exacting approach, get a cabinet design book and a scientific calculator or a computer-aided design (CAD) program for your computer.

Don't forget another variable: speaker impedance. If your nearfields are 6 to 8 ohms, choose a woofer with the same impedance. Choosing a 4-ohm woofer in this case would not produce enough level.

HOOKING IT UP

Figure 1 shows the wiring of a passive subwoofer system. The component values were derived from experiments on my prototype. (Absolutely no cipherin'!) Higher values of capacitance and/or inductance will lower the crossover frequency. There is only one cabinet because, as we know, low frequencies are omnidirectional. This is in direct contrast to high frequen-

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cies, which are highly directional.

The first step is to sum the stereo signal to mono. This can be done passively, that is, without op-amps, transistors or tubes. (These items are known as active electronic components because they are capable of amplification.) The passive components used in this project, inductors (coils) and capacitors, will be used to construct the filter.

To create mono from stereo, one simply adds left plus right. In the passive system shown in fig. 1, the nearfield monitors will act as summing resistors. Check it out. Connect the amplifier plus (+) to the nearfield plus. Nearfield minus (–), however, does not go to amplifier minus. Instead, the minus wires are joined together. (At this junction, left meets right. If you listened to the system now, you'd be subtracting left from right.)

At the junction of the two minus wires is the input to the crossover network. As the signal passes through the inductor (L1), high-frequency information (above about 100 Hz) is reduced 6 dB per octave. This is called

continued on page 123

PARTS LIST

Capacitors/Inductors

Component	Designation	Value, Voltage	MCM Part #	Price
Capacitor	C1-MCM	100 mF, 100 V	31-2065	$2.65
Capacitor	C1-a (M-7); parallel*	200 mF, 100 V; 22 mF, 100V	31-2070	$3.40; $1.05
Capacitor	C1-a (NS-10) parallel two 200 parallel *	470 mF, 100 V; ; 200 mF caps, plus... 47 mF, 100 V	31-0690	$1.70
Capacitor	C2-a (NS-10); parallel*	1000 mF, 100 V; five 200 mF caps		$16.25
Inductor	L1-a (NS/M)	2 milli-Henry (mH)	50-730	$6
Inductor	L1-MCM	18 milli-Henry (mH)	50-740	$19

Speakers

Component	Diameter	Impedance (efficiency)	MCM Part #	Price
Speaker	8-inch subwoofer	8 ohm (94 dB)	55-495	$27.40
Speaker	12-in subwoofer	8 ohm (good-94 dB)	55-900	$22.50
Speaker	12-in subwoofer	8 ohm (better-96 dB)	55-900	$48.55
Speaker	15-in subwoofer	8 ohm (96 dB)	55-540	$52.55

Miscellaneous

Component	For Satellite Model	Description	MCM Part #	Price
Cabinet	Minimus-7	2 cubic feet (1' x 1' x 2')		
Cabinet	NS-10	8 cubic feet (1' x 2' x 4')		
Cabinet	for 12 inch	2.7 cubic ft (1.4' x 1.4' x 1.4')	80-430	$87.95
Switch	S1, S2	Single Pole, Single Throw (SPST)	26-020	$0.66
Switch	S3	Double Pole, Double Throw (DPDT)	26-030	$1.00
Barrier Strip	B1	8 Terminals	28-715	$1.45
Fork terminals for above		#6, 14 -16 AWG	28-203	$4.10

Note: Capacitors in micro-Farads (mF), Inductors in milli-Henries (mH). Parts specific to NS-10 and Minimus-7 followed by parenthesis (NS-10) or (M-7); the values I used. When researching the parts list, I found MCM's new crossover component chart. Those parts followed by parenthesis are (MCM) recommended values. * indicates parts that must be paralleled to achieve desired value. (Capacitor values add in parallel.) Feel free to experiment!

CIRCLE 16 ON FREE INFO CARD

World Radio History

Demo Queen for a Day

The daily dilemmas of a doting demo-grapher

BY C. REEDER

The lights are flashing at me like mute robots with encoded microchips seemingly programmed to send off inaudible frequencies designed to confuse my already convoluted brain. These mechanical wonders are my assistants, so to speak. The units I depend on to help me achieve my goals. My goal at the moment is to get past all the junk these machines are throwing at me and get the little musical ideas floating around in my head on a piece of analog tape, so I can then blast it on my car stereo.

After all, I am "Queen of the Daily Demo." Yes, music's the game and Demo Queen's the name. My credo is *Perscribere rapide, tum Flatus,* which roughly translates to "Record fast, then blast!" and I proudly wear my crest of rackmounts with royal aplomb.

Figuring out why machines and sometimes musicians are thwarting my noble intent to demo a tune a day is what I have chosen to do with my short time here on earth — that is, around all the other stuff, such as running a household, taxiing my kids here and there, singing on sessions, sketching out song ideas or music beds, and squeezing in a few Z's whenever possible.

We interrupt this program...the lights will have to wait.

Loud noises are being emitted from the room above me. One particular scream sounds like my youngest kid. I've heard these vocal chords for 8 years and know every little shade of squeal. This squawk is not in the "needing immediate adult intervention" category. It doesn't have the sharp ring of pain. This is more like: "I've just teased my older sister about something and she's wreaking revenge; so I need Mom — who's only playing around with all that junk downstairs, to get her off my back, so here I go: AHHHHHHHH!"

I generally wait for the painful wail, because it doesn't always get to that point; and if I ran in for every little whimper, I'd accomplish nothing. The words of wisdom that I so carefully try to choose only stun my kids, they don't stop them. I think they should love each other all the time and just shut up. These days I'd settle for no

Photo by Amy Hill

KILLER QUEEN: Life's not easy for o engineer/mother/demo queen.

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permanent facial scars. If I accomplish that, time will take care of the rest, and they'll probably be best buddies in their 30s or at least by their 60s.

All this tunnels through my mind in less than 3 minutes, but now I've lost my train of thought about those damned flashing lights.

I go through several scenarios. The MIDI box that the music-editing program in my computer should trigger is not flashing the appropriate red LEDs.

Oh well, silly me. I must have left the MIDI button out after receiving a modem transmission. So I push the button in and, bingo, there are lights; but as I expectantly push the keys on the controlling keyboard, a scary silence fills the room. Not good.

I move my line of vision a little to the right and notice no level on the tape machine. Aha! Well, it was late when I finished that vocal last night and sometimes in the heat of background vocal passion I start patching rather quickly and without a lot of forethought. I try to keep good notes, sorta.

I play around with the patches and *voilà* — there's level on the tape machine; but there's still no sound. My grasp on reality is taking a serious turn down the wrong road. I am not unlike a rat trapped in a maze at this moment, and am fast losing the musical idea I was trying to grab. Oh I know, a great idea is hard to forget, but you may miss that one little magical nuance in phrasing or some inner moving line that demanded your undivided attention.

Actually this has a happy ending, because all I did after that was push the right buttons on the mixing board and Lights! Action! Music! The days I hate are when more complicated things happen, such as horrible ground loops. Crawling behind my machines and testing 60 patches just to find out that the 61st cord has a bad male connection is not how I like to start my day.

It's not always easy being the Daily Demo Queen. Hey, a demo a day keeps the blues away, and sometimes little pieces of paper that translate into hard currency arrive in my mailbox as a result of one of my little gems.

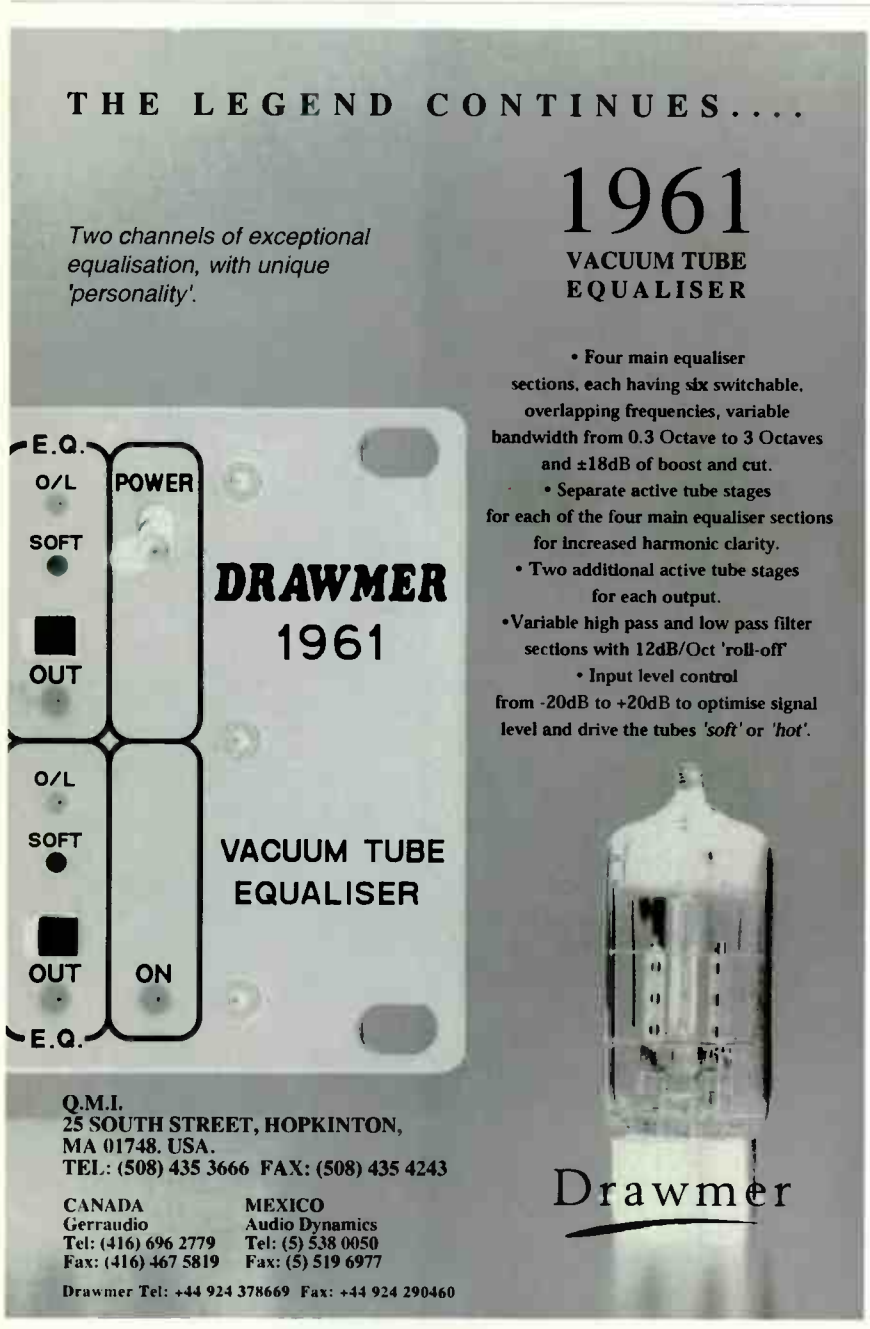
Sometimes they fail to arrive in a timely fashion, throwing me into a deep panic. I have such dark thoughts as: "If I were a lawyer my, substantial check would have been here every other Friday, but no, you (talking to myself that is) chose to be an artist, so now you'll take 90-day billing and love it." I just wish the guys I owed money to were as patient as my titled self.

Still, it's a crown I wear with pride. But I sometimes notice that my natives, whom I affectionately call song pluggers, are restless and not adoring their monarch as much as I think they should.

Sometimes they ignore my new daily demo, just as I'm about to ask myself: "How can these misguided souls sleep at night after turning a deaf ear to the demo of the song that undoubtedly, in my mind, is a smash Number One crossover hit?"

Lord, we must forgive them for what they think they know. As your faithful servant and humble keeper of the Holy Daily Demo Grail, I, Queen of the Daily Demo, wish no one ill.

Besides, who's got the time to bitch? I've gotta find a sitter by tonight, so I can truck on over to Mr. X Publisher tomorrow with my new batch of musical delights. Hey Ho... EQ



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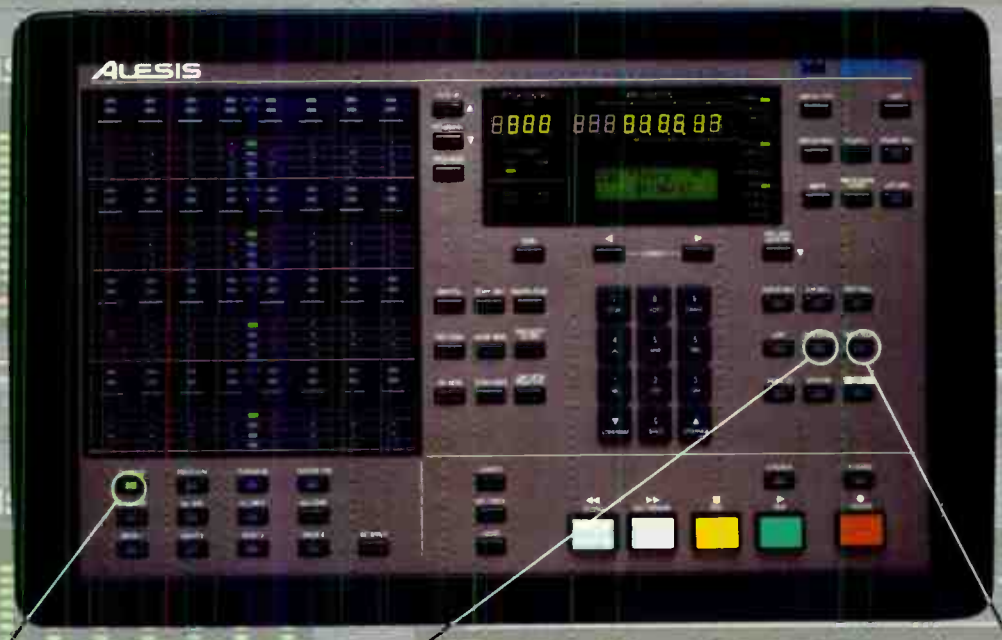

Select source with trk buttons

Offset Tape 02 from L04 to L03

L04 'Chorus 1' + 16-01/00

L08 'Chorus 2' + 48-01/00

Track delay: 170.0 ms

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To be continued...

ALESIS STUDIO TECHNOLOGY

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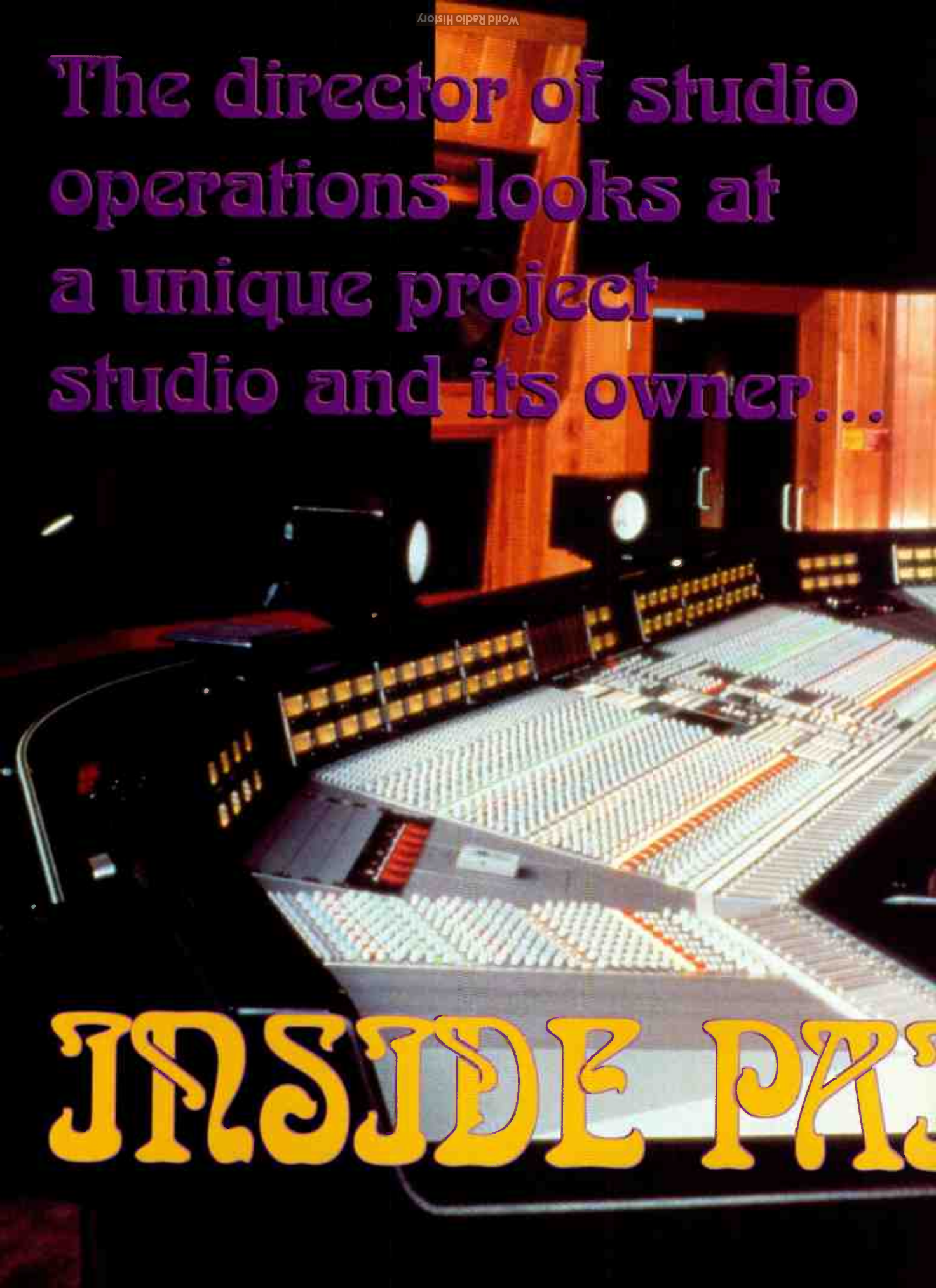
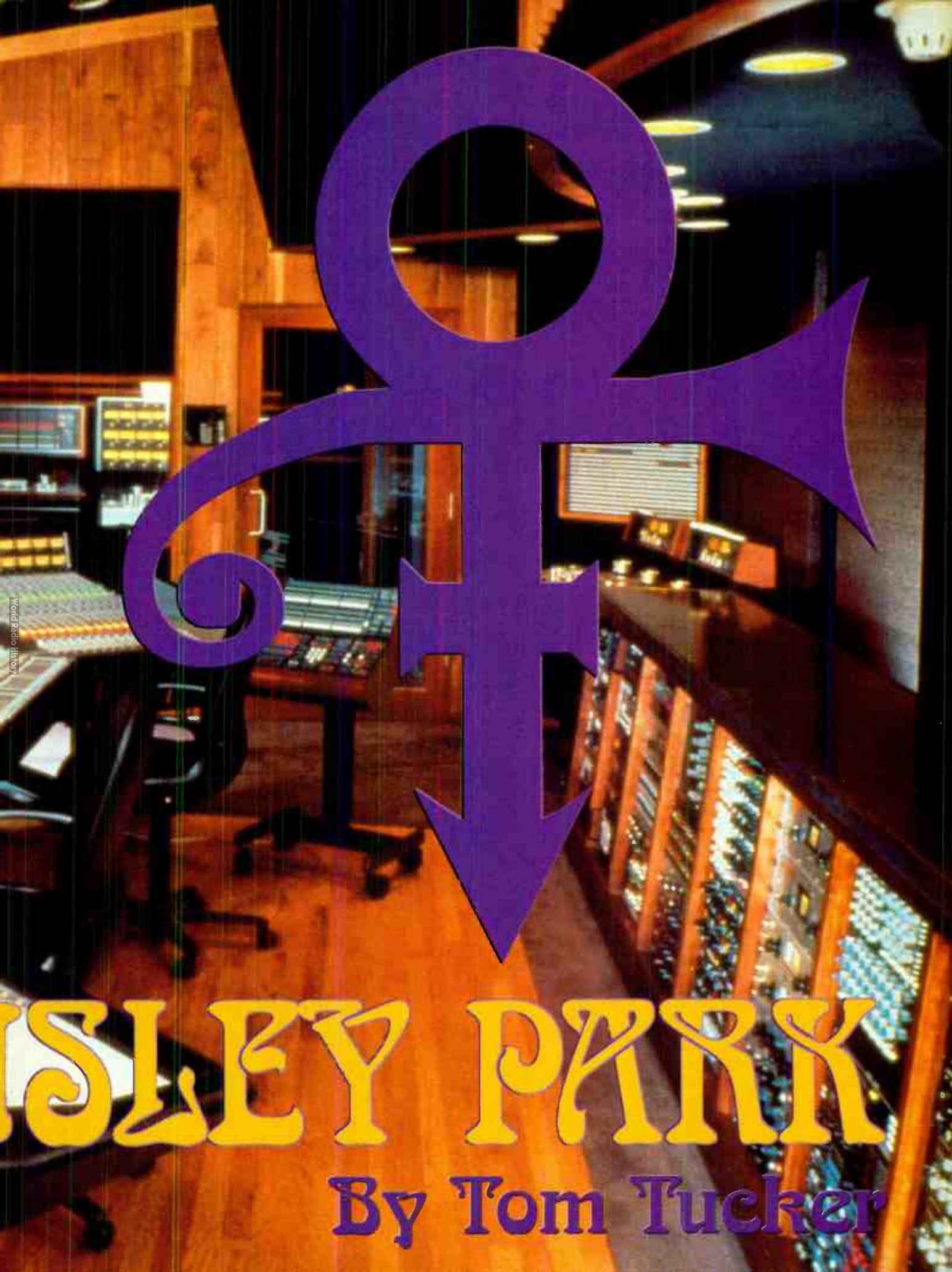
The director of studio operations looks at a unique project studio and its owner...



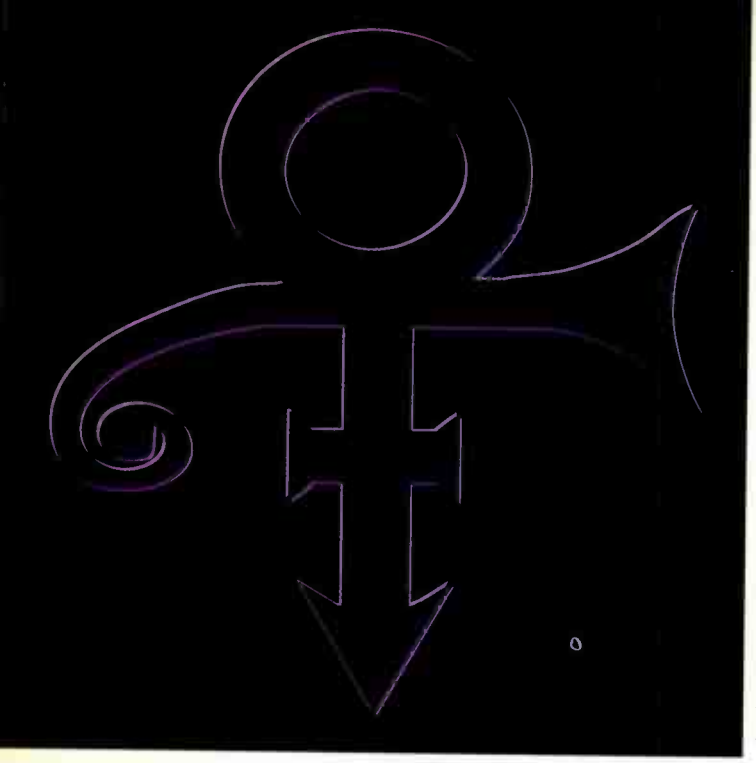
INSIDE PA



SLEY PARK

By Tom Tucker

World Radio History



is a very demanding artist to work for. He likes things to be done immediately, and expects high levels of competency. That's why every person, from the recording engineers to the receptionists, helps generate a family-oriented vibe that adds to the magic. And with 70 employees at Paisley Park, "The Boss" has a very large family.

☥ is the sole founder and owner of Paisley Park, but his presence in the facility is extremely subtle. While there are some of his photos and platinum records hanging on the wall, most of the studio is covered with the records and photos of other artists who have been here to either record, rehearse, or make a film.

Paisley Park is that unique hybrid of commercial and project studio. It has always been open to the public; that was ☥'s choosing. Over the years, Sting, REM, Tevin Campbell, George Clinton, the Bee Gees, Paula Abdul and countless other recording artists have come here to work on projects. They enjoy the atmosphere because the facility is so large (65,000 square feet) and has a well-lit atmosphere, thanks to an atrium that acts as a skylight.

As director of studio operations, I'm in charge of running the recording studios at Paisley Park. We can house a gangsta rapping analog sound or deliver a crisp, digital vibe for anyone who needs it. We're sort of on an island out here in Minnesota, so we have to be well equipped to handle any request a client may have. Most of the gear lives in the rooms here, as opposed to other studios on either coast where you'll find that the control rooms are stripped down. At most facilities, if a client needs an additional piece of gear, the studio will have to rent it. Here, all the equipment is available and set to go. Most of it is installed in the control rooms, but there are some pieces which are available to "float" from room to room.

ENTERPRISING STAR

There are three main recording studios at Paisley Park: the newly upgraded Studio A; Studio B, which features a custom API/De Medio console; and the most intimate of the three, Studio C. Studio A is the place where ☥ prefers to work. It's one of the nicest rooms, and we haven't had any other producers in there except ☥ since it was remodeled. It contains a large, comfortable recording environment (50-foot x 35-foot main room), a big library, and a granite-stone room that is enormous. This room is often used to record drums or guitar amps when the desired result is a live, bright ambient sound.

Studio A also has two isolation booths and a very large wooden isolation room that can handle anything from a band to an orchestra. In fact, we've done a number of orchestra dates in there, during which we have fit in 40 to 50 musicians, along with their instruments.

Paisley Park Studio A photo courtesy of Solid State Logic. ☥ photo by Nicole Nodlund.

World Radio History

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Only 32, Ulrich "Uli" Behringer has already produced a world-class line of signal processing encompassing over 20 ground-breaking products.

His new Ultrafex II is a typically innovative enhancement processor that adds more clarity, punch and excitement to your mixes. Its smooth, quiet Behringer audio performance can give your recordings the professional impact they've been missing.

As usual, Uli has come up with an incredible lineup of features for the Ultrafex, including Effect Solo, adjustable High and Low Frequency Processing, fully controllable Single-Ended Noise Reduction and *Stereo Surround* — something no one else has.

What can Stereo Surround do for your music? Difficult to describe in words, but a revelation when you experience it in person (at your nearest Behringer dealer). It actually widens the stereo image to create an open, multidimensional sound panorama.

Quality-intensive throughout, the Ultrafex features fully balanced inputs and outputs with Tip-Ring-Sleeve and XLR *standard*, and is backed by a five-year warranty for parts and labor.

Ultrafex II. Another breakthrough from a man who will stop at nothing less than the very finest processing in audio.

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BEHRINGER

For more information about the full line of Behringer signal processing, please call (516) 932-3810, fax (516) 932-3815 or write to Samson Technologies Corp., P.O. Box 9068, Hicksville, NY 11802-9068

Suggested retail price for Ultrafex II is $349.99.
Behringer is exclusively distributed in the U.S. by Samson Technologies Corp

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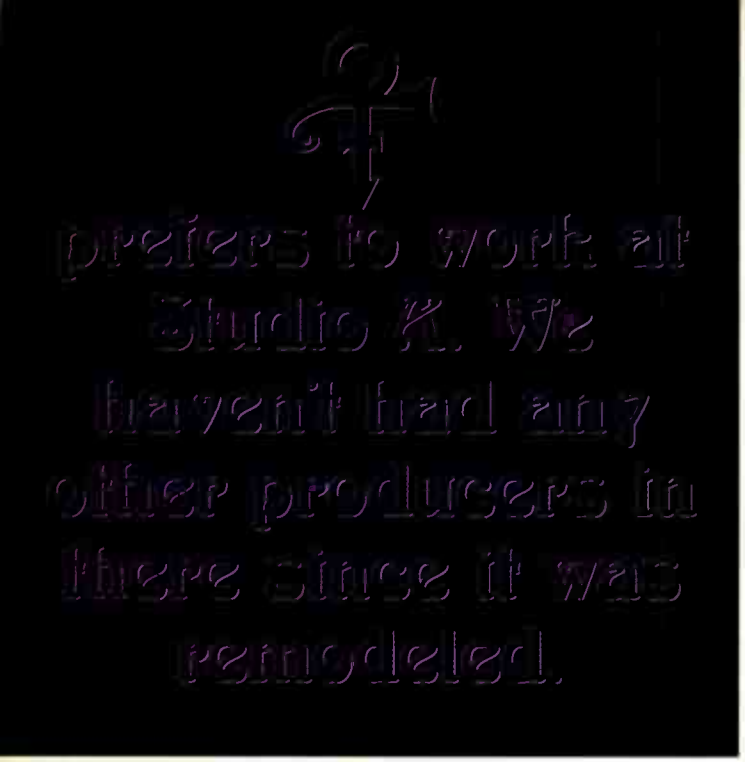
CIRCLE 17 ON FREE INFO CARD

World Radio History



Studio A was remodeled to house our newest SSL console, an 8088G+ with Ultimation. I think there are only a few of them in the country right now, and they're much better sounding than the old SSLs — much warmer, and a lot more punchy. With Ultimation, the signal path doesn't pass through VCAs anymore because it's going through moving faders. Oxygen-free cabling is used in the console to help eliminate that harsh, crunchy sound, which is how some people would describe past consoles as having. With the 8088G+, SSL is approaching a much more audiophile design.

Studio A has become such a source of technological pride at Paisley Park that we've even given it a name: Starship Enterprise. It's equipped with a full complement of gear that includes TimeLine Lynx synchronization, surround sound capabilities, and custom Westlake four-way studio monitors. When the room was renovated, the console was moved closer to the speakers, giving the room more of a nearfield, in-your-face type of sound.

In addition to the SSL, Studio A has a 48-track Studer D-820 digital machine and two 24-track Studer A800 analog machines. These machines can be locked together, allowing clients to work in the digital domain, analog domain, or a combination of the two. We plan to have a 16-track head stack available for the analog multitrack machines. Many engineers like to record rhythm tracks on the two inch, 16 track format and then bounce those tracks to digital tape to proceed with overdubs. This provides the best of both worlds— the warmth and saturation abilities of analog tape and the clarity and resistance to high frequency loss of digital tape. If a producer wanted to quickly lock the analog and digital machines, it could be easily accomplished. We can set up the analog machines for any tape formulation desired including 3M 996 or Ampex 456 or 499. The equipment in this room is completely flexible, which is the way a lot of producers, including ☥, like their equipment.

Studio B is an analog control room which houses two Studer A-800 24 track machines and the previously mentioned API/De Medio recording console. This discrete console (no I.C.'s in the signal path) has custom mic preamps and other modifications performed by De Medio to make the desk sound more warm than a "stock" API unit. The API sound is quite different than that of the SSL so having a room with the De Medio/API allows us to attract clientele that would not necessarily be attracted to a studio offering only SSL consoles.

While Studios A and B can be used for tracking and mixing, Studio C is used primarily as an overdub room. It features a Sony JH-24 multitrack recorder and a Studer A-20 1/2- or 1/4-inch 2-track machine with center code track, and is tied into the rehearsal room (which can be booked with or without the control room). If ☥ is rehearsing and decides to roll tape, the recording can be made via tie lines to Studio C.

All of the control rooms have tie lines and video links to the sound stage, as well as an assortment of Neve, Focusrite, GML and API mic preamps. Facility maintenance is overseen by chief tech Sal Greco.

☥-INTERACTIVE

☥ needs flexibility when he's working, but will seldom make a special request for a specific piece of gear. If he does, it will be for something that he has a strong opinion about, such as a microphone. Paisley Park, like any

(The Former) Prince's Palace

STUDIO NAME: Paisley Park Studios Studio A

LOCATION: Chanhassen, MN

KEY CREW: ☥ (owner); Tom Tucker (director of studio operations); Dan Soltys (facility director)

CONSOLE: Solid State Logic SL 8088 G+ with Ultimation

SYNCHRONIZERS: TimeLine Lynx

MONITORS: Westlake HR-1 four-way monitor system; Yamaha NS-10M; Auratone and Westlake BBSM-4 reference monitors

RECORDERS: Studer D 820 48-track digital machine, A-800 MarkIII analog multitrack [2], and A-820 1/2-inch or 1/4-inch analog 2-track w/center track timecode

DAT MACHINES: Sony PCM-2500 w/Apogee filters; Panasonic 3700; Otari DTR 90 TC

OUTBOARD GEAR: Lexicon PCM-70, Prime Time II, PCM-42 delays [4], and 480L and 224XL reverbs; Yamaha SPX-900 [2] and Rev 5; Eventide SP-2016; AMS DMX 15-80S delay/harmonizers [2] and RMX16 reverbs [2]; Publison Infernal Machine 90; Roland Dimension D; Jeanius Electronics Russian Dragon

EQUALIZERS: Focusrite 110 [4]; Neve 31105 [2]; Pultec EQP-1A [2]; API 550A [14]; Massenburg GML-8200 [2]; Avalon E55 [2]; Klark-Teknik-DN360

COMPRESSORS: GML 8900 stereo; Neve 33609; Summit Audio TLA-100A [2], UREI 1178 and 1176N; dbx 165a [2] and 160x [4]; Teletronix LA-2A [3]

NOISE GATES: Drawmer DS201 [3]; Kepex II [4]; dbx 904 [2]

MISCELLANEOUS: Studer A725 compact disc player; Studer A721 cassette decks [2]; Korg tuner

World Radio History

Project Studio Paradise

In this age of digital audio, the "golden oldie" processors of yore don't cut it, with their excessive coloration, high noise levels and poor resolution. Nor does the waning breed of studio multi-effects, with their swiss army butter-knife, blah-for-the-buck limitations. The project studio producer/musician must answer to the increasing sonic awareness and demands of the digital age. RSP Technologies understands and embraces this with a line of processors specific to the audio and economic realities of the project studio. From our revolutionary **Circle Surround**™, to the flexible **Intelliverb**™ and the incredible **Reanimator**™, RSP makes the project studio a paradise of processing.

Intelliverb's Virtual Room™ allows you to go where your imagination takes you, a tremendous panoply of reverbs, cutting the edge in the project studio. This verb lets you program not only room size, but the location of the sound source in the room **and** the listener's position. Craig Anderton in **EQ** said, "it looks as if RSP has come up with a winner for project studio owners". **HS & R**'s Nick Botzdorf wrote, "the Intelliverb sounds so good that I'm now disenchanted with the four other effects processors in my studio!"

Nothing new in compression? There is in paradise. Check out the new **Reanimator**™ from RSP Technologies. Rather than settling for a loss of high-end normally caused by compression, the **Reanimator** actually allows for selective replacement of high-end loss with its unique **dynamic enhancement**. The **Reanimator** precisely tracks the amount of compression being used, (enhancement is not added when no compression is taking place), resulting in an unadulterated mix, with no added noise. A compressor of the highest audio quality, providing the most natural sounding dynamics control possible.

Need help with monitoring capabilities while tracking? The **Emphasis**™ is Paradise found! RSP's unique headphone distribution system offers tremendous flexibility. Each participating musician can set up his own headphone mix for the ultimate in personal monitoring capability. Handle your ever-changing monitoring needs with the best project studio headphone amplifier!

Send $3.00 (shipping and handling) for your RSP Technologies **Project Studio Processing** catalog. Put your studio in paradise!

RSP Technologies

Intelliverb and Reanimator include dbx noise reduction licensed by dbx

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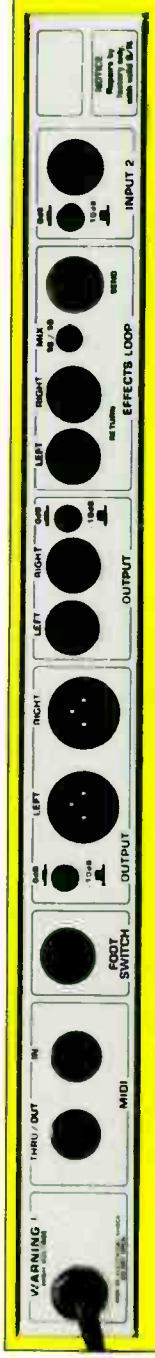
CIRCLE 71 ON FREE INFOCARD

Get a Warehouse of Tube Amp Rigs in a Single Rackspace.

Tech 21's revolutionary technology is designed in the true tradition of tube amplifiers in their *totality*. SansAmp PSA-1 merges the warmth, dynamics and responsiveness of this 100% analog circuitry with digital programmability. You can instantly select from a "warehouse" of industry-recognized tube amp sounds, and create an entirely new arsenal of your own. Engineered for direct recording and live performances, SansAmp PSA-1 delivers *consistent* pro quality sound, studio to studio, venue to venue.



From Vintage to Modern.
There are 49 factory presets and 49 user-definable programs. Presets pay tribute to such distinctive sounds as Hendrix and Van Halen I, B.B. King and Stevie Ray Vaughan, Santana and Metallica, Queen and Pantera. There are 10 bass style settings, ranging from traditional jazz to Yes, from slap to King's X.

Effects Loop "50/50" Switch.
Preserves signal integrity. When engaged, Effects Loop runs in parallel with the internal signal path of the SansAmp. The dry signal remains in the PSA-1 and is not subject to A/D conversion or other signal degradation.

Universally Friendly.
Parameters are adjusted manually in real time with standard/analog potentiometers. You just play the instrument, turn the knobs until you like what you hear, and save it. The exact position of each pot is then stored in the memory. To find the preset position of any particular pot, arrow indicators guide you directly to that point.

Universal Output Section.
Enables signal to be compatible with full-range systems as well as guitar and bass speaker cabinets.

Not Just Another Pre-amp.
Uniquely designed with an individually adjustable pre-amp section ***and*** *symmetrical clipping "push-pull" output stage, you are able to achieve and modify the harmonics and sweet overdrive characteristics inherent to tube amplifiers.*

Universally Creative.
In addition to its obvious applications with guitar and bass, SansAmp PSA-1 yields intriguing results when used in seemingly unorthodox ways, such as with keyboards, drums, sax, and vocals. It is also excellent for enhancing existing tracks in mixdowns.

SANSAMP™ MODEL PSA-1
TECH 21 · NYC

1600 Broadway, NYC, New York 10019
212-315-1116 / Fax: 212-315-0825
MADE IN THE U.S.A.

world-class facility, has a large collection of tube mics. We have vintage tube models like the AKG C12's and C24's and Neumann U47's and U67's, plus we have more recent designs like the mics from Groove Tubes (which I have found to be real effective when miking guitar amplifiers). In the solid state realm, our low-noise B&Ks are very popular when it comes to miking drum setups.

Like most producers ☥ will mention what he likes and what he dislikes. When I'm mixing or engineering a song with him, I'll use what suits my particular taste, and he'll tell me his opinion. There's no doubt that he is very much in charge. During the mixing stage, ☥ will either come in and work with me on a track, or ask that changes be made. For example, on "The Most Beautiful Girl In The World," we really went out of our way to make it sound like a midtempo ballad. It was a marriage of old and new technology, combining live drums with sampled loops, which really give it the sound we were looking for. There were also a lot of sound effects used in the song, which helped make it visual — it was very important to The Boss that the song appear visual. We wanted to use the technology to make "The Most Beautiful Girl" sound really romantic, and it was my job as a mixer to shape all those sounds.

From his earliest songs on, ☥ has always been very vocal about the beats that are created for each song. Designing and sampling has always been one of his fortes. Actually, he was one of the few nonalternative rock artists who were pursuing all the technology available in the studio and utilizing it with live players.

QUALITY FREAK

Most of the creative decisions a producer or engineer makes during the mixing stage are usually very impulsive. But when it comes to my style, I guess you could say that I'm a quality freak. I like things to feel and sound bigger than life. Three-dimensional sound is what I like best, so that when you play a song on a really good system, it sounds as though you could walk right into it. And it should be able to hold up on the radio, as well.

Each song is its own entity — its own creation — and you have to do what's right for that song. If there was only one rule I had to go by, it would be simply that there *are* no rules. An artist should do what's right for the tune, and let the music flow. EQ

CIRCLE 83 ON FREE INFO CARD

World Radio History

Hard Disk Recording Doesn't Have To Be Hard On Your Wallet.

"...in a price/performance comparison, the DR4d would be hard to beat. Thumbs up on this one."
George Petersen, MIX Magazine

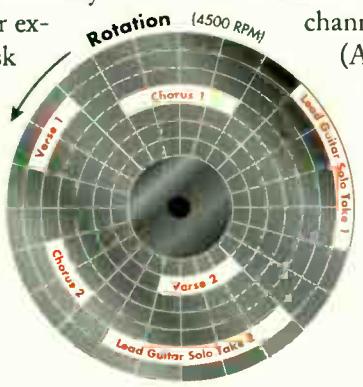
"...great sound, useful features, and friendly operation... technology that is sure to set a new standard in affordable recording"
David Frangioni, EQ Magazine

Ah, decisions, decisions. You want to buy a new multitrack recorder, and you want to go digital so that you'll get the best possible sound quality. And you'd like to buy a hard disk recorder, rather than tape, so you can get random access editing power. And finally, it's got to be something you can really afford. But there's a problem.... don't all hard disk systems require expensive add-in hardware and software, to already expensive computers? Not anymore!

The DR4d is the solution for those looking for an alternative to expensive, complex computer-based systems, or the limitations and mechanical uncertainty of tape recorders. It offers a perfect combination of hard disk recording benefits with an easy-to-use interface.

The DR4d can record up to four tracks simultaneously to standard SCSI hard disks, either internal or external drives. An optional 213MB internal disk offers 40 track minutes of recording (44.1kHz) right out of the box. To expand your recording time, simply connect external drives to the DR4d's supplied SCSI port.

With standard tape machine-style controls the DR4d is by far the easiest hard disk recorder to operate, which means that you can get to work immediately creating music rather than setting up and operating a computer system. Punch ins/outs can be performed manually or automatically from the front panel, or by footswitch, naturally.



On a spinning hard disk, the sections of music can be accessed almost instantaneously by the moving heads of the drive mechanism. This allows you to seamlessly output parts regardless of their location on the disk. Also, music can be easily rearranged in ways not possible with tape.

Now you can start to take advantage of random access editing. You can cut, copy, and paste sections of audio with ease. Our Jog/Shuttle wheel lets you scrub through the audio at various speeds, forwards or backwards. Try out different arrangements. Create perfect tracks by combining the best sections from multiple takes. And you can edit with confidence, because if you change your mind you can instantly Undo your last edit - even after the power is turned off and on again! Imagine it. Do it. It's that simple.

You can instantly move to 108 memorized locations at the touch of a button, and these locate points may be entered manually or on-the-fly. It's also simple to set up **seamlessly looping** repeat sections, so it's easy to jam over tracks. No more wasting time on rewinding tape!

Of course, how the DR4d sounds is as important as how it works. Advanced 18-bit oversampling A/D and D/A converters insure crystal clear sound, and with a full 96dB dynamic range, the DR4d offers no-compromise specs. The four balanced 1/4" input and output jacks are switchable between -10 and +4 operation, and 2-channel digital I/O is included standard (AES-EBU and SPDIF) with two additional digital ports optional.

Need more than four tracks? Four DR4d's can be linked to create a 16-track system. And for synchronization to other gear, just add the optional MIDI or SMPTE interfaces.

And best of all, the DR4d is an **affordable** reality: suggested list is only $2495.00 (or $1995.00 w/o hard disk)! Multitrack disk recording *is* within your reach, so see your Akai dealer today for a complete demo!

Now Available - Version 3.0 Release: Track Merging, Midi Machine Control, and Midi Time Code support!!

On tape, the sections of music are physically located far from each other, separated by many feet of the tape itself. Since you have to move all that tape past the heads to get where you want to go, it's impossible to jump instantly from one section to another. It wastes time, and limits creativity!

Intro
Verse 1
Chorus 1
Verse 2
Lead Solo

DR4d

AKAI DIGITAL

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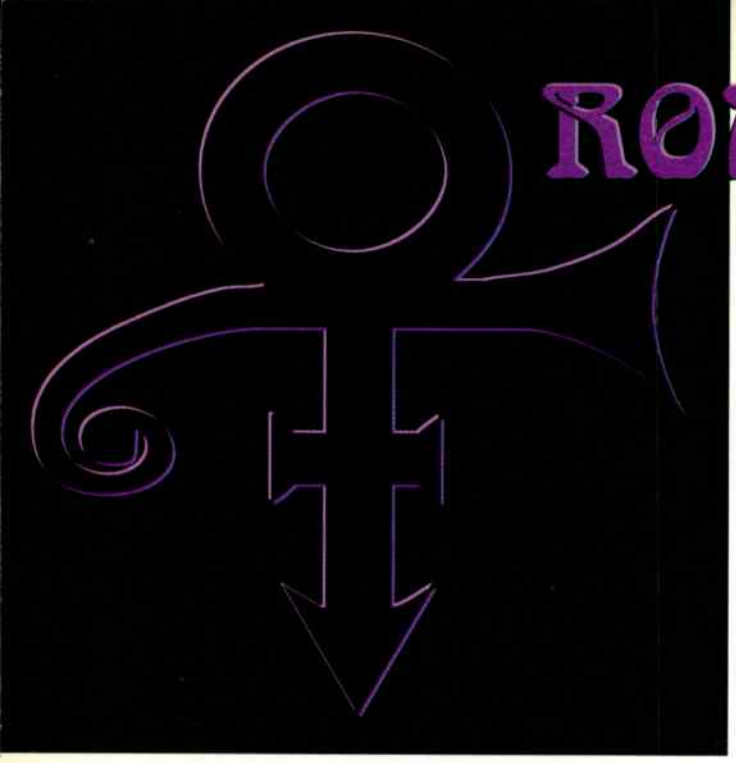

ROM With a VU

What's-his-name's new interactive CD-ROM packs audio and video into one multiplatform format

BY GREGORY SANDLER

ONE OF THE HOTTEST selling CD-ROMs on the market these days features that nameless artist who once recorded a song entitled "My Name is Prince." But this is no run-of-the-mill CD: it's an interactive CD-ROM that combines music, video, and animation, including a new song and video from the artist.

The CD, titled *Interactive,* is the first in what developers at the Graphix Zone, an interactive CD-ROM publisher in Irvine, CA, say will be a series of Interactive Music CD-ROMs (IMCDs) featuring leading recording artists. Reliable scuttlebutt has it that the next IMCD will feature Bob Dylan. Graphix Zone produced *Interactive* in an agreement with Warner Bros. Records and 's company, Paisley Park Enterprises.

The IMCD puts the user in control of a series of changing interactive events featuring state-of-the-art morphing and 3D visuals. Unlike traditional interactive CD-ROMs, *Interactive* actually lets the user control various different aspects of 's music and videos. The graphics include a visit to a surreal home of the artist formerly known as Prince and entails virtual visits to many key rooms such as Studio, Boudoir, and Dance Club.

In addition to working on both PCs and Macintosh computers, some of the audio files on the disk also can be played on a standard audio CD player. An MPEG version of *Interactive* is the first music CD-ROM title to support MPEG video. This version will allow full motion, full screen playback in real time.

Packing samples from 52 of 's songs — along with four full-length music videos — onto a CD was no small chore. There are 52 minutes of audio on the disc, including six full songs. Greg Fisch, an audio engineer, joined Graphix Zone at the end of '93 to work on the new IMCD.

Fisch, officially credited with custom programming for the new CD, says the development team broke into groups, each working on a different virtual room on the CD. "Each group went through all the music and picked out the most appropriate music for its area," he says.

But what can you do in 's virtual Studio? Users can, for instance, click on a book of music next to the guitar stand in order to hear isolated riffs. There are more than a dozen different licks to choose from, including bass and drums, vocals, keyboard, and guitar.

The Studio also features three sets of user-controllable screens: the Funkyoka, a karaoke of the song "Kiss"; the Mixolater, an interactive mixer; and the ICU, an interactive camera controller that offers multiple views of the studio.

In the Music Club room, end users can go into a DJ booth and click on CD titles stacked in a rack to sample some of Prince's music. There is also a large screen video projector that offers some of the artist's most popular videos.

Fisch says the development team culled through lots of recorded material in search of just the right tunes to include on the IMCD. "We picked up the little shorts from previously recorded CDs. Other material we mixed from ADAT or DAT."

Much of the music on the IMCD was remixed using the original DAT material from Paisley. "They gave us the signal and the edit list," he says. "It was interesting to see what used to be there. There were big sections missing and some areas were heavily distorted."

Music was brought into a Macintosh Quadra 840AV one track at a time using Digitrax, SoundEdit Pro, and Disc-to-Disk. Audio digitizing was done with the AV's built-in audio and Digitrax. "We EQ'd as necessary, but we didn't handle any compression until the end," says Fisch. "We started with nine tracks and ended up with four."

The ADAT master from Paisley proved challenging because all of the tracks had to be reassembled. Using a reference tone that went across the original 24 tracks, the audio team was able to line up the material for remixing.

After all the material was edited and pieced back together in the computer, Fisch ran it through a dbx Project One compressor. "We needed to get the dynamic range to where we could handle it," he says. "Some of the EQ was done using Digitrax, but most of it was done using an external Rane parametric equalizer or an ART equalizer built into the mixer."

CRAM SESSION

Because the IMCD was designed to run in either a Macintosh or PC environment, material had to be tightly packed. One of the biggest challenges from an

World Radio History

audio point of view was maintaining quality while compressing music for the mixer in the Studio room from 16 bits/44 kHz to 8 bits/11 kHz. "Digitrax did the best job of bringing it down to 8 bits," notes Fisch. Because of the amount of noise present at 11 kHz, the compressed material was run through EQ again in an effort to quiet it down.

In the Studio, users actually can mix bass and drums, vocals, and sound effects. That means the developers had to give CD viewers the ability to mute channels and adjust amplitude. "The computer is actually mixing the data on the fly," explains Fisch. On the Mac side, providing for interactive mixing presented very few problems — that's because the Macintosh can handle multiple sound inputs — but Fisch had to write custom software in order to facilitate interactive mixing on PCs.

Elsewhere on the IMCD, sound was in either .WAV files at 8/22 or QuickTime movie files at 16/22 with sound only. Most of the shorter effects use the .WAV format, while longer pieces are in QuickTime.

Another challenge for all the rooms on the ☥ IMCD was including ambient music in the background. Fisch says it took a lot of custom code writing to develop sound loops that fit the various room sizes. In particular, the loops had to be long enough to keep them from breaking at the wrong time or from cutting out as the user moves around the room.

"Because this was cross-platform," says Fisch, "our biggest problem was trying to figure out the best formats to use." Fisch ended up using the Apple Media Kit authoring tool to write custom code, enabling the disc to work well in both the Apple and Windows environments.

The ☥ *Interactive* IMCD strives to merge audio and video elements into one seamless package. Fisch says the quality of the original ☥ recordings was good, so it wasn't necessary to tackle enhancement tasks, such as very complex EQs.

But in the future, particularly if older recordings are used, Fisch expects to use a BBE sonic maximizer. "It's a tone controller that enhances phase and frequency on both the low end and the high end." Re-engineering older material with a spectral enhancer, he says, can actually improve old recordings. "It brightens up the sound," says Fisch, "but it's obvious what you're doing."

While ☥ did not get involved in the actual production process, he did have input into the development of the IMCD. "According to Paisley Park Enterprises, we hit exactly the look and feel he wanted," says Fisch.

The project took six months to complete, and Fisch says he would have liked another six months for fine-tuning. But even the luxury of six months may disappear if the success of the ☥ *Interactive* continues. Compton's New Media, which is distributing ☥ *Interactive*, reported initial sales of more than 30,000 copies. Fisch says that since the CD began shipping, the phones have been ringing off the hook. "A lot of artists are calling and saying, 'I'd like to do a CD like that.'" **EQ**

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2. Turtle Beach Tahiti	$ 279
3. Card D+	$ 599

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8X AND THE PROJECT STUDIO

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TEN THE HARD (DISK) WAY

A comprehensive comparison of the higher end hard-disk recorders for IBM personal computers

By David Miles Huber

As far as computer platforms go, it's no secret that the IBM-Windows platform has been gaining a greater degree of acceptance over the last few years. As a result, music hardware and software for the PC has begun to crawl out of the depths and into our project studios, commercial studios, broadcast departments, and postproduction edit suites. Also coming to light is hard disk recording, as some rather impressive PC-based systems have been popping up from both the pro and multimedia marketplace.

In honor of this (not to mention that it's the focus of this issue), we thought we would round up a number of them and take a closer look. So, move 'em out, boys...

DIGIDESIGN SESSION 8

Manufacturer: Digidesign, 1360 Willow Rd., Suite 101, Menlo Park, CA 94025. Tel: 415-688-0600. Fax: 415-327-0777.

Applications: Digidesign's IBM-Window's entry — with its general music feel and excellent MIDI integration — is designed primarily with the electronic musician and project studio in mind.

Minimum Requirements: 486SX/25 MHz CPU with 4 MB RAM, 2-ISA Bus expansion slots, and an optional MPU-401-compatible MIDI interface.

Price: Core System: $1995; 882 Studio Interface: $1995; 882 Audio Interface: $995

EQ Free Lit. #: 115

Session 8's software provides for recording at rates of either 44.1 or 48 kHz, full internal signal path routing, mixing (including track volume, pan, solo, and mute), transport control, track bouncing and punch in/out facilities, six parametric digital EQs, fader groupings, and a full range of on-screen editing functions.

SMPTE sync lock and soundfile trigger have been designed into the system, along with provisions for playing back a MIDI sequence (either from within the program as an integrated track or in tandem with another sequencer running on the same computer).

DIGITAL AUDIO LABS CARDD SYSTEM

Manufacturer: Digital Audio Labs, 14505 21st Ave. N., Suite 202, Plymouth, MN 55447. Tel: 612-473-7626. Fax: 612-473-7915

Applications: A high-quality, 2-channel multimedia audio interface for the PC. Its EdDitor is a useful tool for editing master tapes, editing samples, and creating complex effects, while the Catalog software can accurately trigger Wave files to MIDI in the project studio.

Minimum Requirements: 386/33 MHz or faster PC.

Price: CardD Plus: $795; I/O CardD: $295; Digital Only CardD: $495; Fast Eddie: $195; EdDitor Plus: $349

EQ Free Lit. #: 116

For those who need only two channels of digital audio (for purposes such as editing a final DAT master, creating sound effects, or processing and editing samples), Digital Audio Labs (DAL) has created the CardD family of multimedia hardware cards and associated editing software that is designed to operate under Windows.

The CardD Plus is a professional-quality, 2-channel hardware board capable of digitizing and playing back audio at rates of 32, 44.1, or 48 kHz. RCA in and out jacks have been designed directly into the CardD's slot panel and individual reference levels can be set to either –10 or +4 dB.

A companion I/O CardD can be placed alongside the CardD Plus, which will add S/PDIF digital in and out capabilities to the existing analog card. DAL has just released a digital-

All illustration by José Cruz. Screen shots on previous page from left to right: SAW and Soundscape.

World Radio History

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Otari's new RADAR. A 24-in/24-out multitrack replacement that's easy to use and easy to pay for!

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only CardD that reduces the cost of the entire system by more than half by giving you just the digital I/O and letting your DAT do the conversions.

On the editing software side, Fast Eddie is a well-designed Windows program for editing stereo soundfiles in the Multimedia Wave (.WAV) format, while the soon-to-be-released EdDitor Plus program will let you overdub additional music parts onto disk while listening to a previously recorded soundfile.

On a final note, the almost-never-publicized Catalog program from DAL (included free with its software editing packages) finally makes it possible for Wave soundfiles to be quickly and accurately triggered from an external MIDI source (or from an internal MIDI interface source with the help of a special, included driver). This handy little program could give you a stereo pair of hard-disk tracks for very few bucks.

INNOVATIVE QUALITY SOFTWARE SAW

Manufacturer: Innovative Quality Software, 2955 E. Russel Rd., Las Vegas, NV 89120. Tel: 702-435-9077. Fax: 702-435-9106.

Applications: Real-time mixing, four stereo virtual tracks, and SMPTE integration make this a powerful, cost-effective piece of software for the project studio, as well as for broadcast, multimedia, and audio-for-visual production.

Minimum Requirements: 386/40 MHz or faster Windows PC with at least 8 MB of RAM and a video adapter resolution of 800 x 600 (SVGA) or greater.

Price: SAW software: $599; Signal processing plug-ins: $199

EQ Free Lit. #: 117

For those who would like to work in a multitrack hard disk environment but don't have the bucks to shell out for the hardware, the Software Audio Workshop (SAW) can give you up to four stereo virtual tracks (8 channels) that are then mixed down (in real time) to the two outputs of a multimedia hardware card. Defined regions (which can be taken from up to 40 different soundfiles from any disk) can then be selected from an editlist and placed into any of the four stereo tracks of the multitrack window. On-screen faders can also be used to mix the relative track levels to the hardware card's stereo outputs (the calculations are performed in real time, without having to commit the level changes to disk).

The addition of a Music Quest MQX-32M MIDI/SMPTE interface enables SAW to trigger these stereo regions (in a virtual multitrack environment) directly to SMPTE. Then, by using the remote record and transport control windows, SAW can be easily controlled while your MIDI sequencer is actively running in the foreground. In addition to SMPTE lock, defined regions can also be triggered via MIDI (although only one region can be triggered at a time).

Although SAW will work with all multimedia cards, when it is used in conjunction with Digital Audio Labs' CardD Plus or Turtle Beach's Multisound card it is possible to overdub additional tracks (that can later be defined and placed into their own track) while listening to up to three of the previously recorded stereo tracks in sync.

"Plug-in" modules are now available that can be used for additional signal processing such as soundfile comp/limiting, multiband parametric EQ, delay effects, panning effects, and bit/rate conversion.

IT CAME, IT DAW, IT CONQUERED: TimeLine's DAW-80.

MTU MICROSOUND

Manufacturer: Micro Technology Unlimited, P.O. Box 21061, Raleigh, NC 27619. Tel: 919-870-0344. Fax: 919-870-7163.

Applications: MicroSound's complex layering features are ideal for those who need lots of "tracks," and could be put to good use for creating audio for video, sound and ambient effects beds, radio spots, or dance remixes.

Minimum Requirements: 386/33 MHz or faster PC.

Price:2-Ch MicroSound: $2995–$4895; 4-Ch MicroSound: $6745; MicroSync SMPTE/Video: $1500; SMPTE/MIDI Board: $250; MicroTools DSP Software: $200; Turnkey MTU Systems: $7660 to $12,000

EQ Free Lit. #: 118

The MicroSound is a 2- or 4-analog channel hardware and software product that installs into a standard IBM PC (or is optionally available as a fully configured turnkey system) and is runs under DOS and Windows.

Unlike other systems that offer a dedicated number of tracks or even virtual tracks, MTU's MicroEditor software lets you click and drag up to 50 stereo/mono sements to play at the same time; each segment digitally mixed internally. You can also record (and later overdub multitracks or takes) soundfiles at any of 15 sample rates ranging from 8 to 48 kHz. While, or after, soundfiles are recorded, up to 2900 Segments (defined regions) can be placed into a project screen from up to 40 soundfiles. Beyond the accurate placement of segments, this screen can be used to make relative level changes (in real time) while other markers in a segment show beginning/end, fade in/out, and instant deletion zones. Any marker can be moved any time, in any order to adjust to perfection.

Whenever less than five mono- or stereo-linked segments overlap within a project, the system "dynamically"

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mixes the tracks in real time. However, should more than five segments (up to 100 tracks) overlap at any point in time, the samples within the overlapped segments will be mixed to hard disk in nonreal time, then the combined segments can be played back instantly. Subsequent changes remix only the change — not the whole overlap.

Additional options include a SMPTE/video sync card; a MIDI/SMPTE trigger card; and MicroTools signal processing software that provides for noise reduction, time change, holding pitch, pitch shift, holding time, sample rate conversion, filtering, and pure waveform generation.

THE POWER OF EIGHT: Digidesign's Session 8

SOUNDSCAPE

Manufacturer: Soundscape Digital Technology Ltd., 717 Lakefield Road, Suite C, Westlake Village, CA 91361. Tel: 805-495-7375. Fax: 805-379-2648.
Applications: This system's unique and impressive "sequencerlike" approach to recording seems best suited to the musician or commercial music studio, but also works well for postproduction.
Minimum Requirements: 386DX or faster PC.
Price: 4 out, 8-track recorder: $3250; Expansion Module: $2925; Pro Audio Option: $325; Hard Drives separate, starting at $597 for 540 MB.
EQ Free Lit. #: 119

One English hard-disk editor that has been getting attention lately is the Soundscape system. Soundscape's audio and processing "engine" is built into a 2U rack that connects to a PC via a simple controller interface card.

Each hardware rack is designed to handle four channels of discrete audio; however, by simply plugging in more cards, each of which can handle two hardware racks, it's possible to add up to 16 more racks to your system. Sounds like ADAT marketing to me, but this could yield up to 64 separate outputs...more slots, anyone? Analog I/O connections to the outside world are made through balanced (XLR) and unbalanced (gold-plated RCA) connectors along with AES/EBU and S/PDIF digital and MIDI in, out and thru connections (for MIDI timecode sync implementation).

Soundscape's approach to software is unique in that its design and "feel" are more like those of a sequencer, most notably Cubase, than of a traditional digital audio editor. For example, to record a soundfile into an overall "arrangement" (an open project or song), all you need do is choose from any of the 64 available virtual tracks, set your record in and out markers, and select record. Once you've finished recording, a "part" (recorded soundfile) is then placed onto the screen for further placement or processing. Also as in Cubase, editing is done with simple icon tools.

As in a sequencer, a tempo and time signature can be entered into the arrangement so that parts can be accurately placed at specific bar lines within the time axis readout. A continuous loop record function is also included that will automatically record up to nine takes within a defined section and then let you choose the best one — a feature that is very cool for musicians and dialog sound editors.

The possible maximum of 64 virtual tracks (for each 4-channel hardware rack) can be played back in either of two ways: The system's 4-channel software can be used to route parts directly to the rack's individual outputs, or an 8-track software option allows for up to eight virtual tracks to be mixed to the system's outputs (configured as two stereo pairs).

MICRO MULTITRACKER: MicroTechnology Unlimited's MicroSound System.

SPECTRAL SYNTHESIS AUDIOPRISMA

Manufacturer: Spectral Synthesis, Inc., 18800 142nd Ave. NE, Suite 4-A, Woodinville, WA 98072. Tel: 206-487-2931. Fax: 206-487-3431.
Applications: The ability to route soundfiles to its eight individual out-

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puts or to internally mix regions (via an internal 12 x 2 mixer) seems best suited to professional recording, broadcast, and audio-for-visual applications.
Minimum Requirements: 386 MHz or faster PC.
Price: AudioPrisma System: $3995; ADAX 8-ch A/D converters: $3795; MAX-880/e 8-ch digital I/O: $1750
EQ Free Lit. #: 120

Spectral Synthesis is in the process of unveiling its new 8-channel hardware/software package for Windows: the AudioPrisma.

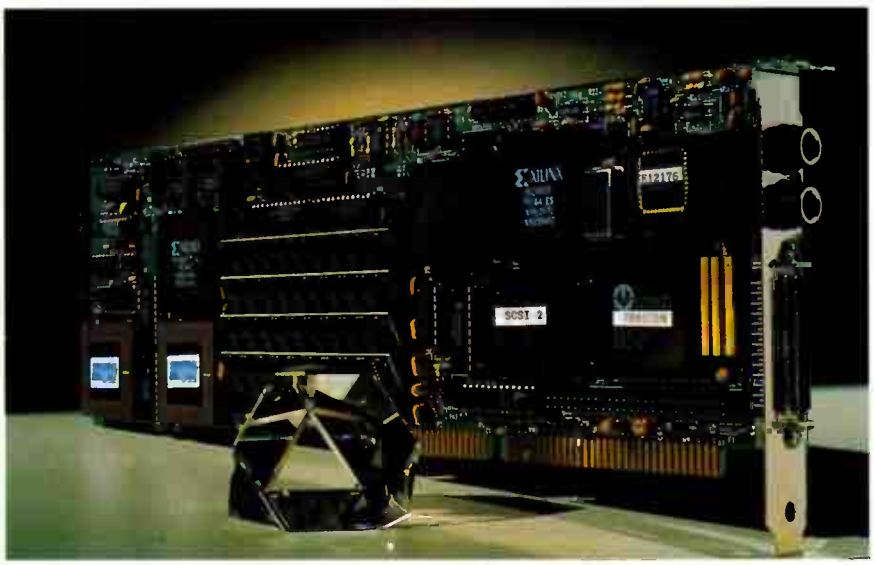
On the hardware side, the AudioPrisma single-slot card connects directly to Spectral's AB-1 aux box (providing RS-422 machine control, video, SMPTE, MTC, and MIDI interface). An additional I/O interface (not included with the basic system) is required to connect audio to the outside world. This interface comes in two flavors: 8 channels of analog I/O plus S/PDIF and AES/EBU stereo ports or 8 channels of S/PDIF or AES/EBU digital I/O.

On the software side, the Prismatica editing and multitrack software allows up to 96 tracks of audio to be placed into a session at one time. These tracks, of which only one can be playing back on a channel at any one point in time, can then be assigned to any of the system's 8-channel outputs or routed to the 12 inputs of an internal mixing window. This built-in mixer includes two aux sends and two parametric digital EQs per channel, metering, and master outputs for "auto-mixing" the mixed signal to DAT.

For those working in video or broadcast production, AudioPrisma can chase-lock to SMPTE or MTC and can resolve to video black burst sync. With additional software, it can auto-conform to CMX edit decision lists, making it possible for dialog, ambience, and sound effects to be recorded, built up, and placed into an existing film or video soundtrack.

STEINBERG/JONES CUBASE AUDIO FOR WINDOWS

Manufacturer: Steinberg/Jones, 17700 Raymer St., Suite 1001, Northridge, CA 91325. Tel: 818-993-4091. Fax: 818-701-7452.



PRISM SENTENCE: Spectral Synthesis's AudioPrisma

Applications: The integration of digital audio into a pro sequencer package means that this system has been designed for the MIDI-based musician (i.e., for use in the project studio or in jingle production).
Minimum Requirements: Basic Windows requirements.
Price: Cubase Audio: $999; Yamaha CBX-D5 interface: $2995; WavePlayer: $99
EQ Free Lit. #: 121

Although Steinberg/Jones's Cubase for Windows doesn't fall squarely within the peg of a digital audio editor, it can't be denied that the full integration of digital audio into a professional MIDI sequencer is

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what most electronic musicians salivate over — and that is just what Cubase Audio for Windows offers.

Two versions are currently available: Cubase Audio combines sequencing, music-scoring capabilities, and a digital audio editor into a single, integrated package for the IBM PC. With this program, hard-disk recording isn't directly handled by the PC, but instead is routed through an external 4-channel interface/processing box (Yamaha's CBX-D5 digital interface). The other, more cost-effective approach is to purchase their WavePlayer software that can then be used to trigger recorded Wave files from a multimedia hardware card when using any of Cubase's Windows-based sequencing packages.

TURTLE BEACH SYSTEMS 56K

Manufacturer: Turtle Beach Systems, 52 Grumbacher Rd., York, PA 17402. Tel: 717-767-0200. Fax: 717-767-6033.
Applications: Its 2-channel edit and processing tools seem to be useful for the audio enthusiast, although the ability to trigger defined regions to SMPTE or from a MIDI source has applications within music and audio-for-video production.
Minimum Requirements: IBM PC — 12 MHz, with DOS 4.01 or later version.
Price: $1295
EQ Free Lit. #: 122

Designed to run strictly under DOS, the 56K 2-channel editing system is made up of a DSP card and digital interface box. Although SMPTE and MIDI connectors are designed into the system's external interface box, analog I/O connections aren't included. Instead, its AES/EBU and S/PDIF digital ports can be connected directly to a DAT machine, which will in turn provide an analog interface.

The 56K's SoundStage editing software includes a large waveform display area and mouse-controlled icon buttons for auditioning sounds; for scrub, edit, and marker functions; and for providing access to the system's record and playlist screens.

Both destructive and nondestructive edit tools are included within SoundStage. The destructive tools (which actually rewrite the recorded data on disk) include: cut and paste editing, soundfile mixing, 4-band para-

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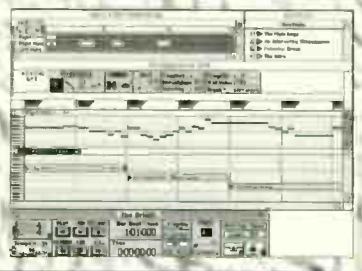

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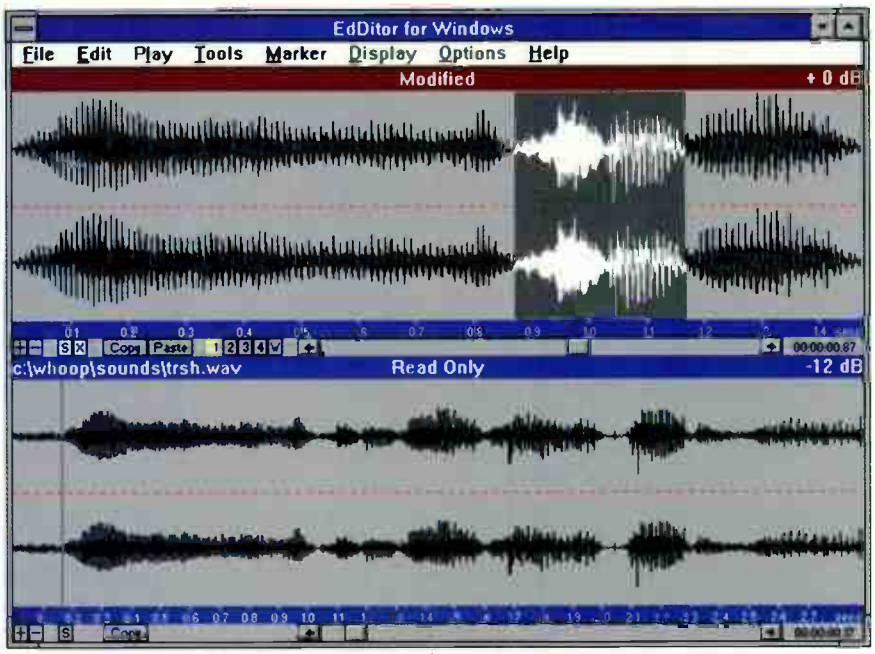

A WINNING HAND: Digital Audio Labs' CardD system.

metric EQ, crossfade functions, gain changes, time compression/expansion, and reverse functions. Real-time, nondestructive tools include: varispeed control, 4-band parametric playback EQ, and the Playlist Editor.

The Playlist Editor allows defined regions (called "zones") from up to four separate soundfiles to be assembled into a playlist region and played back in a user-defined order. These zones can then be triggered from SMPTE, MTC, a MIDI device, or by manually clicking the mouse on the desired entry.

TIMELINE VISTA DAW-80

Manufacturer: TimeLine Vista Inc., 2401 Dogwood Way, Vista, CA 92083. Tel: 619-727-3300. Fax: 619-727-3620.
Applications: Its user-configurable software, ability to record and play back eight separate channels, and internal digital mixer have been designed with the audio-for-video and film postproduction facility in mind.
Minimum Requirements: 486/66 MHz CPU.
Price: $17,500 (basic system list cost)
EQ Free Lit. #: 123

The DAW-80 is clearly in a different price range and operational class from most of the other systems we've covered, but because it's Windows-based, we didn't want to separate it from the herd.

Essentially, all the processing functions of this 8-in/8-out professional system are handled by three cards that fit into the PC. An external I/O breakout box provides analog (8-in/8-out XLR) and digital (AES/EBU and S/PDIF) connections. Ready access to MIDI, MTC, SMPTE, VITC (Vertical Interval Timecode), word clock, and Sony-style 9-pin machine control are also provided.

Up to 256 virtual tracks can be placed into a project and assigned to any of the system's eight outputs (upgradable in 8-channel increments) or to an internal 10 x 4 digital mixer, configured with full parametric EQ and two aux sends on each input strip.

Although this system works well in music applications, particular attention has been paid to the needs of those working with music cues, sound effects, Foley (the replacement of on-screen sound effects), and automatic dialog replacement (ADR, the art of rerecording on-screen dialog). Recorded soundfiles and effects can be easily archived into and retrieved from a built-up effects database and then placed into the system's project screen or edit decision list (EDL) at a desired SMPTE or film frame event time. The ability to create and print spotting and cue sheets (used to keep track of dialog and effects within a project) are also fully supported.

continued on page 118

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The HDR series recorders come with a digital mixer built in so you can merge and track digitally without any A/D or D/A conversion. The master stereo signal can be recorded direct to DAT or any other digital mastering deck. The digital mixer on the HDR-6 features a 3-band digital EQ with sweepable mid-frequency and 4 Aux sends and 4 stereo returns, while the HDR-4 has the same EQ section with 2 Aux sends and 2 stereo returns. All the parameters of the digital mixer are displayed on the bargraph meter and the counter and can be adjusted by using the jog wheel. MIDI in, out and through are built in for MIDI synchronization and all the mixer parameters can be assigned to MIDI so they can be controlled by an external mixer or set up for automation.

Edit functions including move, copy and delete allow for song editing from track to track. Auto punch in/out as well as 99 auto locations are also featured to further ease editing. The HDR Series can be synchronized with a simple connection, allowing you to sync with an unlimited number of HDR recorders. With this connection, a digital master signal is sent to the other units so they can be mixed together digitally. MIDI or unit synchronization does not occupy any tracks, so they don't take up your valuable recording space. The HDR series recorders are available with SMPTE, SCSI or AES/EBU interfaces.

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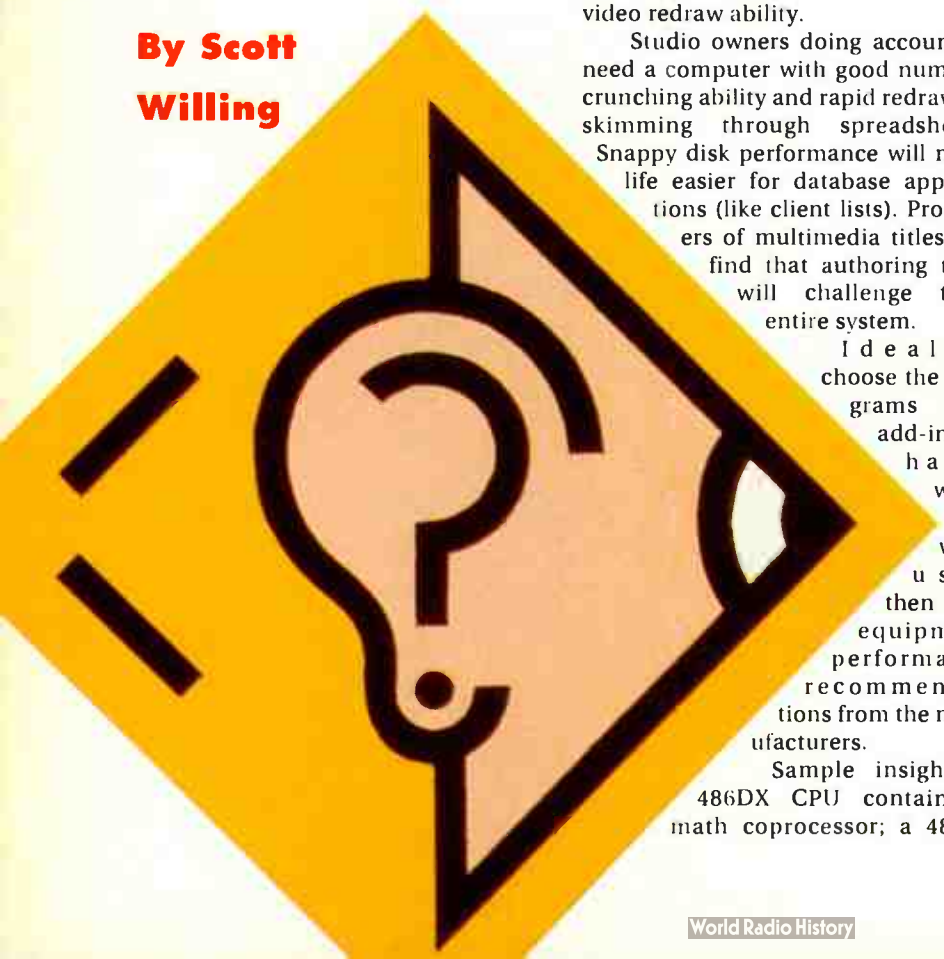
WHAT PC TO GET NOW

The EQ guide to finding the best Intel-based personal computer for your studio

By Scott Willing

So you can't stand it any more: it's time for a new PC. Fortunately, getting the right machine requires only a little planning and research. Of primary importance is the preparation of a personal machine specification. Here's what you need to consider:



DOS OR WINDOWS?

Operating environment has a huge impact on machine requirements. DOS can be run on 386 or lesser machines with minimal hard drives and memory. Windows' graphical interface has many fans, but usable performance comes at significant cost.

APPLICATIONS

List the type of applications you need. Musicians using sequencers and writing lyrics on text-based word processors don't need much horsepower, but if you need good video performance or to produce promotional materials and CD cover art, or run a notation program, you will require a faster machine. Sample editing demands a fair amount of RAM, good raw computing power, and quick video redraw ability.

Studio owners doing accounting need a computer with good number-crunching ability and rapid redraw for skimming through spreadsheets. Snappy disk performance will make life easier for database applications (like client lists). Producers of multimedia titles will find that authoring tools will challenge their entire system.

Ideally, choose the programs and add-in the hardware you will use, then seek equipment performance recommendations from the manufacturers.

Sample insight: a 486DX CPU contains a math coprocessor; a 486SX does not. If your program doesn't use the coprocessor (many don't), at the same clock speed *the DX nets no performance advantage*. To know for sure, ask the software author.

PORTABLE OR DESKTOP?

Portability is costly. For example, the best type of portable color screen (active matrix LCD) will add $1500 or more, which would buy a much larger, higher resolution CRT monitor and a good size hard drive to boot. If your requirements are split, consider a monochrome portable machine with a docking station that provides quick connection to expansion cards, color CRT monitor, etc., or purchase both a powerhouse desktop and an inexpensive portable.

WHICH CPU?

The cost of a machine can easily be 25 percent CPU. 386's are on the wane, but represent a tremendous bargain where adequate. 486's of various flavors now range in performance from the marginally 386-superior 486SX/20 to the Pentium-challenging DX4/100.

At current price/performance ratios, Pentium's superior math coprocessor and dual-path process architecture don't offer a significant advantage to the average user. Unless you're running background simulations of your new guitar amp design over a network while tweaking the cabinet drawings with AutoCad, Pentium may be overkill.

The much touted PowerPC processor, said to provide the first serious challenge to Intel's hold on PC CPU's, has yet to arrive in a PC architecture machine.

Many factors affect the final performance of a CPU and that of a complete system. For example, the superior architecture and larger (64-bit) word size of the Pentium result in faster processing than a 486 or 386 at the same clock speed, but two different systems with the same CPU can

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- advanced resampling
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The ASR-10's excellent fidelity and features haven't gone unnoticed. It was awarded EQ's "Blue Ribbon Award" for *AES*, nominated as the *Music & Sound Awards* "Most Innovative Keyboard" and "Product of the Year" for *Winter NAMM*, and tested #1 in frequency response and distortion in the August 1994 issue of *Keyboard*.

The ASR-10 has a huge library of sounds on diskette and CD-ROM (including our acclaimed Signature Series artist collections). And this fall we're premiering CD-ROMs created for ENSONIQ by *Hollywood Edge, Sounds Good, InVision, Sonic Arts,* and *Q Up Arts* as well as new volumes available from *Eye and I, Greytsounds, Pro-Rec,* and *East-West*.

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vary in overall performance by as much as 100 percent! *The CPU and clock speed are not the last word in system rating.*

The issue of clock frequencies is itself confusing. The system clock defines the basic rate of data interchange between the CPU and memory. The 386 and regular 486 processors run internally at the system clock rate, 486DX2's double the system clock within the chip, and DX4's can clock multiply by 2, 2.5, or 3 times. The 486DX/33, 486DX2/66, and DX4/100 all run from 33 MHz system clocks, but internally operate at 33 MHz, 66 MHz, and 100 MHz, respectively. Simple, huh?

Intel has developed the iCOMP performance index to compare their processor speeds, though not those of other manufacturers. Call 1-800-955-5599 and ask for literature package #73. It's free.

CIRCLE 48 ON FREE INFO CARD

BRAVE NEW WINDOWS

Microsoft Corp. is poised to unleash a radically revamped Windows, promising the friendliest PC operating system yet. Expected in late '94, Windows 4.0, a.k.a. "Chicago," embodies a fundamental architectural change and a new user interface that borrows much from the Mac.

Chicago is self-contained — it does not require DOS. It provides improved ease of use and functionality, yet matches Windows 3.1's performance even on the "minimum requirement" system: 386 CPU/4 MB RAM.

A cleaner and more consistent user interface uses nestable folders to represent all grouped items (directories, program groups, and so on) and icons for individual applications and files. A movable, resizable "Task Bar" replaces the Program Manager window on the desktop. One Task Bar button accesses standard system operations and the 15 most recently used programs or files, while minimized (background) applications appear as additional buttons.

Two resource-browsing tools replace Windows' File Manager. "My Computer" is a good novice-level browser, while "Explorer" accesses all system resources and operations. Power users may well run everything from within its environment.

With long (256 character!) file names, a vastly improved help system, smoother, more bulletproof multitasking, the ability to run DOS and even Windows 3.1 programs more effectively, fully integrated networking, and support for the upcoming Plug-and-Play (self-configuring) hardware standard, this is a brave new Windows indeed. Upgrade street price is rumored at "under $100," but Microsoft is not saying.

Everyone should find the PC friendlier, more stable, and less frustrating than ever before — if Chicago can deliver on its promise. Let us pray.

—Scott Willing, CET

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Ronnie Montrose
Recording Artist/Producer

"IT'S RIDICULOUS! Excellent bass control, great harmonic detail, the 9505 Trans•nova is another level up in overall performance."

Tom Jung
DMP Records

"The new Hafler Trans•nova sounds great here at Capitol's Tower Mastering. Dependable as always - clear and detailed with wonderful bass response."

Wally Traugott
Tower Mastering
Capitol Records

"The first 20 Trans•nova 9505's ever produced are now in use at Warner Bros. Studios Facilities in Burbank, CA."

Claus Wiedemann
Chief Engineer

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CIRCLE 68 ON FREE INFO CARD

"DynaTek drives are the most stable part of my system."

Producer/Musician/ Vocalist, Trevor Rabin, of megagroup YES

What's All The *Talk* About?

Talk is the latest release from mega-group *YES*. *Talk* recalls the classic *YES* sound of the 70s and takes it a step further into the 90s.

As the principal song-writer, producer and co/engineer of *Talk*, Trevor Rabin combined analog and digital recording techniques that pushed the envelope of technology to the limit. Throughout this painstaking and demanding project, the DynaTek Track Series data storage that Trevor used never failed.

Trevor depends exclusively on DynaTek Track Series rackmountable data storage for its ergonomics, versatility and reliability. And when *YES* takes *Talk* on tour, they'll be using DynaTek Track Series to help bring their unique studio sound to live audiences around the world.

Trevor's talking about DynaTek.

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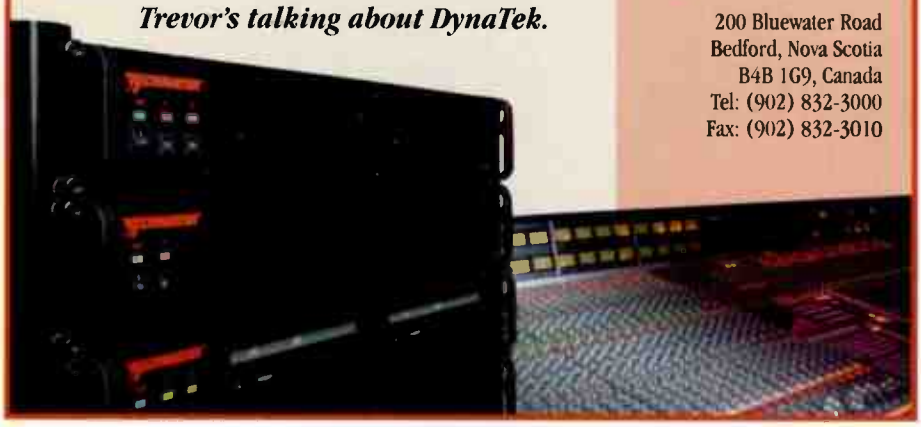


CIRCLE 38 ON FREE INFO CARD

The 100 MHz clock-tripled DX4 can provide performance approaching some 60 MHz Pentium machines, but for less money. If you want a very fast but cost-effective machine, consider high-end (50 to 100 MHz) 486's.

CATCH A LOCAL BUS

The ancient ISA (Industry Standard Architecture) 8 MHz/16-bit expansion bus bottlenecks communication between the CPU and peripherals. "Local Busses" produce about 25 times ISA's throughput by providing a direct (or nearly direct) connection to the CPU, running at or near the full system clock rate and word size: 32-bit (486) or 64-bit (Pentium).

Prime LB candidates are the disk controller and video adaptor; some motherboards integrate these functions while others provide a few LB slots in addition to ISA's.

Current serious contenders: VESA (Video Electronics Standards Association) and PCI (Peripheral Components Interconnect, an Intel design). VESA is older, slightly less expensive, and more plentiful than newcomer PCI. VESA LB is a direct extension of the CPU data bus, whereas PCI places an intermediate layer of electronics between the CPU and peripherals and runs at 33 MHz regardless of the system clock. The buffering reduces CPU electrical loading and therefore heating, allowing more devices to be driven, and making future installation of faster CPUs without fear of obsoleting peripherals possible. PCI may eclipse VESA eventually, but they will coexist in the marketplace for some time.

Having a local bus machine is useful only when there are local bus options installed. Some inexpensive clones are advertised as having local bus, and do indeed have LB motherboards, but are not supplied with any LB cards. Caveat emptor.

GRAPHICS

Windows' graphical environment strains video, disk, and RAM requirements. Graphics-intensive applications (desktop publishing, scoring, etc.) coupled with an inadequate video card can make a fast 486 into a slug.

"Windows accelerator" video cards (many are less than $100) offer

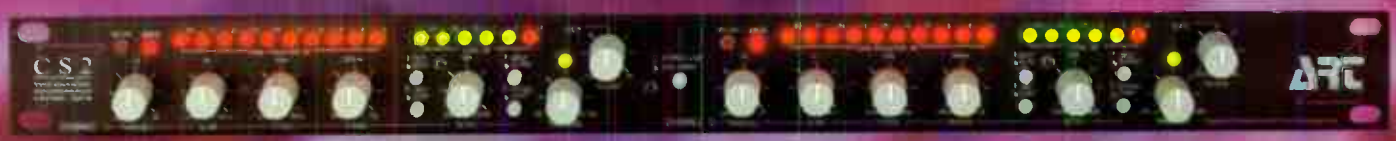
continued on page 117

World Radio History

SQUEEZE LIFE INTO YOUR TRACKS

Tube compressors were those magic devices that allowed an engineer to capture an incredibly dynamic performance without saturating the tape or losing the subtleties. You never actually heard them work, but without them, many recordings would have been impossible.

Solid state compressors have had their problems...you can usually hear them doing their thing. Pumping, breathing, adding noise and distortion, and robbing your recording of life and vitality.



A.R.T.'s new CS-2 Two Channel Compressor/Limiter features a tube emulation circuit that gives you back that old magic. Capture a vocal as loud as the singer can belt it out or as quiet as they can whisper. Grab the bottom end of a bass and let it flap your pant legs. All as invisible as you like. No noise. No distortion. No pumping. No breathing. Just great natural sound. Plus, with features like One Button Limiting, the CS-2 is a breeze to use. And it's durable and flexible enough for sound reinforcement applications! The price? A song.

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CIRCLE 09 ON FREE INFO CARD

AN OUNCE OF PREVENTION

Troubleshooting your PC can prevent some big bills down the road

By Craig Anderton

As a friend of mine once said, "I'd rather do without my car than my computer." (Considering that she's a Californian, that really means something.) But it makes sense. Computers have a way of working their way into your life until they're not just useful, but essential.

As a result, downtime is something you want to avoid at all costs. One of the best ways to prevent downtime is to avoid stressing out your computer in the first place. Some problems cause catastrophic failures (e.g., spilling beer into the monitor), but there are other factors that can chip away, at your computer's reliability until bit by bit, one day a failure occurs:

The following tips help mitigate these factors and extend your computer's useful life in the process:

• **Ventilate.** Heat is the main enemy of electronic devices because it shortens the lifetime of various components, which eventually causes a string of failures (of course, these always tend to start right after the warranty has expired). It's imperative that all vents always remain unblocked, and that there be plenty of room for air to circulate around the computer. For the same reason, keep all computer equipment out of direct sunlight. The focused heat of the sun can sometimes be enough to warp a plastic case.

• **Fan and filter.** If the cooling fan has a filter, check it periodically and clean or replace if necessary. Filters can get so clogged with dust that they prevent proper air flow, which increases the machine's internal temperature. Also, the fan itself is often a dust magnet because it's pulling lots of air over those blades. Wipe them off periodically to keep dust from getting into the machine.

• **Dust and debris.** Speaking of dust, unless you're in a "clean room," computers accumulate a lot of it. Dust has two main nasty qualities: it interferes with proper contact between moving parts, and it forms a layer of insulation on parts that prevents heat from dissipating. When it's time for spring cleaning your computer, take the cover off, go outside, and carefully blow out the dust with a can of compressed air. Don't forget to clean out the monitor as well; dust and cobwebs can really wreak havoc with high-voltage circuits.

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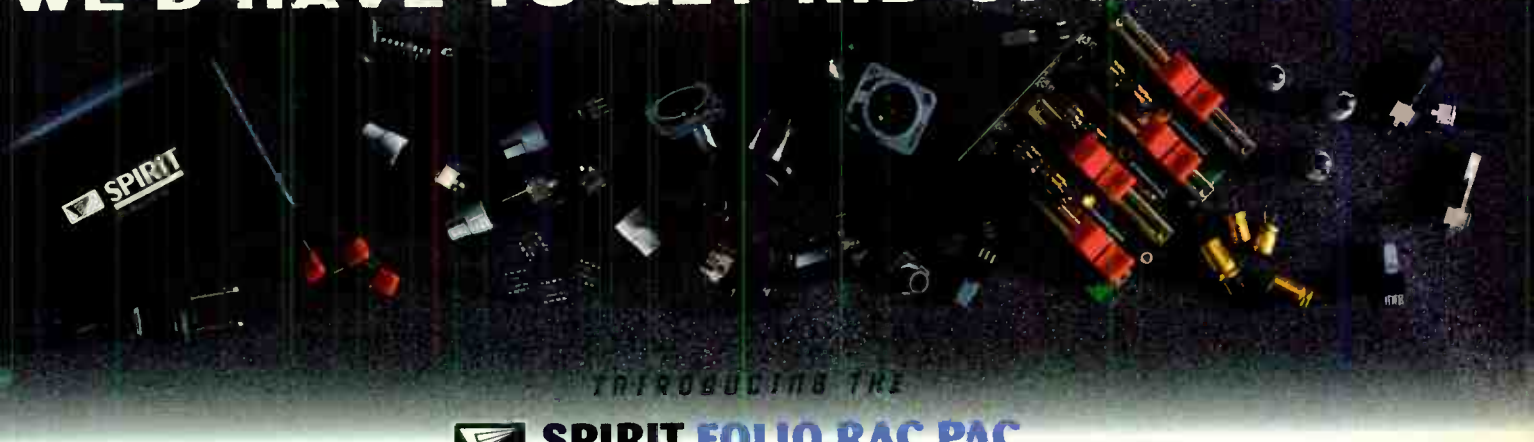
TO MAKE OUR MIXER SOUND JUST LIKE THE COMPETITIONS' WE'D HAVE TO GET RID OF ALL THIS!



INTRODUCING THE

SPIRIT FOLIO RAC PAC

CHANNEL INPUTS

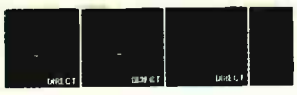
The Spirit Rac Pac offers mic and line inputs on all mono channels with gain adjustments from -50 to +8. Also included are two stereo channels (4 line level inputs) for single fader control of your stereo keyboards or drum machine.

MID SWEEPABLE EQ

With the Spirit Rac Pac we let you select the frequency points from 250Hz to 6kHz. Our competitors select your mid frequency points for you. (We think you're intelligent enough to decide what's best for your music!)

TRUE DIRECT OUTPUTS

The Spirit Rac Pac features individual inserts **and** true post fade equalized direct outputs. The competition makes you choose one or the other. And, if you choose direct outputs, your signal bypasses the EQ.

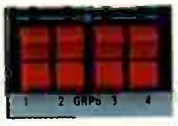


AUXILIARY LOOPS

The Spirit Rac Pac gives you 6 auxiliary outputs, and the ability to solo all 6, not just the first 4, like other mixers! Plus, the Rac Pac provides a return for all 6 with stereo returns. That's 12 additional inputs!

4 SUB GROUPS

The Spirit Rac Pac provides 4 discrete sub groups which are assignable to separate left and right stereo outputs. Other mixers require you to sacrifice your channel mute function to achieve 4 sub groups.



EXTERNAL POWER SUPPLY

The Rac Pac provides an external power supply, which eliminates any chance of that annoying 60-cycle hum!

With built-in features like a high-pass "rumble" filter, direct outputs on all mono channels, true sub groups, and a full master section with control room outputs and two track returns, why would you settle for anything but the Spirit Folio Rac Pac?

HOW WE RACK UP AGAINST THE COMPETITION

	SPIRIT FOLIO RAC PAC (RP 28)	MACKIE 1604	SAMSON 2242
TOTAL NUMBER OF INPUTS	28, including 6 returns & tape returns routed to mix.	24, including stereo returns	30, including 4 stereo returns
EQ	3 Band with sweepable mid on Mono inputs 3 Band fixed on stereo inputs	3 Bands fixed only	4 Band fixed
AUX SENDS	6 (Aux 1 -always pre-fade, Aux 2 -Pre/post switchable globally)	6	6
STEREO RETURNS	6 (4 stereo returns, 2 stereo FX returns)	4	4
HIGH PASS FILTER	Yes (at 100Hz)	No	No
SUB GROUPS	4 discrete	No (2 separate stereo buses)	No (2 separate stereo buses)
TWO TRACK RETURN	Yes	No	No

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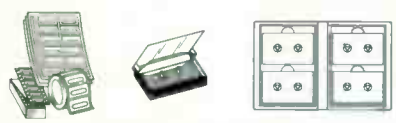

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PC AND THE STUDIO

• Connector jiggling. While the cover's off, jiggle any connectors by gently rocking the male part of the connector. This helps prevent oxidation from building up on the contacts, and sometimes can even end pesky intermittent problems. If any internal peripheral boards are installed, lift them up slightly then reseat them in the motherboard to clean the contacts.

• Dust covers. You don't need anything fancy — a plastic shopping bag around the monitor works just fine to cut down on dust.

• Quickie keyboard maintenance. Disconnect the keyboard, take it outside, hold it upside down, and shake gently. Then blow into the spaces between the keys and shake gently again. This will get rid of at least some of the dust.

• Use a surge protector. Many people ascribe powers to these devices far beyond what they really deliver. Still, if there's a really bad spike on the line, a surge protector will usually take care of it. Note that some surge protectors need to be checked periodically because the protective component may give its life to suppress a particularly nasty transient.

• Uninterruptible power supplies (UPSs). These provide a smooth, regulated, spike-free voltage source that lets you power down elegantly in the event of power problems. Although not cheap, a UPS provides your computer with a diet of gourmet-quality electricity. The first time someone kicks out the plug or a falling tree takes out a power line, you'll really appreciate what a UPS is all about.

• No smoking. Smoke particles look like boulders to the surface of a floppy disk. Having them stuck on the disk doesn't cause an immediate, total failure, but does reduce the disk's long-term reliability.

• Battery problems. Some computers use regular batteries to back up functions such as date and time settings. Although today's batteries are pretty good about not leaking, leakage can still happen. When it does, corrosive chemicals are let loose inside your computer. Check the battery periodically for leakage or lower-than-normal voltage.

• Never touch cable pins. Always handle a cable by the casing. Some pins might connect to sensitive parts of a device that could be damaged by static electricity charges (such as the one you accumulate walking across a rug on a low-humidity day). Also, it's generally good practice to turn off the computer's power before connecting cables.

• Avoid turning the computer off and on in quick succession. Turn-on transients put a strain on components. If you're going to take an hour's break, leave the computer on and turn the monitor brightness down. Some people insist you're better off just leaving the machine on all the time, but that wastes electricity unless you're doing something like letting it receive faxes while you sleep.

• Head cleaning. Disk drive head cleaners strike me as more hype than substance; even if you exercise your disk drives pretty hard, it takes a while for heads to get dirty. However, a piece of gunk or loose oxide can stick

Dust has two main nasty qualities: it interferes with proper contact between moving parts, and it forms a layer of insulation on parts that prevents heat from dissipating.

World Radio History

to the drive head, and that's when head cleaning is definitely recommended. The procedure is similar to VCR head cleaners: you put a few drops of cleaner on a fabric "disk," insert it in the disk drive, let the disk spin around for about 20 seconds, then eject it.

• **Hard disk optimization.** Here's something that other people think is hype, but I disagree. Optimization programs find sections of the same file that are spread all over a disk, then rearrange these fragments into one contiguous file that the disk drive can read in one fell swoop instead of having to jump around to different parts of the hard disk. This results in a noticeable speedup in operation, plus the hard drive doesn't have to work as hard. It's impossible to know how much this affects the life of the hard drive, but it certainly can't hurt.

Most of the time, optimization means running your optimization program of choice, then waiting while it shuffles data around (this can take a long time; be prepared). There are two cautions: back up your disk before optimizing in case a glitch occurs during the process, and deinstall any copy-protected software or you'll lose a hard disk install. Some newer forms of copy protection do let you optimize a hard disk without deinstalling the software.

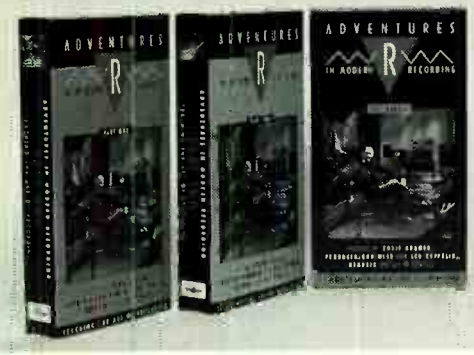
• **Don't move the computer while it's on.** This can cause problems with the hard disk (excessive bouncing of the head will cause it to crash into the platter, which corrupts the surface), as well as with the floppy drive if it's in action.

• **Don't write on diskettes with pencil.** Pencil leads shed graphite, which can get into your disk drive and cause problems. It's better to use a felt-tipped pen for marking diskettes (by the way, these can often write on the disk plastic itself).

Follow these tips, and your computer will thank you for it. May your machine never go down in the middle of a crucial session...

Craig Anderton is technology editor for EQ *and a consulting editor to* Guitar Player *magazine. He is also coauthor with Bob Moses and Greg Bartlett of the ultracool new book* Digital Projects for Musicians *(AMSCO Publications).*

ADVENTURES IN MODERN RECORDING



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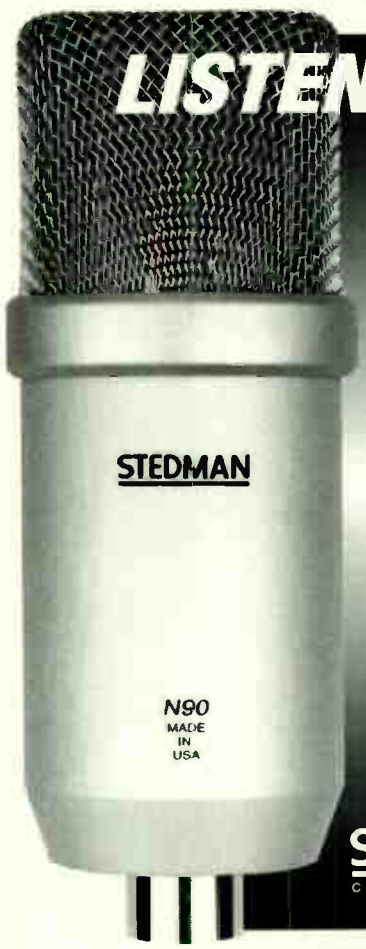

You're about to hear what users are saying about the Stedman N90 studio microphone . . .

"Miking male vocals with the N90 produced a very big sound...The sound was both warm and detailed" REVIEW in H&SR, May 94' by Micheal Cooper

"I used to use 57's to mike my AC 30, but the N90 brings out so many more nuances, it's incredible" Phil Solem, The Rembrandts

"I love the N90 for vocals. I actually prefer the high end over my tube mics." Danny Wilde, The Rembrandts

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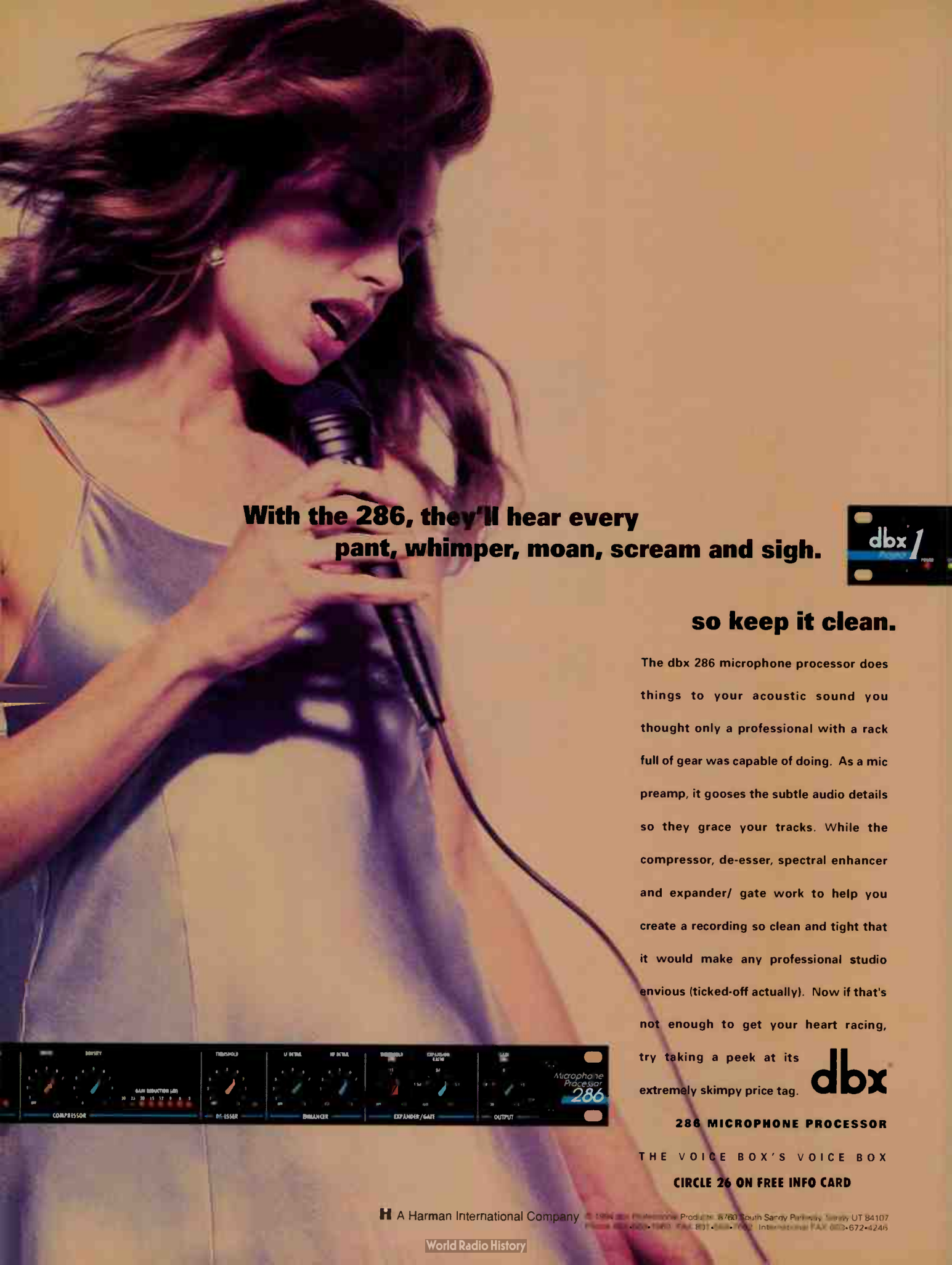

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EQ LIVE

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GARDEN PARTY

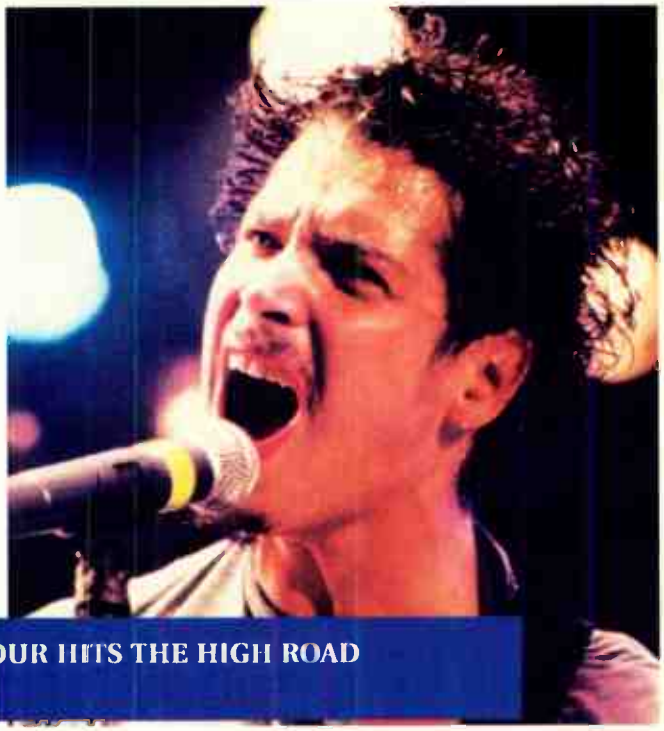

Photo by Sin/LGI

SUPERUNKNOWN, SOUNDGARDEN'S LATEST TOUR HITS THE HIGH ROAD

BY STEVE LA CERRA

■Stewart Bennett has been working with Soundgarden since the band's platinum release *Badmotorfinger*, and is currently on tour with the band celebrating thier latest release *Superunknown* (A&M Records). Although he has recently moved to the front of house mixing position, Bennett spent several years working as the monitor engineer for the band. *EQ* recently had the opportunity to speak to Bennett regarding monitors, FOH, and the "Soundgarden experience."

EQ: What are you finding is the major readjustment from doing monitors to doing FOH?

Bennett: Basically going from the monitor standpoint to the FOH standpoint is a philosophical problem. It's a situation of having to deal with how I think the band wants to be presented to the fans, as opposed to the band letting me know how they want to be presented on stage to each other.

Most of the monitor cues relate to vocal effects, and generally (Soundgarden

World Radio History

Photo by Joe Giron/LGI

SEATTLE'S FINEST: Soundgarden before the big show.

front man) Chris Cornell wants to maintain a certain amount of ambience in his vocal sound. So I have come from the background of doing vocal cues in the monitors that were close to what was being done in the house. At this point we have opted to have a send with the exact cues from the FOH console to the monitor console. If I a do a delay cue FOH, monitor mixer David Selg (aka "Gunque") gets it in the monitor system for delivery through Chris's wedges. We are still working out the kinks in that a bit.

If the band could go without monitors then I think they would, but in this situation, that just cannot be done. They rely upon the monitors to a large extent and we have gone to great lengths for Chris's vocal mix. We make sure that his mixes are time aligned so we can maximize the on stage vocal level to the greatest degree.

Q: How are you doing that?
A: There are three fundamental vocal mixes: four center wedges on one mix, side fill on a second, and what we are calling "butt fill" — on the floor behind Chris — on a third. By the very nature of their location these three mixes are not coherent at Chris's singing position.

The front-center wedges, which are Showco BFM-600's, are delayed until they are time aligned with the side fills. Then we take the rear fill and align those wedges to the new center fill mix value so that everything is arriving simultaneously at Chris's position, at least theoretically.

To get the alignment in the ballpark we use a 1 ms per foot delay theory. We run a 100 cycle tone through the center wedges and side fills simultaneously. We delay the center fill by around 1 ms per foot of distance from the side fill and place a condenser mic at Chris's position. We connect that mic to his channel and solo it up on the console so that the console meters are showing what is happening to the 100 cycle tone between the side fills and the wedges. Then as we scroll through the delay time on the center fill we can see the coupling and cancelling on the meters. Of course, we make sure that all of the other mics are turned off. There can be as much as an 8 dB difference in that tone at points where it is cancelling and coupling. In the audio spectrum, there is a certain point the sound reaches where the phasing is obviously less perceived, but in the lower registers it is definitely a noticeable thing. Most importantly, we avoid the vocal smear and phasing problems from the corners and we don't have to EQ to the extent that might otherwise be necessary.

Q: So you are still running the typical feedback-cancelling EQ, but you don't have to deal with the severity of also having the various monitors out of phase.
A: Right and also it allows for as much consistency as possible. We are trying to remove as many of the variables as we can.

Q: In the monitor mixes for Chris, are you also running kick, snare, bass, and guitar?
A: Just vocals. It's kind of a battle getting Chris's vocal the way it needs to be on stage. We don't want to sonically cloud the center of the stage any more than necessary, so we try to isolate the vocals as much as possible. Chris is generally singing in a fixed position, and we include the kick and snare from the rear fill because the rear fill is coming from the same direction as the natural sound source — the butt fills are placed directly in front of the drum riser. When Chris does want to hear a little more kick, he is getting it as naturally as possible. It is the same for the guitar coming from the back line — when he needs more guitar, we dial it in from behind him. Most of the time there is enough guitar coming from the

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poses as opposed to layering effects. Then I can jump from one cue to another.

Q: What size and type venues are you guys doing?
A: Anything from 2500 up to about 22,000. The band has tried to stay away from the typical arena scenario. They requested that the booking agent take them to venues that will allow general admission and that don't normally have live rock shows. They want the experience in the live environment to be as special to the fans as possible. If somebody had a big enough barn, the guys would set up there just because of the intimate feeling.

Q: What do you think is the biggest difference on this tour now that the band is headlining as opposed to a tour where they might have been a support act?
A: First and foremost is creative control. They are in a position to go as far as they can to make sure that the crowd is given the best sound possible at the shows. As a support band we sometimes dealt with headlining acts that did not have the same priorities as Soundgarden did.

Q: Have you been dealing with rooms that are totally designed for purposes other than live music?
A: How about the National Guard Armory in New York? It was an extremely reverberant room and the actual percentage of the building used to accommodate the fans was very small. We're talking about general admission and no balcony, so the fans were taking up only six feet of the 140-foot ceiling height. There was very little to absorb the reverberant quality of this room. That is a tough room. The old line about "that will change when the crowd comes in..." didn't really apply.

Luckily the promoter rep and the production manager went to look at the room in advance and realized that there were going to be some difficulties. We ended up hanging some theatrical drapes, which helped the sound. The acoustical properties of the room were actually pretty good. It was extremely reverberant and had a very nice tone and decay to it. That was the saving grace. It just so happened it was a room that someone would want to have a Lexicon algorithm for.

Q: Have you had any equipment disasters?
A: Chris took an Atlas mic stand and beat up on a wedge one night. At first I thought, "God the sound must have really sucked on stage." But after the show he told me, "It really wasn't all that bad." So I asked him why he went at the wedge. He said, "Because it was there."

Q: How are the fans reacting to things like this?
A: With stuff like that happening on stage, who has time to pay attention to the crowd response. When I was doing monitors I'd keep my eyes on the band as much as possible. Every once in a while I'd pay attention to the swirling mash out of the corner of my eye. It seems as though they are stunned, amazed, and inspired by such on stage activity. EQ

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MAX HEADROOM

MAKE THE M-M-M-MOST OF YOUR DYNAMIC RANGE: Sage advice from Max Headroom.

Photo by Michael Ochs Archives

NO, NOT A BLAST OF '80S NOSTALGIA, BUT TIPS ON MAKING SURE THE CROWD DOESN'T HEAR YOUR GEAR UNTIL YOU WANT IT TO

BY WADE MCGREGOR

■A live performance should be capable of the widest dynamic range of any form of entertainment. This dynamic range can only be heard if the sound system does not distort the peaks and makes no noise of its own when the music stops. In order to create the widest dynamic range, the sound system's headroom must be optimized. It is the headroom that allows the transient nature of live sound and the dynamics of live performers to reach the audience loud and clear. Optimizing headroom will significantly reduce the sound system's noise while making the system easier to operate. Only after aligning the relative headroom of each device in the sound system will you be able to realize the full capability of your equipment.

The dynamic range of an audio device, or of an entire sound system, is the difference in dB between the noise floor and the signal level that causes clipping distortion. Between these two extremes lies the useful operating range of the system. Obviously, operating at any level lower than maximum will reduce the signal-to-noise ratio, while operating at too high a level will cause distortion and possibly even component failure, especially of loudspeaker drivers.

MUCH TO GAIN

Maximizing the headroom in a system requires you to examine the system's gain structure — the relationship of nominal program audio level (i.e., of music or speech) relative to the noise floor and clipping level throughout the various components of the system. See fig. 1, whose diagram shows a system that operates line level equipment after the mixer at +4 dBm, even though the headroom in some devices varies considerably. The mixer will clip at +20 dBm, the equalizer at +24 dBm, the digital delay at +18 dBm, the crossover at +24 dBm, and the amplifier at +4 dBm. If the operating level in each device is changed so that the margin in dB before clipping is the same (see fig. 2), then not only does the system have more usable headroom, the system noise level is reduced.

The most common gain-structure mistake is having the power amplifiers set to provide full power when sent a signal 16 dB below the maximum output of the mixing console (i.e., full power = 0 dBm). In this situation the amplifier is making the noise in the system as much as 16 dB louder than it needs to be. It is better to reduce the input level of the amplifier to provide the minimum gain required, thereby keeping the system noise heard from the loudspeakers as low as possible.

Gain structure is even more critical in onstage monitoring systems because the noise from the monitors can be picked up and amplified through the main FOH system for everyone to hear — and there is usually already enough noise onstage.

KEEP IT QUIET

With current analog audio equipment capable of a dynamic range in excess of 100 dB, the sound system shouldn't be audible until the show starts. If it is hissing and humming all on its own, perhaps the gain structure has not been optimized. Optimizing it requires only a few tools and an hour or two inside your rack (the first time, and much less time once you understand the process) making some measurements and adjustments.

Have an oscilloscope handy to allow you to see when the test signal becomes distorted. A distortion meter, RTA, or even listening can detect the clipping level of the equipment if you cannot access a 'scope. The metering provided on the equipment may not always tell you how much headroom the device has, so the external test equipment is usually necessary. Whatever form of analysis you choose, it must

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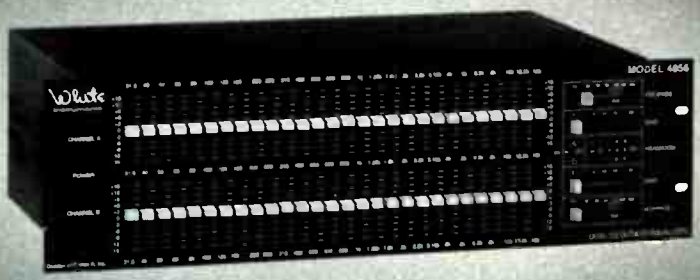

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HOW LOW CAN YOU GO?

Further improvement in the audible noise from a sound system can be made by reducing the amplifier level to suit the type of show. For instance, suppose you are doing a corporate A/V show consisting of speech with some background music. Reduce the amplifiers so that the protection limiters will act 6 dB above the loudest part of this production. That leaves you some margin for unexpected peaks but reduces the noise of the system. After all, this will be a much quieter audience than the one at the previous night's rap concert. Optimizing system gain was one of the reasons that computer control started with power amplifiers, allowing quick changes to be made from the mix position during setup and the show, while always maintaining the lowest possible noise floor.

By going through each stage of your sound system and ensuring that there is no headroom going to waste, significant improvements in a system's overall signal-to-noise ratio can be made. When you have finished, you won't be plagued by one device that always distorts first, and the audience won't know your system is on until the show starts.

FURTHER READING

Davis, Don and Carolyn Davis. *Sound System Engineering*, 2d ed. Indianapolis: Howard W. Sams, 1987

Ballou, Glen, ed. "Handbook for Sound Engineers," In *The New Audio Cyclopedia*. 2d ed. Indianapolis: Howard W. Sams, 1991

Davis, Gary and Ralph Jones. *Sound Reinforcement Handbook*. 2d ed. Milwaukee: Hal Leonard, 1990

McGregor, Chuck. "New Ways to Set Up Gain Structure: TOA Application Note." TOA Electronics, South San Francisco, 1993 EQ

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Grand Reception

Sennheiser's EM 203 is a 3-channel wireless receiver. Utilizing Phase Locked Loop (PLL) technology, each receiver module can be tuned to a 24 MHz range in the UHF band of 450–960 MHz. Within this range there are up uo 4800 user-selectable frequencies. Employing a modular design, up to three receiver modules can be inserted into the chassis. The receiver modules are interchangeable with those found in Sennheiser's EM1046 8-channel chassis. They feature true diversity reception with an electronic logic switch that senses which redundant receiver section is capturing the stronger antenna input and directs it to the audio output. The module's display can be programmed to read text (such as a performer's name), or the frequency to which it is tuned. The bar graphs can be selected to indicate RF field strength, audio deviation, or battery strength of the SK 50/SK 250 transmitter. Each module has adjustable squelch and can be selected for monitoring via a headphone output. The rear of the chassis has connectors for three audio outputs, a DC power supply input, and antenna inputs. Multistage RF filtering networks and highly linear circuitry for maximum intermodulation suppression allow the use of over 50 channels simultaneously. For more information, contact Sennheiser, 6 Vista Dr., P.O. Box 987, Old Lyme, CT 06371. Tel: 203-434-9190. Circle EQ free lit. #124.

Sennheiser EM203 Wireless Receiver

Fer Shure

Shure Brothers has introduced the M367 Portable Mixer — an updated version of the M267, which has been the best selling portable mixer of the last 10 years. The new M367 is a six-input portable microphone mixer that handles up to six mics or line-level signals and can be used with any balanced, low-impedance dynamic or condenser microphone. The M367's low-noise circuit makes it over 25 dB quieter than the M267 and allows it to be used for DAT, recordable CD, and other digital formats. Among its improvements, the M367 adds user-friendly LEDs and peak lights, as well as 12- and 48-volt phantom power. It has the features of the M267, plus input clipping LEDs, detachable power cord, two XLR outputs, easy-access side battery compartment, power-on LED, headphones monitor circuit, and more. Frequency response is 20 Hz–20 kHz and the dynamic range is greater than 100 dB. The M367 operates at 110–120 VAC, and can be switched to operate at 220–240 VAC. Two 9-volt batteries can provide up to eight hours of continuous operation. For further information, contact Shure Brothers, 222 Hartrey Ave., Evanston, IL 60202-3696. Tel: 708-866-2200. Circle EQ free lit. #125.

Shure M367 Portable Mixer

EQ With IQ

Klark Teknik's DN3600A programmable digitally controlled graphic equalizer with Version 2.0 software is an upgraded version of the DN3600, which was introduced last year. The unit now has a brighter screen display that is easier on the eyes in a variety of lighting conditions. With the new software, additional information is displayed at the top of the screen, including numerical frequency and level display of the selected fader, name of last recalled memory, Q mode, and channel selected. The faders, as well as low- and high-pass filters, can also now be adjusted in the curve display — the display changes in real time. Version 2.0 gives the user expanded facilities, faster memory access, and a greater degree of readable information. Owners of DN3600's can have their units upgraded to the A version at a nominal charge, and Version 2.0 is available to DN3600 users as a free upgrade. For more information, contact Klark Teknik, 448 Post Rd., Buchanan, MI 49107. Tel: 616-695-4750. Circle EQ free lit. #126.

Klark Teknik DN3600A

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Big T's

SoundTech's new series of mixers in its Panoramic line, the T Series, has been designed by engineer John Oram in the UK, where the mixers are manufactured under his supervision. The T Series mixers are 8-bus desks available in 16-, 24-, or 32-channel formats. Each channel features simultaneous line and tape mixing, five balanced aux sends, and a 3-band EQ with mid sweep, high-cut, and low-cut filters. The mic amp features a custom Analog Devices chip that provides low signal-to-noise. Each channel also has its own LED output level indicator. Routing can be done directly to the left and right masters, or to any of the eight subgroups. The master section features a built-in active crossover at 125 Hz and a separate output level control. Prices start at $4000. For complete details, contact SoundTech, 255 Corporate Woods Pkwy., Vernon Hills, IL 60061-3109. Tel: 708-913-5511. Circle EQ free lit. #127.

SoundTech's T Series Console

Audio-Technica Wireless Mics

Freedom For All Sounds

Audio-Technica recently added a number of new wireless mic systems to its product line. The 500 Series features the WR5 receiver with ToneLock squelch for quieter operation. Compander circuits improve sound quality, while surface-mount technology adds to the reliability. A choice of 12 VHF frequencies are offered and indicators for power, RF, and AF are included. The 300 Series utilizes a dipole receiving antenna system. A choice of 20 frequencies is offered. LED indicators are included. The 1200 Series features true diversity reception with two independent RF sections and new compander circuits. The 1000 Series features true diversity reception, as well as a special muting circuit. Compander circuits are also built in and up to 15 frequencies can be selected. For further information, contact Audio-Technica, 1221 Commerce Dr., Stow, OH 44224. Tel: 216-686-2600. Circle EQ free lit. #128. EQ

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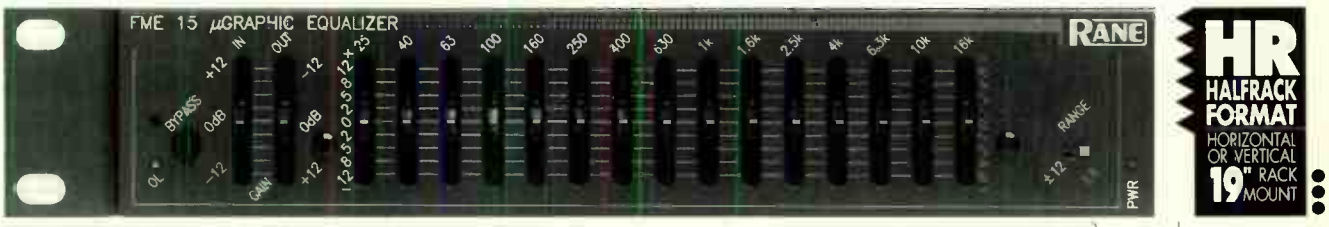

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ART CS2 COMPRESSOR/LIMITER GATE

■The CS2 compressor/limiter/gate from ART may be overlooked by some just because of its incredibly low price. Inexpensive devices are often associated with lack of control or dynamic range, but that's not true for this unit. Not only does the CS2 have the signal-to-noise ratio required for live sound or digital recording, the controls offer users the power to create a wide range of effects.

Many low-cost dynamic processors are meant for those users who only want to reduce the dynamics of an audio source as unobtrusively as possible. There are, however, many other applications for dynamic control — some of which should create an audible result. These require complete control over all the parameters.

The CS2 offers controls (except gate attack, hold and range, and onboard filters for de-essing or frequency-selective gating) with a complete range of parameters on each one [see sidebar]. This may seem intimidating for those who've purchased the CS2 as their first compressor or gate, but ART has considered that possibility, too, by having the user's guide detail typical control settings for many common applications. The guide also explains how the CS2 is connected and functions in the context of typical applications that many musicians and sound techs will encounter. This is an alternative to the "you're too dumb to use all the knobs so we didn't give them to you" approach common to entry-level devices. Those other devices have their place, even for experienced users, but lack the universal application of a processor with a full complement of controls.

All the controls and metering are identical on both channels. There is a switch between the two channels that selects Stereo operation and, unlike many compressors, this switch functions as labeled. When depressed, parameters for both channels are controlled from channel one. This obviates the need to match settings and offers quick and accurate stereo compression without altering the stereo image. The bypass switches, output level controls, and metering, however, still function independently in stereo mode. This is the way 2-channel compressors should be linked in stereo. How often do you really want a level-dependent panner or set two controls to listen to the effect of a single change in parameters?

I GET AROUND

Considering the CS2's range of functions (as compressor, limiter and gate), its front panel is easy to navigate. The controls are not color-coded but are arranged into logical groups; the associated metering is positioned above each group. The compressor/limiter Threshold control is under the two LEDs that indicate Above (red) and Below (yellow) threshold; the other compression controls are under the gain-reduction metering; the input/output level meter is above the output level control; and the gate-closed indicator is above the Gate Threshold control. The Gate Release Time control is raised out of line with the other knobs, making the gate controls just a little more obvious. It would seem that ART spent some time on the ergonomics of this device, instead of just throwing some colored knobs onto the front panel.

I did find the function switches to be a little small, but they travel just enough to show whether they are up or down. All the controls are clearly marked, although there are only three positions of each knob (two on the gate controls) that indicate the numeric value of the control setting. Not everyone sets a compressor to exactly 1.3:1; many people just set the control into the general

ROAD TEST

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SUMMARY: An inexpensive 2-channel compressor/limiter/gate with a wide range of control and with true stereo operation.

STRENGTHS: Complete metering; clear layout; great signal-to-noise ratio; balanced ins and outs.

WEAKNESSES: External power transformer; tiny switches; does not switch nominal level to –10 dBV; balanced ins and outs.

PRICE: $279 **EQ FREE LIT. #:** 129

BY WADE MCGREGOR

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Brando Triantafillou–Editel, Chicago

We use it as the master machine with two ADATs for Post Scoring and Composition for commercial TV productions. I also like the fact that the Fostex RD-8 can act as a stand-alone digital recorder; it has the balanced time code inputs and outputs that I use with automation, and it has a really good layout of the front panel controls.

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range and listen while making the final adjustment. For the numerically inclined, a digital device with three-digit accuracy may be more appropriate, but it may cost over $300.

The Threshold control takes a bit of getting used to, as it operates in a direction opposite to that in most processors. As the control is rotated clockwise, the threshold is lowered (from +20 dB to –40 dB) and more compression is engaged. Once you get used to this logic, however, no problem.

Thankfully, the threshold setting does not affect the input gain. I often use a compressor to reduce peaks in a vocal or instrument signal. I set the average level in the mix and then use the compressor threshold to bring down the peaks. I find it frustrating to use compressors that increase their input gain as the threshold is adjusted. This is a particular problem in live sound applications where you do not want to cause the vocal mic to go into feedback just because you want the compressor to hit the vocal a little harder. I prefer the CS2 approach because I can make up any loss in overall level with the output control, if I choose.

METER READER

The LED metering on the CS2 is simple but very well done. The red gain-reduction meter indicates the amount of compression or limiting in 3 dB steps over a 30 dB range. The other meter uses green, yellow, and red LEDs to indicate either input or output level (switchable) over a range of –30 dB to +5 dB, in 5 dB steps. All the LED indicators have an unusual lens that improves visibility off-axis but may make the metering difficult to see in direct sunlight and causes a little ghosting in adjacent indicators. All these meters are duplicated on channel two, yielding plenty of dancing lights to entertain your studio clients or the row behind the mix position at a live show.

Two switches directly affect the compression section. One switch alternates between Soft and Hard, referring to soft-knee (variable compression ratio near threshold) or linear compression. For applications where the onset of compression is too audible, the Soft setting can make the transition more subtle. The review unit would momentarily go into full compression (>30 dB) when the audio was 3 dB or more above threshold and the Soft/Hard switch was operated, but this is supposed to be fixed on the final production units. [*The manufacturer states this no longer occurs in the final production units. — Ed.*] The second switch, Limit/Comp, bypasses the Compression

ART CS2 COMPRESSOR/LIMITER/GATE SPECS

CONTROLS	PARAMETERS
Threshold	+20 dB to –40 dB
Slope (Compression Ratio)	1:1 to infinity:1
Attack	0.5 ms to 50 ms
Release	50 ms to 2 sec
Output (Level)	–20 dB to +20 dB
Gate Threshold	Off to 0 dB
Gate Release	20 ms to 2 sec (Hold time=Release time/2)

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Ratio and Attack controls, optimizing these parameters for hard limiting. This is a handy feature if you need the CS2 to operate as a system-protection limiter before power amplifiers in a live sound system or as a last resort in preventing digital overload on a digital effects device or recorder.

The bypass switch directly connects the input and output connectors, allowing signal to flow by the CS2 even if it loses power. This is a good thing because the CS2 is powered by one of these ubiquitous wall wart external transformers that can save you money but can be difficult to mount in an equipment rack. The CS2 uses a coaxial connector on the back that may become dislodged when patching cables into the backs of devices in your rack. Since the CS2 is only one of many audio products that utilize wall warts, here's a way of making wall warts survive even the roughest of tours: Don't plug the wall wart directly into an outlet, because the wall-wart can destroy the socket after being bounced around in the truck for a few weeks. Instead, mount the wall wart in a small metal cage at the bottom of the rack, using rubber padding to keep the transformer in position within the cage. A short AC extension-cord will connect it to an outlet. Then cable-tie the CS2 power cord to the back of the unit just before the plug goes into the coax connector. This way, moving cables in the rack won't accidentally unplug the CS2, and the wall wart will still be plugged in at the end of the tour.

The signal-to-noise ratio of the CS2 is listed as an impressive –97 dBu, and the review unit easily exceeded this specification. The lack of switching to accommodate

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–10 dBV operating levels is unfortunate, but because of the low noise of the unit, working at those nominal levels did not pose a major problem. With the gate on, input audio is reduced by over 90 dB (at 1 kHz), and the self-noise of the CS2 is below –108 dBu. Frequency response is also excellent, with less than 0.5 dB variation between 20 Hz and 20 kHz.

The CS2 can be adjusted to sound very good compressing, limiting, or gating a wide range of audio sources. Those less experienced with compressors, however, will need to spend some time becoming familiar with the effect of each control; otherwise, they may have difficulty in achieving good results. This is true of many good compressors and ART has included an informative user's guide.

Don't let the price fool you. This is a practical and complete dynamic processor with actively balanced inputs and outputs. There is even a detector loop for creating "voice over" ducking effects, inserting an EQ to de-ess a vocal track, or controlling the low-frequency boom in a drum. The combination of compressor and gate is well thought out, with the compressor reducing the dynamic range of a performance and the gate eliminating the noise that can become noticeable after the dynamics have been reduced. Two independent or stereo-coupled channels of dynamic processing in a solid single-rack-unit case make the CS2 a space-efficient and cost-effective device. EQ

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AD INDEX

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PAGE	BRAND	INFO#	PHONE#
09	3M	01	612-733-3477
53	Akai/IMC	03	817-336-5114
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02, 13, 45	Alesis	02, 05, 07	310-558-4530
11, 91	Amek	08, 06	818-508-9788
25	Aphex	04	818-767-2929
73	Applied Research & Technology	09	716-436-2720
10	Ashly Audio	10	716-544-5191
66	Audio Institute of America	11	415-931-4160
85, 116	AudioTechniques	12, 13	212-566-5989
19	BASF	14	617-271-4000
65, 41	BBE	15, 16	714-897-6766
49	Behringer	17	516-932-3180
105	BSS	XX	510-351-3500
96	Caruso Music	18	203-442-9600
108	CM Automation	19	818-709-4020
79	Community Light & Sound	20	215-876-3400
88	Conneaut Audio Devices	21	216-593-1111
109	Crescendo	22	410-792-7230
38	Crown	23	219-294-8000
14, 15	D&R	24	409-588-3411
05, 78	dbx	25, 26	415-351-3500
131	DIC Digital	27	201-692-7700
82	DIC Distributors	29	800-522-2732
29	Digidesign	30	415-688-0600
89	Digital Audio Labs	32	612-473-7626
96	Discount Distributors	33	516-563-8326
84	Dolby	36	415-558-0200
44	Drowmer	37	508-435-3666
72	Dynatek	38	416-636-3000
69	Ensoniq	39	215-647-3930
102	Europadisk	40	212-226-4401
39	Fender	43	602-596-9690
123	First Light Video	44	800-777-1576
95	Fostex	45	310-921-1112
30	Full Compass	46	800-356-5844
103	G-Prime	94	212-765-3415
08	Gemini Sound	47	908-969-9000
70	Glyph	48	607-275-0345
82	Grandma's Music & Sound	49	505-292-0341
126	Guitar Guitar	50	818-784-1706
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66	JRF Magnetic Sciences	52	201-579-5773
61	Kalix	34	410-553-6771
123	Klark Teknik	53	800-695-1010
43	KRK	28	714-841-1600
55	Leigh's Computer	54	215-658-2323
16, 17	Lexicon	92	617-736-0300
34, 35	Mackie Designs	55	206-487-4333
118	Microtechnology Unlimited	93	919-870-0344
55	MIDI Solutions	57	800-561-6434
81	Musician's Friend	35	800-776-5173
76	National Sound & Video	58	404-447-0101
119	Neumann	97	203-434-5220
32	Night Technologies	59	801-375-9388
65	O.S.C	60	415-252-0469
59	Otari	61	415-341-5900
31	Peavey	56	601-483-5365
64	Pertek	62	714-858-1685
76	Polyline	63	708-390-7744
77	Premium Entertainment	42	415-989-6245
97	QCA	64	800-859-8401
93	Rane Corporation	65	206-355-6000
108	Rhythm City	66	404-320-7253
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128	Ross	70	817-336-5114
51	RSP Technologies	71	313-853-3055
98	Sascom Marketing	72	416-420-3946
26, 27	Sennheiser	73, 74	203-434-9190
107	Soundscape	75	805-495-7375
37	Soundtrocs	67	516-932-3810
75	Spirit By Soundcraft	77	818-893-8411
77	Stedman	78	616-629-5930
87, 40	Sweetwater Sound	79, 80	219-432-8176
33	Tannoy America	81	519-745-1158
22, 23	Tascam/TEAC America	81, 82	213-726-0303
52	Tech 21	83	212-315-1116
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132	UREI	XX	818-893-8411
67	Vestax	86	707-427-1920
90	West L.A. Music	87	310-477-1945
90	White Instruments	88	512-389-3800
126	World Media Group	89	317-353-1113
07	Yamaha Pro Audio	90	714-522-9011
117	Yorkville Sound	91	716-297-2920

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Alesis QuadraSynth

EQ LAB REPORT

MANUFACTURER: Alesis Corporation, 3630 Holdrege Ave., Los Angeles, CA 90016. Tel: 1-800-5-ALESIS.

APPLICATION: Keyboard synthesizer for stage and studio work.

SUMMARY: Good "bang for the buck," but evolutionary rather than revolutionary.

STRENGTHS: Powerful onboard effects processor; 64-voice polyphony; 76-note keyboard; good master keyboard functions; direct ADAT digital output; well-written owner's manual; good technical support.

WEAKNESSES: No onboard sequencer; no disk drive; no dynamic panning; no easy way to bypass onboard effects; plastic casing (Noryl structural foam) raises roadworthiness question.

PRICE: $1499 **EQ FREE LIT. #:** 130

WHEN A COMPANY that has dominated both the signal processor and digital multitrack market announces that it is building a low-cost keyboard synthesizer, you'd better believe that the whole industry sits up and takes notice. Will the QuadraSynth enjoy the phenomenal success that its predecessors — QuadraVerb and ADAT — enjoyed? Stay tuned...

Let me start by saying that this instrument certainly has a very futuristic look. A sleek plastic casing (actually Noryl structural foam from GE) houses a 76-note keyboard (with obligatory pitch bend and modulation wheels) and a front panel dominated by the Huge volume wheel (somewhat reminiscent of Yamaha's short-lived "B" series of synths introduced in the late '80s — but more about this wheel later in the review). To the immediate right of the wheel is a series of numeric entry buttons, followed by eight mode-select buttons. The central two-line LCD display is surrounded by pairs of incremental/decremental Function, Page, Value, and MIDI buttons. To their right are four knob/button combinations — these are the so-called "Quad" controls that give the synth its name. The rear panel provides two pairs of stereo output jacks (main and auxiliary) and the usual MIDI in/out/thru and footpedal inputs. More impressively, the rear panel also sports a direct digital output for connection to ADAT, as well as a 48 kHz digital clock input (required for synchronization when recording directly to an ADAT equipped with a BRC controller).

Does the QuadraSynth also have a futuristic sound? Well, yes and no. Yes, because more than a few of the factory presets are geared toward Techno and Rave styles of music (these are also the best of the presets), but no because, well, there's just not a whole lot that's new here. Don't get me wrong — many of the QuadraSynth's sounds are quite good, but the technology being used is pretty much the same play-back-a-sample-put-it-through-a-filter-and-tweak-it-with-an-envelope stuff we've been hearing since the original introduction of the Korg M1. Not that the M1 wasn't a great instrument and not that the QuadraSynth isn't a good one — especially for its price. It's just that we're talking evolutionary here rather than revolutionary.

BY THE NUMBERS

OK, now that I've got that off my chest, let's take a closer look at some of the QuadraSynth's main features. First and foremost, it provides a whopping 64-voice polyphony — something no other manufacturer has yet been able to duplicate in an under-$1500 instrument. In common with most other synths, the QuadraSynth's polyphony is decreased whenever multiple voices ("sounds") are used in a "program" (up to four sounds can be stacked in a single program, yielding 16-note polyphony) or when multiple programs receiving on the same MIDI channel are stacked within a "mix" (up to 16 programs can be contained within a single mix). However, there's no question that starting with 64-note polyphony provides for a lot more flexibility. This extra dose of polyphony really adds to the realism when playing harp or pedaled piano sounds.

Second, the QuadraSynth provides truly excellent onboard signal processing — similar in many ways to that of the QuadraVerb. In fact, it is the signal processing that really brings many of the factory presets to life. The internal routing is also highly flexible, with four discrete effects sends allowing true multieffects processing (up to 11 different effects can be generated simultaneously!). One multieffect (that is, one group of up to 11 effects) can be called up per program or mix.

I only have two complaints about the QuadraSynth's effects section. One is that it cannot be easily bypassed, as might often be required when using the instrument in a studio equipped with high-level outboard effects processors. There is no dedicated

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effects bypass button (as is found on many other synths) and no real editing shortcut to quickly kill the onboard effects, short of routing the program or mix to the instrument's auxiliary outputs (which are always dry). The second is that, there is no provision for routing an external signal into the onboard effects processor — a feature provided by a number of newer synths on the market.

The QuadraSynth's third main feature is the use of four "soft" buttons and knobs (as opposed to the single one usually provided), which does help to somewhat speed up the editing process, though it should be noted that many displays only utilize two of them at a time. In general, editing is fairly straightforward, although there is no means of directly inputting numeric data (you can only increment/decrement with the use of a Quad knob or the value up/down buttons), despite the presence of dedicated numeric buttons. These numeric buttons can only be used to type in program or mix numbers — and, most irritatingly, pop the QuadraSynth out of edit mode (losing all your edits in the process) when accidentally pressed during editing. It should also be noted that effects patches have to be stored independently of program or mix patches — a minor annoyance, but it would be more helpful if the operating system provided a means for storing "all" data at once.

There's plenty of memory in the QuadraSynth — 128 ROM ("Preset") programs and another 128 RAM ("User") slots for storing your own programs (out of the box, these are filled with different sounds, so in effect you are provided with 256 factory sounds). There are also 256 effects patches (128 Preset and 128 User) and 200 mix patches (100 Preset and 100 User). Sounds within programs can either be transposed over the entire keyboard or placed into a "drum mode," where a single percussion sample is assigned to a single key (drum sounds are transposable in normal mode, but not in drum mode). There are more than 16 MB of raw samples in the QuadraSynth's ROM, so there's lots of variety. Although the looping in all is excellent, many of these samples — particularly fairly critical ones such as piano samples — sound overbright (a problem that the filter can deal with) or, worse yet, overcompressed (for which there is no obvious solution). Also, it seems as if there weren't enough multisamples taken of many of the acoustic instruments. As a result, the breakpoints are easily heard, and this tends to reduce the realism of a number of the QuadraSynth factory patches, including most of the piano sounds.

In terms of outboard data storage, there is a RAM card slot (these cards use PCMCIA technology and, impressively, are capable of storing up to 8 MB of sample data) and provision for MIDI sys ex bulk dumps, but there is neither an onboard disk drive nor an onboard sequencer. Neither of these is a necessity, but these features are found on many of today's keyboard synths.

The QuadraSynth does provide a fair bit of editing flexibility. There are sufficient parameters (including a few, such as a tracking generator, that are throwbacks to the "good old days" of modular analog synths) to keep most propeller-heads happy, but the instrument isn't as "deep" as some others (such as the Kurzweil K2000 or E-mu Morpheus), either. One editing feature that isn't here — and one I'm particularly partial to — is dynamic panning. Simply put, there's no way of moving a sound around, short of using the onboard effects processor. More disappointingly — especially because this is a stereo instrument — sounds within a program (or programs within a mix) can only be placed in one of seven static positions.

IN CONTROL

Because the QuadraSynth has a full 76-note keyboard, many potential QuadraSynth owners will want to know how well the unit functions as a master keyboard controller in a large

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MIDI setup. In fact, there are a number of well-thought-out controller features, including the ability to quickly and easily change the MIDI transmit channel. (Dedicated MIDI increment/decrement buttons do the trick, and the top line of the LCD always shows the current MIDI transmit channel along with an "activity" cursor.) From Mix mode, you can also transmit on multiple MIDI channels (up to all 16 of them) simultaneously, and this mode also allows you to create multiple keyboard zones, each of which can transmit over a different MIDI channel or channels. In Global mode, you can set overall keyboard sensitivity and choose one of three preset sensitivity curves — Weighted, Plastic, or Maximum — as well as transpose the MIDI note output in semitones over a range of a full octave. There are also three keyboard "modes" provided; the first two allow you to access programs within a mix in different ways, and the third acts as a MIDI Local Off control, with the added bonus of allowing you to specify the transmit channel. On the negative side, I was disappointed to find that neither the volume wheel nor the "Quad" knobs or buttons can be used to transmit MIDI control change messages — a significant design oversight, in my opinion.

Now to return to the topic of the Huge volume wheel: One would think that the reason for having this wheel be so Huge is to allow a live performer to be able to grab it easily in low-light situations in order to change the QuadraSynth's overall volume. Logical, right? Not really. Yes, you can use it to lower volume, but since it turns out that this is a digital volume wheel, you'll have to keep it at maximum in order to get full resolution. The owner's manual states flatly that "lower settings have lower resolution." I discussed this somewhat surprising revelation at length with an Alesis tech support person and he explained that the purpose of making this a digital control was to allow you to digitally attenuate the QuadraSynth signal when recording directly to ADAT from the rear-panel digital output. In any event, the bottom line is that the Huge wheel really has to stay "Hugely" at maximum all the time or those bits will start dropping away and the dynamic range will actually decrease — as opposed to the QuadraSynth. Or is this simply a classic case of form over function? (By the way, kudos to Alesis for not only providing a toll-free tech support number, but actually stocking it with real human beings and not machines playing endless renditions of "You Are The Sunshine Of My Life" while you hold and hold and hold...)

So, back to the central question: Will the QuadraSynth follow in the footsteps of ADAT and take the world by storm? The answer has to be a resounding, "Maybe." Still, for those on a limited budget, there is no question that the instrument provides plenty of "bang for the buck," especially when measured against other synths in its price range. And, certainly the presence of a direct digital output has to make it particularly attractive to existing or soon-to-be ADAT owners.

Howard Massey heads up On The Right Wavelength, a MIDI consulting company, as well as Workaday World Productions, a full-service music production studio. His MIDI-controlled German shepherd woofs on com-

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Amek Big by Langley Console

EQ LAB REPORT

MANUFACTURER: Amek/TAC U.S. Operations, 10815 Burbank Blvd., North Hollywood, CA 91601. Tel: 818-508-9788. Fax: 818-508-8619.

APPLICATION: Project and commercial studio console.

SUMMARY: SuperTrue VCA fader and switch automated in-line recording/mixing console with pot and switch recall.

STRENGTHS: Basic desk features surprisingly flexible; good EQ; fast and reliable recall; SuperTrue 486-based automation even better than Atari version.

WEAKNESSES: As yet no automation autotakeover or off-line mix editing; cue sheet; VCAs cannot be bypassed; automation lacks some functionality.

PRICE: $25,500 (excluding stand and computer) for 28-channel base model

EQ FREE LIT. #: 131

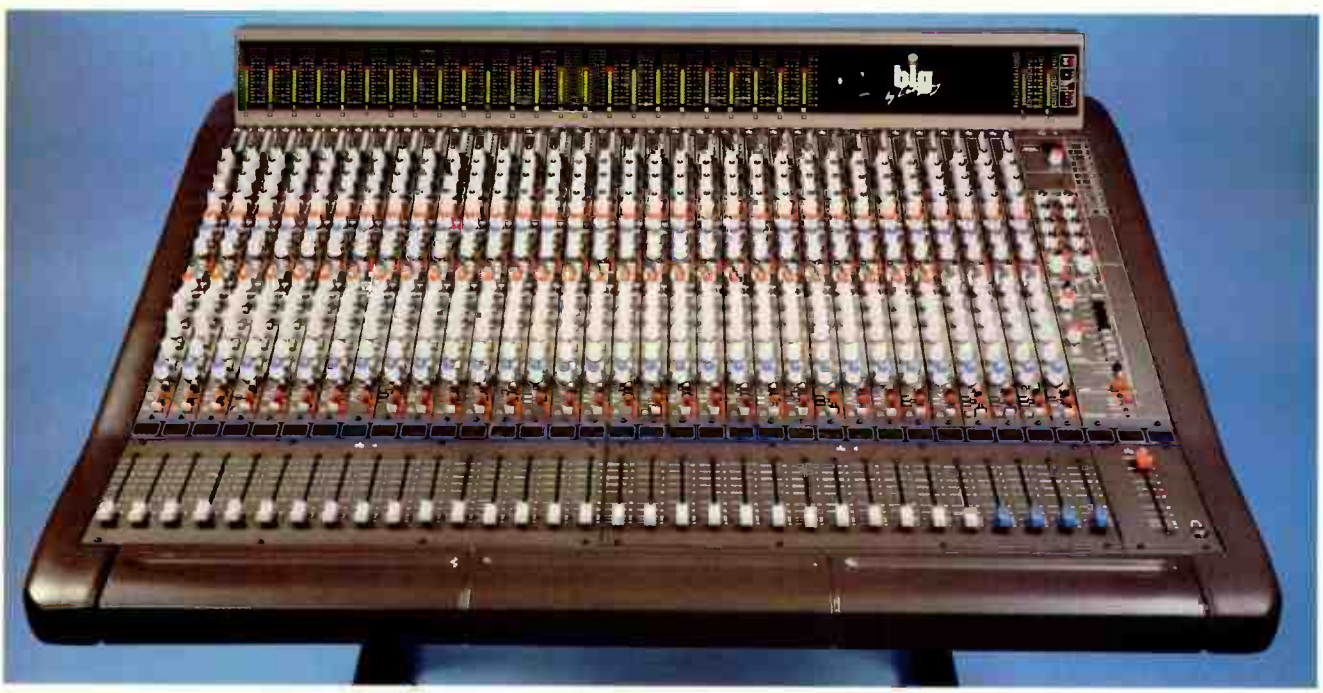
THE BIG by Langley console from the Amek camp is an important board for the project studio sector. Tascam may have got to VCA automation on a budget first with the M3700 and Soundcraft may have democratized moving faders with the DC2000, but in there among them the Big is a project studio's answer to a mini-SSL. It's in-line, it has SuperTrue automation of monitor faders and module switches, and, most dramatically, it has a recall system of knob and switch statuses — and talking recall at that. They're even discussing adding machine control to the package, and this software aspect of the Big is perhaps one its most important features. All versions of SuperTrue on new Amek desks now run on IBM-compatible 486 machines to coincide with its switch from the Atari Mega computer to the more widely available and more powerful new platform last year.

The implications for Big purchasers of SuperTrue 3.0 and above, as it is called, are greater scope for future enhancements and a higher degree of mix compatibility between SuperTrue VCA and SuperMove moving fader automated desks within Amek's range.

Another upshot of changing computer platforms is that the SuperTrue automation designers have taken the opportunity to rethink the presentation and subtleties of the system. It's nothing drastic and it's still very familiar, but it is improved.

However, 3.0 currently lacks some of the functionality of the last incarnations of Atari SuperTrue — most notably offline editing that the company says is coming soon and will be worth waiting for because 3.0 runs faster, smoother and, to continue the car analogies, seems to be more comfortably geared.

Another point to bear in mind is that Big, like all other SuperTrue desks, supports Amek's Virtual Dynamics (VD) package, giving sophisticated on-screen dynamics processing such as



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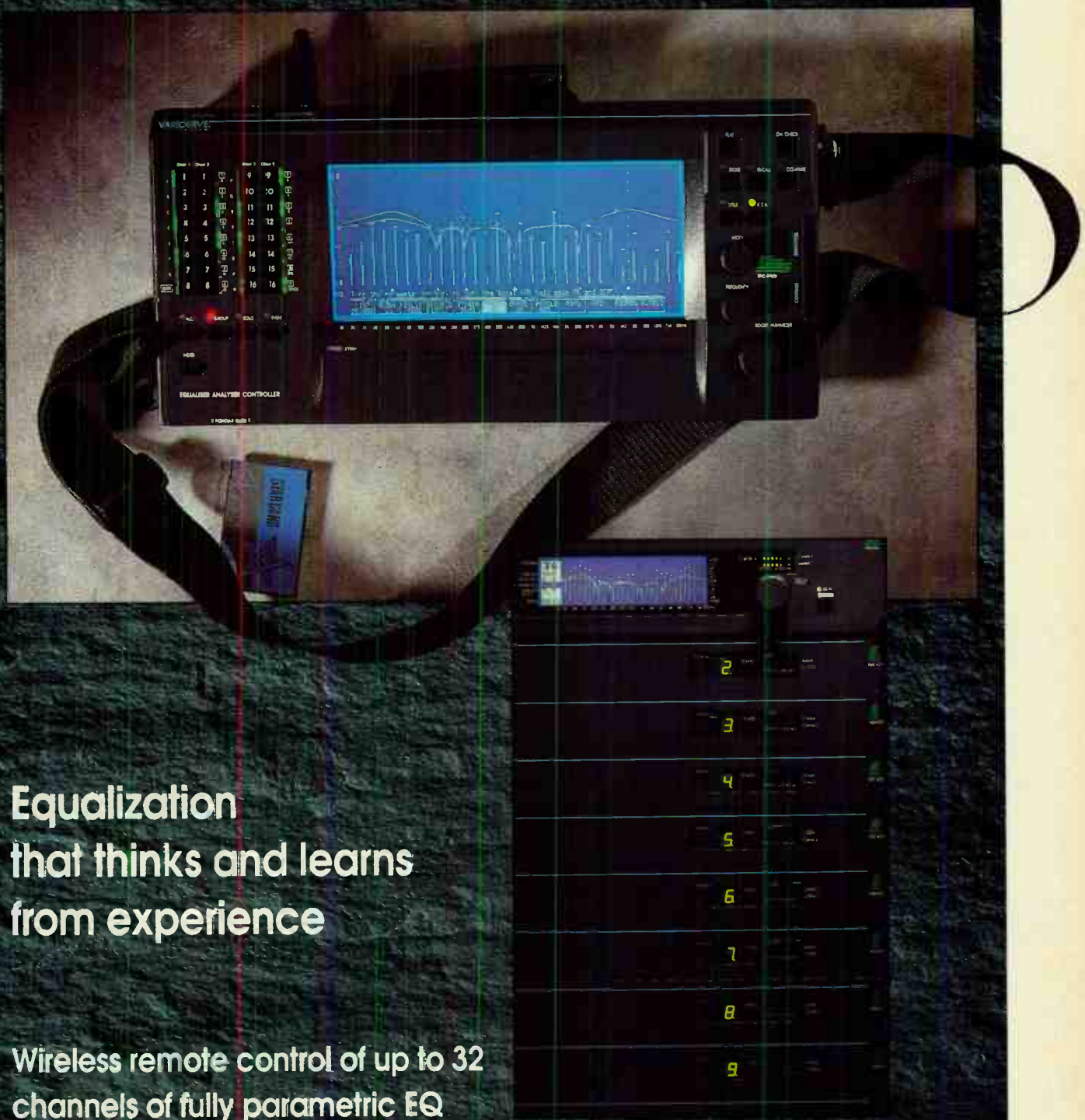

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compression, limiting, gating, and autopanning. Big is, however, all about the magic price/performance/features equation, and installing VD does add significantly in percentage terms to the total desk cost and eases it up to the next price point up the ladder.

THE BIG ROUNDUP

Enough about software — what are you getting deskwise? It's a 12-bus (24-output) in-line console available with from 28 to 44 mono strips and a master section, plus four stereo strips, each capable of handling a stereo effects return and a stereo input. Each mono strip has 8 auxes divided between the channel and mix (monitor) paths, four-band EQ with swept mids and switched shelving HF and LF, and automated mutes on channel and mix paths plus aux send 1/2. Solo in Place can be automated within SuperTrue.

Stereo modules have automated mutes on both stereo signal paths plus aux send 3/4. Again there are eight auxes, but EQ is relegated to switchable four-band with 12 kHz shelving, switchable 40, 80, 120, and 240 Hz shelving, and peaking switchable mids at 350 Hz, 700 Hz, 3.5 kHz, and 7 kHz. These are stuck in the stereo input path and can't be applied to the effects return. You do get fader flip, AFL and full access to the routing from both pairs and the progressive inclusion on a desk of this sort of the stereo line input's ability to decode M/S stereo.

The Master Control Module is a low-key affair as it doesn't house the integral keyboard for the automation computer like the higher-end Ameks, and uses grub screw trims for the 12-bus outputs. Aux masters have AFLs, no mutes, and aux 1/5 and 2/6 send blend switches. Talk-back is to the studio, slate, or auxes 1/2 and 5/6, while the studio output can be derived from aux 1/2 or follow the control room source of three 2-tracks or the main mix.

The feel throughout is good. It's big enough to look like a grownup's desk yet not really a head turner because the emphasis is clearly on functionality. There'll be no surprises for those who are used to the way Amek lays things out, as again the knobs are comfortably large and chunky and again they shadow and tighten access to some of the regulation small switches. There are no overload LEDs. But it is flexible when you get to know it and there is a way to do most things, although aux pre/post switching, muting, and mix/channel sourcing requires planning if you want to get clever.

The EQ is very good: broad, fat, and potently useful in the LF and LMF, with plenty of lift in the high mids. Not exactly clinical stuff, but a nice workhorse enhancing desk EQ. It's a clean desk too.

BIG AUTOMATION

SuperTrue 3.0 achieves the not inconsiderable feat of looking simpler than its Atari predecessor and Big actually offers more automatable features than the Einstein. The display is four-color, neatly arranged on one screen for the majority of mixing activities, and boasts a handy zoom feature for fader and strip switch statuses.

It operates in the well-accepted Read, Write, and Update (autonulling) modes, with each strip's status being set locally on Select switches with associated red and green LED indicators. Modes can also be set globally from the screen, or by keyboard command with a main screen panel permitting the automatable elements to be switched on individually. Thus a full desk's worth of aux mutes alone can be written as easily as two channels of fader and mute. The Select buttons can be programmed to cycle between different combinations of automation modes such as only Read and Write, for example.

Automation modes conjure up different colors on the screen channel strips and give plenty of feedback, proving that a good display still pays dividends on a VCA system. This is particularly the case with grouping — 10 VCA groups can be created, and include mutes — and the Zoom screen makes master/slave assignment simple and clear. The Select buttons can also function as automated Solo in Places (with programmable solo defeat) for the channel or mix paths by activating the switch's status from a Select Switch Mode Menu that additionally allows them to be programmed for latching, momentary, or interlocking responses.

Changes to the current mix can be aborted with a keyboard stroke, provided tape, and therefore code, is not stopped first. There is, however, no automatic saving and incrementing pass procedure as yet. This means that regular saving is to be recommended if disasters are to be averted, but it's quick and does encourage a methodical approach.

Options selectable when the tape is stopped include: write to end of mix; return to mix, which merges the last written data into what comes next by a programmable Blend amount of up to 99 frames; and write to next, which sustains the last written data until the next change occurs.

Big has an integral all-popular-rates timecode reader/generator and does not require SMPTE-mix start and end zones to be specified. It also outputs MTC and can run the automation directly from the generator, enabling tapeless sequencer mixing to be performed.

However, as yet there is no auto-takeover automation mode whereby a fader is flipped from Read to Write at the point at which it passes through the existing VCA value. There is also no off-line mix-editing capability — something Atari SuperTrue is very good at and switch automation shines with — so we must look forward to this. There is a cue list for event firing, but it doesn't yet have implemented some of the more advanced features from the Atari version, and currently concerns itself only with such things as MIDI note and desk switch firing.

For the record, the VCAs on Big cannot be bypassed. It is worth pointing out, though, that strip flexibility is such that you can get around that without going near the fader, if it bothers you that much.

Within the wider project-saving routine, ten recall settings can be named and stored in a title (a song) along with channel listings, MIDI device/channel identifications, and VD settings if

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BIG LINEAGE

The Langley brand name was suggested by Amek's Rupert Neve as a long overdue recognition of Amek technical director and cofounder Graham Langley, the man behind all Amek desks. The range contains Big, under scrutiny here, and the sound-reinforcement-oriented Recall. The desks apply their shared recall and automation features to these different environments and both have effectively redefined what you can now expect from a console for this money in these markets.

It was the Mozart that was originally conceived as a replacement for the evergreen Amek Angela, but it grew and grew. Big has perhaps the greatest similarities to that 1982 board; its EQ is very close to it, and thus represents a good yardstick for measuring just how much market demands and technology have changed the shape of desks in 12 years. —*Zenon Schoepe*

installed. Recall is available from the main automation screen and storing is no harder than choosing a name for the recall and telling it to save. The ensuing scan of all nonautomated pots and switches on the desk takes a few seconds. Recalling a recall is initiated by clicking on the relevant name, causing the screen to immediately change to a diagram of the module 1 strip. Pots that are out of position are highlighted in white; switches that are up and should be down, in black; and switches that are down and should be up, in white.

A red marker on the pots indicates the direction in which they should be turned to null. From here you can scroll though the desk manually on cursor keys to the module you're interested in — its Select button red and green LEDs flash alternately — or put the recall into autosearch. The system will then scan through the modules sequentially from left to right, pausing at each until its controls are reset as would be required for a complete desk reset.

It's painless, and marvelous, and quite frankly I didn't think it would be this smart. There are three levels of accuracy: coarse, medium, and fine, corresponding to 9, 6, and 2 degrees of rotational accuracy, respectively. Fine is obviously best, but coarse can be useful if you're in a burning hurry. Matching the geography of the strip to what is on screen is difficult at first.

Alternatively you can employ the recall Voice Prompt to bring the voice of console designer Rupert Neve up on a channel and let him direct you through the reset.

THE BIG CONCLUSION

As someone who liked SuperTrue on Atari and considered it very able on the more upmarket Hendrix, I have to say that 3.0 is positively splendid on the entry-level Big. Even without all the Atari SuperTrue features, it's already very sophisticated, looks better, seems faster graphically, and has benefits all its own.

Amek has the unpleasant task of switching automation system platforms, and to its credit has concentrated on providing the essential features first with some of the icing to follow a little farther down the road. I am confident that they will do this well and make 486 SuperTrue an even slicker system. After all, through Mozart, Hen-

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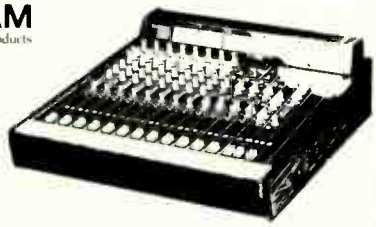

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BIG UPDATE

Available in September, Version 3.1 of SuperTrue automation offers significant enhancements over the software reviewed here. Auto takeover has been implemented in two ways: fully automatic (as in the original Atari version) and a manual punch-in with match facility, plus an automatic punch-out method that permits the user to find the fader position and select the point at which writing starts.

Mix processing now includes programmable crossfades at the edit point in/out times with free selection of events for routines like Copy, which permits only defined automation functions to be copied.

A mix pass can now be forgotten even after the tape has been stopped and automatic save has been implemented. Additional features include ten user-defined macro keys for controlling all main page settings, a "switches only" playback mode, and user-defined console and automation system default set up.

Mochine control now supports the Adams-Smith Zeta 3 synchronizer, but other protocols including MMC are being investigated.

—Zenon Schoepe

drix, Einstein, and Big, SuperTrue has the largest installed VCA automation base in the world, so there are a lot of Atari users out there who will be considering progressing to the 486 system via the company's upgrade scheme.

The recall works exactly as you'd expect it to, but is something you have to work with to fully appreciate — particularly since the majority of readers have managed so far without it.

By far the biggest tip in Big's favor is the combination of these features with a very able and pleasant-sounding traditional console that is not overwhelmed by more technological aspects.

This is an important point because things like automation and recall are a poor substitute for a board that struggles to do overdubs or is limited in its ability to adapt to your needs. The Big may be cheap for an automated desk with recall, but it is still likely to represent the single biggest investment in a project studio setup.

Special thanks to Stirling Audio, London, for making a desk available for review. *—Zenon Schoepe*

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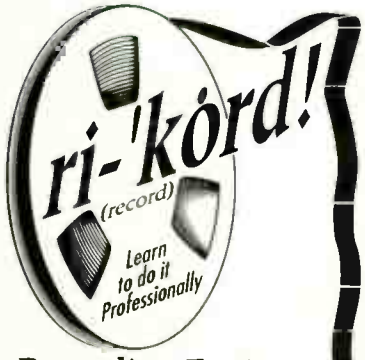

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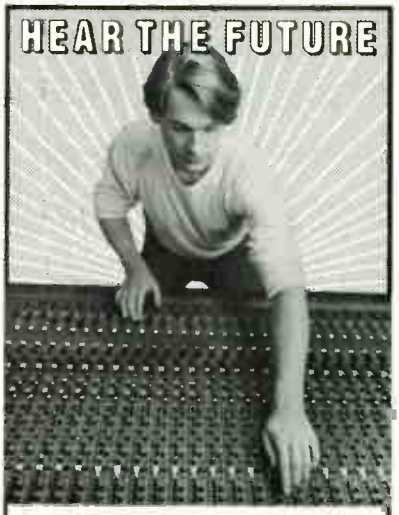

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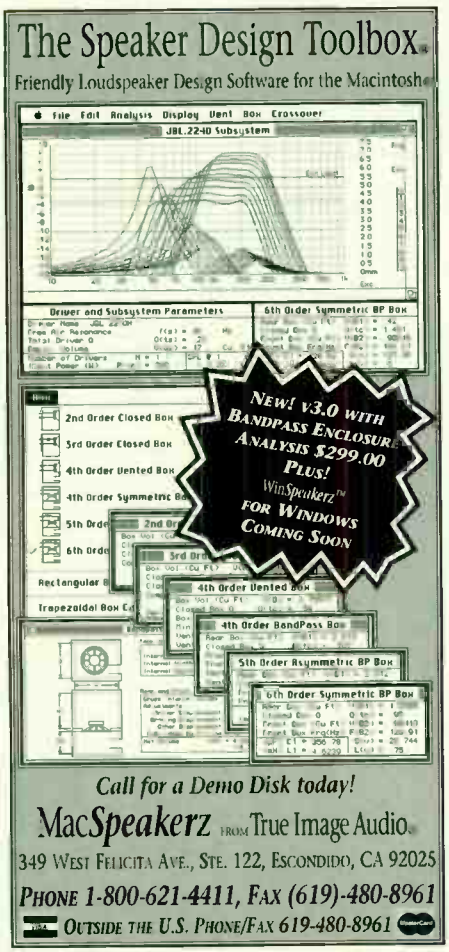

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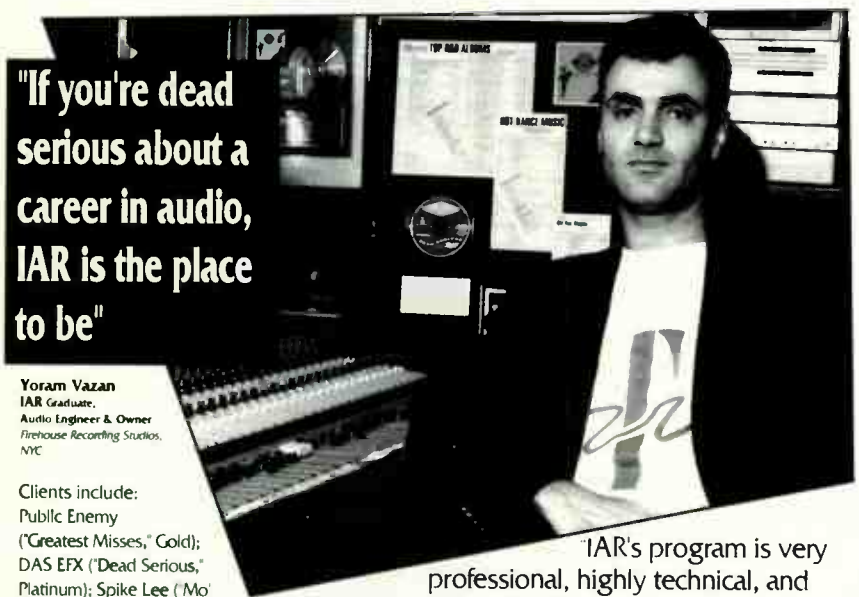

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WALL WARTS

continued from page 32

danger of the thing falling off and cutting power. There are also models that have a hole for you to secure them to the wall via a jack plate screw. Just be careful not to leave the duplex wall plate off, as this is your protection against all that nasty 117-volt AC running inside your wall (just ask Edison how dangerous AC is). If you're planning on ganging two warts to a duplex outlet, hope that they're not so large as to get in each other's way and make sure that the warts don't have phasing blades (that's where one of the blades — the plug-in part — is wider than the other to ensure that phasing is neutral and correct). A wart shouldn't care about phasing, anyhow.

For rack-mount gear you can buy rack-mount power supplies. I ran into one unexpected problem when I bought a Boss unit for my rack. I discovered that the warts from my Alesis microeffects put out AC instead of DC 9 volts, mind you, but apparently Alesis thought it worthwhile to rectify the AC in the units themselves. This means that I still have three warts nailed inside my rack. Oh, well.

You can also gang a number of devices onto one wart by soldering your own jumper plugs onto a single wart. The only thing to watch out for here (aside from making sure that the polarity on your jumpers is correct) is to take care that the total current draw doesn't exceed the output of your wart. The current available should be printed on the wart in milliamps (mA), usually in the 300 to 500 mA range. In many cases you can power two or three devices off of one wart this way. Higher output warts are available. I tied four older drum sound pads together on a platform and powered them all off the same wart with no trouble at all.

Unfortunately, the bottom line seems to be that the wall wart will be with us for a while; there's no quick and easy solution or cure. It is worthwhile to note that a wall wart is better than any sort of battery power. Batteries, even rechargeables, wear out and contribute a considerable amount of toxic waste to our landfills. So the next time you unpack a piece of gear and find the ubiquitous wall wart, force a grin and think of how kindly you're treating Mother Nature. EQ

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WHAT PC NOW?

continued from page 72

substantial improvement by taking routine Windows graphics tasks away from your CPU. Local bus video is another option; some cards have both (and cost about twice as much), but can really get the lead out.

Consider a larger monitor. A 17-inch version (about 50 percent more screen area than a 14-inch) is advisable for heavy users of Super VGA and higher resolutions. The down side: it is triple the cost of a comparable 14-inch. Prices are falling, though slowly.

RAM

Many DOS applications can only access the first 640k of memory. With a 2 to 4 MB machine, some background programs — including part of DOS itself — can be moved out of the way. More RAM than this is likely to be wasted.

Four MB is the practical minimum for running Windows; 8 MB is ideal. Heavy hitters such as authoring systems (for the production of multimedia titles) may demand 16 MB or more.

Single in-line memory modules (SIMMs) now come in two styles: 30-pin and 72-pin modules. Make sure your system has enough empty memory sockets to allow for easy memory upgrading. With 30-pin systems, you have to fill a whole bank (four sockets) and all the SIMMs have to be identical; if you only have a single-bank system, you must toss all existing memory to install larger modules. Conversely, 72-pin systems are more flexible as there are more sizes of SIMM available, there is no "bank-fill" requirement, and different sizes can be mixed.

DISK SPACE

Whatever hard drive you buy, it will seem small within a year. Some single Windows applications can suck up 30 MB! I recommend at least 200 MB; 340 MB is even better. Cost is about $1 per MB. Serious hard-disk recording may require a large external SCSI drive. Consult the manufacturer before you buy.

For backup, get a tape drive. They're easy to use, and can save your professional life for a few hundred bucks.

CD-ROM

Audio samples, DTP fonts, and clip art as well as multimedia titles all come on CD-ROM. One disk can hold about 650 MB, saving much hard disk space. CD-ROMS are painfully slow, but they are hot with home users and prices are dropping rapidly. Get a dealer to struggle with installation, though; getting a CD-ROM to coexist peacefully with other hardware can challenge even experts.

THE CASE FOR EXPANSION

Low-profile desktop cases and mini-towers are common, but may be shy of slots or drive bays for CD-ROM, tape units, or optical drives. Next to RAM, the chassis of the machine is most likely to limit your upgrade path (or force you to use external accessories); consider a large tower.

THE LAST WORD

Wherever possible, make your purchase conditional on delivery of a complete machine with most or all software and hardware preinstalled and working. Insist on a trial period so you can bail out if there are serious problems. With this insurance, and proper groundwork, you can fearlessly set sail on the murky waters of PC shopping. EQ

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The Pulse 283 3-way cabinets and Pulse 12M 12" 2-way monitors complete the system with clear, smooth mids and highs.

Despite its size, this compact PA will cover a small to medium size venue with killer sound...at a price that won't kill you.

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THE HARD DISK WAY

continued from page 66

STUDIO AUDIO & VIDEO LTD SADIE

Manufacturer: SADiE, Inc. 1808 West End Ave., Suite 1119, Nashville, TN 37203. Tel: 615-327-1140. Fax: 615-327-1699.

Applications: Its multiple output and flexible approach to automated mixing seems to be well suited to music production, broadcast, and audio-for-video postproduction. Its 24-bit recording capabilities will be of interest to classical folks who are looking to do 20-bit recordings.

Minimum Requirements: IBM 486 PC under Windows with at least 4 MB RAM.

Price: Full turnkey system: $9995; Digital and analog sub-system and peripherals: $8439.

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The 4-channel SADiE hardware and software package from Britain consists of two computer slot cards (a processing card and a converter/timecode interface card) as well as an external 1U hardware rack that contains all analog/digital I/O, SMPTE, and MIDI timecode connections.

Standard sample rates between 32 kHz and 48 kHz are supported at either a 16- or 24-bit resolution (during which time only two channels can output at a time, due to the increased processing overhead). In its standard 16-bit mode, up to eight virtual mono tracks can be played back at one time through the use of the Levels Window. This on-screen mixer provides full automation over volume, pan, output channel routing, muting, and solo functions for each "input strip," while also offering full output metering.

As with a number of other hard-disk editors, SADiE is based upon the definition of regions, called "Clips" in SADiE terminology. These defined Clips are then named and placed into a region sourcelist called a "Clipstore," where they can be copied either into a standard editlist or placed into one of SADiE's eight linear "tracks." Unlike other editors of this type, however, Clips that are placed on the same track can be highly interactive with each other. For example, audio portions of a Clip that have been "slipped" behind another existing Clip won't be played back, but these sounds can be easily recovered by nudging the desired clip in either direction so that the hidden portion is both visually and sonically brought back into the forefront. Similarly, crossfades between adjacent Clips can easily be performed and written to disk without having to place the separate regions on separate tracks (as is the case with several other systems).

SADiE's signal processing functions include a 3-band stereo (or dual mono) EQ section, dynamics (compression, expansion, and gating), noise reduction, sample rate conversion, varispeed, and subsample microtiming (for correcting phase errors between stereo tracks). PQ subcode editing has recently been implemented, allowing the system to cut CD masters directly from an EDL to an external CD recorder or 1630.

IN CONCLUSION

On a final note, this comprehensive roundup represents the more sophisticated systems that are available for the PC. Of course, I haven't listed the entry-level multimedia systems, as there are just too many to rustle into one corral. Remember, if you're looking for a new system, your best approach is to determine your needs and then check out the model that'll best suit those particular needs. EQ

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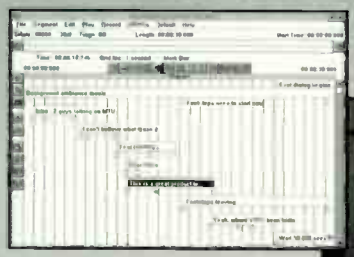

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REVIEW SHORT

Turtle Beach Maui Software

"SampleStore allows you to download soundfiles and to substitute these for any or all of the General MIDI ROM sounds."

MAUI ($199) is unique in that it can be used either as a stand-alone PC sound card (providing a wavetable synthesizer and an MPU-401-compatible MIDI interface — but no digital-audio recording) or as a daughterboard extension, adding these capabilities to a number of other sound cards, including the Creative Labs' Sound Blaster 16 ASP and Turtle Beach's own Tahiti digital-audio card.

Installation of Maui is exceptionally easy, thanks in large part to a clear, concise owner's manual. A thoughtful touch is the provision of a text file that tells you precisely what files are copied where during the installation process. In addition, the accompanying README file gives step-by-step instructions for deinstalling the Maui software and drivers.

Four factory demo sequences are provided; these allow you to confirm that the installation was successful (or unsuccessful) and also enable you to preview most of Maui's 128 8-bit ROM synth sounds. These sounds are arranged in a General MIDI set. Unfortunately, there is no Roland MT-32/LAPC compatibility, a compatibility that is expected by some game and multimedia programs.

The overall quality of the sounds is mixed and somewhat dependent upon the polyphony selected: while Maui can play up to 32 voices simultaneously, it does so at the expense of playback sample rate (higher polyphonies are accomplished at lower sample rates, so that maximum sound fidelity is achieved only when the minimum 16-voice polyphony is selected). I found most of Maui's drum sounds to be excellent, although most of the instrument sounds are on the dull side. Also, there's no provision for onboard effects, which could help mask the deficiencies in these sounds.

A powerful Maui feature called SampleStore allows you to download 16-bit soundfiles into the card's RAM and to substitute these for any or all of the General MIDI ROM sounds. Because the downloaded samples are stored in volatile RAM memory, however, they disappear when you power down. You'll therefore need to reload them every time you turn your computer on, and there is no provision for automating this potentially time-consuming process. (Out of the box, Maui has only 256k of RAM, but, using standard SIMMs, this is expandable to 8 MB, and it can take several minutes to download that much sample data.)

Maui's bundled software utilities include Wave SE, which is one of the better PC soundfile editors on the market, offering advanced features such as sample-rate conversion, 4-band equalization, frequency analysis, loop editing, and time compression /expansion. The Wave SE owner's manual is generally well written and helpful; however, no tutorial is provided — a surprising omission, given the complexity of the program itself. It also includes a Patch editor that will allow you to edit the parameters of the Wavefront chipset and define your own patch set, which will automatically load up Windows boot-up.

Overall, I have mixed feelings about Maui. Certainly, if your current sound card uses low-quality FM chips, Maui provides a cost-effective alternative to scrapping the card and buying a new one, and will replace your cheesy synth sounds with significantly better ones. The Wave SE program alone is almost worth the $199 investment (Turtle Beach's identical Wave for Windows program lists for $149, so it's as though you're getting a sound card for just 50 bucks). I guess it's dilemmas like these that make life interesting.

—Howard Massey

For more information, contact Turtle Beach Systems, 52 Grumbacher Road, York, PA 17402. Tel: 717-767-0200. EQ free lit. #133.

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Geometry & Dimensions, Part 2

More on making your studio shape up

BY JOHN STORYK & BETH WALTERS

Geometry and dimensions. What to do with these two ways of thinking about sound?

Very simply, view the nature of sound in your project studio and the resulting shape and size as a function of two different types of analysis: wave and ray.

WAVE ANALYSIS

At lower frequencies (the ones subject to wave analysis), only the very proportions of the boundary pairs themselves will cause eigentones to proportion themselves in a unique spacing — unique to that distance between pairs of surfaces. If we assume that our room is rectanguloidal in nature (in fact, any room can be abstracted into a rectanguloid), then for any pair of walls the fundamental frequency can be expressed as F = C/W or 1130/2D, where D = the distance between the two boundaries (see fig. 1).

Multiplying this number by increasing integers will produce the associated harmonic eigentones (standing waves) for this room axis. Repeating this simple mathematical formula for the other two primary axes, and then plotting all these numbers, will give an early indication of whether or not there will be good frequency spacing. As you might expect, there are numerous ratio sets that will reveal reasonably good spacing. There is no one best ratio, although various theorists have been so bold as to suggest there is. One such list of good ratios is included here (see fig. 2).

Another approach is the famous Rettinger ratio plot (see fig 3). Convert one of the axes (typically the z, or height axis) to unity, and plot away! You will notice that virtually all the listed ratios in fig. 2 will fall within the plot blob. The important point to remember is that the axis ratios control the lower frequency response in the studio environment. If you can have control of this ratio design, *do so!* Often the best thing you can do for a small project studio is to actually make it smaller.

What should you do when the program, ergonomics, and existing conditions create a room with less than perfect proportions? Basically, all you can do is control the natural (or rather, unnatural) eigentone buildups and voids. Usually this is best done by low-frequency absorption, which essentially smoothes out the effect of the eigentones. It is similar to broadening the response of a notch filter. You still have the same frequency setting on the filter, yet its effect is smoother. Be careful not to introduce low-frequency absorption; at the same time, increase mid and high absorption. Surface treatments that will accomplish this successfully are helmholtz resonators, specialized surfaces such as Almute, tuned diaphragmatic membranes, and so on. However, nothing replaces trying to simply get the geometry of the room correct.

RAY ANALYSIS

At higher frequencies (subject to ray analysis), exact surface geometry and individual surface treatment are what count. A two-dimensional ray trace analysis will very quickly reveal where first-order reflections (commonly defined as the first few reflections of sound in a particular environment) will end up. Individual reflections must then be "weighted" by the amount of sound that will be reflected from a surface. Reflected sound is essentially the complement of absorbed sound energy. This is calculated (and thus defined) by measuring each unit surface area by its associated absorption coefficient, *a*. The absorption coefficient is a dimensionless percentage indicator from 0 to 1 (1.00 being the most absorptive) that

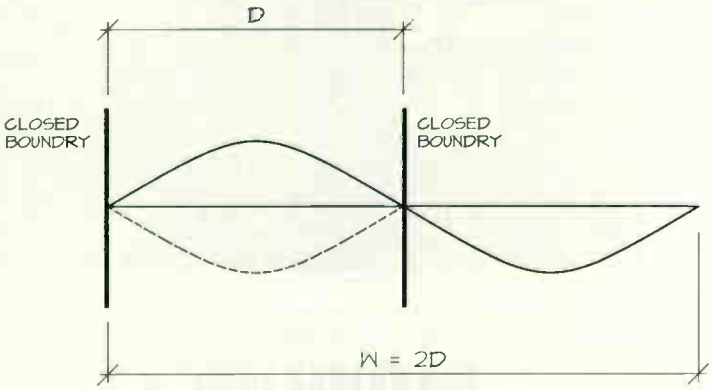

Figure 1: Fundamental eigentone (standing wave) development

Order	Length	Width
1	1.9	1.4
2	1.9	1.3
3	1.5	2.1
4	1.5	2.2
5	1.2	1.5
6	1.4	2.1
7	1.1	1.4
8	1.8	1.4
9	1.6	2.1
10	1.2	1.4
11	1.6	1.2
12	1.8	2.3
13	1.6	2.2
14	1.8	1.3
15	1.1	1.5
16	1.6	2.4
17	1.6	1.3
18	1.9	1.5
19	1.1	1.6
20	1.3	1.7
21	1.8	2.3
22	1.9	2.4
23	1.4	2.2
24	1.7	2.3
25	1.7	2.2
26	1.9	2.0
27	1.4	2.0
28	1.3	2.1
29	1.5	2.4
30	1.9	2.3
31	1.9	2.5
32	1.9	2.7
33	1.8	2.5
34	1.5	2.3
35	1.8	2.4
36	1.8	1.5
37	1.7	1.4
38	1.7	2.4
39	1.2	1.8
40	1.5	2.0
41	1.7	2.5
42	1.8	2.2
43	1.9	2.8
44	1.8	1.8
45	1.8	2.0
46	1.8	2.6
47	1.1	1.3
48	1.7	1.2
49	1.2	1.3
50	1.8	2.6

Height = 1 (unity)

Figure 2: Good room ratios list

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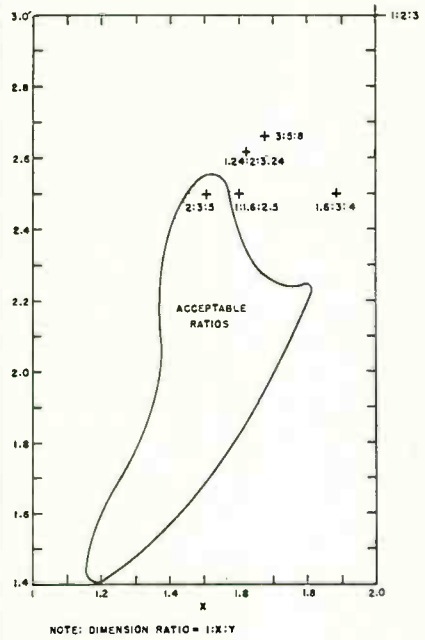

Figure 3: Rettinger room ratios plot

changes by frequency range. *Remember:* virtually all materials behave differently at different frequencies — basically an anthem in acoustics. Thus the exact geometry of sound rays and the surfaces that they meet *plus* the nature of the boundaries that they meet combine to allow or not allow reflections to propagate in a space on a frequency-by-frequency basis. We are trying to ensure that rays of sound (packages of sound energy) do not "pile up" unnaturally at specific locations in a room — e.g., at the mix position in a typical control room (see fig. 4). Computerized acoustic ray trace software allows computers to perform dozens of complex ray traces very quickly, with small changes for observation.

PUTTING IT ALL TOGETHER

With these two ways of visualizing the effects of propagated sound in an environment, we now try to answer our initial questions. Wave acoustics will reveal the best sets of ratios for rooms, while ray acoustics will assist in correctly angling walls and ceilings, as well as dictate which surfaces should be more absorptive than others, or less. Additionally, it will help us determine which surfaces want to be diffusive, and at what frequencies. As you think about the two concepts, you quickly realize there can be thousands of possible combinations of geometry and surface treatments for critical listening room design. Like all design problems, the task at hand is to turn as many variables as possible into invariables — or better yet, into assumptions. However, we usually have to start off with certain assumptions early in the design process:

Floor: It's pretty safe to assume that our room's floor will be flat and level. The final surface treatment for studio floors is usually a function of taste or function rather than acoustics. Even if the final floor surface is carpeted, it will still more than likely be reflective at lower frequencies. Floors and their surfaces can usually become a known design element early in the studio design process.

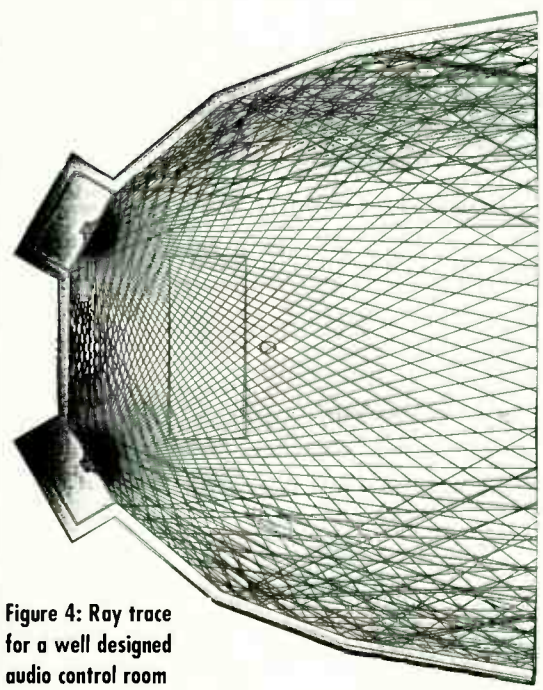

Figure 4: Ray trace for a well designed audio control room

Room Area: The required floor area for a studio space, again, is typically a function of almost anything other than acoustics. Likely reasons for floor area numbers are required program, available space, room ergonomics, estimated room population, and, of course, budget. Again, acoustics will not be the primary reason for establishing a room area.

Vertical Dimensions: In general, the more height you have, the better, and we usually can use more than we are given. There are several rea-

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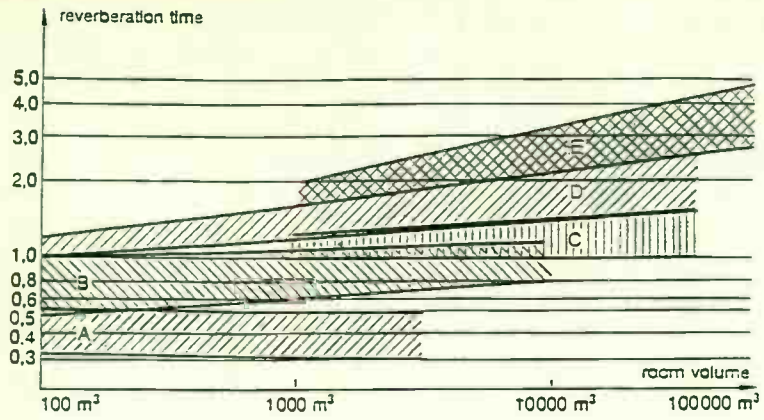


Figure 5: Reverberation (RT60) values for rooms as a function of size and use

sons for this. As you become more and more involved in studying acceptable ratios for critical listening environments in typical sizes of audio studios, you begin to note that heights on the order of typical room heights (i.e., eight to ten feet) are often insufficient for these required low-frequency room ratios to hold true. One of the first questions I will ask regarding a potential design site is the height of the proposed single-story spaces. Because we are typically limited by this dimension, it will often become the dictating guideline for a room size.

Ergonomics: At the end of this planning process, much will be revealed about the nature of the room — before even designing the first surface of the environment. Again, most of this design work is nonacoustic.

With the above assumptions determined along with other design parameters, the following simple approach is a good first step towards developing the size, shape, and surface treatment for a critical listening environment:

Room Ratio: Take the most critical room dimension (typically the height) and test the other dimensions as required for room area and configuration purposes by looking at desired ratios tables (fig. 2) or by plotting it on a room ratios plot diagram (fig. 3). If you use such a plot, you must convert one of the dimensions to unity. Again, this would typically be the height.

Ray Trace: Even without a computerized ray trace program you can still perform some simple ray trace exercises to determine some of the fundamental angle splays and boundary geometries. The goal here is to create as clean a listening pattern as possible with direct sound before secondary reflections "fill in" the ambience of the room sound.

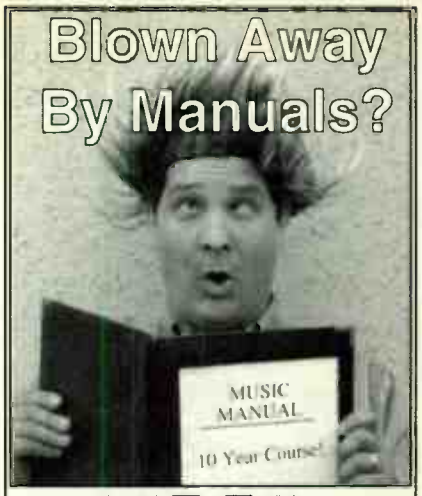
RT60: For larger rooms (approaching 600 square feet or more), a quick estimate of the required total room absorption is necessary. This is the RT60 formula in reverse — namely, At = .049/Rt60.

Target Rt60 values are usually a function of room volume. An example of one is shown in fig. 5. What this calculation will quickly give you is a rough idea of the amount of total absorption you will need. You have to adjust the square footage of this amount by the coefficient of absorption for the type of material you are using, but for broadband midfrequency panels, one could use .9 for this value (i.e., 1 sq ft of panels delivers .9 units of absorption of .9 sabines). Be careful not to use too much absorption in a room, as too much will control reflections but also make the room too dead, and thus quite unnatural.

Treatments: The final step is to correctly select and place the surface treatments to satisfy the design requirements that have been developed in the steps above.

Remember, all rooms are three dimensional. Thus, ray trace analysis and resulting treatment placement need to be developed in plan as well as in section for any room. This is a very basic design guideline and assumes that after a room shell is created, we will achieve the desired internal acoustics via applied surface treatments. This is the simplest method to begin with; the fun starts when things aren't so ideal, such as when you don't have optimum height vs. room area ratios, or when there's a need for a great deal of glass in the listening room.

Good luck designing. Pay attention to details. EQ



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ACROSS THE BOARD

continued from page 130

(the output from the Sony converter box) to AES (the input to all of the other gear).

Now comes the coolest addition to the mix stack: The problem with 20-bit mixes is that there is almost nowhere to store them. Until recently you could store your mixes on a Mitsubishi X-86 or a specially modified Sony 3402-X (extended version), both of which are no longer available. Sonic Solutions and Digidesign are among the Mac-based digital audio storage devices that will allow 20-bit storage, but it sure eats up hard disk space quickly when you need to save multiple versions of each mix.

I thought it would be great if you could use four tracks of a Tascam DA-88 to store two channels of 20-bit audio. Rane is getting into digital audio, so I asked my friends there if they would be interested in designing a box that would perform this task. They said yes, and I just got the prototype yesterday. I plugged the AES cables from the SBM into one end and the DA-88 into the other end, and that was all there was to it. I record my mixes to the DA-88 and play them back just as if they were on a DAT tape, but I am not stuck with 16 bits any more. I also don't have to rent a $25,000 digital machine that needs $200-per-roll tape.

The Sony PCM-9000 is supposed to be the replacement for the Sony 1630. The 1630 is the format that is used by every CD plant for submission of CD master tapes. Sony hopes that all mastering facilities and CD pressing plants will switch over to the new system. Each disk holds up to 84 minutes of 24-bit audio. Optical discs are also not as prone to errors as much as 1630 tape is. Until the price comes down below $40,000 I probably won't be getting one for my personal use real soon.

Finally, there is the SADiE hard disk system, whose development I have been watching for about two years now. I have been more impressed each time I have seen the system. Masterfonics in Nashville uses it for all their mastering chores. Mixes are uploaded to SCSI hard disks, where they are EQ'd, level-corrected, and sequenced, and then squirted onto 1630 tape or a write-once CD. Editing with the system is unbelievably fast and intuitive. It makes all of the other systems look medieval by comparison. The software development and support at SADiE is the best I have ever seen anywhere.

Anyway, because Masterfonics uses a SADiE system for mastering and we plan to master there, it seemed a good idea to print mixes directly into the SADiE system. We could make level changes, set the spacing between tracks, decide on the side order, and then just send one of the removable SCSI drives to Masterfonics. They would not have to spend any time uploading the mixes into their system; they would simply plug in the hard disk and press Play. That's a few hours of mastering time that would be saved right there. There would actually be two digital transfers that wouldn't have to be performed: our downloading to some transportable media and their uploading. And wanting to remain 20 bits would have added the wrinkle about what format to use for storage.

So here we are, up to our eyeballs in digital bits again. We should have plenty of choice formats filled with 20-bit information to feed into the SBM/UV-22 comparison later this month. If I live through that one, I will tell you about it in my next column. EQ

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More New Toys

Keeping my head afloat in uncharted waters where the digital sharks byte

BY ROGER NICHOLS

Two cool topics for this month. First is a trip to Buenos Aires for the first annual South American Pro Audio Expo. Rane, Alesis, Audio-Technica, Sony, JBL, and a host of other pro audio companies exhibited their wares. I was there to do seminars on digital audio. It was a lot of fun, but it was also a lot of work.

Because we were in a predominately Spanish-speaking country, the seminar needed to be in Spanish. Well, Spanish not being my bag, it took two translators because of the technical nature of the subject. It took me a while to get used to the pace of pausing for the translation.

I was very surprised by the interest in digital technology and by how hard some of the questions were. One of the seminar participants said she was interested in the difference between straight PCM and Delta Sigma conversion techniques. After I picked my jaw up off the floor, I did my best to answer without stuttering and stammering.

After all the votes were in, the show went pretty well, and plans are already being made for another show in November. It will be a challenge to learn some Spanish between now and then. I would like to find out if the Japanese equipment manuals are just as hard to figure out in Spanish as they are in English.

MIX-A-MANIA

Topic number two: I just started mixing Walter Becker's solo album — you know, the one I've been working on for the last year or so. We finally finished the recording and spent two days setting up the studio for mixing.

I've talked before about mixing to multiple formats, and this project is no exception. In one stack is my set of Apogee converters, the Marantz CD-R 610 CD recorder, a Fostex D-30 timecode DAT machine, and a Sony MZ-R2 portable MiniDisc recorder. In the other stack is a prototype of Sony's new 20-bit A/D and D/A converters, a new improved version of Sony's Super Bit Map Processor, a prototype box from Rane called the Paq Rat, a Tascam DA-88, a SADiE hard-disk recorder and editor, and a Sony PCM-9000 24-bit optical disc recorder. Now for the details.

I had my D/A 500 Apogee upgraded to a D/A 1000-20. This is the current hot 20-bit version of Apogee's digital-to-analog converter. I was going to get a prototype of the new 20-bit A/D with built-in UV-22 processing; it wasn't ready in time, though, so I will have to stick with my A/D 500, which is an 18-bit converter and actually sends out 18 bits in the AES stream. The Apogees were feeding the Marantz CD-R machine, the Fostex D-30, and the MiniDisc. This was our 16-bit stack.

The Marantz 610 is an upgraded version of the popular Philips-based CD-R machines. The 610 has full AES in and out as well as coax and optical S/PDIF interfaces. There is also a remote that adds the ability to control multiple units. Walter had another Marantz in his hotel room to play back mixes from unfinished CDs.

I have owned a Fostex D-20B timecode DAT machine for about five years. It has been an unbelievable asset. When Fostex D-10 DAT machines first came out six months ago, I got a pair because of their editing capabilities, memory play, and superaccurate metering system. I wished that the features available in the D-10 were available in the D-20B. Bingo! Fostex introduced the D-30, which does everything the D-20 and D-10 do, plus more. I hope to do a full review of it soon.

Why the MiniDisc? We use the MiniDisc to play mixes back in the car, instead of using cassettes. A couple of times Walter took the player and jogged around the block while listening to a replay of a mix. It is a good thing the tunes weren't any longer or we would have had to follow him with an ambulance.

Now on to the 20-bit stack: Heading up this side is a box that looks as though it is actually a Sony 1630. Big, heavy, and expensive looking. It turns out that Sony has been taking its Super Bit Map (SBM) processor around for people to try, and there has been a big discrepancy in the quality of the 20-bit source material. Sony decided to hand-build a couple of 20-bit converter boxes to send with the SBM processor so that converter differences would not add other variables to the equation. Since the processor was built in a 1630 box, it has the 1630 meters built right in. This is a very accurate metering system and is basically the standard for CD production. They also make the meter package as a stand-alone box called the DMU-30. I use it to monitor digital levels whenever I mix to anything.

On top of the Sony converter box is the Sony SBM processor. When we get to the end of these current mixes, we will listen to the 20-bit mixes through the SBM and compare it with the Apogee UV-22. The new software for the Sony SBM has apparently been greatly improved, but I haven't heard it yet. I'll let you know next month. Right now we are just using the SBM box as a format converter from SDIF-2

continued on page 128

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