

DIGITAL RADIO—WAVE OF THE FUTURE

AUDIO

EXCLUSIVE
INTERVIEW
MARC AUBORT
MASTER OF CLASSICAL
RECORDING

THE EQUIPMENT AUTHORITY
SEPTEMBER 1994

**TESTED IN
THIS ISSUE**

**SWEET
NEWCOMER
AYRE V-3 AMP**

**BASS ON A
BUDGET
B.I.C V-12
SUBWOOFER**

**THE NEW KING?
PASS ALEPH O
AMP**

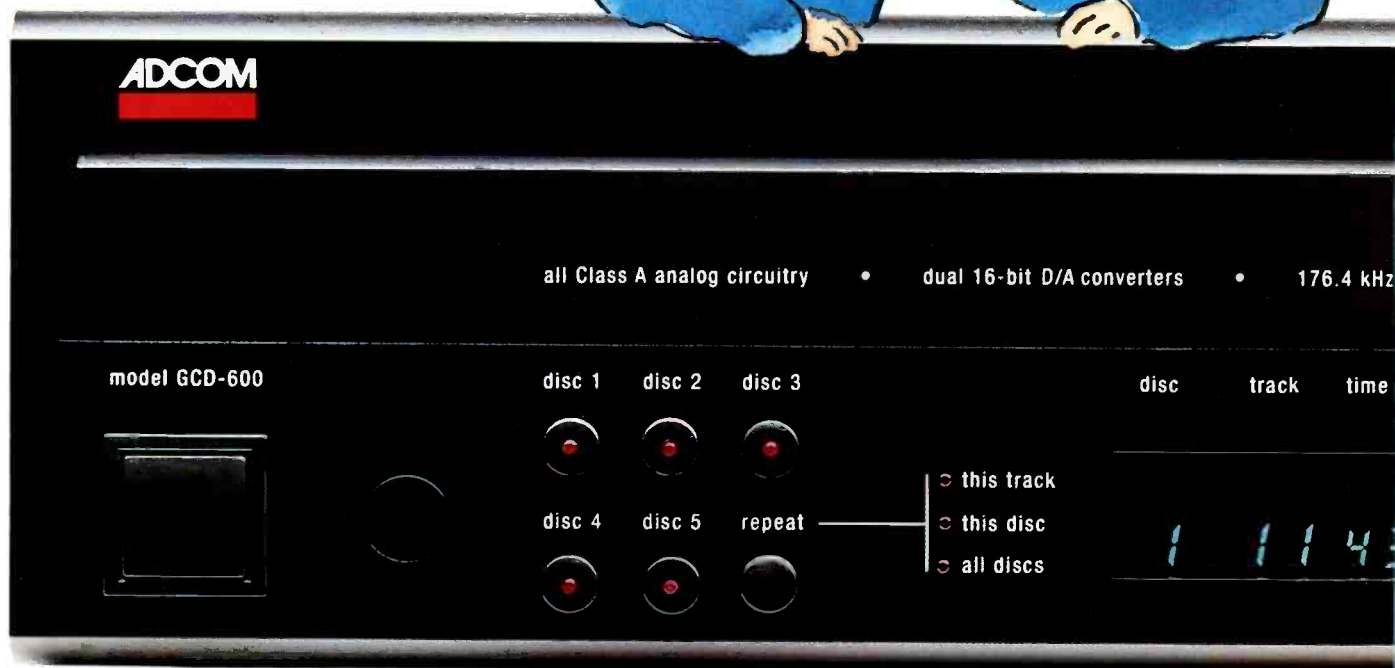
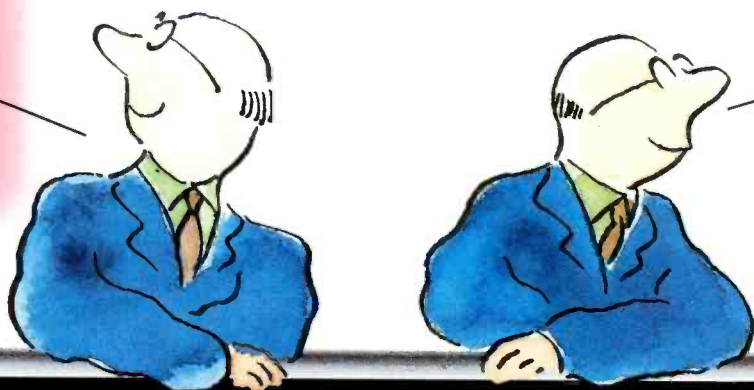


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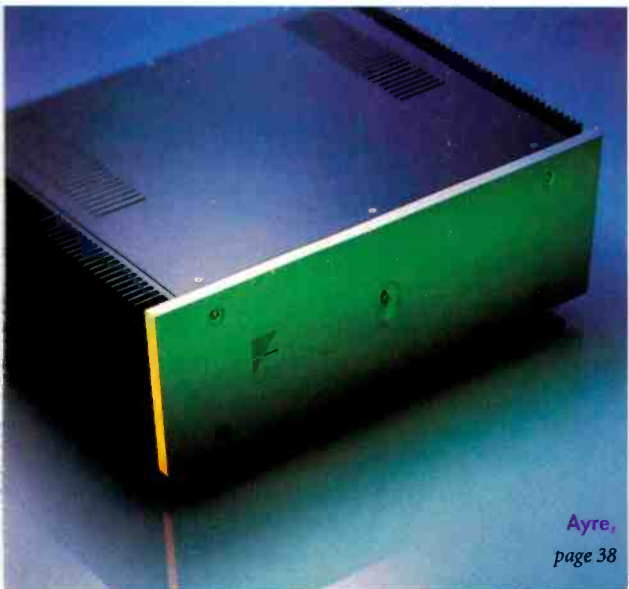
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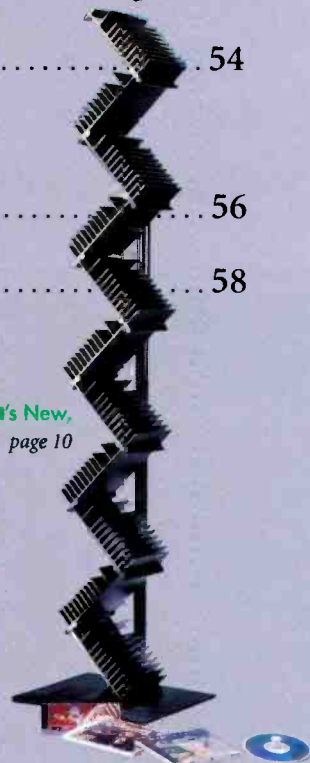
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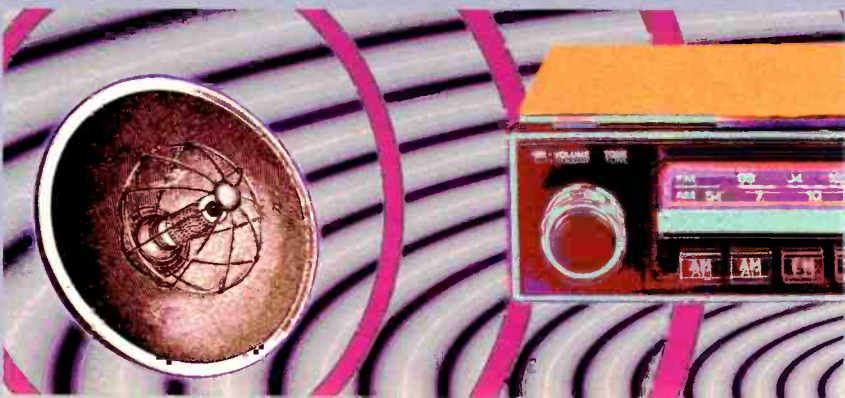


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THE STYLOS

UNTIL NOW, high resolution sound reproduction meant sacrificing space. Until now, placing a speaker near a wall meant sacrificing the quality of sound. Who else but Martin-Logan could take electrostatic technology to a realm where music has never been before?



ON THE WALL

The standard wall-mounting kit includes brackets and a full-size poster of the Stylos that clearly marks the placement of the wall anchors (stud location is not necessary). A plumb alignment tool is integrated into the poster to ensure accurate installation.

AGAINST THE WALL

Using the optional base, the Stylos can stand against the wall, yet remain moveable. This is ideal for apartment living and allows easy repositioning as new demands arise. The Stylos is also the perfect addition to a home theatre system.

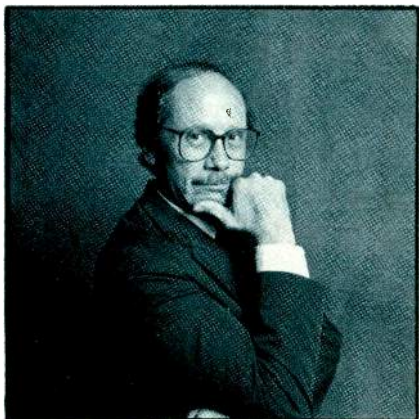
IN THE WALL

The Stylos can be built into a wall requiring vertical space of approximately 5 feet and a width of 14 inches. The designer scrim, which is included in the optional installation package, can be painted to match your decor.

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The 1994 Summer Consumer Electronics Show (SCES) is supposed to be the last Summer Show or, alternatively, the last Show in Chicago. At least, that's what almost everybody thought late last Spring, as they got ready for the '94 SCES in Chicago.

Indeed, the Electronic Industries Association's Consumer Electronics Group (EIA/CEG), which puts on the twice-annual shows, had announced on March 30, 1994, that they had arranged with the Pennsylvania Convention Center in Philadelphia for 1995 show dates of Thursday, May 11th, through Saturday, May 13th. Earlier on, both New York City and Atlanta had been mentioned as possible sites, and several alternative Spring dates were suggested.

More importantly, the EIA/CEG had renamed the May Show "CES Interactive '95" to demonstrate its interest in doing shows for such computer and video game stalwarts as Nintendo, Disney Software, WordPerfect, Time Warner Interactive, Konami, and Compton's New Media, who have signed for Philadelphia. "So much for hi-fi..." seemed to be the message. And perhaps the Show people were right, what with the big exhibitors withdrawing from the main floor of McCormick Place and even from having "hospitality suites" in various hotels in downtown Chicago. The most recognizable electronics industry names on the main floor were Recoton and RCA/Thomson.

The attendance at this last Chicago Show was very low, only 36,964, the lowest since

1970's 36,100. The number of buyers, that all-important category, was only 8,905 according to the EIA/CEG. The hi-fi industry's cynics, i.e. the press corps., were quoted in "Audio Week," a trade newsletter, as repeating barbed names for the Show including "CES Lite" and "CES Jr."

Ironically, the folks in the Speciality Audio group, the ones in the Hilton in Summer and in the Sahara in Winter, had enough traffic, they felt, to want to talk to the EIA/CEG people about holding a Show in the Hilton for them in June of '95. Thiel's Kathy Gornick, one of those most committed to the concepts associated with high-end equipment, told me after the Show that this group could field a Summer Show by getting 50-plus exhibitors. Having lived in both Chicago and Philadelphia, let me say that I'd rather listen to Chicago blues than to W.C. Fields' jokes about preferring to be in a grave than in the City of Brotherly Love.

And if that potential Show weren't enough, Ken Furst of the Home Theater Industry Assn. has announced a show at the Meadowlands Hilton, Secaucus, N.J., March 10 through 12, 1995, and there is another video game-oriented show set for exactly the same dates as the EIA/CEG's Interactive '95. The Electronic Entertainment Expo will be put on in the Los Angeles Convention Center by Infotainment World and Knowledge Industry Publications.

For myself, I rather liked the "moderate traffic" and "manageable number of exhibits" in the Hilton. I was able to get around to a greater proportion of the rooms. One item that pleases me no end was the renewed distribution in North America of Opus 3 records by May Audio. I use several of Opus 3's well-recorded discs to evaluate speakers for potential review, and find they stand up well to the necessarily repeated listenings.

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Clear Days on the Cable Scene

Dear Editor:

In this column in January, Roy Allison's letter defending the view that all speaker cables sound alike resurrects the classic live versus recorded demonstrations given by AR and Dyna 25 years ago. Listeners either could not hear any difference, or (when they heard differences) could not decide which was which.

To Mr. Allison, this implies the reproduction was substantially uncompromised. Actually, there is another, far more-likely conclusion: The sound of the room masked the differences between live sound and its reproduction.

This can be demonstrated by using a high-quality equalizer to flatten the system's response, first in a neutral-to-dead room, then in a very live room. Even if the steady-state response in the live room is flat, the room's colorations are still plainly audible. (This is fact, not theory. I have done this.)

A live-versus-recorded demo is not the most exacting test of reproduction. Although it is philosophically valid (we want to see if the reproduction matches the original), there's no way of ever making the test practically valid, because the room acoustics swamp most differences—including differences in speaker cable.

Implicit in Mr. Allison's naive acceptance of the near perfection of late-'60s sound reproduction is the conclusion that there has been no real advance in speaker quality since the AR-3. (If live versus recorded is the most exacting test, then any speaker which passes must be so near absolute perfection that it can't be meaningfully improved.) This is patently absurd! Does Mr. Allison believe there's no worthwhile difference between AR-3s and my Apogee Divas?

*William Sommerwerck
Bellevue, Wash.*

Roy Allison replies: I didn't literally say all speaker cables sound alike, but something close: I applauded Fred Davis' scholarly ar-

ticle on the subject, in which he pointed out that some cables, when used with certain amplifiers and speakers, can cause changes in system response that are "at the threshold of audibility."

I also reported the outburst of delighted laughter which greeted Edgar Villchur's description, in his talk at the annual Boston Audio Engineering Society meeting, of the equipment used in AR's live-versus-recorded concerts; after pointing out he couldn't afford to use anything that might compromise the system's performance, he listed 18-gauge zip cord as the speaker cable. Some members of the audience were present at one or more of these concerts (I, among them), and we knew the performance was not audibly compromised. It is a fact most of the switches between live and recorded music were not detectable.

What does this prove? It demonstrates that the combination of the anechoic recording and all of the equipment used (including the AR-3 loudspeaker and the speaker cables), with very precise level matching, was able to inject into the benign acoustic environment of Carnegie Recital Hall (and other halls used in the series) an acoustic power spectrum audibly indistinguishable from that of the live instruments of the Fine Arts Quartet. That is the most exacting test for that kind of environment, and AR-3 speakers were indeed up to it. A pair of these classic loudspeakers is on permanent exhibition at the Smithsonian Institution.

Mr. Sommerwerck is wrong when he states I must believe there have been no real improvements in speakers since the AR-3. There have been significant improvements in the performance of speakers in the home environment. In the concert halls the speakers were close to the musicians, well away from walls. The only large surface nearby was the stage floor, and its effect would have been the same on the live instruments as on the speakers. We know now that the enforced proximity of loudspeakers to domestic listening-room surfaces causes large changes in middle-bass

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In fact, the most acoustically correct location for the tweeter is precisely at the *center* of the woofer. This strategic placement creates a single sound source, allowing high and low frequencies to reach your ears at the proper time, regardless of where the speakers are placed or where you are sitting. (No wonder KEF's patented Uni-Q® is the technology of choice for advanced Home Theater applications.)

Perhaps the greatest benefit of the KEF Q Series speakers is that they sound as good in your home as they do in the showroom.



output. AR-3s would not perform as well in a living room as they did on stage. We also know how to deal with this; for example, my own company, RDL, makes a variety of models each designed to perform in a different room location.

Another way in which speakers are better than they were in the '60s is in improved dispersion of tweeter output, which is more important in a small room than in a hall.

Finally, I cannot agree with Mr. Sommerwerck that live-versus-recorded tests

are not valid because "room acoustics swamp most differences." Following his argument to its extreme: Since home listening rooms have a much stronger acoustic signature than does a good concert hall, we should be insensitive to much larger sound differences at home—perhaps even differences among speakers. But we can detect very subtle differences in either live or reproduced sound, in spite of the strong influence of the room. The trick is to make speakers work with the room acoustics, not against them.

Kudos to Whyte & Fisher

Dear Editor:

Learning of Bert Whyte's death was a real heartbreaker for me. Bert goes back to my "salad days" at Mercury when Bob Fine, George Piros, and myself were producing the original "Living Presence" stuff in Chicago, Minneapolis, Rochester, and Detroit. This was in Bert's Magnecord days, and I remember when he brought his staggered-head Magnecorder to Orchestra Hall in Chicago for the December 4-6, 1952 sessions. He did an experimental stereo taping of the Rafael Kubelic performance of Smetana's "Ma Vlast" simultaneously with our mono pick-up, which was our first shot with the Schoeps lognette-style microphone (single, of course!). Bert was also with us on one of the early Paul Paray/Detroit Symphony sessions when I insisted we use the old Orchestra Hall (it had then been turned into an African-American church and had a magnificent choir). I also had the fun of doing some behind-the-scenes work on Bert's Everest project (I did the notes for some of the releases). Bert was slated to be managing editor for the still gestating *Stereo Review*, but *force majeure* kept him from carrying through. He was directly responsible for my association there, which began with Vol. I No. 1 and still continues.

I associated with a lot of colorful characters at Mercury—John Hammond, Mitch Miller, Norman Granz, and Nat Shapiro. Believe me, Bert was right up there with the best of them, even if not officially part of the Mercury crew. Everything that was said in your June issue was right on target!

Avery Fisher was also one of my early friends and colleagues when "hi-fi" really got going. I owned a custom-built Philharmonic in 1942 and it stayed with me in various bits and pieces for a very long time.

By the same token, I still own the speaker enclosures and Pickering electrostatic speakers that I bought from Bert in 1957. Only when the Origin I Wharfedale cones gave out two years ago, as a result of the Maine climate, did I get replacement drivers. So Bert is here still as a material presence, so-to-speak. Needless to say, with Bert and Ruth, none of us went away hungry or thirsty! Thanks for the memories!!

David Hall
Castine, Maine

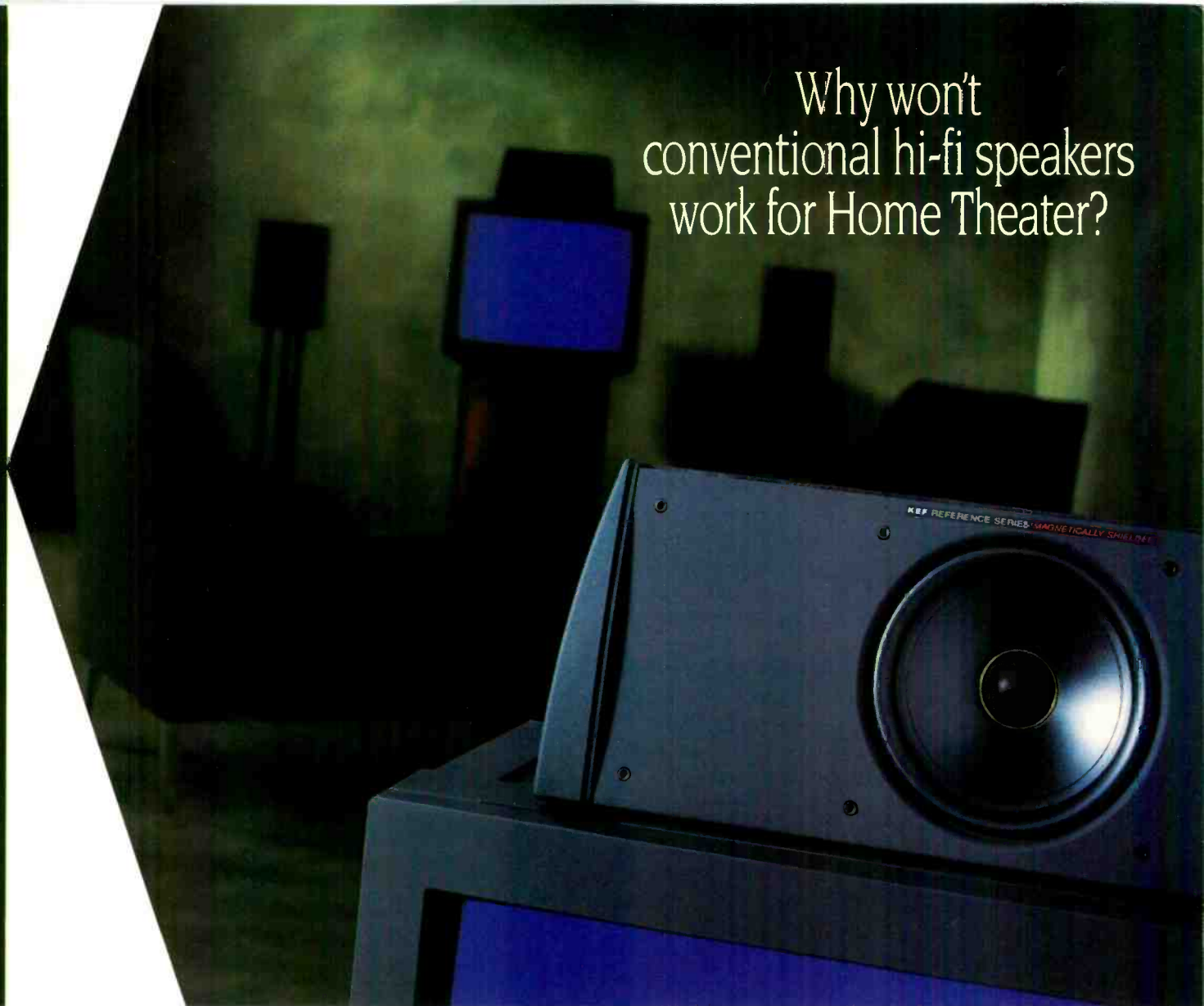
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Yakov Aronov Audio Lab, Inc. logo and "MADE IN U. S. A." text are at the bottom.

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WHAT'S NEW



Proton Amp and Preamp

The Proton AP-2000 preamp and AA-2120 amp can be linked by a cable that turns the amplifier on and off. The preamp features bass and treble controls with bypass, a switchable bass equalizer for compact speakers, a switchable (75/150 Hz) subwoofer output, separate

record and listen selectors, and a low-noise, high-gain phono section. The amp is a dual-mono design, delivering 120 watts per channel with 2.5 dB of dynamic headroom and 0.01% THD. It featured dual peak-level power meters. Prices: AP-2000 preamp, \$300; AA-2120 amp, \$700.

For literature, circle No. 100

Surge Control, Ltd. Surge Protector

Designed to protect electronic equipment against voltage surges, the Surge Control SPW-120 is built into an electrical wall outlet for greater convenience and has automatic reset. The multi-stage design is said to exceed ANSI/IEEE

C62.41 Category 2 specifications, and is UL-listed and CSA-certified for 15 amperes at 120 V. It is available in a hospital-grade, isolated-ground version as well as the standard version shown. Prices: Standard version, \$53; hospital version, \$63.

For literature, circle No. 101



Cello Preamplifier

The Encore Line Preamplifier uses Cello's proprietary, 59-step precision volume control and other premium components. It provides one balanced and four unbalanced line inputs and two tape monitors; moving-magnet and moving-coil phono inputs sections are optional. The one balanced and two unbalanced outputs can be used simultaneously. Tape outputs



can be switched off at the front panel, to eliminate loading effects from connected equipment not powered up or in use. The "Mode" control includes a

reverse stereo position. Finish is silver anodized. Prices: Preamp, \$8,000; phono sections, \$2,000 each.

For literature, circle No. 102

La Scala CD Racks

The sculptured, stepped designs of the aluminum La Scala-88 series CD racks give them reasonably high capacity in minimum space. The 143-disc LF-S-11 and 53-disc LT-S-4 shown are only two of the four models available. Prices: LF-S-11, \$159.98; LT-S-4, \$59.98.

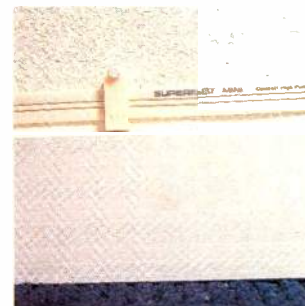
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Monster Cable Speaker Cables

Designed for easy concealment, Monster SuperFlat and SuperFlat Mini speaker cables are flat and pliable for easy routing, and have repaintable white jackets. SuperFlat is AWG #12, while SuperFlat Mini is 16 gauge. The cables may be tacked down with supplied adhesive dots or mounted with optional SuperFlat Corner Trim cover plates and Monster Clamps-Flat. Prices: SuperFlat, \$1.50/ft.; SuperFlat Mini, \$0.75/ft.; Corner Trim, four for \$4.95; Mini Corner Trim, four for \$2.95; Monster Clamps Flat, 40 for \$9.95.

For literature, circle No. 104



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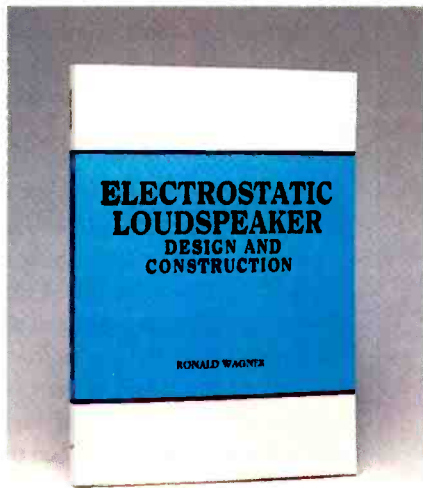
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Electrostatic Loudspeaker Design and Construction

Ronald Wagner

OLD COLONY SOUND LAB,
243 pp., softcover, \$19.95.

I reviewed an earlier edition of this book in the January 1991 issue of *Audio*. At that time, it was published by TAB Books; it is now available from Old Colony Sound Lab, a division of Audio Amateur Publications, which publishes many books on audio as well as the magazines *Audio Amateur*, *Glass Audio*, and *Speaker Builder*. This book is still the only one dedicated to the design and construction of electrostatic loudspeakers. Anyone who desires to know more about electrostatic loudspeakers, or how they are constructed, should have a copy. I'm glad that Audio Amateur Press has decided to republish it.

This new, second edition follows the first edition very closely. It has a total of 243 pages compared to 248 pages in the first edition, and the page numbers are identical except near the end. A paper by C. I. Malme, "A Wide-Range Electrostatic Speaker," has been eliminated, but a very

comprehensive bibliography has been added that includes the Malme paper. In the interest of economy, the book has been photocopied from the original, so the typographical errors of the first edition are retained. To remedy this, an Errata section has been added at the end. In my original review, I found an error on page 13; while discussing Fig. 1.13, which shows the lens of the Beveridge speaker, the text of this second edition still describes the channels of the lens as being designed in such a way "that their effective sound paths were equal." In the earlier review, I mentioned that the word "equal" should be "unequal," and this correction is picked up in the Errata section.

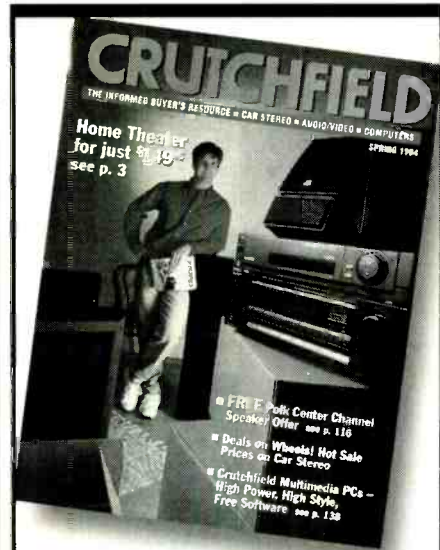
The author, Ronald Wagner, intends the book to be a reference about electrostatic loudspeakers and a guide for building them. The book has historical information and general information on radiation of sound, loudspeaker parameters, and measurements, but most of it deals with electrostatic loudspeaker theory, construction, and testing. There is also detailed information on the famous Quad and Acoustat electrostatic loudspeakers, a three-page Appendix that contains a list of all the parts needed to build the full-range electrostatic loudspeaker described in Chapters 5 through 13, and a two-page Index. The historical information included in Chapter 1 is very interesting and useful because it covers specific in-

ventions, providing the inventors' names, dates, and patent numbers for anyone interested in investigating them further.

For still more details about this highly recommended book, refer to my original review. (Old Colony Sound Lab, Audio Amateur Publications, 305 Union St., Peterborough, N.H. 03458; add \$3 shipping and handling; phone, 603/924-6526.)

Edward M. Long

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First, surround signals came from stand-alone decoders, then from surround circuitry in amplifiers, receivers, and the occasional TV set. Soon, it may be everywhere. Earlier this year, Pioneer showed a prototype LaserDisc player with built-in surround, while Yamaha has announced production of a surround-equipped cassette deck.

Yamaha's KX-W582 uses DSP technology to generate surround signals from stereo program material. This doesn't just work in playback; recordings made with the DSP circuit are said to yield "three-dimensional" effects when played on personal portables or car stereos.

The prototype LD player shown by Pioneer incorporated Dolby Surround Digital (DSD) circuitry for playback of future DSD LaserDiscs.

All production DSD decoders will also be equipped to decode today's Dolby Pro Logic surround tracks. The "5.1-channel" DSD system, which produces discrete digital signals for three front and two surround channels plus a subwoofer uses Dolby Laboratories' AC-3 perceptual-coding system. The AC-3 system has also been selected for the soundtracks of the U.S. HDTV Standard and for at least some new digital cable TV systems, and an AC-3 decoder chip is already available from Zoran Corp.

Pioneer is proposing that DSD LaserDisc be accepted as a Standard by the Laser Disc Association in the U.S., as it already has been by Japan's Laser Disc Association of the Pacific. As now proposed, DSD LaserDiscs would include today's CD-compatible digital soundtracks plus one channel of analog sound; thanks to AC-3's bit compression,

the DSD digital signals would fit in place of the other channel of the analog track.

However, Digital Theater Systems, a rival of Dolby's in the movie-theater world, has proposed an alternate system, using a six-channel soundtrack that would replace the digital soundtracks on current LaserDiscs.

Brief Notes

- The U.S. audio market, long in the doldrums, has had its best first quarter since 1989, according to the Electronic Industries Association. Sales of audio components rose 4.1% over the first quarter of 1993; sales this March were 14.5% over the previous March figures. Aftermarket autosound grew even faster, though, with sales up 30.8% for the quarter and 47.4% for March, the highest monthly growth on record; most of this rise was due to increased sales of in-dash CD players.

- Lux, of Japan, has now been purchased by Samsung, a Korean company. The Samsung group, with annual sales of \$54 billion, is ranked by *Fortune* as the 18th largest industrial company in the world. More to the point, Samsung has built up substantial research and development capabilities, which should benefit Lux. The distribution of Luxman audio components will continue unchanged.

- Worldwide sales of pirated music recordings declined in 1993, according to the International Federation of the Phonographic Industry, more than offsetting the previous year's rise. But record piracy is still big business: Even after the drop, bootleg sales amounted to \$1.9 billion—nearly 6% of the total world market for recordings.

- Hitachi increased optical-disc recording density a hundredfold by replacing conventional laser lenses with fiber optics. The experimental optical system can reduce the laser spot to about a 10th that of today's laser pickups.



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EDWARD TATNALL CANBY

BASS FOR A BATTLESHIP



One of the names of the audio game is bass, right? We hear about big bass right and left all the time and, all too obviously, we experience it too, if mostly radiating hugely from cars.

"Bass" indeed is an interesting concept in itself. It is relatively new, scarcely existing as a separate entity until recent years, though universally present in music through the ages.

I left off my intermittent personal history of audio a few months back with bass on my mind, slightly exaggerated. My first experience with *real* bottom sound out of a loudspeaker was with the help of a 6-foot flat baffle for the speaker unit removed from my 1930s Midwest radio. (Not 7 feet, as I had said.) Big enough, though, for all the bass that speaker could produce, and more than I had ever heard before. Recent

events, more than a half century later, impel me forward into questions concerning bottom sound today. What *is* bass in terms of our present communication? What does it do for the many arts of reproduced music? (I include percussion instruments, an area where exact pitch is minimal, as well as other music where precise pitch is crucial to musical sense.)

I ran into my first subwoofers—early models—seven or eight years ago while visiting a computer mogul who, having programmed something that went to Mars, took his millions into hi-fi, bought an old 'Frisco house, converted the entire basement into a home sound theater

(sound only) complete with a pair of BIG subs and enough wattage to shake a battleship (or the entire house, which it did). Was I impressed? Yes, but as I now recall it was not so much by the subwoofers as by the whole immense and expensive system, which was superb—even the acoustics were excellent.

Yes, we talk about bass and subwoofers, as though a thing separate. Not true—except in audio! Physically separate, in our equipment and notably in the subwoof, which now is often self-powered to keep it out of the way of the lesser power required to run the rest of the system.

So bass is now a separate thing. Accordingly, we contrive to *create* a separate bass sound—what else? Quite inevitable. Brand-new sound, music, or whatever, that provides optimum bass for audio listening.

So you see, steam locomotives are no longer the ultimate in sound power for us though surely the mostest in actual close-up acoustic shove. Rockets, nuclear explosions, and such, are louder but further away. "Natural" sounds just aren't enough for us today. We have to synthesize an even bigger impact.

Hence all that incredible noise that boom booms out of sealed automobiles! We have made ourselves an art to fit.

Frankly, I find it awful, especially at 4:00 on a Sunday morning out-

**BASS TODAY IS A
SEPARATE THING,
AND WE CONTRIVE TO
CREATE A SEPARATE
BASS SOUND—WHAT ELSE?**

side my apartment window in New York, or when stuck driving on the ex-West Side Highway with a blasting car in the next

lane, only feet away. But then, I'm in my late stages and people my age get crotchety about too many decibels. So have your fun, folks, and take in my thought: If specific low-frequency loudness is your thing, you will find it best in audio created for *you*. Natural bass, bass as a part of something else, is no longer enough.

Illustration: Teofilo Olivieri



Soundgarden—Superunknown. Title cut, *Spoonman*; *Let Me Down*; more. (A&M) 475•186

Counting Crows—August And Everything After. *Mr. Jones*; *Round Here*; *Time And Time Again*; *Sullivan Street*; *Rain King*; more. (DGC) 467•944

Tom Petty & The Heartbreakers—Greatest Hits. *Free Fallin'*; etc. (MCA) 474•411

Bonnie Raitt—Longing In Their Hearts. *Love Sneakin' Up On You*; *You*; etc. (Capitol) 477•505

"8 Seconds"—Orig. Sndtrk. (MCA/Nashville) 475•483

10,000 Maniacs—MTV Unplugged (Elektra) 469•775

Reba McEntire—Grt. Hits, Vol. Two (MCA) 467•316

Gin Blossoms—New Miserable Experience (A&M) 463•737

Nine Inch Nails—The Downward Spiral (TVT/Interscope) 476•739

Sheryl Crow—Tuesday Night Music Club (A&M) 476•531

Various Artists—All Men Are Brothers: A Tribute To Curtis Mayfield (Warner Bros.) 474•155

Confederate Railroad—Notorious (Atlantic) 475•194

Bryan Adams—So Far So Good (A&M) 467•738

George Strait—Easy Come, Easy Go (MCA) 467•308

Billy Joel—River Of Dreams (Columbia) 463•695

Beck—Mellow Gold (DGC) 476•721

Bob James—Restless (Warner Bros.) 476•309

The Beavis & Butt-head Experience—Featuring Nirvana, Aerosmith, etc. (Geffen) 472•852

Columbia House. The Face of Rock.



Various Artists—Rhythm, Country & Blues (MCA) 474•536

Guns N' Roses—The Spaghetti Incident? (Geffen) 472•837

Various Artists—Common Thread: Songs Of The Eagles (Giant) 469•999



Pearl Jam—Vs. (Epic/Associated) 465•427

Heart—Desire Walks On (Capitol) 471•292

Van Halen—Live: Right Here, Right Now (Warner Bros.) 454•470/394•478



Ace Of Base—The Sign (Arista) 468•108

Meat Loaf—Bat Out Of Hell II: Back Into Hell (MCA) 458•232

Alice In Chains—Jar Of Flies (Columbia) 471•979

Nirvana—In Utero (DGC) 467•159

"Philadelphia"—Orig. Sndtrk. Featuring B. Springsteen, N. Young, P. Gabriel, etc. (Epic Soundtrax) 472•928

Green Day—Dookie (Reprise) 476•549

Richard Marx—Paid Vacation (Capitol) 474•973

James—Laid (Mercury) 467•761

Various Artists—Greenpeace: Alternative NRG. Featuring R.E.M., U2, Soundgarden, UB40, more (Hollywood/Greenpeace) 478•750

Hancock/Shorter/Carter/Williams/Roney—A Tribute To Miles Davis (Qwest) 476•382

The Cranberries—Everybody Else Is Doing It, So Why Can't We? (Island) 465•559

Blackhawk (Arista) 473•397

Elton John—Duets (MCA) 472•845

Tori Amos—Under The Pink (Atlantic) 473•207

The Breeders—Last Splash (Elektra) 465•351

Sammy Hagar—Unboxed (Geffen) 478•107

Neal McCoy—No Doubt About It (Atlantic) 474•619

Faith Hill—Take Me As I Am (Warner Bros.) 473•728

"Philadelphia"—Orig. Sndtrk. Featuring B. Springsteen, N. Young, P. Gabriel, etc. (Epic Soundtrax) 472•928

Stanley Jordan—Blue Light 'Til Dawn (Blue Note) 471•656

Mark Chesnut—Almost Goodbye (MCA) 463•273

Clay Walker (Giant) 467•449

Proclaimers—Hit The Highway (Chrysalis) 477•513

The Benoit/Freeman Project (GRP) 474•429

Nirvana—Nevermind (DGC) 442•046

Bruce Springsteen—Born In The U.S.A. (Columbia) 326•629

Yanni—Live At The Acropolis (Private Music) 475•178

Frank Sinatra—Duets (Capitol) 471•615

Elvis Costello—Brutal Youth (Warner Bros.) 476•168

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Meat Puppets—Too High To Die (London) 474•221

"In The Name Of The Father"—Orig. Sndtrk. (Island) 474•213

US3—Hand On The Torch (Blue Note) 471•342

Suzy Bogguss—Something Up My Sleeve (Liberty) 465•997

Yanni—Live At The Acropolis (Private Music) 475•178

Morrissey—"Vauxhall & I" (Sire/Reprise) 476•341

The Best Of The Village People (Casablanca) 478•131

Cheap Trick—Woke Up With A Monster (Warner Bros.) 474•148

Xscape—Hummin Comin At Cha' (So So Def/Columbia) 469•981

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Babyface—For The Cool In You (Epic) 464•222

Angela Winbush (Elektra) 477•786

Fourplay—Between The Sheets (Warner Bros.) 464•578

Celine Dion—The Colour Of My Love (550 Music/Epic) 467•662

PM Dawn—The Bliss Album? (Gee Street/Island) 456•772

Various Artists—MTV Party To Go, Vol. 4 Featuring Red Hot Chili Peppers, TLC, En Vogue, etc. (Tommy Boy) 478•628

Robin S—Show Me Love (Big Beat/Atlantic) 463•992

Robyn S—Show Me Love (Big Beat/Atlantic) 463•992

Shai—If I Ever Fall In Love (Gasoline Alley/MCA) 453•324

Ottmar Liebert & Luna Negra—The Hours Between Night & Day (Epic) 464•149

Phish—Hoist (Elektra) 477•919

Gang Starr—Hard To Earn (Chrysalis) 476•176

Various Artists—MTV Party To Go, Vol. 3 Featuring Jodeci, Boyz II Men, etc. (Tommy Boy) 478•610

Tony Toni Tone—Sons Of Soul (Mercury) 463•679

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Various Artists—Club MTV Party To Go, Vol. 1 (Tommy Boy) 453•175

Danzig—Thrall-Deamonswealthe (American) 462•333

David Lee Roth—Your Filthy Little Mouth (Reprise) 476•333

Jade—Jade To The Max (Giant/Reprise) 453•068

Various Artists—MTV Party To Go, Vol. 2 Featuring Jodeci, Boyz II Men, etc. (Tommy Boy) 478•610

Color Me Badd—Time Anc Chance (Giant/Reprise) 471•532

Cypress Hill—Black Sunday (Ruffhouse/Columbia) 463•596

En Vogue—Funky Divas (eastwest) 435•750

The Black Crowes—Shake Your Money-maker (American) 462•184

Gerald Albright—Smooth (Atlantic) 475•152

K7—Swing Batta Swing (Tommy Boy) 474•866

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Queen Latifah—Black Reign (Motown) 471•466

Michael Jackson—Dangerous (Epic) 433•920

Barbra Streisand—Back To Broadway (Columbia) 461•988

Aerosmith—Get A Grip (Geffen) 458•075

Hammer—The Funky Headhunter (Giant/Reprise) 474•262

CeCe Peniston—Thought Ya Knew (A&M) 467•860

Luther Vandross—Never Let Me Go (Epic/LV Records) 457•176

Boyz II Men—Cooler-higharmony (Motown) 424•754

Madonna—The Immaculate Collection (Sire/Warner Bros.) 414•557

Little Texas—Big Time (Warner Bros.) 460•204

Stone Temple Pilots—Core (Atlantic) 453•043

Jodeci—Diary Of A Mad Band (Uptown/MCA) 473•116

Prince—The Hits 1 (Paisley Park) 466•623

Janet Jackson—Rhythm Nation 1814 (A&M) 388•918

Janet Jackson—Rhythm Nation 1814 (A&M) 388•918

"Above The Rim"—Orig. Sndtrk. Featuring SWV, A.B. Sure, etc. (Death Row/Interscope) 478•875

Paul McCartney—All The Best (Capitol) 459•776

Pearl Jam—Ten (Epic/Associated) 428•433

A Tribe Called Quest—Midnight Marauders (Jive) 472•860

Snoop Doggy Dogg—Doggystyle (Death Row/Interscope) 465•955

Haddaway (Arista) 471•409

Janet Jackson—Rhythm Nation 1814 (A&M) 388•918

"Above The Rim"—Orig. Sndtrk. Featuring SWV, A.B. Sure, etc. (Death Row/Interscope) 478•875

Deep Forest (550 Music/Epic) 459•479

Tony Bennett—Steppin' Out (Columbia) 467•431

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Haddaway (Arista) 471•409

Janet Jackson—Rhythm Nation 1814 (A&M) 388•918

"Above The Rim"—Orig. Sndtrk. Featuring SWV, A.B. Sure, etc. (Death Row/Interscope) 478•875

Gloria Estefan—Mi Tierra (Epic) 458•497

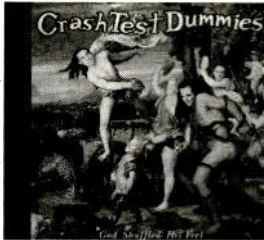
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Aaron Neville—The Grand Tour (A&M) 457-200

Dwight Yoakam—This Time (Reprise) 456-913



Mariah Carey—Music Box (Columbia) 465-435

"Sleepless In Seattle"—Orig. Sndtrk. (Epic Soundtrack) 458-430

Duran Duran (Capitol) 455-550

Joe Diffie—Honky Tonk Attitude (Epic) 454-629

Sting—Ten Summoner's Tales (A&M) 454-561

Brooks & Dunn—Hard Workin' Man (Arista) 454-025

John Michael Montgomery—Life's A Dance (Atlantic) 453-746

AC/DC—Live (ATCO) 453-217

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Elton John—Grt. Hits 1976-86 (MCA) 450-353

Sade—Love Deluxe (Epic) 449-439

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Best Of Joe Cocker (Capitol) 455-790

George Strait—Pure Country (MCA) 448-753

Vince Gill—I Still Believe In You (MCA) 448-571

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"The Bodyguard"—Orig. Sndtrk. (Arista) 448-159

Kenny G—Breathless (Arista) 448-142

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Alan Jackson—A Lot About Livin' (And A Little 'Bout Love) (Arista) 447-458

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Jimi Hendrix—The Ultimate Experience (MCA) 458-034

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The Moody Blues—Grt. Hits (Polydor) 423-756

Eric Clapton—Time Pieces (Polydor) 423-467

Alice In Chains—Dirt (Columbia) 445-833

Soul Asylum—Grave Dancers Union (Columbia) 445-510

George Thorogood And The Destroyers—The Baddest Of The Bad (Hits) (EMI) 444-505

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Mary Chapin Carpenter—Come On, Come On (Columbia) 440-560

Confederate Railroad (Atlantic) 439-158

ZZ Top—Grt. Hits (Warner Bros.) 438-010

Enya—Watermark (Reprise) 431-403

John Lennon Collection (Capitol) 405-308

Lynyrd Skynyrd—Skynyrd's Innryds/Their Grt. Hits (MCA) 381-129



Elton John—Goodbye Yellow Brick Road (Polydor) 471-060

Grateful Dead—Skeletons From The Closet (Warner Bros.) 378-406

Ray Orbison—The All-Time Hits, Vols. 1 & 2 (CSP) 377-945

Guns N' Roses—Use Your Illusion II (Geffen) 442-038

Spin Doctors—Pocket Full Of Kryptonite (Epic/Assoc.) 428-482

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"Grease"—Orig. Sndtrk. (Polydor) 424-721

Bonnie Raitt—Luck Of The Draw (Capitol) 423-186

Peter Gabriel—Shaking The Tree (Geffen) 415-968

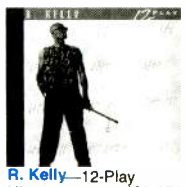
Sarah McLachlan—Fumbling Towards Ecstasy (Arista) 473-389

Mariah Carey (Columbia) 407-510

U2—Achtung Baby (Island) 431-213

Brooks & Dunn—Brand New Man (Arista) 429-969

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R. Kelly—12 Play (Jive) 469-676

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AC/DC—Back In Black (Atlantic) 305-045

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Toby Keith—(Mercury/Nashville) 458-315

Sammy Kershaw—Haunted Heart (Mercury/Nashville) 456-541

Bon Jovi—Keep The Faith (Jambco/Mercury) 451-310

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Megadeth—Countdown To Extinction (Capitol) 444-489

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Pat Benatar—Best Shots (Chrysalis) 401-646

Chicago—Grt. Hits 1982-89 (Reprise) 401-166

Aerosmith—Pump (Geffen) 388-009

REO Speedwagon—The Hits (Epic) 367-672

Patsy Cline—Grt. Hits (MCA) 365-924

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John Michael Montgomery—Kickin' It Up (Atlantic) 473-157

The Police—Every Breath You Take—The Singles (A&M) 348-318

Jimmy Buffett—Songs You Know By Heart (MCA) 339-911

Bob Marley & The Wailers—Legend (Tuff Gong/Island) 337-857

Billy Joel—Grt. Hits, Vols. 1 & 2 (Columbia) 336-396/396-390

Air Supply—Grt. Hits (Arista) 321-307

Michael Jackson—Thriller (Epic) 318-089

Jackson Browne—I'm Alive (Elektra) 469-783

CLASSIC ROCK

Fleetwood Mac—Grt. Hits (Warner Bros.) 375-782

The Beach Boys—Made In The U.S.A. (Capitol) 346-445

Bad Company—10 From 6 (Atlantic) 341-313

A Decade Of Steely Dan (Capitol) 341-073

Best Of The Doobies (Warner Bros.) 291-278

The Cars—Greatest Hits (Elektra) 339-903

The Best Of Kansas © (CBS Assoc.) 327-742

The Best Of Blondie (Chrysalis) 311-811

Credence Clearwater Revival—Chronicle—20 Grt. Hits (Fantasy) 308-049

America's Grt. Hits (Warner Bros.) 291-385

Journey's Greatest Hits (Columbia) 375-279

Steppenwolf—16 Grt. Hits (MCA) 372-425

Marvin Gaye's Grt. Hits (Motown) 367-565

Styx—Classics, Vol. 15 (A&M) 364-448

Best Of The Doors (Elektra) 357-616/397-612

Elton John—Greatest Hits (Polydor) 471-011

Janis Joplin's Grt. Hits (Columbia) 231-670

Simon & Garfunkel's Greatest Hits (Columbia) 219-477

Bob Dylan's Grt. Hits (Columbia) 138-586

James Taylor's Grt. Hits (Warner Bros.) 291-302

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The Steve Miller Band—Grt. Hits 1974-78 (Capitol) 290-171

Eagles—Grt. Hits, 1971-75 (Asylum) 287-003

Eagles—Hotel California (Asylum) 286-948

Meat Loaf—Bat Out Of Hell (Epic) 279-133

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You can now understand the obverse: Most low-frequency musical sound, in almost every kind of music, is simply *one seamless part of a large and continuous range of frequencies*. Bass may be featured every so often, but so are many other sounds. If we excerpt just the one sound, we are being musically destructive. Note the familiar “demo” records we in audio have exploited over the years. Ugh—“Death and Transfiguration”—an endlessly long 19th-century heavyweight, of which we took out the first 0.01% for its bass and played not a note of the rest. I myself am unmoved by *all* of that particular work; but I did not like to hear it mutilated. Then there was the “Organ” symphony (Symphony No. 3) by Saint-Saëns, who happily wrote some fine pedal music for the very lowest pipes on a huge 19th-century French organ—and a great deal more that is also worthwhile hearing. Low bass was just one of countless goodies in that composer’s musical storehouse. This is the normal nature of all “classical” music and most pop, jazz, and so on, as well. If we disturb the harmonious family of many sounds together, many frequencies, we are not producing high fidelity.

Thus it behooves audio engineers, speaker designers, to think unto their bass-end objectives. Forget the usual declarations—highest possible perfection etc., etc. True, true. But true for *what*? Are you designing for closed-window car stereo and the inevitable bass that, in 99% of the installations, is what people want? That’s where your subwoofer shines, sonically. Or are you designing speakers for general music including classical? By all means, then, build your bass seamlessly, into the full musical range, including your subs. They should never be obtrusive except when there is intentional bass to be featured.

As you may now discern, this is as much as anything else a matter of expert crossover circuitry between speaker units high and low. Unless perhaps you are dealing with some improbably full-range, maybe electrostatic, speaker. Even these tend to require a separate woofer because of the physical properties of this special type of unit, a difficulty which, to make a pun, has always been quite baffling. Usual solution: A separate conventional woofer. And a crossover. For full coverage of the

musical frequency range, we are unfortunately still stuck with the need to use more than one speaker unit. If someone would just devise a revolutionary single speaker that could respond flat from 20 to 20 kHz!

Bass has all sorts of ramifications in the area of human perception. Our ears take in signals, then “process” them in such wonderfully subtle ways that the specialists in this area have work to do for years ahead.

**NATURAL BASS, BASS
PRECONCEIVED AS A PART
OF SOMETHING ELSE, IS
NO LONGER ENOUGH.**

As I have noted before, we are getting there—that is, lining up the purely scientific observations, measurements, tests with the intuitive, subjective inner perceptions our minds receive. That means increasing practicality for audio design, no doubt including bass response.

Very curious. Listening on the telephone, from the higher sounds present, our ears are able to synthesize a virtual bass—a bass that isn’t there—for a persuasive and intelligible comprehension. Otherwise, only females would be able to talk over the phone! Do you have any trouble recognizing a male voice with most of its frequencies missing? Via the help of assorted associative processing—you *know* it’s a male voice—you are virtually unaware of the missing components.

Happily, the same goes for a billion bucks’ worth of small boom boxes and much littler transistor radios (do we still call them that?). They all have the same lack of bass, in variable degree, from some to none. We can use them with pleasure even so. Related to this is the effect I would call Early Boombox, the lucky fact that a highly spurious and resonant peak in the middle low bass can be accepted, interpreted by the ears and mind, as the legitimate bottom of a piece of music, even if we can hear (some of us) that it is not a true reproduction of the sonic waveform. The early boombox, in case you do not remember, was a peaky bass-reflex speaker and enclosure that did just what I have described. If it got the musical sense over, it

was adequate for its purpose. Now we have smoother, flatter, more accurate and lower bass in smaller enclosures. Eureka!

All of the above dissertation, I would have you know, stems from the modest new (two-channel) speaker system I recently acquired, after many a year with a pair of monsters so heavy I could not lift either off the floor. (Our still-youthful Editor heaved them into my car single-handed and two-armed.) I really did not like those old speakers, however fancy their three-way double enclosures. They are extinct—just as well. Both failed when their woofer surrounds completely disintegrated, leaving an annular hole around the cone and no perceptible bass. . . . The new speakers, pairs, comprise an astonishingly small semi-full-range unit, oddly unsquare, and a separate subwoofer, a modest cube. I was immediately pleased—digital computer analysis has taken us a long way forward in clean sound these last years. I noticed at once the much improved stereo location—obviously due to good flat matching of the two pairs from side to side. But what really interested me was the effect of the two subwoofers when I got them hooked in. They *blended* into my classical music so nicely that at first I thought they weren’t working. I was astonished—I expected, foolishly, a closed-auto boom to knock me over! Far from it. Only after some listening did I begin to hear bits of very low bass in the appropriate spots, as per the music itself. I was charmed. For those who play any type of music that does not especially feature big bass (though it may have it), this type of woofer is really useful. It just blends in, awaiting its moments, so to speak.

Best of all, these woofers are passive, sharing the main amplifier. (They can be separately powered if desired.) I have enough power, and the balance between them and their upper siblings is automatically set and absolutely correct—no tinkering. So—consider a subwoofer! It could be for you, for almost anyone even if you don’t have a car with stereo.

These surely are not the only subs of the type and I am not writing an “Equipment Profile.” Since the management will allow, I’ll name names: NHT is the brand, which stands for an unlikely corporate name—Now Hear This. So you may Now Hear Me saying Good Bye until Next Time. **A**



In The Mid '70s We Now We've Created

The people who work at Cambridge SoundWorks - including our cofounder Henry Kloss (who also founded AR, KLH and Advent) - have been involved with the concept of home theater from the beginning. In 1969 (years before VCRs and cable TV), Henry Kloss founded Advent, the company that introduced the first home theater audio/video systems - complete with big-screen TVs and digital surround sound. We have had an ongoing relationship with the people at Dolby Laboratories, creators of Dolby Surround Sound, since Henry Kloss introduced the *first* consumer products with Dolby noise reduction over 20 years ago. And now at Cambridge SoundWorks we believe

systems factory-direct, with no expensive middlemen, you can save hundreds of dollars. We believe the products on these pages represent the country's best values in high performance home theater components. Audio critics, and thousands of satisfied customers, agree. *Stereo Review* said "Cambridge SoundWorks manufactures loudspeakers that provide exceptional sound quality at affordable prices." *Audio* suggested that we "may have the best value in the world."



Our Surround Speakers

Cambridge SoundWorks Ensemble satellite (but with magnetic shielding). \$149. Center Channel Plus uses an ultra-low, ultra-wide design that is ideal for placement above (or, with optional support stand, below) a TV monitor. \$219.

Surround Speakers

Cambridge SoundWorks makes two "dipole radiator" surround sound speakers. Dolby Laboratories recommends dipole radiator speakers for use as surround speakers. *The Surround* has a very high power handling capacity and is often selected for "high end" surround sound systems. *Audio*, describing a system that included *The Surround* said "In many ways the surround sensation was every bit as good as far more expensive installations." \$399 pr. The smaller *The Surround II* is arguably the country's best value in a dipole radiator speaker. \$249 pr.

Our EXO-1 Electronic Crossover



Our Center Channel Speakers

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Because we sell carefully matched and tested home theater speaker

Center Channel Speakers

Cambridge SoundWorks manufactures three speakers for use as center channel speakers in Dolby Pro Logic home theater systems. All three are magnetically shielded so they can be placed near a TV or computer monitor. Model Ten-A is a small, affordable two-

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Our Powered Subwoofers

Home Theater Speaker Systems

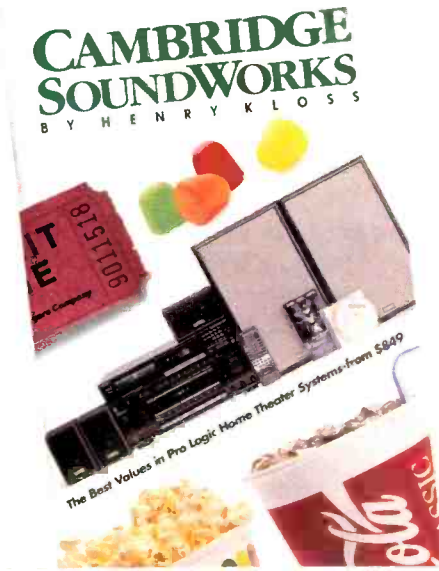
We have assembled a number of home theater speaker systems that consist of center channel, surround and main

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uses the same woofer driver and cabinet, but does not include the amplifier or crossover. It can only be used in conjunction with the Powered Subwoofer. **\$299.** The new Powered Subwoofer II uses a 120-watt amplifier with an 8" woofer. **\$399.**

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JOHN EARGLE

NEW LIFE FOR LIVING STEREO

We are now into the 13th year of the CD, and it is probably safe to state that the vast majority of music lovers who intend to replace their LPs with CDs have already done so. What is left is a dedicated group of people who definitely *do not* intend to forsake the LP but who will supplement their music collection with new CD performances not likely to be issued on LP. What drives them is a love for the mystique of the LP, its sound and its technology. Price is no barrier in this unique market; certain mint-condition stereo LPs from the early '60s command prices in

“found money,” in that LP sales will hardly impact their sales of CDs. For the dedicated company that undertakes the project, it is often the fulfillment not of economic opportunity but of a personal goal.

Recently, I met with the principals of Classic Records, Michael Hobson and Ying Tan, at the studios of Bernie Grundman Mastering in Hollywood. Classic Records announced at the Winter Consumer Electronics Show in Las Vegas that they would release 15 RCA Living Stereo LPs between April 1994 and

June 1995, with an additional 16 during the year to follow. There is one aspect of their agreement with RCA that is unusual; RCA is allowing their earliest-generation master tapes to be used for production of all items in the extended project, and here is where our technical story begins.

When I arrived at the studio, Bernie Grundman was reviewing one of the master tapes recently re-

ceived from the RCA tape vault in Indianapolis. Bernie is one of a handful of mastering engineers in the United States who are respected for both astute musical and technical judgment. It was Classic Records' choice of Grundman that convinced RCA to entrust their masters to the company. Bernie had just finished



Cutting lathe at Bernie Grundman Mastering.

comparing the master tape with an early RCA pressing and had resolved a slight pitch difference between the two in favor of the tape. During the remainder of the day he would cut three sets of lacquer master discs, and these would be hand-carried that evening to Greg Lee Processing, in Gardena, Cal., for immediate electroplating and subsequent processing into metal matrices and stampers.

There are a number of technical differences between Classic Records' approach to LP production and the

RCA procedures of 30 years ago. The most significant, of course, is the use of the earliest master tape source available; RCA, on the other

hand, always cut their master discs from a first-generation copy of that original tape. RCA had decided, and rightly so, that to use the original master tape for routine production



Living Presence recordings from RCA are coming back to vinyl, through Classic Records.

the hundreds of dollars, and newly produced premium LPs normally sell at prices in the \$30 to \$45 range.

Because the major labels have virtually ceased LP production, the only way that early LPs can be perpetuated is through licensing programs in which a company gets permission from a major label to issue the product. Of course, the arrange-

ments vary, but they all carry restrictions on what items will be reissued, the durations of the agreement, and the specific graphic and technical standards that will be imposed. For the major label, it is



Bernie Grundman (left) with Ying Tan (center) and Michael Hobson of Classic Records.

CLASSIC RECORDS' "FACSIMILES" OF LIVING STEREO WILL BE MORE THAN THAT—THEY WILL BE BETTER.

work would very likely accelerate its deterioration. Furthermore, band-to-band level or equalization adjustments that might have been felt desirable in the finished disc product could better be controlled over a long period of time by cutting from a processed copy of the master tape. Even where the source tapes are three-track, half-inch originals, Grundman is equipped to make the necessary 3-to-2 mixdown during lacquer transfer, and in this case the left, center, right mix is carefully matched to the reference RCA vinyl discs.

Another step forward is the use of 180-gram pressings, which have become fairly standard for today's premium vinyl product. Record Technology, of Camarillo, Cal., will do all the pressing for Classic Records. By all rights, Classic Records' "facsimiles" of Living Stereo will be more than facsimiles—they will be enhancements.

Hobson and Tan are also concerned about the quality of album and label art. In a few cases there is some original art that can be used, but for the most part mint-condition albums are carefully scanned and digitally brought up to modern standards. The examples I have of Classic's

specialty audio dealers. Regarding production quantities, Classic states that three sets of master lacquers, and their successive progeny through the master, matrix, and stamper, should take care of normal demands. If a given release makes considerably greater demands on



CLASSIC RECORDS IS USING THE EARLIEST MASTER TAPE SOURCES AVAILABLE.

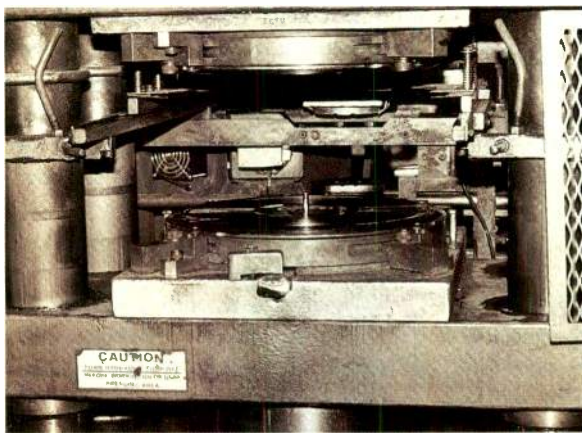
quantity, there will always be sufficient time to get the original tape from RCA to cover the demands of added production.

Programming has been a prime consideration to Hobson and Tan, who are both collectors of early LPs. Future projects, they state, will involve jazz reissues. Their first three items in the Living Stereo series are: Strauss *Also Sprach Zarathustra*, Reiner, Chicago Symphony Orchestra (LSC1806); Offenbach *Gaité Parisienne*, Fiedler, Boston Pops (LSC1817), and Debussy *Iberia*, Reiner, Chicago Symphony Orchestra (LSC2222).

Future releases include: Lalo *Symphonie Espagnole*, Szeryng, Hendl, Chicago Symphony Orchestra

(LSC2456); Kabalevsky *The Comedians*, Kondrashin, RCA Victor Symphony Orchestra (LSC2398); Mussorgsky *Pictures at an Exhibition*, Reiner, Chicago Symphony Orchestra (LSC2201), and Berlioz *Symphonie Fantastique*, Munch, Boston Symphony Orchestra (LSC1900).

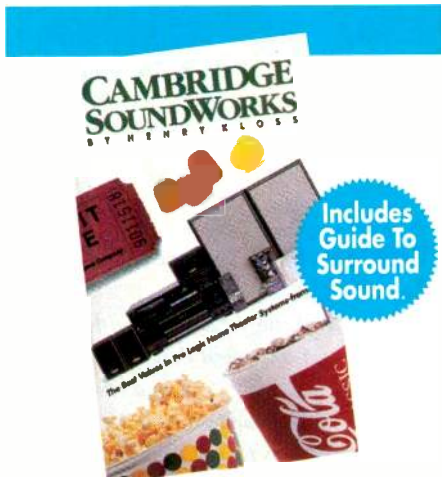
One last note: Hobson and Tan give Jack Pfeiffer of RCA highest credits not only for making the deal with RCA workable but in providing a wealth of technical and session information on the releases.



Pressing a 180-gram LP at Record Technology.

discs and albums are of the highest quality. Both label and front-cover art are direct facsimiles of the originals. Back-cover notes have been reset, using the original type font, adding only a description of the studio-session tape-to-lacquer transfer process.

Hobson's background is in high-end audio retailing and Tan's is in LP retailing. Between them, they have an excellent knowledge of their market, which will be served primarily through mail order and



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Problems With Autoreverse Tape Decks

Q *When using tape decks with autoreverse, I often find that one side of the cassette (usually side 1) sounds better than the other. Tapes made on such decks usually sound best when played back on the decks that recorded them rather than on a deck where the tape must be turned over manually. Why?—Richard Wang, Irvine, Cal.*

A To begin with, the effects of misalignment of a tape or tape heads is exaggerated when a tape recorded on one deck is played back on another—except in the rare case where both decks are misaligned identically.

When going from side 1 of a cassette to side 2, the tape's direction through the shell will be reversed, on any deck. In an autoreverse deck, however, the tape will also pass over the heads in a different direction, which can make it ride over them a bit differently. Unless the tape path is clean and mechanically perfect, the tape may skew a bit when the deck reverses, which also affects the angle of the tape across the heads. This will change the azimuth, causing a loss of highs in one direction as compared to the other.

The tape may also be skewed by the cassette shell, so that it rides over the heads at a different angle for each direction of play. Using an autoreverse deck to play a tape that was flipped over between sides during recording (or flipping a tape in playback that was recorded in autoreverse) can exaggerate this problem.

A few reversing decks have separate heads for each tape direction. If the azimuth of one head is incorrect, this will again lead to a loss of highs when the tape is moving in one direction as compared to its performance when it moves in the opposite direction. Decks whose heads flip over to play the second side may also exhibit azimuth differences.

If the autoreversing deck's pinch-roller alignment and head azimuth have been set up properly, some of the effects I have described will be averaged out. Somewhat

better performance will be obtained than if adjustments are not checked and made as necessary.

A Bi-Wiring Alternative

Q *I want to be able to bi-wire my speakers. Can I connect one cable to my amplifier's "A" output terminals and the second cable to its "B" terminals? Will I damage my amplifier? Will the sound actually be better than I now get with one set of cables handling the whole spectrum?—Wilden A. Valencia, Holbrook, Mass.*

A In general, I see no reason why you can't use the "A" and the "B" terminals for bi-wiring. Notice that I said "in general." Most amplifiers' "A" and "B" terminals are wired in parallel. So your suggested hookup is equivalent to connecting both wires to a single set of output terminals. But some amplifiers (cheaper ones, for the most part) have their "A" and their "B" terminals wired in series. Although I see no way of damaging your equipment, the sound will be terrible if you try bi-wiring with this arrangement.

Whether or not bi-wiring offers sonic improvement is a subtle matter at best. Experiment for yourself.

Noisy Cassette Deck

Q *Every now and then playing cassettes, I get both static and a reduction in signal level from the left speaker only. Sometimes this condition lasts just a few seconds; sometimes it lasts a few minutes. Rarely, it does not appear at all. I have had the deck serviced. The shop aligned the heads and made some adjustments to the door mechanism. I have tried new cables between the deck and my receiver. I have tried different inputs of my receiver. Now what?—Valentine Kwatsch, Ozone Park, N. Y.*

A I must say first that I feel really sorry for a service shop, even a good one, when it has to handle problem equipment like yours. Just the fact that the condition is not constant makes it hard to locate. You might, for example, disturb the p.c. board and the problem goes away—only to come

back a day later. So, even though I really do not see what track your service shop was taking by adjusting heads or the door mechanism, your problem is still difficult. My answers are just guesses.

Although I am reasonably sure that the problem lies within the deck, perhaps we can prove it to a greater extent. Plug a pair of headphones into the deck and play tapes. I believe that the problem will again be heard—in the left channel. If it isn't heard, it is likely that the receiver is the culprit. (This is not a certainty because there could be some additional circuitry between the takeoff point for the phones and the output jacks.)

Let's assume that the problem does reside in the deck. I can only give you a partial list of possibilities because they are so numerous: The left-channel coil windings in the head could be intermittent. The cable that connects the head to the rest of the electronics could be intermittent. (After all, the head moves in and out, and this could cause the thin wiring to separate. You won't see that because it happens under the insulation.)

There could be dirty switch contacts. If your deck has a head used for both play and recording, there is some complicated switching that must take place. Dirty switch contacts can cause your problem, as could a poorly soldered circuit board connection, defective components (especially capacitors), etc.

VHS Hi-Fi Tapes

Q *In addition to using a standard cassette deck for his recordings, a friend of mine also uses a VHS Hi-Fi videocassette recorder. He says that VCR gives him better results than his cassette recorder. Is there honestly any advantage in sound quality when using videocassettes as opposed to audio cassettes?—Scott D. Brutout, Lititz, Penn.*

A As far as I am concerned, VHS Hi-Fi tapes do sound better than cassettes. Wow and flutter is virtually nonexistent,

If you have a problem or question about audio, write to Mr. Joseph Giovanelli at AUDIO Magazine, 1633 Broadway, New York, N.Y. 10019. All letters are answered. In the event that your letter is chosen by Mr. Giovanelli to appear in *Audioclinic*, please indicate if your name and/or address should be withheld. Please enclose a stamped, self-addressed envelope.



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and frequency response is flat between 20 Hz and 20 kHz. Signal-to-noise can be 80 dB or better. Add to this the fact that one can have six hours of music on a single tape—without turning it over—and we have a system that is difficult to beat!

Because of VHS tapes' greater width, they stretch and jam less. I have never lost a VHS tape because of a jam, but I certainly have lost cassettes for that reason. This isn't to say that there is no place for cassettes. They are far more practical for car or portable use. Many commercially made titles are available on this format, but not on VHS Hi-Fi. If you consider how many people have vast tape libraries, it is unthinkable that we should scrap these recorders.

I often record music on my VCR's Hi-Fi track, leaving the linear track (conventional audio track) available for such purposes as recording album notes or other comments related to the program on the Hi-Fi track. (However, not all VCRs let you replace the audio on the standard audio track. If you wish to use my approach, you must be certain that the machine you

purchase includes this audio dub replacement feature.)

You must get used to the fact that the pause function on a VHS machine does not produce the conveniently quick starts and stops of cassette decks. This is a definite drawback if tight cueing is needed. Listen to VHS Hi-Fi tapes and judge for yourself.

Matching Subwoofers to Satellite Loudspeakers

Q *I have been interested in buying a subwoofer, but I have some concerns about the differences in sound pressure level between these subwoofers and my existing loudspeakers. The specs for my loudspeakers indicate that they can reach a level of 112 dB maximum at 20 Hz. The subwoofer can produce 119 dB at 20 Hz. Will that 7-dB difference mean that I can really shake the house with lots of bass?—Mark Pommeh, Osterville, Mass.*

A The fact that a subwoofer can produce more output at 20 Hz at maximum power than is true of your existing loudspeakers does not tell us too much.

What you have said does indicate that your existing loudspeakers are quite good in producing bass.

What is relevant here (unless you use a separate amp to feed the subwoofer) is how much output the subwoofer will produce when fed with the same amount of power as the satellites. We would hope that the outputs from the subwoofer and the satellites would be equal at the crossover frequency. Assuming that the subwoofer is doing its job, as the frequency falls below the crossover point, the output from the subwoofer will increase somewhat, but the output from the satellites will gradually decrease.

If you use a separate power amplifier to drive the subwoofer, it is not nearly as important for the subs and satellites to match in output at crossover. Any differences can be made up by adjusting electronic crossover output levels.

As to whether the subwoofer will "shake the house," try playing some low bass through it at the store, using an amplifier of the same power as you'll use at home, and see how much bass you get. **A**

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marc
aubort

CLASSICAL MASTER

Just after World War II, a young piano student and jazz fan at the Zurich Conservatory built his first electronic project, an amplifier that, like many other first projects before and since, did not work. With the unit under his arm, the music student called on Fred Wettler, then Zurich's top recording engineer, who quickly diagnosed and fixed the amplifier. A shared interest in jazz and complementary skills in technology and classical music formed the basis for a relationship that soon caused Marc Aubort to leave the conservatory and begin a career, first as a recording engineer and then as a producer. Forty-five years later he is the veteran of uncounted thousands of classical recording sessions in both the United States and Europe.

The walls of his compact Manhattan studio, where he now works with Joanna

Nickrenz, are covered with golden Grammy nomination plaques, but the visitor will find no 48-track recorders, mixing consoles the size of a soccer field, or towering studio monitors. Antipathy to new technology should not be inferred; Marc

purchased the first Dolby A noise reduction system available in America and was Dolby's first United States distributor. He is now and always has been a technological minimalist; his methods were not formed by fashion or driven by technology. They stem instead from a profound respect for music and musicians.

Through the years, his work has appeared on a panoply of labels, with Nonesuch, Vanguard, and Vox among them. Aubort recordings have an extraordinary durability; their musicality transcends time in a way that reviewers rarely fail to note, even on 30-year-old reissues. Notwithstanding the fact that he recorded with Stokowski, there is no



D. W. Fostle

need to rummage the cut-out and bargain bins in order to find examples of Marc Aubort's work. He still practices his art and craft on more than two dozen new releases each year, including recent recordings by the Tokyo String Quartet and Pinchas Zuckerman, both for BMG.

D.W.F.

There seem to be many approaches to producing recordings. How do you view the role of the classical producer?

A basic thing to keep in mind is not to interfere with the artist's intentions, not to project what you like or dislike onto what the artist is doing. Sometimes this is difficult. If you grew up with a performance, you learned it a certain way, and suddenly you are confronted with a totally different approach. It is very hard to distance yourself and say this is what the artist wants. It is none of my business to influence a performance in one way or another or to change it.

Are you saying then that you don't direct artists?

No, you don't direct them. You collect what they do, to the best of your knowledge, so that you have everything on tape that you will need for editing. There are producers that direct. I know of one who even goes to the piano, plays for the artist, and says this is the way it should be. That is a total, absolute no-no. That is not the producer's function. The task is to get the best out of the artist and to keep tensions and frustrations to a minimum.

Most artists are nervous in front of microphones. We have to alleviate any technical worries that they may have and let them concentrate on making music. The beauty of a recording session, or sometimes the drawback, is the ability to correct technical flaws in order to get the most out of the performance. The artist should not be intimi-

dated or worried about making mistakes. We can always redo it and restate the idea, the musical idea. That is what a good recording is about. The object is to get the best out of the artist at that particular moment in his or her life. The recording is a snapshot in time. Two months later or two years the artist is going to say "That's me? I can't believe this," but at the time he or she was doing that recording, that was the statement they were trying to make. It is none of the producer's business to either try to change a performance or to influence an artist in any other way.

The producer has to bow to what the artist is trying to say. There is one little exception though. In a live performance, very often a tempo might be appropriate, but on a recording, when there is no visual contact with a stage or with the artist playing, that very same tempo might sound slow. This is something to point out, not as a suggestion that it should be faster, but that for the recording specifically, without an audience being present, it may be an idea to think about a slightly faster tempo. They can

overrule you and that's that, but at least you should be able to mention it.

So the recording is documentary, is that it?

In essence, yes. Sometimes you find out an artist has been playing a certain passage incorrectly, that he plays notes different from what is printed. That too is something to point out. This comes up sometimes, especially with established artists who have been playing the same piece for decades. Suddenly you point out that this is not actually written that way and they come and look and say, "Oh, my God, I've been playing that all my life like that!" It is sometimes very hard for them to play it as written because it seems new. It is something that they didn't think about. They always played it one way and it became ingrained.

Is that why you work with scores?

Oh, yes. You cannot produce a classical record without having a score, and someone has to read the score. A good producer will be able to analyze a chord, an orchestral chord, and hear any instrument that is not playing exactly what it should be playing. Joanna is a wizard at that. *So you're saying a producer must have a conductor's ear but not conduct.*

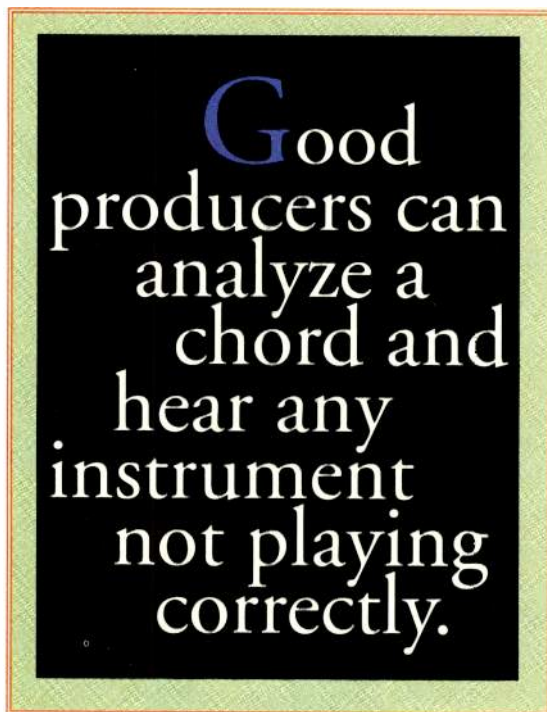
That is a fair statement. The basic tenet of a good record producer is that he or she does not interject personal opinion into performance. Those are the artist's and conductor's prerogatives.

The same is true for playing God with dials. You do not make things louder or make things softer because you want to hear them that way. That is also the artist's responsibility. You can point out that on recordings dynamic markings tend to sound less pronounced than he or she thinks he or she is playing. In other words, the need to exaggerate dynamic markings is something you can point out,

because on tape very often the pianissimo that the artist intended does not sound like pianissimo; it sounds more like a mezzo forte. This has much to do with the monitor level. You usually monitor fairly loud and the ear tends to flatten out. It is not linear in progression and dynamic range. If you listen too loud, the difference between fortissimo and pianissimo becomes squashed. This is something to point out during a session: Dynamic markings have to be exaggerated for the recording. With digital recording now, it is marvelous because we don't have to be squeezed between hiss and distortion; we can let the whole thing sit there and get the full dynamic range of the performance without having to touch a knob from the beginning to the end of the session. In the analog days we sometimes had no choice but to change dynamics so the performance would fit on the tape between noise and distortion.

Can you give me an example of a work where that was a problem?

The Tchaikovsky Sixth Symphony, the "Pathétique," has a spot in it where the clarinet trails off in a quintuple or sextuple pianissimo



Good
producers can
analyze a
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with barely a breath. That is followed by a massive F chord, a real crash. On any analog recording it was totally impossible to hear the clarinet trailing off into the blue mist before the huge crash came. That's one of the things that could not be handled at all in analog.

Do you have any views on analog and digital? It seems that you are very satisfied with 16-bit digital media.

Yes, and I don't share this subjective craze that, for instance, strings sound harsh and brittle in digital and sound absolutely marvelous in analog. For me digital has advantages such as no wow or flutter. A piano that is really in tune stays in tune on a digital tape, while in analog there is always a slight wobbliness. That's one thing. Harmonic distortion is virtually nil with digital, at least in the region that is most annoying, in the fortissimo passages. The problems in digital are at the very low levels, quantization artifacts, dither noise, and things like that. But all in all, for me digital is better than analog. There are all sorts of purists who won't get close to a digital recording. They carry their LP records around like raw eggs and buy re-cuts from the original tapes. This is fine; it's amazing how good analog can sound on the record. But to me digital is a big advantage. We don't have to spend hours aligning, calibrating, and changing bias for every batch of tape that comes along. You plug it in, forget about it, and it works.

Are the operating conveniences the big benefits?

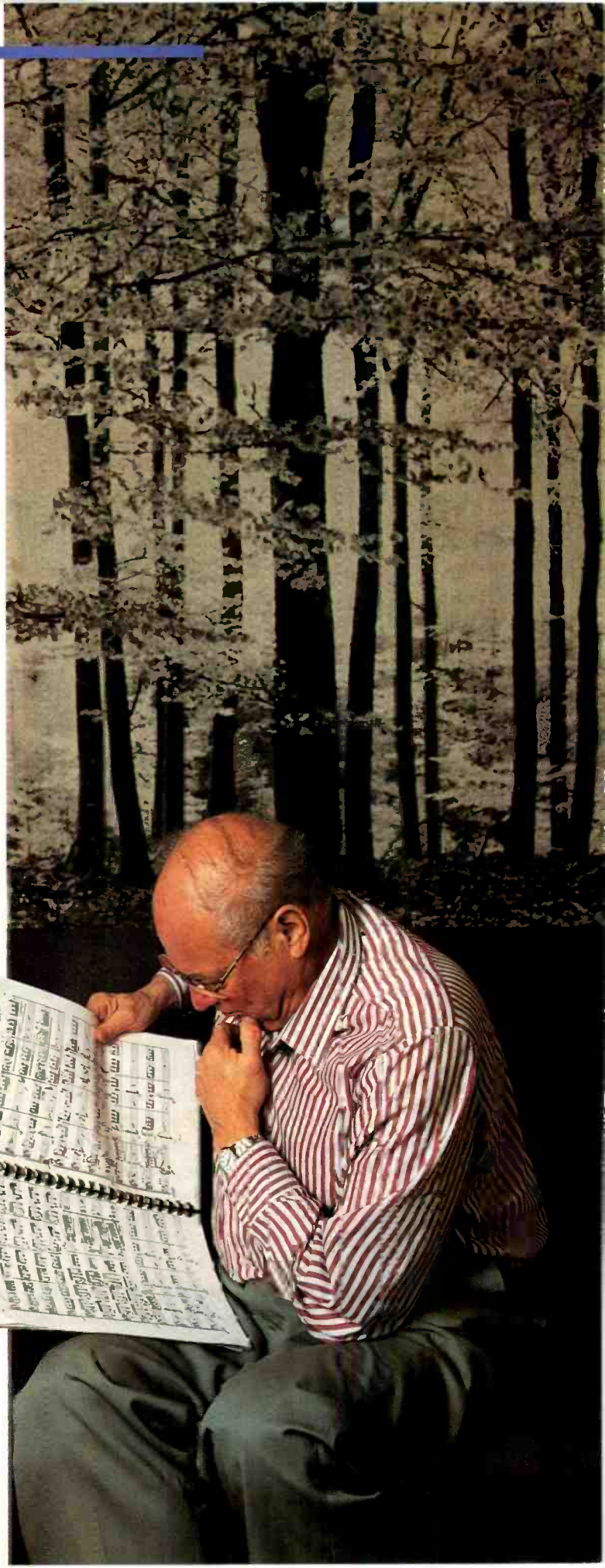
Yes. And unless my ears are going—I don't think so—I do not hear the alleged harshness and the alleged digital sound that some people complain about. Digital does show up sins in recording technique much sooner than analog because there is nothing to mask them, nothing to hide behind. Whether it's lights buzzing or faulty microphone placement and/or microphone choice, you will hear that. However, that's not the fault of the digital medium. Digital is simply an unforgiving medium; you cannot hide.

Do you believe that if the craft of recording is properly practiced, digital will help, not hurt?

That's right. If you consider 16-bit recording versus 20-bit recording, you can say, well, it's silly to bring everything down to 16 bits again. On the other hand, you can shift the extra bits and have a subjectively lower noise floor. That may be an advantage, but I really think there is too much emphasis today on minute technical trivia. Many people start to forget that what we are doing is freezing a performance, no matter what the medium is. The musical performance is what's important. Some people don't even listen to music; they listen for things that have nothing to do with the performance itself.

The absence of hiss and noise today is certainly a big advantage, yet I can listen to a performance on short wave radio interspersed with Morse signals, hash, and noise and still enjoy the music. The main thing is what is going onto the tape, not what the tape is. Basically we are overemphasizing the marvelous technique and forgetting that we are still dealing with musicians and performances.

Do you see the technology as now at a level where it doesn't really need to get any better?



Technology always needs to get better, but not necessarily for the reasons that are professed. If you can put, say, 90 minutes on a CD, that would be a big advantage for some compositions. But from a sound quality point of view, a CD is perfectly valid. There is nothing that bothers me when I listen to a recording on Compact Disc that is inherent in the medium.

Are you saying CDs are satisfactory?

For what I am listening to as the musical experience, yes. The rest starts to get into gimmickry and wizardry and gee-whiz. There was an interesting experiment that Wettler and I did in Zurich many years ago. We played for audiences full-dynamic-range tapes and tapes compressed 3 dB, 6 dB, and 9 dB. Almost invariably, listeners preferred the compressed versions. People did not want full dynamic range. That was an eye-opener, but I don't know if it's still valid today, now that we can actually have nearly full dynamic range. Then comes a very practical question: How, in a home situation, are you going to use full dynamic range? Do you want to break your lease by playing music so loud that the windows bend? And, if not, you're not going to hear the softer spots either.

The only alternative is to listen through headphones, and many people do not like them. I happen to like listening with headphones, because that's the way I set my balances, but I have to translate in my mind so I will know what the recording will sound like to most people on speakers.

It's your style to do all your balance work on headphones. Do you take speakers to a session?

I take them to the sessions but only as noisemakers, and I certainly do not list what loudspeakers I use on my records. In an orchestral situation, for instance, you have only a few seconds to set a balance; you cannot fool around with noisy environments and control room acoustics. There are so many variables. In a different room even familiar speakers will sound different. With the headphones, I have the same parameters each time, and I eliminate as many variables as possible. Any small adjustment on the mixer is immediately audible on headphones, but on speakers you have to make wild swings of the same fader in and out, in and out, until you can really find the position where you want it. On the headphones that takes only a few seconds. You can go up and down twice and that's it.

What kind of procedure do you go through?

I start by going into the hall and seeing whether it is a live hall, a dead hall, or anything in between, whether it has flutter echoes or not—things like that. I have looked at the score and have seen where the pitfalls might be; I have made notes about what I am going to ask for from the conductor to set the balance. The first thing to look for is the loudest spot in the piece, then ask for it to be played. Once I have the peak level, then I ask for some specific

instruments. I may ask for a timpani roll, with medium or hard mallets, mezzo forte. If I have a microphone back there, I use the fader to bring in the timpani, so I just hear the difference compared to the timpani coming through the main microphones. The result will be increased clarity, not a higher level. That, more or less, will be my timpani setting. And so on with different instruments. If there is a harp, I request a couple of harp runs so I can evaluate it. I usually put the harp forward in the orchestra so I do not need an extra microphone on it. To make sure, I will listen while the orchestra tunes. While they're tuning, I hear that the harp is also playing, and I will listen to hear whether I get enough harp. If not, then I know I will have to do something about it. If I know the hall and it is a fairly standard score, I can set the faders and the master to approximately where they will be before anyone plays.

Much can be done even while the orchestra is tuning or in the first few minutes of the session. Fine adjustments will be made in

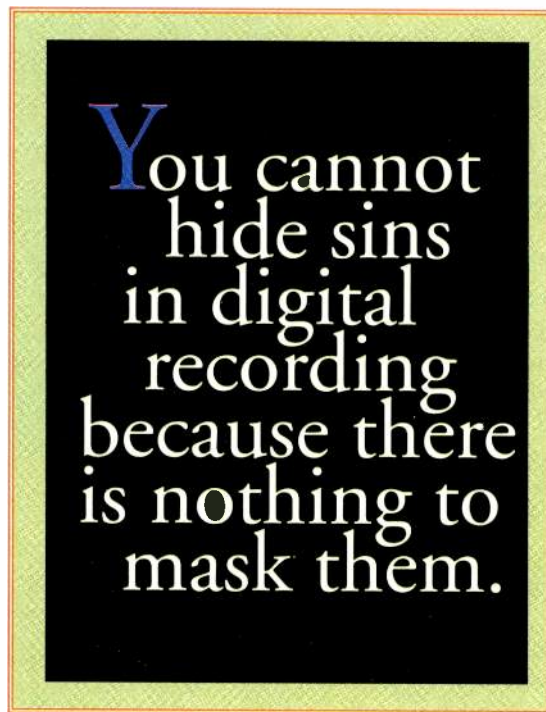
the first take, but they must be fine enough so that you can use that take to splice in whatever is coming later. The first take will be 95% of whatever I want for balance. Sometimes I will move musicians to get a more natural balance and avoid using any additional microphones.

And you're ready a few minutes after you walk in the door?

It is usually two minutes, something like that. This puts a little pressure on because with two-track, it cannot be fixed later. That's the advantage of the way we work, with only Joanna and me in the booth. We make all the decisions. There's no committee that has to decide on everything. Getting the balance, even with a choir and soloists and all that, should not take more than two to three minutes. Then it's working time, and I forget about the mixer.

From what I heard you saying about playing God with dials, you would be opposed to multimike, multitrack mixdowns?

No, not necessarily. I use multimiking sometimes if I have to, but only as a crutch. Once I have the balance set, I don't touch the mix at all. It stays the same throughout the whole session unless the conductor specifically requests that he needs more, let's say, bassoon at some specific spot because the cellos, which are doubling the bassoon, are covering the bassoon. Then I might put a microphone in the vicinity, which I will briefly bring in to get more bassoon just for that particular passage. That is on request, or I may point out that, in the context of this passage, I don't hear the color of the bassoon compared to the cellos enough. Then I ask the conductor for less cello or permission to do something about it. The conductor is really the deciding factor in this. We are just helping him. A score that is well written and well orchestrated—and there are many of those around—usually does not require any changes in balance.



PRIME CUTS

Marc Aubort lists a few of his favorite recordings among the many he has made, then comments on their salient characteristics and the challenges of making them. The list begins with symphonic works, proceeds through chamber music, and concludes with soloists.

Prokofiev: *Alexander Nevsky*, Leonard Slatkin and the St. Louis Symphony, Vox CT 2182. (Also on vinyl as Reference ALSY 10003 and as a Mobile Fidelity CD.) This is an example of wide dynamic range, subtle orchestral color, and a masterful orchestration by Prokofiev that virtually balances itself. Although nine microphones were used, seven of them add only a little to the main pair. There was no mike on the alto solo; instead, an elevated podium was used with a mirror so that the soloist had eye contact with the conductor.

Ravel: *Daphnis & Chloe*, Skrowaczewski and the Minnesota Orchestra, VoxBox CDX-5032. Maestro Skrowaczewski followed the composer's instructions to the letter, achieving a wonderful tapestry of impressionistic colors. A record reviewer criticized this recording as "a great wash of sound," probably forgetting that this is what Ravel must have had in mind. I took this as a compliment. The *Rhapsodie Espagnole* [from CDX-5031] in this complete set of Ravel's orchestral music is another fine example of Ravel's sound colors.

Christopher Rouse: *Infernal Machine*, Slatkin and the St. Louis Symphony, None-such 79778. A five-minute *tour de force* for any orchestra, but in the hands of Maestro Slatkin it becomes a real show-piece. There is much percussion, extreme dynamic range, and a virtuoso performance of a contemporary American composer. The piece has a quote from a late Beethoven Quartet. Can you name it? At the climax the infernal machine self-destructs with a big bang.

Rimsky-Korsakov: *Scheherazade*, Semkow and the St. Louis Symphony, Turnabout CT 2136. An example of an all-time popular favorite so well-orchestrated that any

more than two microphones for stereo would be superfluous given the wonderful acoustic of Powell Hall in St. Louis.

Richard Strauss: *Don Juan, Till Eulenspiegel, Salome*, et alia., Schippers and the Cincinnati Symphony, Turnabout CT 2138. If there were "X-ratings" in classical music, *Salome's* "Dance of the Seven Veils," as conducted by Maestro Schippers, would surely qualify. Two ambience microphones—cardioids facing away from the stage—were used to enhance the somewhat dry acoustics of the Cincinnati Orchestra Hall.

Beethoven: *The Complete String Quartets*, Tokyo String Quartet, RCA (Red Seal) 09026-61284-2. Recorded in the Richardson Auditorium, Princeton, New Jersey. This space does not have the "shoe-box" shape that is traditionally preferred. The hall is short and high; it has a dome and much marble, with a curved stage and back wall. Microphone placement is the key to successful recording in this space, and the microphones must be near the quartet.

Ravel/Debussy: *String Quartets*, Cleveland String Quartet, Telarc CD 80111. This was recorded at a church in the small town of Lyons, New York. When we arrived, we found an acoustic ideal for Gregorian chant but not for string quartets. A call to a disaster relief organization brought a truckload of blankets within an hour. These were spread around the church, and the result was a tamed acoustic suitable for Ravel and Debussy.

Haydn: *Violin Concerti*, Pinchas Zukerman with the National Arts Symphony, RCA (Red Seal) 09026-60797-2. Halls are chosen for many reasons besides their

acoustics, and the hall on this recording was far too dead. Instead of adding reverberation electronically, a lumber company was called. They provided a truckload of plywood sheets that were placed on the seatbacks. This new "floor" greatly improved the reverberation characteristics of the space.

Beethoven: *Violin Concerto*, Pinchas Zukerman and Zubin Mehta with the Los Angeles Philharmonic, RCA (Red Seal) 09026-61219-2. Solo instruments are often recorded with a single microphone that spreads them across the entire orchestra. This can create the illusion of a violin 10 feet wide that is sonically out of proportion with the orchestra. In this recording, the solo violinist was moved back and forth along the axis of the main microphone pair until the proper perspective was achieved. The same approach is valid for any combination of soloist and orchestra, especially voice or piano.

Liszt: *Piano Music*, André Watts, piano Angel-EMI CDC 47380/81, and Scarlatti: *Fourteen Sonatas*, Anthony di Bonaventura, piano, Titanic Ti 194. These two Steinway grands were recorded with the tops removed. With the top in place, the direct sound and the reflections compete with each other. When the top is removed, there will be a clearly defined "sweet spot" where the piano sound suddenly opens wide. It takes some effort for the pianist to get used to this, but the recorded results are well worth it.

André Watts' performance of the Liszt *Paganini Etudes* and the *Hungarian Rhapsody XIII* were recorded at New York's Academy of Arts and Letters. Had Scarlatti written for today's pianos, he would probably have written in the dynamic markings used by Anthony di Bonaventura in this recording at Manhattan's Rutgers Church. The artists, the repertoire, and the sonics of these two discs are very different, but the basic recording technique is the same.

Once the balance is set—the choir, a solo within the orchestra or whatever—I seldom touch the mix. That's it. You mix at the start of the session, and what you get is what you had. Too bad if you don't hit it right; it can't be corrected. That's what the multichannel people think is so marvelous about their technique. They can go fix it later, but if you didn't have a concept to begin with, there is not much you can fix lat-

er. If it's wrong in the miking and in the setup, then all the flexibility in the world won't help. If you don't hit it at the recording session, then you didn't do your job right. When I was still a novice in this business, Fred Wettler gave me a very good piece of advice: "You have to mentally hear your balance before it comes through the mikes. If it isn't right, go out and do something about it."

Could you expand a little on why you can't "fix it in the mix" as some people say?

The tendency in multitrack recordings is to put a mike wherever you think you need it. This adds mono information to the stereo picture, so you end up with slices of mono, superimposed on what might otherwise be good stereo; but everything is in slices, and if you listen on headphones, you hear the slices, you hear the mono information.

You're saying that panning a source into a position in the sound field doesn't work very well?

Essentially, yes. Sometimes you may have to do that. But, again, when you pan something, you don't pan it in stereo; you pan it in mono. You just shift the source from left to right someplace, and you end up with that superimposed mono information wherever you panned it. I prefer to position instruments so that the balance is right for the main microphones. For a piano concerto or a violin concerto I most often do not use separate microphones on the solo instrument. I position the soloist, whether a singer, flute, violin or piano, so that in the context of an orchestral setting there is a blend. The actual microphone positioning has much to do with the acoustics of the hall and, obviously, with the scoring of the piece.

The score again?

Yes, and that brings us to how we actually conduct the recording session. The main thing is the performance, the large line. Casals called it "the rainbow" from beginning to end, the concept of the piece. You start by taking long takes, usually complete takes of the movement. Once, twice, three times, if you have time, but usually you don't. On these takes we mark things on the score that need to be worked on like intonation, ensemble, rushing, slowing down, possibly a wrong note, things like that.

At this point have you set aside the mechanics of the recording process and are you listening critically to the performance?

That's right. The musicians usually come back to the booth and listen. We discuss musical ideas. Maybe we should do this differently here or maybe we should push ahead a little more there or we should have a little more restraint in this spot. Then comes a good discussion, a last-minute general rehearsal of what they really want in that movement.

Then we start all over again from the beginning. If there isn't time, we concentrate on the spots that the musicians have picked up while they were listening and things that were marked while they were playing the earlier takes. After two takes you usually start working on the rough spots.

Recording is really co-production with the musicians. There is constant dialog going back and forth through the intercom as we work to build the performance to something that will stand the test of time.

Will you interrupt a performance?

Oh, yes. That is hard to do with a full orchestra. It's like holding a Mack truck coming downhill. But it has to be done because of time restraints by unions. Every second counts, and if you waste time by covering things that you don't need, you don't have enough time to cover what you really do need. That is the whole

art in an orchestral union session: Finish on time but have everything in the can. Finishing on time means to the second, by stopwatch, synchronized to WWV. There are people walking around the orchestra with stopwatches, and they are watching very closely. This can be really frustrating.

So will you override a conductor if he keeps playing on and you don't need the material?

Well, as tactfully as we can, yes. We worked with a very famous conductor who wanted to go back 50 bars every time we stopped him. He said he wasn't sure he could hit the right tempo again. Others can pick up three or four bars before, and the whole thing is totally seamless. If a listener can tell, then we didn't do our job. Sometimes we have to shift splices because, for one reason or another, it doesn't work. Moving the splice can minimize the tempo discrepancy.

The objective in this approach, if I understand it, is to get a strong take and then, with the minimum of editing, fix those things that the producer and the musicians agree need fixing?

Exactly. The goal is to end up with a performance that embodies the artist's musical approach and is free from technical imperfection. Every time you hear imperfections on recordings it is very distracting. It's frozen there, and after a few hearings you know it will happen before it does. There was a recording I had when I was a teenager, a record of Stokowski on a 78, one of the Hungarian rhapsodies, and there was a French horn clam on it. To this day, when I hear that piece, I know this is the horn coming up that was wrong on my 78. It is burned into my brain, that wrong horn note.

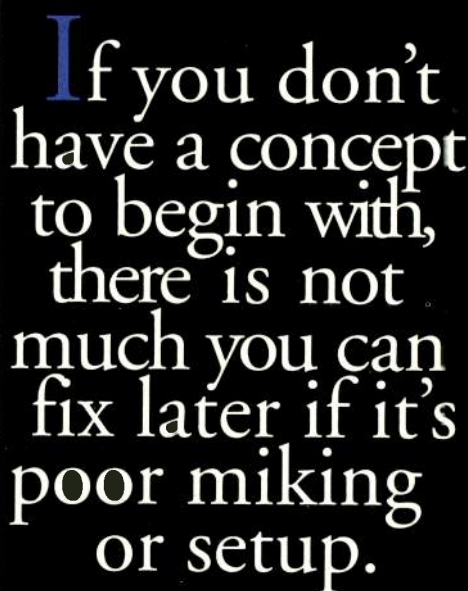
So you have made it through the sessions . . .

Now comes the hard part. We have to take the whole stew and put together a condensed version of what was played.

For a CD there are probably three to four hours of tapes. When we come out of the session, we have an exact log and number for each take. We can always find, even 10 years or 20 years later, where things are located. The score is already heavily marked because we made preliminary decisions during the session as to what everyone does or does not like. The marked score is the guideline to listening later and making the final decision. It does not necessarily mean that you are going to use that take, but usually you do. Sometimes there may be a later take that's even better, one that wasn't marked. All the material will be listened to again in the peace and quiet of the studio before the editing starts.

So the first thing you do when you start to assemble an edited master is to sit down and to listen to everything?

Yes. We also make additional markings in the score and question what we wrote at the session. "Why did I do that? It's perfectly fine . . . I didn't hear this. This is wrong." You go through the score markings again without the pressure of the session. You mark the score



If you don't have a concept to begin with, there is not much you can fix later if it's poor miking or setup.

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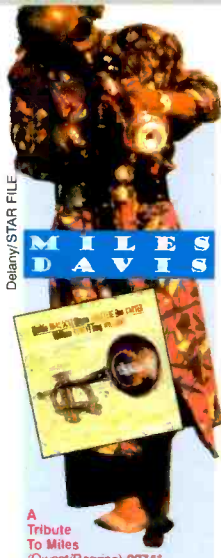
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to show that this take goes from here to here and from there to there with that take. The idea is to put together a sequence of takes that, hopefully, is better than any one of the single takes.

We're creating an illusion, essentially helping the composer, bringing his intentions to their absolute maximum best. The interpreter, the musician, is a part in that chain. The whole recording process does not really help the musician much, but it creates an illusion for the listener, making him think that the piece was performed that way. The editing makes this possible. There has been a trend lately to go back to live performances, and I don't think it is such a good idea because it puts tremendous pressure on the artist to avoid making technical errors instead of concentrating on his performance.

Does the availability of tape editing tend to make artists more adventurous? Does it tend to make them more relaxed?

It can work both ways. It can also induce fatigue at a session. Attention and concentration start to diminish when a segment is done over and over. There should be a certain pressure during the recording session.

So a little anxiety is a good thing?

It is absolutely a good thing. A little pressure doesn't hurt. That's why sometimes the union sessions are a blessing in disguise because you have to get the material down in a certain period of time. If it's open-ended, the session can start lacking tension, start lacking inspiration. An artist cannot be inspired 20 times in a row. Sometimes the first take is best and you go back to it during editing. When all is said and done, after you have mapped out something on the score, you start questioning what you are doing. Very often I do go back, listen again to first takes and start eliminating splices that I had already made, and I put in longer stretches of first takes to preserve the excitement and the freshness of the performance.

You are splicing spontaneity back in...

Yes. I will overrule myself on precision and take as a priority the excitement of the performance, even at the cost of an occasional ensemble problem.

Editing sounds like a deliberative and solitary process...

Sometimes artists are present at the editing session, but we have found this to be actually counter-productive. From experience we have found that we are better off doing editing on our own. Then we have the artist come in, listen to the whole thing, comment, and ask questions. "Do you have something different here? I would like a little more of this or that here. Did we have that at the session or not?" Then, of course, we go through all the outtakes, and if we have it, we will put it in. In any case, the artist and the composer, if living, have to give final approval of their work before anyone else is allowed to hear it.

Editors of classical music have the least latitude of all editors, whether it's pop, rock, film, video, or anything else, because you can't lob out four bars just because they didn't turn out too well. You can't cut it intentionally, but sometimes by error something is added or left out. That happened to me in a recording of Beethoven's Seventh I did in London with Sir Adrian Boult. The record was out for more than a year when somebody wrote that there were 16 bars missing. I looked at the score and listened to the spot, and sure enough, 16 bars were left out. It just so happened

that a repeat was written out twice instead of with the usual double bar repeat sign. In editing, instead of landing on the first segment, I landed on the second while shuttling the tape back and forth. I should have counted the bars and looked at it more carefully when I was finished, but it made perfect sense and Sir Adrian approved the performance. It was just that there were 16 repeated bars missing.

You've been working with artists for decades. What changes have you noticed over the years?

There is always evolution, and artistic interpretation is continually changing. That's why artists are sometimes not keen to reissue things that have been out of print. It does not represent the way that they are now. Unless it's a historical performance or something like that. That's something different.

That would be a problem for them, wouldn't it?

Sure. Look at a picture of yourself 10 years ago. Same thing. A recording is a moment frozen in time. It's like a photograph. It's what was there at that particular point, a statement for that particular day or days or month or whatever. Of course, there is always that great performance in the sky that never happened, but you cannot create what did not happen by editing. All you can do is do your best by putting together what happened at those sessions.

The performances themselves are very subjective. You just have the score and what you're hearing. What's subjective in editing, for instance, are the pauses between movements or pieces. These are things that did not happen at the session. You stopped the tape at the end of the movement, and you don't have the timing to the next movement. While editing, you put the pauses in by feel. But what happens is that in the evening, you put in shorter pauses than you do in the morning.

Do you think that this would be reflected in the performance tempos also?

I'm sure it is, to a certain degree, but not with something that has been rehearsed a lot; but I find invariably that when I put in pauses, they are shorter in the evening. When I come in next morning, I say, why is it so short?

Are we talking 3 seconds versus 5 seconds?

Doing it by your watch is one thing, but if you do it by counting or by feel the way it should be done, then the pause varies. Three seconds is awfully short; a pause lasts between 4 and 6 seconds.

So the silence is important...

Silence is part of the music. A fermata is music, a part of the expression that you are trying to achieve. For years when I listened the next morning to pauses I put in the previous evening, I wondered why I put in such short pauses. It took me a long time to figure it out. Everything seemed the same, but what is different? The heartbeat is different, and so the whole sense of timing is different. In the evening my heartbeat is around 115, and in the morning it's around 80. It's a biological clock, and it's ticking inside. The biological clock guides the reaction to the pause length and sometimes conflicts with or changes the subjective sense of timing. So we have to correct these things and average them out before we ask the artist for approval of the edited master.

And when you have that approval...?

Then it goes to production and is made available for the public to enjoy.



While consumers are becoming accustomed to CD-quality, digital sound, that clean, dynamic audio has spoiled many radio listeners who cannot get the same sound from a 70-year-old analog medium. The transmitted audio scenario,

however, is changing. The broadcast industry is being deluged with technical innovations that will fundamentally improve broadcast sound quality to match that of CD, offer more program choices, and make available other features not associated with analog. Some of these new technologies are available now or will be within a few years.

TERRESTRIAL BROADCAST

For traditional radio listeners, a process is now underway to enable digital radio broadcasting over the air. In 1993, an industry group comprised of consumer audio companies and broadcasters was formed to begin searching for an over-the-air digital transmission system for AM and FM, known as digital audio radio (DAR). The laboratory testing process began early in 1994 at NASA's Lewis Research Center in Cleveland and is expected to conclude this fall; field tests of the systems will follow. The industry group eventually will use the information to recommend a transmission system. Depending on which system is chosen, the Federal Communications Commission may select the digital transmission standard or, at least, impose certain technical rules. Actual digital radio broadcasting before the end of the decade (and century) is likely.

Of the systems being considered, broadcasters favor the one that disrupts their operations the least; the preferred proposal is an in-band, on-channel system, or IBOC. If the technology works as promised, the IBOC system enables transparent piggy-backing of the digital signal on the AM and FM analog signals, which means that broadcasters do not have to invest in a lot of new equipment or acquire new spectrum. This way, they also can simulcast analog and digital for several years until digital receivers penetrate the consumer market. Such a system would give AM stations FM-quality sound.

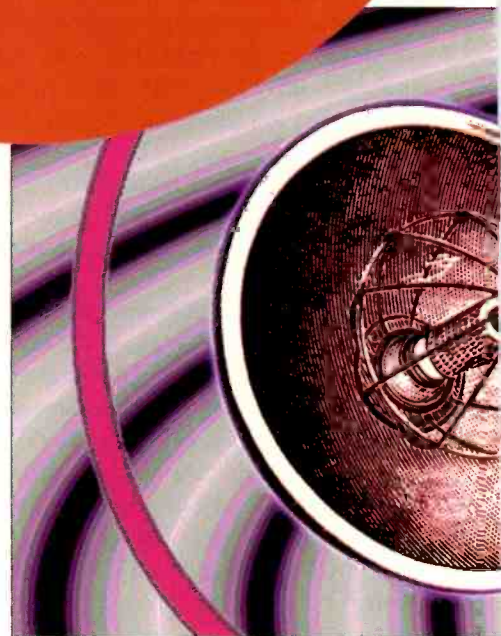
New-band systems, such as the European-developed EUREKA 147, would require new spectrum and new, more expensive transmission equipment for broadcasters. That system, however, has been embraced in Canada and throughout much of Europe.

DIGITAL RADIO

Initially, digital audio radio receivers and tuners are likely to cost more than the current analog components; manufacturers say it is too early to make an estimate. But as with other new technologies, demand will bring the price down.

CABLE SERVICES

For those who are unwilling to wait for over-the-air digital radio, digital sound over cable is already available. Currently, two digital audio services, Music Choice (formerly known as Digital Cable Radio) and Digital Music Express (DMX) are offered as an option by many cable companies across the country. According to the



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companies, Music Choice will be available to more than 12 million households by the end of the year while DMX already is available to 14.5 million subscribers.

Both systems use a digital decoder, similar to a cable box, which routes the digital-to-analog-converted signal to a home receiver or preamplifier. Each service offers more than 30 channels (plans are in the works for more) of uninterrupted programming—no DJs, no commercials. These channels include most of the popular music formats and others that are not heard on typical radio stations. Music Choice and DMX also offer a feature you don't yet get on your CD player or the local radio station: Display of artist, song title, CD title, and songwriter information. This information can be viewed on a remote control with a display.

If set up correctly, DMX and Music Choice have first-rate sound quality, since the cable companies have to install state-of-the-art digital audio distribution equipment. You can compare the analog audio of a premium cable channel to the audio simulcasts on the digital service; the difference is obvious. (Contact DMX at 310-444-1744 in California, Music Choice at 215-784-5840 in Pennsylvania, or your local cable company to find out which service is or will become available in your area.)

technology has progressed to the point that you can dial in satellite programming channels from a receiving dish mounted on a window sill inside your house.

Music Choice is the first audio service to become part of the new DirecTV package, a Hughes Aircraft/Thomson venture that utilizes an indoor 18-inch dish antenna to receive satellite-fed, digital video, and audio signals. DirecTV is a DBS video/audio carrier targeted at those who do not have access to cable, and those who do but are dissatisfied with the "wire" approach. The DirecTV satellite receiving dish and receiver box will be sold by electronics retailers, including Circuit City, Silo, and Sears, as well as electric co-ops. The retail price is \$600, but it is expected to drop with demand.

DirecTV became available in late June, with an initial five-city roll-out. The service will be available nationally by the fall. Music Choice also is slated to start this fall following the launch of a second DirecTV satellite. Annually, Music Choice hopes to pick up a million subscribers through DirecTV.

Like its cable operation, Music Choice will offer multiple channels of digital audio, but it will not need a separate converter box. The programming will be provided through the DirecTV receiver

JOHN GATSKI



DIRECT BROADCAST SATELLITE AUDIO

As good as these digital audio cable services are, they are not available everywhere. A remedy for this inaccessibility is Direct Broadcast Satellite (DBS). Now I am not talking about the huge, conspicuous dishes you see mounted in many back yards. Today,

John Gatski is News/Studio Sessions Editor for Radio World, an industry publication covering radio broadcasting in the U.S., Europe, and Latin America.

box. Music Choice's fee will be part of the overall DirecTV fee for the programming package that contains the service. Initially, however, Music Choice will not have the artist/song title display capability that is available to cable subscribers.

Digital Music Express has its own DBS service; the 120-channel capacity package includes an indoor-located, small receiver dish and custom Bose speakers. This service is oriented to business

RDS (although most make European models with RDS facilities). The companies say that they are waiting for more U.S. broadcasters to add RDS.

Still, some manufacturers have already been delivering RDS products to consumers for several months including Denon, Onkyo, Grundig, and Philips. Delco offers RDS as an option for GM cars. The initial RDS receivers sold for about \$50 more than non-RDS versions, but costs are starting to come down, according to manufacturers.

In use, the current crop of RDS radios work well, and it is nice to be able to see a station's call letters and format on the display. In my view, RDS is analog radio's bridge to digital—it has enough enhancements to keep the customer happy, and is cheap enough for broadcasters to implement without significantly driving up operating costs. Those interested in RDS should consult local stations as to whether they are broadcasting the subcarrier. Contact your local or mail-order audio dealer to see if they have the radios.

customers who do not have access to cable. Other audio-only satellite services will no doubt come on line in the near future.

RADIO DATA SYSTEM

An offshoot of the digital audio revolution is the ability to send video and other types of ancillary information. The Radio Data System (RDS), developed in Europe in the mid-1980s, was standardized in the U.S. in early 1993. In a nutshell, a radio station can broadcast an RDS subcarrier on its main signal to an RDS receiver that can display station call letters and scrolling text/messages; find stations by program format; provide automatic emergency or traffic alerting, and automatically and seamlessly retune a receiver to the strongest signal of a program or network that uses multiple transmitters.

The RDS signal also is capable of sending other types of data, including retail information and paging services.

So far, only about 170 U.S. radio stations are broadcasting RDS data, but numerous station owners have said they want to add the capability in late 1994 or 1995. The slow acceptance by broadcasters, however, has impacted the receiver/tuner side of the business. Most receiver manufacturers have not yet fully embraced

By the way, RDS does not work on AM as the standard is written (the data rate is too low), but some RDS radios will soon use the ID Logic technology that allows AM/FM station selection by format via an internal computer inside the receiver or tuner. (A few non-RDS radios with ID Logic are already available from Alpine and Panasonic.) These radios are programmed with AM/FM station format information, based on an internal database of station formats. Radios with RDS will take ID Logic a bit further, allowing the AM and FM databases to be updated automatically, by an RDS signal from an FM station assigned that responsibility for its market, rather than by hand. According to ID Logic, several companies (including Panasonic, Sony, Alpine, and Pioneer) should be making such radios by early 1995.

Although digital radio, in the traditional sense, has not yet taken hold, the initial wave of products and services is here, giving the consumer a partial menu from which to choose. Judging from the quality of these upstart products and services—and the certainty that others are sure to follow soon—listeners should not be disappointed.

A



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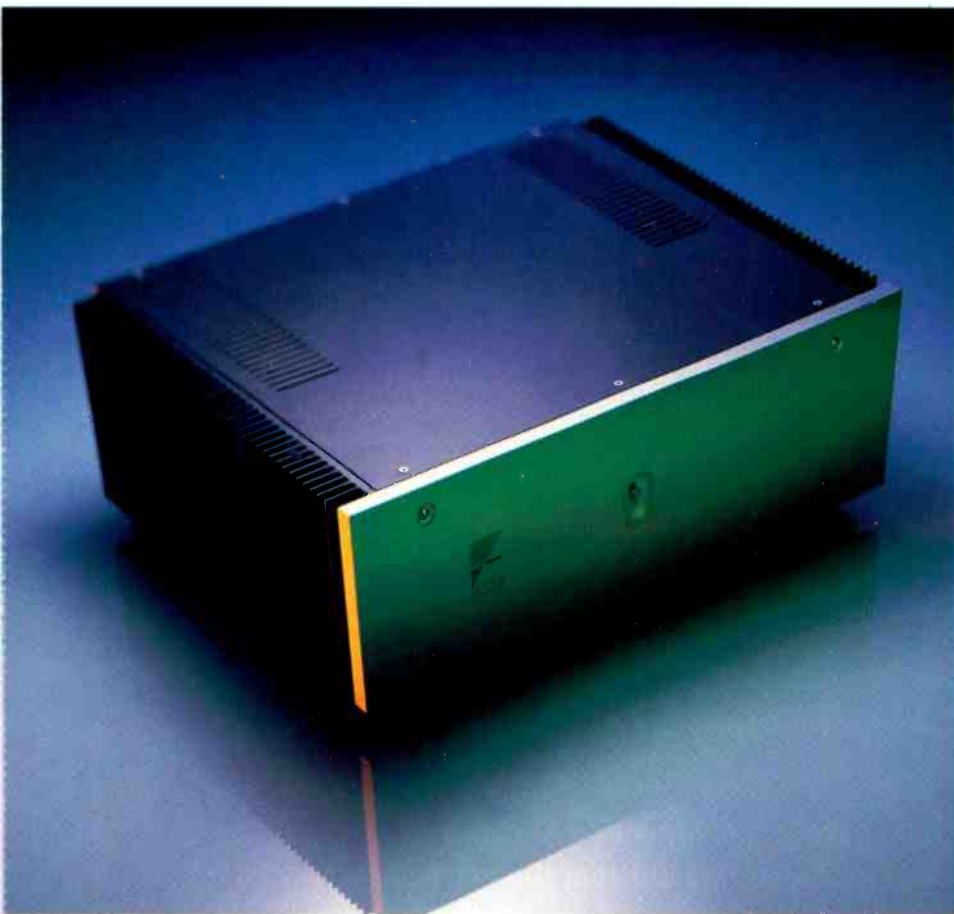
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AYRE ACOUSTICS V-3 POWER AMP



I first encountered the Ayre V-3 at the January 1994 Consumer Electronics Show, and was impressed with its technology and sound. This is an unusual amplifier that differs from most other designs in four major ways: All its amplifying devices, including those used in the front end, are MOS-FETs; the circuit uses a fully balanced bridge topology; there is no overall negative feedback, and, finally, the power supply utilizes choke-input filters. Other power amplifiers may have some of the above features but none that I know of has all four.

The unit is attractively packaged and sports an aluminum front panel, 1/2-inch thick, in your choice of black or silver finish. A centrally located standby/operate



switch is the only front-panel control. On the rear panel are the input and output connectors, an IEC line cord connector, an a.c. line fuse, and a master "On/Off" switch. Provisions are made for both unbalanced and balanced input via high-quality RCA and XLR jacks; small toggle switches, one for each channel, select bal-

anced or unbalanced input. Instead of mirror-imaged p.c. board for the two channels, identical boards are used. As a result, the arrangement of input jacks and the orientation of this toggle switch in one channel is the opposite of that in the other. The speaker connectors are high-quality Cardas, all-metal, five-way binding posts.

Looking within, we quickly see that this is not the "usual bear," as evidenced by the presence of five toroids. The largest, of course, is the main power transformer. Smaller, but still substantial in size, are the two filter chokes for the output-stage supplies. Finally, there are two smaller chokes for the supply that feeds the input circuitry. I can imagine some of you saying "Wait a minute, toroidal cores have no air gaps and would easily saturate with large amounts of d.c. flowing in their windings." Fear not—these cores are cut and have air-gap spacers installed.

As mentioned above, the amplifier circuitry is on two identical p.c. boards, one for each channel. These p.c. boards are mounted to large heat sinks that form the sides of the amplifier. Overall parts and build quality are of a high order.

Circuit Description

Signal circuitry of the V-3 is simple yet elegant. It starts out with a complementary differential input stage utilizing (think hard, now) MOS-FETs! Active current sources, also utilizing MOS-FETs, separately bias the N- and P-channel parts of the input amplifier at a stage current of some 30 to 40 mA per device. The differential outputs of each input pair are direct-coupled

SPECS

Power Output: 100 watts per channel into 8 ohms, 200 watts per channel into 4 ohms.

Gain: 32 dB.

Input Impedance: 10 kilohms.

Dimensions: 18 in. W x 14 in. D x 5 1/2 in. H (45.7 cm x 35.6 cm x 14.0 cm).

Weight: 54 lbs. (24.5 kg).

Price: \$3,450.

Company Address: 2300 B Central Ave., Boulder, Colo. 80301.

For literature, circle No. 90

to the second stage in a folded-cascode arrangement. A regular cascode using FETs would consist of a common-source FET driving a common-gate FET, so that the input FET's drain fed the cascode FET's source. The overall output is taken from the drain of the cascode FET. Ordinarily, both devices are of the same polarity and the drain current is virtually identical in both, as they are connected in series. In the



THE CONSTRUCTION OF THE V-3 IS UNUSUAL, AND ITS CIRCUITRY IS SIMPLE, YET ELEGANT.

folded cascode, two opposite-polarity devices are used, returning the d.c. level of the second transistor's output toward ground. This allows for greater voltage swing. Additionally, a common resistor (or current source) supplies idling current to both devices at the point where the first stage drives the second stage. In the folded cascode, therefore, the currents in the devices are not common but add up to the total amount supplied by the load resistor.

There could be some argument as to whether a folded cascode constitutes one or two stages. It is easier to see the ordinary cascode as one stage because the current of the input devices is common to the cascaded upper devices. I am discussing it as two stages because I think it is a little simpler to understand that way.

The drains of like signal-phase pairs of the four devices in the second stage are tied together through MOS-FET bias-spreading regulators and are also direct-coupled into the gates of the appropriate-polarity output devices. These output devices are of the latest generation and feature ultra-low on-resistance, high-current capability, and very high transconductance. Each device is said to be roughly equivalent in these aspects to 10 of the Hitachi lateral MOS-

FETs frequently used in audio power amplifiers.

Each of the two output terminals has a filter network connected back to the cascode MOS-FET driver gates, providing feedback to minimize the output d.c. offset. This feedback is said to be restricted to the frequency range from d.c. to about 0.16 Hz.

The nature of the N-channel output devices allows an interesting technique for measuring output-stage idling current. These devices have current-sensing attributes, via a fourth terminal, and a small portion of the current flowing through the MOS-FET is channelled to an external resistor through this terminal on the output device. The known relationship between the voltage drop across this resistor and the much larger current flowing through the main portion of the source geometry allows device current to be measured accurately without the power loss and increased output impedance that result from the normal technique of passing all the source current through a sampling resistor.

As mentioned in the introduction, there is no overall feedback loop from the output back to the first stage. Balanced input sources drive the input differential amplifier in push-pull (i.e. the two input terminals in opposite polarity from each other). Signals from the unbalanced input jacks drive the non-inverting input terminal of the input differential amplifier, which acts as a polarity inverter.

The power transformer has two secondary windings, each of which feeds a full-wave bridge rectifier made up of discrete, ultra-high-speed, soft-recovery rectifier diodes. After the choke-input filters for each rail-voltage polarity, the output-stage supply delivers about ± 25 V. The choke-input filters for the front-end supply are followed by a zener-follower arrangement. The zener follower uses two N- and two P-channel MOS-FETs as pass elements to generate ± 45 V to the folded cascode input

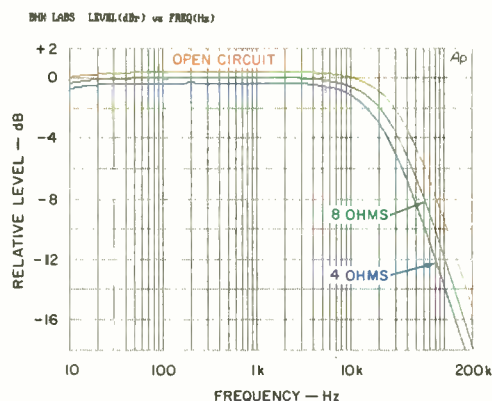


Fig. 1—Frequency response.

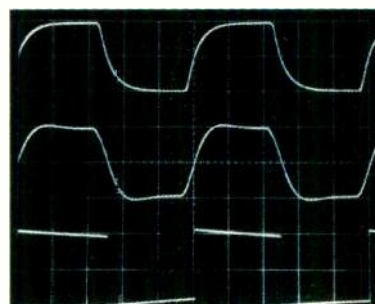


Fig. 2—Square-wave response.

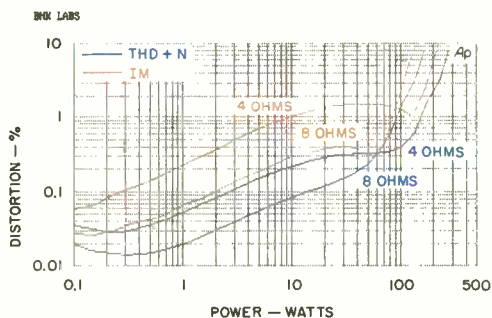


Fig. 3—SMPTE IM and 1-kHz THD + N vs. power.

and driver stage and ± 46 V as signal grounds for the integrating capacitors in the d.c. feedback networks and as bias voltages for the current sources.

Choke-input filters, as opposed to the almost universally used capacitor-input filters, use a series choke or filter reactor as the input element of the filter network, followed by a shunt capacitor to ground. In other words, the rectifier output is connected to a choke and the smoothing capacitor comes after the choke. Choke-input filters were traditionally used years ago in

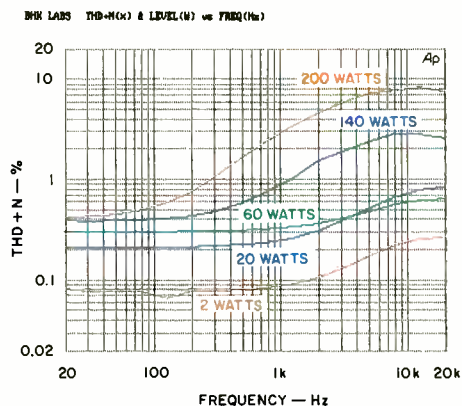


Fig. 4—THD + N vs. frequency.

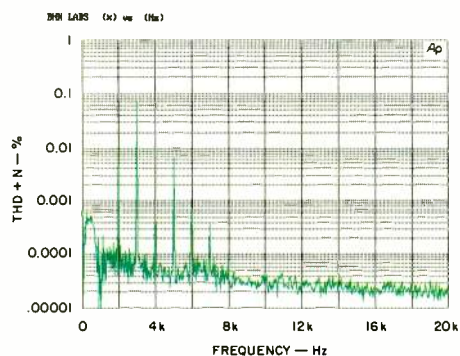


Fig. 5—Spectrum of distortion residue for 1-kHz signal.

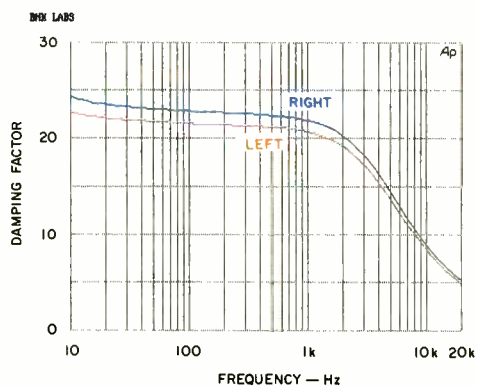


Fig. 6—Damping factor.

large Class-AB₂ and Class-B tube power amplifiers because they provided better voltage regulation than capacitor-input filters did. Such an arrangement, with the proper value of inductance in relation to the current drawn, has the unique property that the current through the rectifier and the primary and secondary windings of the power transformer is continuous throughout the a.c. power-line waveform period.

In contrast, a capacitor-input filter only draws current for a fraction of each half cycle near the peak of the a.c. waveform. As a result, the peak current is much higher and its discontinuous nature causes a.c. line-harmonic distortion and generates r.f. interference. This may cause undesirable sonic degradation in the audio system that includes the amplifier.

Measurements

Voltage gain and IHF input sensitivities were 32.7 and 32.6 dB for left and right channels, with corresponding input sensitivities (for 1 watt output into 8 ohms) of 65.7 and 66.6 mV, respectively. The results quoted are for the unbalanced inputs and were virtually identical, as they should be, for balanced inputs. This unusually high gain will be useful in systems using passive preamp/controllers, and will give low-level recordings from low-output sources a better chance of coming out at good listening levels. If you're playing a high-output source with an active preamp, however, the Ayre's high gain may force you to set the preamp's volume control in the low part of its rotation, where the tracking between channels usually isn't as good.

Frequency response for open-circuit, 8-ohm, and 4-ohm loading is shown in Fig. 1 for the right channel; frequency response characteristics were exceptionally well matched between channels. As can be seen, the V-3 is not what you would call an r.f. amplifier, having a -3 dB point of about 25 kHz.

Rise- and fall-times measure about $\pm 14 \mu\text{s}$, which corresponds perfectly with the classic simple relationship between bandwidth and rise-time, that the frequency in MHz of the -3 dB point will equal 0.35 times the rise-time in microseconds. Square-wave response of the V-3 is shown in Fig. 2. In the 40-Hz trace, some low-frequency tilt can be seen, an effect of the aforementioned d.c.-stabilizing feedback networks.

Distortion characteristics for both channels of the V-3 were very similar and subsequent discussion is arbitrarily for the right channel. Figure 3 shows 1-kHz THD + N and SMPTE-IM distortion for 4-ohm and 8-ohm loading, using the unbalanced inputs. With balanced input feed, hum and noise at low powers were a bit lower than shown. Figure 4 shows THD + N as a function of frequency and power for 4-ohm loading. Distortion characteristics are very similar to those of many tube amplifiers in magnitude and curve shape. A spectrum of

**FOLDED-CASCADE
CIRCUITRY INCREASES
THE AYRE V-3'S
VOLTAGE SWING.**

the THD residue for a 1-kHz signal running at 10 W into 8 ohms is plotted in Fig. 5. Of interest is how rapidly the harmonics fall off—mostly a result of having no overall loop feedback.

Output hum and noise for both channels and unbalanced and balanced inputs are presented in Table I. In the wideband measurements, the output noise is dominated by power supply ripple components. Further, noise is lower for balanced inputs.

Damping factor, referenced to 8 ohms, is plotted for both channels in Fig. 6. The damping factor of the V-3 is between those of typical tube and solid-state amplifiers.

Interchannel crosstalk was measured for both unbalanced and balanced inputs. Crosstalk was generally better than 110 dB down from 20 Hz to 2 kHz except at 120 and 240 Hz, the dominant hum components in this design. Above 2 or 3 kHz, crosstalk reached some -98 to -106 dB at 20 kHz, depending upon direction and input mode. The driven channel level for this test was 10 V rms into 8 ohms, and the un-driven channel was terminated in 1 kilohm for the unbalanced mode and two 1-kilohm resistors, one per input phase, in the balanced mode.

In measuring dynamic headroom, though I still use the IHF tone-burst signal, I am revising my reporting method to add more information than a single number.

Continued on page 49

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ENERGY VERITAS v1.8 SPEAKER SYSTEM

Energy is now a division of Audio Products International, one of Canada's largest audio companies, which also owns Mirage. Energy's Veritas v1.8, at \$3,350, is the lower cost, slightly smaller sibling of their flagship system, the \$6,000 Veritas v2.8. The v1.8 inherits many of the v2.8's sophisticated design features. Like the v2.8, the v1.8 is a floor-standing, three-way ported system. It utilizes a pair of vertically stacked, parallel-connected 6½-inch woofers, operated with what Energy calls a "Coherent Source" mid/high module that uses metal-dome drivers. The v1.8 is vented at the bottom rear by four flared-port tubes.

The v1.8 (and the v2.8) follow quite closely the loudspeaker performance guidelines of Canada's National Research Council, primarily established by Dr. Floyd Toole, former head of the Acoustics Department in the NRC's Division of Physics. (Dr. Toole currently heads the research and development efforts of Harman International, which includes JBL and Infinity, among others). These guidelines state that for a system to be preferred by experienced listeners, it must have wide bandwidth, flat and smooth axial frequency and power response, and uniform, wide dispersion.

The Veritas v1.8 reaches for these performance goals by incorporating such design



**THE VERITAS v1.8 USES
CUSTOM DRIVERS,
SOPHISTICATED
CROSSOVER DESIGN,
AND A REFINED CABINET.**

features as custom drivers, sophisticated crossover design, and a refined cabinet structure and shape. Improved vertical

coverage has been addressed by minimizing vertical lobing through the use of acoustically in-phase crossovers and low crossover frequencies. Energy states that "Correct phase relationship of all transducers throughout the audio band results in a coherent and stable sound image."

The cabinet of the v1.8 is very well braced and uses 1-inch-thick high-density fiberboard throughout.

The interlocked bracing of the v1.8 divides the enclosure into three separate but interconnected chambers housing, respectively, the mid/high driver assembly, the two woofers, and the rear port tubes plus the crossover and input connections. Each chamber is critically damped with generous amounts of fiberglass, 4 inches thick, to reduce internal standing waves.

Cabinet re-radiation, which causes unwanted midbass colorations, is reduced by isolating the system's woofers from the cabinet through the use of mechanical isolation rings. A heavy solid hardwood base, 1½ inches thick, provides additional stability. Spikes are provided for use on carpeted floors. The v1.8's cabinet is finished on all six sides (yes, even the bottom!). Diffraction is reduced by beveling the outside edges of the front panel and by minimizing abrupt angular discontinuities with flush-mounted drivers, etc.

The v1.8's three-way crossover is computer-optimized and includes correction that flattens the system's input impedance. The crossover is quite elaborate and contains 29 parts: nine resistors, 10 inductors, and 10 capacitors (not counting paralleled units), all of high quality. Six of the 10 inductors are iron core, including all inductors in the woofer section.

The woofer is driven through a third-order low-pass filter with a series LCR

impedance-compensation network in parallel with the woofer. The midrange is a second-order bandpass filter and contains two series-connected parallel-resonant rejection circuits that provide response shaping.

The tweeter is driven by a second-order, high-pass filter and contains a series-connected tuned LCR boost network and a parallel-resonant rejection circuit tuned to about 24 kHz. A series LCR impedance-compensation network is in parallel with the tweeter. The tweeter and parallel-connected woofers are connected in positive polarity, while the midrange is reversed.

Each section of the three-way crossover is brought out separately to the back panel with three gold-plated five-way double-banana jacks, which allows the use of single, bi-, or tri-wiring. This feature is super for

equipment reviewers because it allows independent access to each portion of the crossover for measurements. Spade-lug jumpers are provided to facilitate each connection configuration.

Energy manufactures all the drivers used in their systems. Assuming equal displacements, the dual 6½-inch woofers of the v1.8 have the equivalent air-moving capability of a single 9-inch woofer (if there were such a size). The woofers of the v1.8 have injection-molded polypropylene cones which have butyl rubber surrounds.

The midrange and tweeter of the v1.8 are mounted in a separate tear-drop shaped module located above the dual woofers. Both tweeter and midrange utilize hyperbolic-shaped aluminum-alloy domes with cotton suspensions and cloth-roll surrounds. The 3-inch midrange has a large edge-wound voice coil, three inches in diameter, wound on a high-temperature Kapton bobbin. The midrange operates in a sealed rear air chamber that provides a maximally flat response down to about 380 Hz. The 1-inch dome tweeter has a shaped pole piece for higher magnetic flux density.

The front surface of the mid/high module has been carefully contoured to minimize diffraction and is covered with an acoustically transparent, non-removable protective screen. The grille of the v1.8 is an injection-molded plastic piece wrapped with black grille cloth; it attaches to the front panel by means of eight projections that mate with corresponding holes in the front panel.

Measurements

Figure 1 shows the 10th-octave-smoothed on-axis anechoic frequency response of the Veritas v1.8, together with an unsmoothed curve that shows the

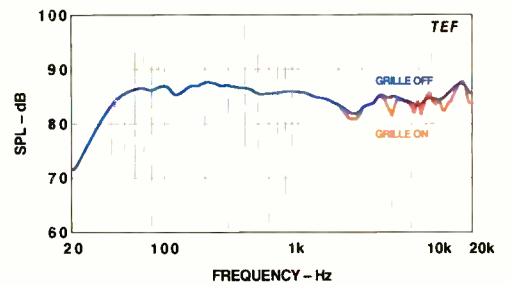


Fig. 1—One-meter, on-axis anechoic response.

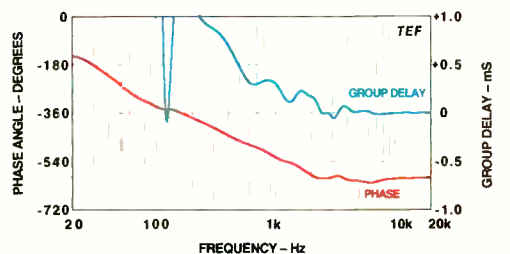


Fig. 2—On-axis phase response and group delay.

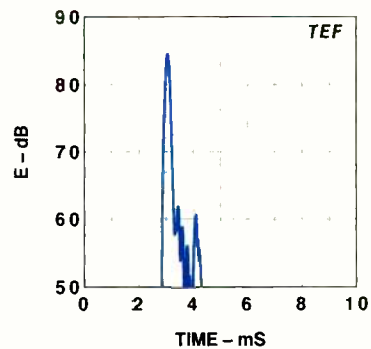


Fig. 3—Energy/time response.

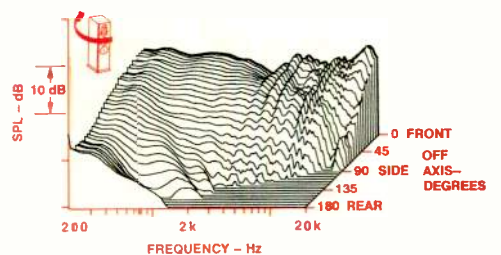


Fig. 4—Horizontal off-axis frequency responses.

SPECS

Type: Three-way, floor-standing, vented system.

Drivers: Two 6½-in. cone woofers, 3-in. aluminum-alloy dome midrange, and 1-in. aluminum-alloy dome tweeter.

On-Axis Frequency Response: 35 Hz to 25 kHz, ± 2 dB; 32 Hz to 33 kHz, ± 3 dB.

Sensitivity: 87 dB at 1 meter, 2.83 V rms applied.

Crossover Frequencies: 400 Hz and 2.5 kHz.

Impedance: 6 ohms nominal, 4 ohms minimum.

Recommended Amplifier Power: 80 to 250 watts/channel.

Maximum Power Handling: 300 watts instantaneous peak at less than 10% clipping.

Dimensions: 46 in. H x 11¾ in. W x 12¾ in. D (116.8 cm x 28.9 cm x 31.4 cm); footprint: 13¼ in. W x 14¾ in. D (33.7 cm x 35.9 cm).

Weight: 80 lbs. (36.4 kg) each.

Price: \$3,350 per pair; available in mahogany wood veneer or high gloss black lacquer.

Company Address: 3641 McNicoll Ave., Scarborough, Ontario M1X 1G5, Canada.

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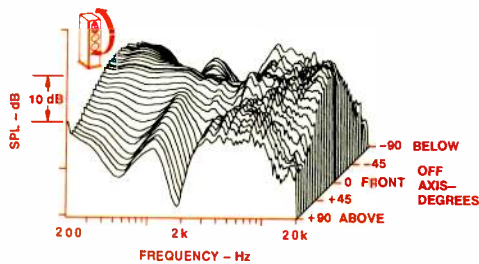


Fig. 5—Vertical off-axis frequency responses.

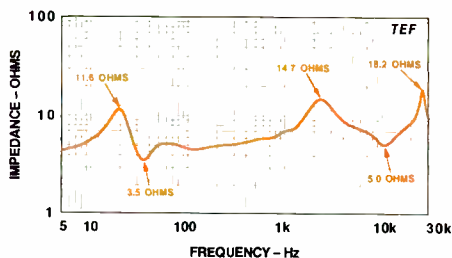


Fig. 6—Impedance.

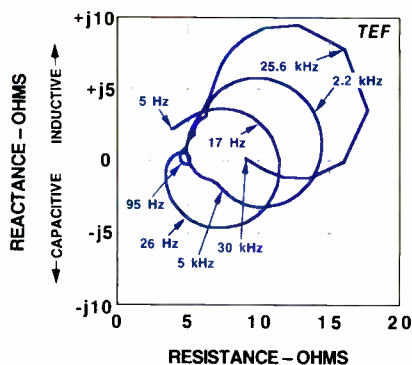


Fig. 7—Complex impedance.

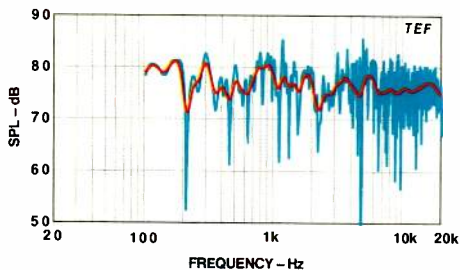


Fig. 8—Three-meter room response.

effects of the grille. Measurements were taken 2 meters from the front of the cabinet, at a point halfway between the midrange and tweeter. A voltage of 5.66 V rms was applied, and the measurement was referenced back to 1 meter. A combination of elevated free-field and ground-plane measurements was used to derive the curve.

The overall curve fits a moderately tight 5.5-dB window (+1.5, -4 dB re: 1 kHz) over the wide range from 36 Hz to 20 kHz. The curve is fairly flat from 50 Hz to 1 kHz but exhibits a somewhat rougher, depressed response at higher frequencies. Major anomalies include a dip, two-thirds octave wide, at the upper crossover point (2.5 kHz) and a high-frequency peak at 17 kHz. Excluding the crossover dip, the curve fits a tighter 4 dB window from 40 Hz to 20 kHz. The grille causes moderate changes in response above 2 kHz, of about +1, -2 dB. The main effect is a series of sharp dips in the response above 4 kHz.

Averaged from 250 Hz to 4 kHz, the sensitivity of the system measured 84.9 dB, about 2 dB below the v1.8's 87-dB rating. Below 15 kHz the right and left systems were matched very closely, staying within ± 0.4 dB. Above 15 kHz, however, one system's tweeter fell about 1.5 dB below the opposite system's.

The crossover frequencies and phase characteristics were investigated by reversing the polarity of each driver in turn. This was made much easier by having the input connections to each portion of the crossover so accessible.

With the tweeter connection reversed, a sharp 20-dB dip in the response was evident at 2.23 kHz, the upper crossover. This indicates that, in the normal connection, the tweeter and midrange are essentially in phase through the crossover region. This inter-driver phase relationship is quite

desirable because it minimizes lobing error and vertical off-axis response anomalies.

With the woofer reversed, the on-axis level was reduced only about 10 dB in a half-octave range centered at 560 Hz, the woofer-midrange crossover frequency. This indicates that the woofer and midrange are not completely in phase at their crossover when normally connected. This is not a significant problem because the midrange and woofers are quite close together acoustically at the lower crossover.

A check of response in the range from 20 to 30 kHz, above human hearing, revealed a high-Q peak of 6 dB at 23.3 kHz and a sharp, 8-dB dip at 25.8 kHz, both caused by a tweeter-dome resonance. At still higher frequencies, the response rolled off rapidly.

The phase and group-delay responses of the Veritas v1.8, referenced to the tweeter's arrival time, are shown in Fig. 2. The phase curve is well behaved and advances only 90° above 1 kHz. The group delay curve in-

**VIBRATION-RESISTANT,
THE CABINET IS FINISHED
ON ALL SIX SIDES, EVEN
THE BOTTOM!**

icates an approximate offset of about 0.4 mS between the midrange and tweeter. The test parameters accentuate the system's response from 1 to 10 kHz, which includes the upper crossover region. The main arrival, at 3 mS, is very compact, but is followed by a response about 25 dB down from the main energy peak and is delayed by about 1 mS.

Figure 3 shows the v1.8's one-meter on-axis 2.83 V rms energy/time response. The test parameters accentuate the system's response from 1 to 10 kHz, which includes the upper crossover region. The main arrival, at 3 mS, is very compact, but is followed by a response about 25 dB down from the main energy peak and is delayed by about 1 mS.

The horizontal "3-D" off-axis responses of the v1.8 are shown in Fig. 4. The bold curve at the rear of the graph is the on-axis response. In the primary $\pm 15^\circ$ listening window, the off-axis horizontal responses are quite uniform and exhibit only slight

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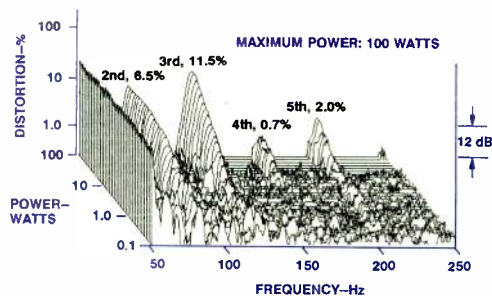


Fig. 9—Harmonic distortion for E₁ (41.2 Hz).

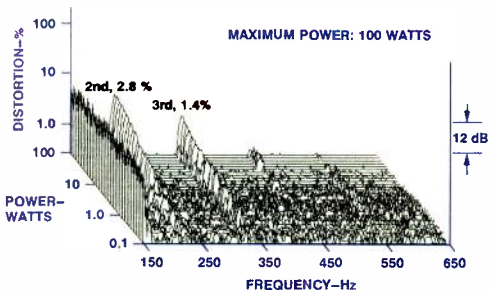


Fig. 10—Harmonic distortion for A₂ (110 Hz).

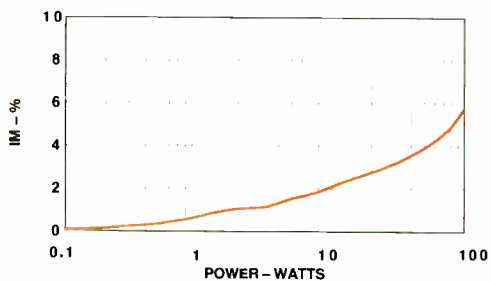


Fig. 11—IM for A₄ (440 Hz) and E₁ (41.2 Hz).

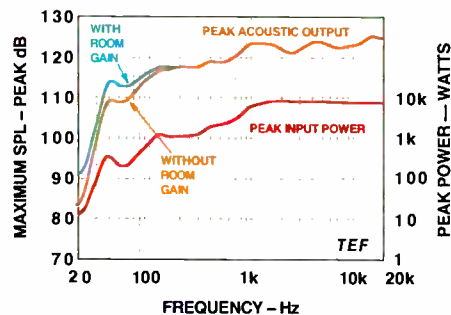


Fig. 12—Maximum peak input power and sound output.

high-frequency roll-off. Interestingly, the on-axis dip in the response at the upper crossover point at 2.5 kHz essentially disappears beyond about 25° off axis. This implies that the dip is diffraction-related and probably associated with the width of the cabinet.

The vertical off-axis “3-D” curves of the v1.8 are seen in Fig. 5. The bold curve half way back is on-axis response. In the primary ±15° vertical listening window, the responses are quite uniform and exhibit only minor anomalies at the upper crossover, 2.5 kHz. These anomalies are restricted to downward angles, where there is a slight, octave-wide level reduction of about 2 to 3 dB (not clearly shown in the graph). Some narrowing of response is noted for extreme off-axis angles in the lower crossover region.

Figure 6 shows impedance versus frequency, plotted over the extended range of 5 Hz to 30 kHz. I chose to extend our plotted data to 30 kHz to show a high-frequency impedance peak of 18.2 ohms at 26.2 kHz. This frequency coincides approximately with the resonant frequency of a previously mentioned parallel-resonant rejection circuit in series with the tweeter. This rejection circuit was presumably added to tame an overactive dome resonance in the tweeter. Even with the circuit in place, the axial response still exhibited a high-frequency peak at the somewhat lower frequency of 23.3 kHz.

Between 20 Hz and 20 kHz, a minimum impedance of 3.5 ohms occurs at 35 Hz, and a maximum of 14.7 ohms occurs at 2.3 kHz. The max/min variation is 4.2 to 1 (14.7 divided by 3.5). This moderately high variation, coupled with fairly low minimum impedance, means that the v1.8 will be somewhat sensitive to cable resistance. Cable series resistance should be limited to a maximum of about

0.053 ohm to keep cable-drop response peaks and dips greater within 0.1 dB. For a typical run of about 10 feet, 14-gauge or larger low-inductance cable should be used.

Figure 7 shows the very energetic complex impedance of the v1.8, plotted over the range from 5 Hz to 30 kHz. Between 20 Hz and 20 kHz, the impedance phase (not shown) reached a maximum angle of +34° (inductive) at 1.51 kHz, and a minimum of -38° (capacitive) at 26 Hz. With these moderate angles, but fairly low impedance values, the v1.8 will not be a problem for most amplifiers, if used one per side.

A high-level, sine-wave sweep revealed a quite rigid cabinet, with the only detectable wall activity a vibration of the top, sides, and rear of the upper third of the cabinet in the 280- to 300-Hz range. The 6½-inch

**THE ENERGY v1.8'S
GOOD INTERDRIVER
PHASE RELATIONSHIPS
MINIMIZE LOBING
AND OFF-AXIS ANOMALIES.**

woofers have a generous peak-to-peak linear travel capability of about 0.5 inch with a maximum capability of about 0.6 inch. Peak-to-peak excursions beyond 0.5 inch resulted in high values of third-harmonic distortion. The woofer overloaded quite gracefully. No dynamic offset was evident.

A sharp excursion minimum occurred at 38 Hz, the vented-box resonance frequency. At this frequency, excursion was about one-third lower than when I closed the ports. A healthy reduction in excursion at box resonance indicates a well-tuned vented box.

Figure 8 shows the 3-meter room curves of the v1.8, with both raw and sixth-octave smoothed. The system was in the right-hand stereo position, aimed toward the main listening position, and the test microphone was at ear height (36 inches), at the listener's position on the sofa. The system was driven with a swept sine-wave signal of 2.83 V rms (corresponding to 1.33 watts into the rated 6-ohm impedance). The direct sound and the first 13 ms of room reverberation are included.

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Overall, the averaged curve is quite extended and fits a reasonably tight 10-dB window. There are no major room-effect dips in the 250- to 500-Hz range. Excluding the dips at 210 Hz and 2.2 kHz, the averaged curve fits a tight, 7-dB window. Above 2.5 kHz, the averaged curve fits a much tighter window of about 3.5 dB.

Figure 9 shows the E_1 (41.2-Hz) bass harmonic distortion data of the v1.8 for input levels from 0.1 to 100 watts (24.5 V rms into the rated 6-ohm load). The second harmonic reaches only 6.5%, while the third attains a somewhat higher 11.5%. Higher harmonics are 2% or less. With 100 watts input, the system reaches a healthy 104 dB SPL at this frequency.

Figure 10 shows the A_2 (110-Hz) harmonic distortion data. The predominant distortion is a low 2.8% second harmonic with an even lower 1.4% third. Higher harmonics were negligible. With 100 watts input, the system reaches a healthy 107 dB SPL at 110 Hz.

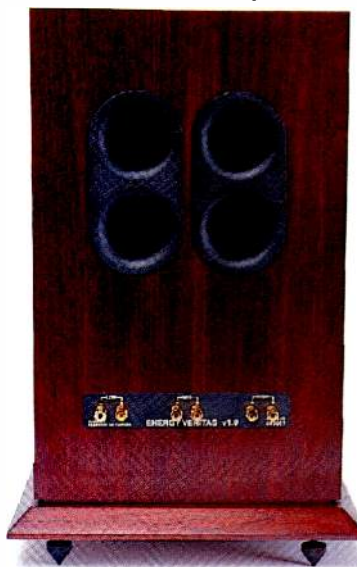
The A_4 (440-Hz) distortion data (not shown) rose only to the low value of 1.2% second and 0.7% third, with higher harmonics below the noise floor of my measuring gear.

Figure 11 displays the IM versus power created by equal power tones of 440 Hz (A_4) and 41.2 Hz (E_1) over the range from 0.1 to 100 watts. The IM rises only to the moderate level of 5.7% at 100 watts. Although the system is a three-way, the IM distortion is not as low as in some other competing three-way systems, whose IM rises only to the 1% range. This is due to the v1.8's fairly high woofer-to-midrange crossover frequency in the 400- to 500-Hz range, which means that the woofer is still reproducing a significant amount of the higher frequency, 440-Hz test tone. With the crossover this high, the two IM test tones are not completely split between the woofer and midrange.

The short-term peak-power input and output capabilities of the v1.8, measured using a 6.5-cycle third-octave tone burst, are shown in Fig. 12. The peak input power was calculated by assuming that the measured peak voltage was applied across the rated 6-ohm impedance.

The peak input power rises swiftly from 12 watts at 20 Hz to about 350 watts at 41 Hz, which coincides approximately with

the tuning frequency of the vented box. After a slight dip, it continues to rise and reaches a plateau of about 1.1 kW between 120 and 310 Hz, then rises smoothly to the 8-kW range above 1.6 kHz. In the level region between 160 and 315 Hz, the main limitation in power handling was that the



**BASS WAS SMOOTH,
VOCALS WERE DETAILED
AND EFFORTLESS,
AND PIANO RETAINED ITS
POWER AND DYNAMICS.**

output waveform turned triangular at higher levels; this implies that inductors are saturating in the woofer section of the crossover.

With room gain, the maximum peak output SPL of the system starts at a strong 92 dB at 20 Hz, passes through 110 dB at 35 Hz, reaches a strong 117 to 118 dB between 100 and 350 Hz, and rises into the low 120s above 700 Hz. Being able to reach 110 dB SPL at 35 Hz places the v1.8 in the top 10% of speakers I have tested, in the ability to generate usable amounts of low-frequency output.

Use and Listening Tests

Even though the Veritas v1.8 weighs 80 lbs., it is fairly easy to move around the listening room by using a rocking and walking motion. The systems come supplied with spiked cone feet (called "Quartets"

and made by Audio Products International, Energy's parent company) that screw into the bottom of the cabinet. Listening was done both with and without these spikes.

My review samples were supplied in a superb mahogany finish that everyone in my family liked. The beveled hardwood base of the cabinet added greatly to the overall look and improved the stability of the system. Construction and appearance are first-rate. The system's grille frame is quite attractive and easy to remove and replace. The system looks quite good even with the grille removed, because of the secondary grille and good looks of the teardrop-shaped mid/high assembly.

The excellent owner's manual runs for 12 information-packed, 8½ x 11 pages. Sections include design philosophy, general information on room acoustics and speaker placement, selection of speaker wire and electronics, different methods of connecting the v1.8s, listening to the systems, cabinet care, and technical specifications, etc.

My equipment line-up consisted of the Krell KRC preamp and KSA-250 power amp, driving the v1.8s through Straight Wire Maestro cabling. Listening was done mainly with normal, single-wire connections. My reference loudspeakers were the B & W 801 Series 3s, while my Onkyo and Rotel CD players provided source material.

Energy recommends placing the v1.8s as far as practical from the rear wall, with a distance of 2 to 4½ feet acceptable. Side-wall spacing should be in the range of 2½ to 5 feet or greater. My customary locations are close to these values but farther away from the rear wall because of the greater length of my listening room. The systems were canted in towards my listening position at the couch.

Initial listening was done with an excellent demo CD of the Holly Cole Trio (female vocal, piano, and acoustic bass; I've heard them in person, super!) titled *Musical Truth* (Alert Music Inc. DPRO-240). The recording was supplied (and produced) by Energy. The v1.8s did an exceptional job in recreating the ambience and acoustics of the trio playing in a small room. Bass was smooth and extended, vocals were detailed and effortless, and the dynamics and power of the piano were reproduced quite well. Some emphasis of

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CD: **Bartok**: "Duke Bluebeard's Castle;" Gwynne Howell (bass), Sally Burgess (soprano). BBC Nat'l Orch. of Wales (Mark Elder). **Magazine**: Opera Special featuring Luciano Pavarotti; plus Martha Argerich, Sara Chang; featured composer: Shostakovich. C1093



CD: **Tchaikovsky**: Nutcracker & Swan Lake extended suites. The Crch. of the Royal Opera House, Covent Garden (Mark Ermler). **Magazine**: Tchaikovsky: his mysterious death 100 years ago, Simon Rattle, Music in Tokyo; featured composer: William Byrd C1133



CD: **Schubert**: Symphony No. 9 in C (Great C major). BBC Scottish Symphony Orch. (Takuo Yuasa). **Magazine**: Exclusive interview with Yehudi Menuhin, Soprano Anne Evans, Victor Borge; still laughing at 85; featured composer: Edward Elgar. C0194



CD: **Rimsky-Korsakov**: Selections from "The Golden Cockerel," "Capriccio espagnol," "Mussorgsky," "Pictures at an Exhibition," (orchestration Ravel). BBC Phil. Orch. (Tortelier). **Magazine**: Leonard Bernstein, Heinrich Schiff, Women Composers of Today; featured composer: Bach. C0594



CD: **Johannes Brahms**: Liebeslieder, Neue Liebeslieder; Louis Spohr, Three Psalms; Giacomo Meyerbeer, Psalm 91; BBC Singers. **Magazine**: Alfred Brendel, Choral Special, New Stage & Screen column; featured composer: Beethoven (Pt. II). C0494



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high-frequency tape or electronics noise was evident on the quieter passages.

The systems played clean and loud on the big-band jazz sounds of The Bob Florence Limited Edition's *Funupsmanship* (MAMA Musical Archives Foundation MMF 1006). The systems did particularly well in reproducing the "bite" and in-your-face sound of the brass section.

On material that did not include any appreciable low bass below 32 Hz, the v1.8's output was the equal of the B & W references'. Rock 'n' roll kick drum and electric-bass lines were handled very well. Pipe-organ bass pedals were reproduced with much authority. On material with very low bass, such as some of the synthesizer notes of Don Dorsey's *Bachbusters* (Telarc CD-80123, particularly the note at time 0:27 on track 8), the Energy speakers could be overloaded at high levels.

The sensitivity of the v1.8 was essentially the same as that of my reference system. Overall tonal balance was also quite similar. When I was not directly facing the systems it was hard to tell on much material when I switched between the v1.8s and the B & W systems.

On the pink-noise, stand-up/sit-down test, the v1.8s exhibited very little tonal change when I stood up. On this test they were the equal of my reference systems. The Energy's spectral balance on pink noise was fairly accurate and extended, but not quite as smooth as the B & W system's.

With third-octave band-limited pink noise, the systems did extremely well at 40 Hz and above. Their clean output at 31.5 Hz was quite usable. The Veritas could not generate any significant output in the 20- and 25-Hz bands; only third harmonics were generated when the sound level was turned up.

On classical material such as Tafelmusik's *Music for Trumpet and Orchestra* (Sony Vivarte SK 53 365), the v1.8s performed very well. Soundstage, imaging, and reproduction of hall acoustics were first-rate.

Played loud on dynamic pop material, with a strong rhythm section like that on "Evolution" from *The Usual Suspects* (Sheffield Lab 10032-2-F), the v1.8s provide impressive sound coupled with stunning good looks and solid engineering. Check 'em out!

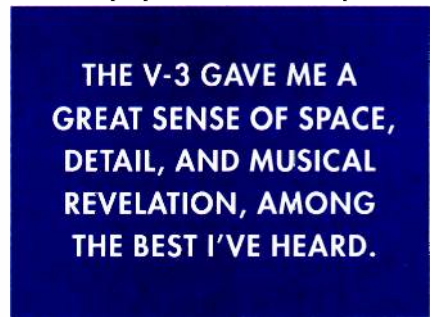
D. B. Keele, Jr.

AYRE, continued from page 40

From here on, I will report the amount of equivalent sine-wave power both at the beginning of the tone-burst and at the end, to show how much the power supply sags during the 20-mS burst. The signal drive level will be adjusted to make the amplifier just begin visibly clipping at the start of the burst. The dynamic-headroom number will continue to be computed from the equivalent sine-wave power available at the beginning of the burst. For 8-ohm loads, the Ayre's starting and ending powers were 138 and 127 watts, respectively,

for a dynamic headroom of 1.4 dB. With 4-ohm loads, the results were 276 watts, 220 watts, and 1.4 dB. Steady-state clipping power for 8 ohms was 130 watts; for 4 ohms it was 218 watts. Clipping headroom figures were 1.13 and 0.37 dB, respectively.

A.c. line draw for the V-3 in full warmed-up operation was 1.7 amperes. In



the standby mode, with the output stage not powered, a.c. line draw was a still substantial 0.5 ampere.

Use and Listening Tests

Phono equipment used in my system during the review period included an Oracle turntable fitted with a Well Tempered Arm and Spectral Audio MCR-1 Select moving-coil pickup used with a Vendetta Research SCP-2C phono preamp. Krell MD-10 and PS Audio Lambda CD transports fed Sonic Frontiers SFD-2, Stax DAC-Talent BD, and other (experimental) D/A converters. Other signal sources included a Nakamichi ST-7 FM tuner and 250 cassette recorder and a Technics open-reel recorder. Preamplifiers used included a Quicksilver

Table I—Output noise levels. IHF S/N ratios for unbalanced inputs were 88.4 and 88.0 dB, respectively, for the left and right channels; for the balanced inputs, IHF S/N ratios for left and right were 89.7 and 88.4 dB, respectively.

Output Noise, μV		
BANDWIDTH	LEFT	RIGHT
Unbalanced In		
Wideband	250	330
22 Hz to 22 kHz	240	320
400 Hz to 22 kHz	110	110
A-weighted	108	112
Balanced In		
Wideband	192	240
22 Hz to 22 kHz	175	225
400 Hz to 22 kHz	101	113
A-weighted	93	108

Audio, Forssell tube line driver, and a First Sound Reference II. Power amplifiers I used for comparison were a Crown Macro Reference and Quicksilver M-135s. Loudspeakers used were B & W 801 Matrix Series 3 augmented by a new experimental subwoofer using two JBL 1400Nd drivers.

My immediate impressions of the Ayre V-3 were very favorable. It has a light, detailed, airy, and spatial presentation. After measuring the amplifier in the lab, I returned it to my setup for more serious sonic evaluation. Again, I got a great sense of space, detail, and musical revelation. In these regards, the V-3 is among the best I've heard. Any concern regarding the measurements on the amplifier quickly disappeared as the music issued forth convincingly from my speakers. It's frequently the case that great resolution and detail may be accompanied by some degree of irritation in the form of hardness and/or edginess. But I am happy to report that, in the case of the Ayre V-3, any such irritation is very low. Music just blooms forth, with very little in the way of its presence. Bass impact and delineation are also very good. On an overall basis, I think the V-3 is a wonderful sounding amplifier. In using the V-3, no operational flaws were found, and there were no annoying pops or clicks when powering on or off.

I think the Ayre V-3 is a worthy contender and a welcome new addition to the constellation of musical power amplifiers. Go give this one an audition.

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NCT NOISEBUSTER NB-DX EARPHONES



Noise Cancellation Technologies' Model NB-DX is more than just a pair of earphones; it is intended to produce good-quality sound *and* reduce outside noise at the same time. There are other earphones that reduce outside noise, but they accomplish this by using closed earcups with a tight seal around the ears. The NB-DX earphones are of the open type, and when they are not in the noise-cancelling mode, they allow outside conversation and noise to be heard easily. To reduce outside noise, they use an electro-acoustical noise-cancelling system. Besides the usual earphone transducer in each earcup, there is also a microphone that picks up outside noise. The microphone output is sent to the input of an electronic circuit that filters and inverts the signal. This is amplified,

**THE NOISEBUSTERS
NOT ONLY PLAY MUSIC
BUT PARTIALLY CANCEL
AMBIENT NOISE.**

mixed with the program material from the source, and fed to the earphones. Since the electronic noise signal is the same as the outside noise at the earcup but of opposite polarity, it cancels (or at least reduces) the noise heard by the listener. Conversation can still be heard, albeit at a slightly reduced level. According to Noise Cancellation Technologies, "low-frequency program material is adjusted to compensate for the cancellation."

The electronic circuitry is built into a small plastic box and is powered by a 9-V battery. The box has smoothly rounded edges and a cleverly designed belt clip that allows the earphones to be snapped onto the top of the box so you can carry them around easily when you aren't wearing them. The earphones are wired perma-

nently to the electronics box by a cord about 3 feet long. The box has a stereo mini-jack input that accepts the 18-inch cable that comes with the NB-DX earphones. This cable has a volume control that allows you to adjust the level of the sound with your thumb; the volume control thumbwheel has been cleverly recessed between two raised ridges to protect it against inadvertent misadjustment. When you are using a portable tape player, you can set the thumbwheel to maximum and adjust the level of the tape player to the loudest level that you will ever need; then you can use the thumbwheel to change the level afterwards, which is more convenient than using the volume control on the tape player.

The NB-DX earphones can be used without the noise-cancelling feature. The noise cancelling is turned on and off by a recessed switch on the side of the electronics

SPECS

Transducer Design: Dynamic.
Coupling to the Ear: Supra-aural (on the ear).
Equalization: Not specified (see text).
Sensitivity: 102 dB. SPL per mW, ± 3 dB.
Maximum Output: 100 mW per channel at 1 kHz.
Impedance: 44 ohms.
Price: \$149.
Company Address: 800 Summer Street, Stamford, Conn. 06901.

MEASURED DATA

Absolute Polarity: Positive, but shifted 90° when noise cancelling was on.
Cord: 3 feet between earphones and control box; 18-inch cord with 1/8-inch stereo mini phone plugs for connection between control box and source.
Adjustments: Headband slides in yoke, with detents; earcups have swivels.
Weight: Earphones: 128 grams; control box: 131 grams.
For literature, circle No. 92

box. Even if the battery runs down, you can use the earphones. The battery compartment is on the same side of the box as the belt clip, which makes changing the battery difficult. I found that, after I managed to put the battery into the box by sliding it under the clip, I couldn't put the cover back on; the compartment didn't seem deep enough for a standard 9-volt battery. *Audio* has since been told by NCT that there is room, but only if the battery is inserted a certain way. Newer units have a diagram showing this. I used the NB-DX earphones with some CD and tape players, and the level they provided was more than adequate. The input impedance of the NB-DX isn't specified but is high enough that it didn't affect the response of the signal from my test system or a portable CD player that I used.

The NB-DX earphones are a very lightweight, open design and are relatively comfortable even for extended listening. While they can be used for jogging or running, I think they are a little loose-fitting for this type of activity. The headband is made of spring steel, with a flexible rubber covering that rests on top of the head. The plastic bails have detents that hold the earcups in place after you adjust them. The earcups are attached to the bails by ball swivels and

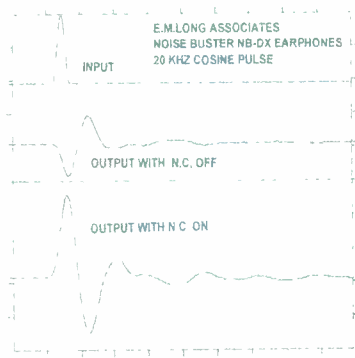


Fig. 1—Cosine pulse test; note the phase relationships (see text).

they have foam covers; this combination allows a comfortable fit. The foam covers are removable for cleaning.

The response of the NB-DX earphones extends smoothly from 2.5 kHz down to about 50 Hz; from 2.5 to 4 kHz there is a gradual rise. The response is uniform to about 12 kHz where it rolls off gently to 20 kHz. Figure 1 shows the output of the NB-DX earphones for a 20-kHz cosine input pulse.

The upper trace is for the input pulse.

The middle trace shows the output without the noise-cancelling circuit. The polarity of the output is inverted and is changed to a sine wave, which indicates that the phase is 90° from the input. I measured the phase versus frequency and found an almost uniform curve at around -90°. The lower trace shows the response of the NB-DX earphones with the noise cancellation turned on. The polarity is positive but the phase is still 90° from the input. The listening panel found it difficult to determine the correct absolute polarity of various program material and these traces may correlate with their difficulty in hearing this.

The listening panel found the bass sounds produced by the NB-DX to be very good, despite their open design, although not as convincing as the sound from the Stax SR-Lambda Pro reference earphones. The equalization appears to be designed to provide a good approximation to the diffuse-field response of the human ear. Comments about the midrange were: "Very open and clear," "articulate on voice," and "good presence." The comments about the sound in the treble range were "not as extended as reference," and "good, but not exceptional." Listeners agreed that the treble was generally not as good as on other, more expensive earphones but it is adequate and does not have an unpleasant quality that would cause long-term listening fatigue.

When the noise-cancelling switch is turned on, there is a slight delay while the system stabilizes. If you move your head

EARPHONE EVALUATION

PARAMETER	RATING	COMMENTS
Overall Sound	Very good	"Good sound," "Smooth," and "A little bright"
Bass	Good	"Adequate" and "Not boomy"
Midrange	Very good	"Good presence," and "Articulate on voice"
Treble	Good	"Not extended like reference," and "Subdued"
Overall Isolation	Good	"Rumble reduced" and "Outside sounds are easily heard"
Bass	Good	"Low rumble sounds reduced"
Midrange	Poor	"Conversations can be heard"
Treble	Fair	"Some reduction of treble sounds"
Comfort	Good	"Good fit" and "Easy to adjust"
Value	Good	"I like the noise cancelling"

GENERAL COMMENTS: A little bright but good articulation. Very good for listening in noisy situations such as when transportation background noise is high. Adequate bass. Clean sound and overall good value.

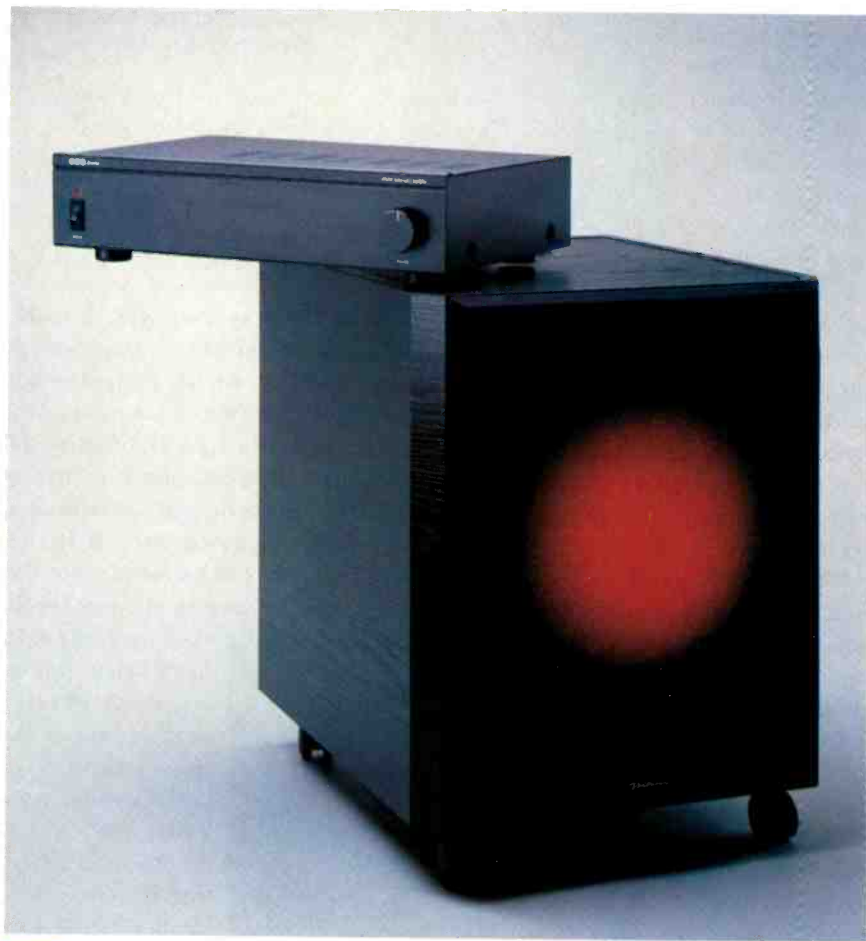
suddenly, a change occurs in the background noise; this is because when you move your head, the two microphones in the earcups have a new position in the sound field and the noise-cancelling system takes a second to re-adjust itself to that background noise; the noise cancellation is most effective from about 70 to 200 Hz. It is very effective in reducing outside noise that can reduce your listening enjoyment, with-

**BASS WAS VERY GOOD,
AND MIDRANGE WAS
OPEN, ARTICULATE,
AND CLEAR.**

out impairing your ability to hear conversations or warning signals. I once made a spectrum analysis of the background noise leaking into a recording studio in a large city, and it was almost identical to the spectrum shown in the NB-DX earphone literature; even if you are listening outside on what you might consider to be a quiet evening in a large city, the NB-DX will reduce the background noise. I tried the NB-DX in different noisy situations and they do a good job of reducing transportation rumble and noise. They would be ideal for anyone who rides public transportation such as trains, buses, subways, or even airplanes. I found them fun to use, especially in a situations where background noise was a problem. I think that they are a very good value, especially if you listen while you travel.

Edward M. Long

B·I·C AMERICA V-12 SUBWOOFER AND SWA-100 AMPLIFIER



The purpose of the B-I-C America SWA-100/V-12 amp/subwoofer combination is to add an octave of bass extension to a pair of small satellite speakers. It also serves to add the "whump" factor needed in video soundtrack reproduction. It is a good complement to B-I-C's line of small, inexpensive two-way speaker systems. When purchased together, the SWA-100 and V-12 list at a package price of \$728. The system's "street price" should be even more affordable.

The V-12's 12-inch woofer and twin 3-inch ports are forward-firing in the ade-

quately rigid, 2½-cubic foot cabinet, to allow flush mounting for built-in use. Nothing exotic here; just well-proven proportions for good bass. The caster-equipped cabinet is finished in a black wood-grain vinyl veneer on all sides. It can serve as an end table, with the driver facing any convenient direction. I found fit and finish to be typical of inexpensive speakers. Connection is made to five-way binding posts

on standard ¾-inch centers located on the bottom of the cabinet.

The SWA-100 subwoofer amplifier, which can be stacked with other hi-fi components, has only a power switch and volume control on its front panel. The rear panel accepts line or speaker-level inputs from the host system and provides high-pass line or speaker-level outputs back to it. The subwoofer signal is derived by summing the inputs, sharply low-pass filtering at 85 Hz, and feeding this to the internal amplifier. A rear-panel switch sets the amplifier to handle either 4-ohm or 8-ohm subwoofers. Two V-12s may be driven if this switch is set to 4 ohms. Speaker connectors are inexpensive spring-loaded types for the main speakers and heavy five-way posts for the subwoofer. The owner's manual has instructions and illustrations for adding the SWA-100 to all common types of component systems. (An error was found in the diagram for wiring to a line-level surround processor; it would produce a left/right front channel reversal.)

Measurements

The V-12 speaker and the SWA-100 amplifier were measured as separate components and together as a subwoofer system. Figure 1 plots the impedance magnitude versus frequency for the V-12. The minimum of 8 ohms between the two peaks occurs at 32 Hz, indicating the box tuning frequency of this vented system. The V-12 presents a reasonable load to any amplifier rated for loads of 8 ohms or less.

The 1-meter, 1-watt anechoic frequency response plot of the V-12 alone, Fig. 2, shows the response falling below 50 Hz and very strong well above the subwoofer range. It is necessary to attenuate the upper range and perhaps to boost the low end

THE COMBINED RESPONSE OF THE AMP AND THE SUBWOOFER EXTENDS STRONGLY BELOW 30 Hz.

with an external crossover. (Also, the low end will be radically improved when the speaker is placed in a room. Although room gain—or transfer function, as I prefer to call it—varies from room to room, a significant boost below 50 Hz is common.)

The SWA-100's internal crossover filter supplies such upper-range attenuation.

Figure 3 shows the amplitude response of the V-12 when powered by the SWA-100. (The SWA-100's gain was adjusted to provide 2.83 V output at 50 Hz.) This is more like it. Low midrange is filtered out and the bass in a typical room will extend strongly to below 30 Hz. This response is a good complement to that of a typical, small two-way system.

Maximum output of the combination versus frequency is shown in Fig. 4. I attempted to obtain a practical maximum output at each frequency by pushing the system to 10% total

harmonic distortion. To my surprise, an internal limiter fought my efforts to go past 3% distortion; the curve shows the SPL at the limiter threshold (and beyond, for frequencies where it could be pushed further). The result is a very clean woofer with moderate maximum output.

Figure 5 shows six amplitude response curves for the SWA-100 amplifier. The

**LIMITERS IN THE AMP
RESTRICT OUTPUT A BIT
BUT THEY ALSO KEEP
THE SUBWOOFER'S SOUND
VERY CLEAN.**

"Subwoofer" curve (the signal fed to the subwoofer) peaks at 35 Hz; note the high-pass filter at 20 Hz. This keeps out unusable frequencies below the subwoofer's range that might cause distortion. The other five curves in Fig. 5 are for the high-pass signal that feeds the satellites. From these measurements, it can be deduced that a

simple series capacitor is used to provide the high-pass function in the line-level and in the speaker-level interfaces. The problem with this is that the high-pass crossover frequency depends on the impedance of either the power amp or the satellite speaker.

Line input responses are shown for a "high-impedance" amplifier load (100 kilohms) and for a "low-impedance" amplifier (20 kilohms). The -3 dB points are 40 and 80 Hz, respectively. This variation

could cause a problem in transition from satellite to subwoofer.

The situation is worse for speaker-level operation, which is necessary when the

Continued on page 60

SPECS

SUBWOOFER

Enclosure Type: Vented box.

Driver: 12-in.

Recommended Crossover Frequency: 85 Hz to 120 Hz.

Frequency Range: 28 Hz to 85 Hz; -6 dB at 22 Hz when used with SWA100 amplifier.

Sensitivity: 90 dB SPL at 1 meter for 2.83 V.

Nominal Impedance: 8 ohms.

Recommended Amplifier Power: 20 to 100 watts.

Dimensions: 21 in. H x 16½ in. W x 18½ in. D (53.3 cm x 41.9 cm x 47.0 cm).

Weight: 40 lbs. (18.2 kg).

Price: \$329.00 each.

AMPLIFIER

Power Output: 8 ohms, 70 watts; 4 ohms, 100 watts;

both from 20 Hz to 70 Hz.

Dynamic Headroom: 8 ohms, 2 dB; 4 ohms, 1.9 dB.

Frequency Response: 20 Hz to 50 Hz; -0, +3 dB.

Crossover Frequency: 85 Hz.

Crossover Slopes: High-pass, 6 dB/octave; low-pass, 24 dB/octave.

Input Sensitivity: 160 mV for rated power.

Amplifier Class: A/B.

Dimensions: 4½ in. H X 17 in W X 12¾ in. D (10.5 cm x 43.2 cm x 32.4 cm).

Weight: 14 lbs. (6.3 kg).

Price: \$395.00 each.

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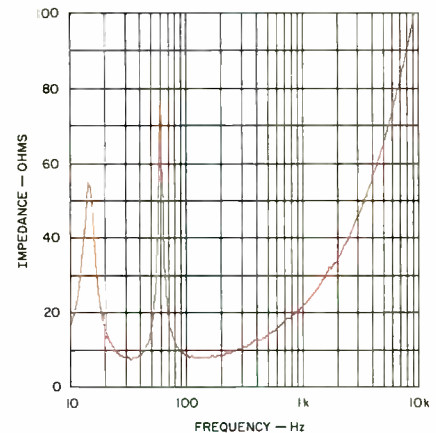


Fig. 1—Impedance of V-12 subwoofer.

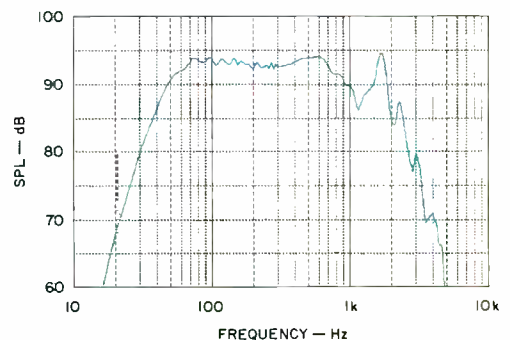


Fig. 2—Anechoic frequency response of V-12.

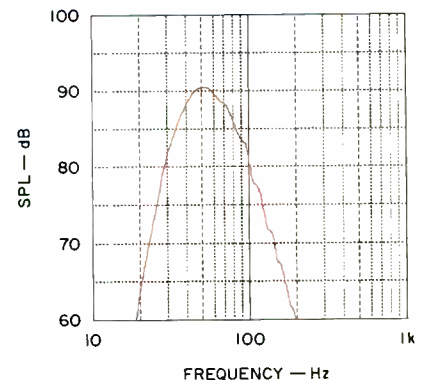


Fig. 3—Anechoic frequency response of AWS-100 amp and V-12 subwoofer.

ASC NA-4 SHADOW CASTER ACOUSTIC PANELS



Acoustic Sciences Corp. (ASC) is best known to audiophiles for the attractive Tube Trap line of cylinders for improving listening-room acoustics. Art Noxon, ASC's president, once gave me an unforgettable demonstration of how effective ASC's room treatment products can be. Identical adjacent hotel demo rooms at a Consumer Electronics Show were set up with identical sound systems. One had

been tuned with a variety of ASC devices and the other had not. The shallow, glaring confusion of sound in the untreated room was transformed by the ASC tubes and panels into effortless reproduction of depth and spaciousness.

The NA-4 Shadow Caster is a free-standing panel designed to address the problem of poor imaging caused by unwanted sound reflections from the room's side walls. The panels are about 5 feet high, 2½

feet wide, and 4 inches thick and cost \$629 per pair. Each panel contains four tubes, half covered with reflective material and half with a sound-absorptive coating. In the original version, these tubes could be turned by the user to vary the proportion of reflection and absorption on each side; my review sample's tubes were locked in place, with absorption only on one side of the panel, but ASC says it is now returning to their earlier adjustable configuration.

Each Shadow Caster must be precisely placed at a point along the side wall where it will intercept the wall reflections from both left and right speakers.

My listening room is 13½ feet wide, 19 feet deep, and 8 feet high. To test the Shadow Caster, I used a pair of Celestion 700 satellites on stands, placed across the long side of the room with a Velodyne ULD-15 subwoofer in between. The satellites were positioned 48 inches from the wall behind them and 30 inches from the side walls. I listened on the center-line about 10 feet from the speakers. With a 4-foot square absorptive panel on each side wall, this arrangement sounded quite good.

The first step was to listen with bare, reflective side walls; that is, I took down the absorptive panels I had previously been using. It was awful. Instruments were given a confusing quality analogous to visual glare. Soundstage width was good, but imaging was ambiguous from side to side, and a sense of depth was missing.

Next, with the help of ASC's diagram, I installed the Shadow Casters at the reflection interception points. This point, for each panel, was 60 inches from the speaker along the side wall and 24 inches out from the wall and parallel to it. Per instructions, the acoustically reflective side

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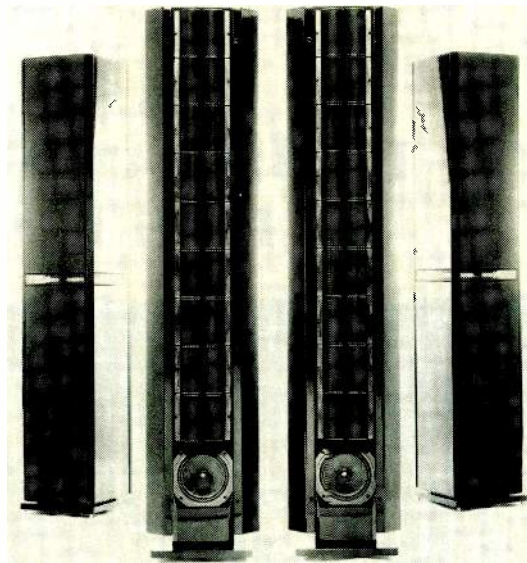
faced the wall and the absorptive side faced into the room. The sound was greatly improved but still not as good as it could be. The glare was gone. Left, center, and right image locations were sharply defined, and depth and spaciousness returned. Unfortunately, a distinct hollowness was audible on male speaking voice. This effect was not heard on symphonic music but was slightly

**USED AS DIRECTED,
THE SHADOW
CASTERS REMOVED
THE GLARE FROM
MY ROOM'S SOUND.**

audible on most solo voices. Also, there was an overly focused "in the head" quality to any instrument exactly centered in the soundstage.

To understand what was happening, I used my Techron TEF-20 analyzer to assess the early reflection patterns in the room. With no treatment of the room's side walls, each speaker generated a reflection from the near wall at 2.3 mS and one from the opposite wall at 8.3 mS. The Shadow Casters removed the 8.3-mS reflection, but the near one remained, slightly delayed and lengthened in time. When I added absorption to kill the near reflection as well, the audible hollowness and in-the-head problems disappeared.

The bottom line is that the Shadow Casters probably would have worked better in my room if they had been absorptive on both sides. Used as instructed, the reflective side facing the wall created a path for the near-wall reflection to spoil the sound. Partial success was achieved by experimenting with positioning. I reversed the Shadow Casters (absorption to the wall) and angled them slightly so that the near speaker's reflection was absorbed and the far reflection was directed behind the listener. For my room, which has no absorptive or scattering objects along the sides, this was the optimum configuration. As with any acoustic device, I advise the user to arrange an at-home trial period for the Shadow Casters involving much listening and experimentation. *David Clark*

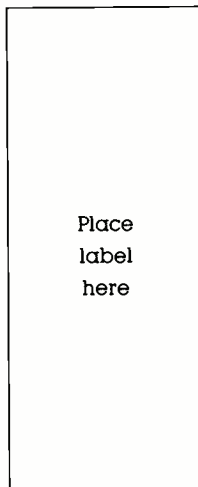


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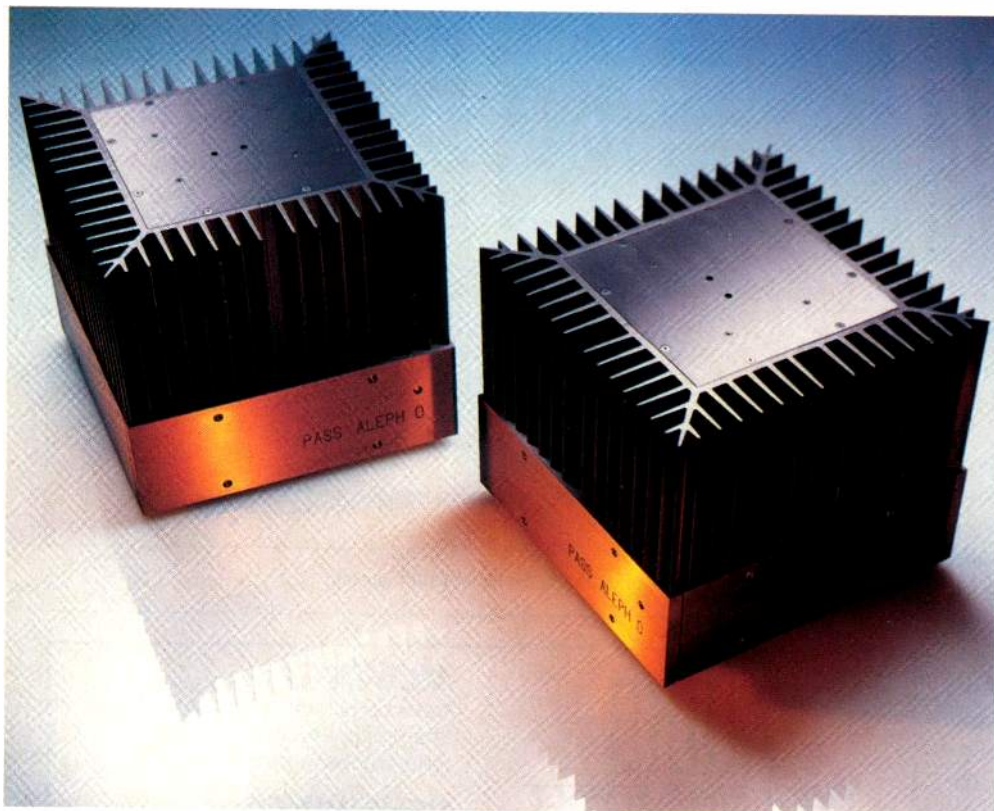
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PASS LABORATORIES ALEPH 0 AMP



Nelson Pass, widely recognized as one of the world's top transistor amplifier designers, was one of the founders of Threshold. The monophonic Aleph 0 power amplifier is the first product of Pass's own firm, Pass Electronics, with a stereo amplifier and preamp to follow.

The \$3,500 Aleph 0 is a simple black block of machined, anodized aluminum, weighing about 70 pounds and measuring 12 inches square by 10½ inches high. Its controls are basic—a power switch and

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Cal. 95631.
For literature, circle No. 95

LED plus a switch to choose between balanced and unbalanced inputs. Power into 8 ohms is a comparatively modest 75 watts, but into 4 ohms the Aleph 0 yields 150 watts, and it delivers 250 watts into 2 ohms. This amp can therefore deal with speakers with very low impedance or with demanding crossovers.

Frequency response is 3 dB down at 100 kHz. Distortion is rated simply as 1% THD, but each amplifier is shipped with an individual test curve of its distortion at 1 ohm

from 1 to 400 watts, showing that distortion is less than 0.1% at 400 watts. Common-mode rejection is 60 dB, output noise is 10 nanowatts from 20 Hz to 20 kHz (-100 dB at 75 watts). Power consumption is 250 watts at idle and operating temperature is a comparatively high 50° to 90° C, so the Aleph 0 requires good ventilation and at least 6 inches clearance on the top and sides. The amp takes at least an hour to reach operating temperature and for output d.c. offset to drop to its rated 50 mV.

The Aleph 0's design has been evolving for more than 15 years. In fact, Pass designed a somewhat similar amplifier as a construction project for *Audio* back in 1977. In the Aleph 0, Pass strove for simplicity, a minimum component count, and the purest possible signal path. Beyond that, he strove for maximum intrinsic linearity in the performance of the gain stages before feedback is applied, using maximum bias on the devices to achieve this.

The key feature of the Aleph 0, however, is its use of what Pass calls Asymmetric Class A, which is single-ended, rather than the usual push-pull topology. Pass feels that push-pull amplifiers produce crossover distortion that does not increase smoothly with power, and that even Class-A push-pull amps present problems of crossover distortion and nonlinearity, asymmetric low-order and low-level nonlinearity, and odd-order harmonics. He also feels that proper single-ended, asymmetric amplification (rou-

**THE KEY FEATURE OF
THE ALEPH 0 IS ITS
ASYMMETRIC CLASS-A
CIRCUITRY RATHER THAN
THE USUAL PUSH-PULL.**

tinely used in the best pre-amp circuitry) avoids many of these problems. (The Aleph 0 amplifier does, however, have a pull element in the output

stage, to avoid clipping at negative currents greater than the bias point when operating on a negative signal.)

Photo: Michael Groen

The design is capable of 50-ampere currents on both negative and positive peaks and can operate into impedances of less than 1 ohm with any phase of reactance. However, Pass admits that Asymmetric Class A is the least efficient of all types of Class-A operation, typically idling at four times the maximum continuous output power.

All of the gain devices in the Aleph 0 are carefully matched hex-FET power MOS-FETs. They are rated for operation up to 150° C but are normally operated at 20% of their rating, and are kept under 80° C at all times. Pass notes that MOS-FETs share a characteristic with triode tubes in that their gain tends to increase with current, a trait that asymmetric Class-A circuits need—but MOS-FETs, unlike tubes, operate at voltages and currents suitable for delivery to a loudspeaker.

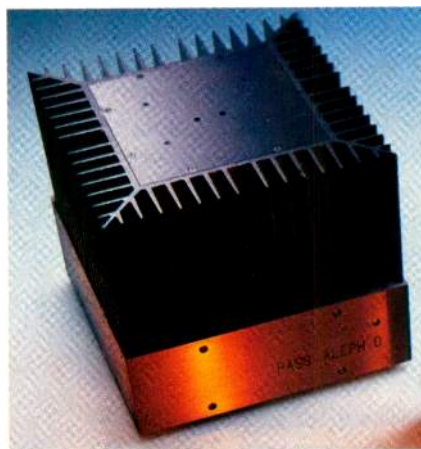
The Aleph 0 does not seek to maximize bandwidth. Instead, it uses the wide bandwidth of the MOS-FETs, and their capacitance, to give the amplifier a simple, single-pole roll-off characteristic. The slew rate is about 60 V/μs under load, which Pass states is about 100 times faster than musical signals. The Aleph 0 does, however, have response down to d.c. While the d.c. output of the amplifier itself is only about 0.05 V after warm-up, there can be problems if d.c. is fed to the amplifier by defective equipment.

My first few hours of listening to the Aleph 0, with its superb sense of openness, air, and transparency, made me think back to the days when I was building triode power amplifiers out of war-surplus tubes. The Aleph 0 did not, however, simply send me on a nostalgia trip and remind me of my past love of triode designs. Its sound was very much like the sound of a triode amplifier with guts!

The Aleph 0 sounds strikingly different from the amplifiers that Nelson Pass designed at Threshold. While maintaining those amps' dynamics, bass power and upper octave energy, the Aleph 0 has more subtlety, significantly more harmonic detail, low-level detail, and a sweeter and more musical sense of air. Instead of the slight apparent rise in the upper midrange of Pass's earlier designs, the Aleph 0 has an upper midrange and treble that seem slightly soft until you realize just how

much detail there really is. This sweetness is not euphonic coloration: The Aleph 0 is sweet without losing detail, energy, or dynamic pace.

The Aleph 0 easily took on the challenge of the new Frederick Fennell/Dallas Wind Symphony recording of *Power & Pipes* (Reference Recordings RR-58CD), probably the best test of deep bass and orchestral dynamics currently available on either CD or analog. This is the kind of music that provides an instant test of what an amp can



TO ME, THE ALEPH 0
SOUNDS VERY MUCH
LIKE A TRIODE AMPLIFIER
WITH GUTS.

and cannot do. The Aleph 0 easily drove my B & W Matrix 801 Series 3s to the limits of their rather considerable dynamics and ability to reproduce massive and deep bass. In fact, the Aleph 0 provided this kind of performance into any speaker load I could throw at it, and provided far better dynamics, bass response, and control of the loudspeaker than any triode amplifier I know of.

Compared to many competing amplifiers, the Aleph 0 appears to roll off slightly in the upper octaves until you listen carefully to the details of the music. It then becomes apparent that the upper octaves are all there, and that the "roll off" is actually an exceptional lack of the hardness or edge that clings to some of the best electronics. The sound of the Aleph 0 is similar in this respect to the best amplifiers I have heard,

although its handling of upper midrange transients and harmonics is unique. The Aleph 0 does a good job of delivering both the deepest bass and top octaves. There is nothing "polite" about this amplifier.

The Aleph 0 does not have the power to equal the slam and dynamics of the largest high-end power amplifiers. (This showed up with the Thiel CS-5 and on the bass units of the Apogee Studio Grands.) However, this will affect only a small number of users. When the Aleph 0 is judged by real-world peak music listening levels, it takes you down to the limits of the deep bass with real force and with a great deal of detail and control. The Aleph 0 is just slightly warm in the deep bass, not handling transients quite as crisply as my Classé M-1000 or Krell M-300 reference amplifiers. Whether the Aleph 0 is more or less realistic in this regard, however, is a matter of judgment. The audiophile who shapes his system around the search for the ultimate bass-drum sound may not find the Aleph 0 to be the ultimate answer—but there may be just a little more to the last seven centuries of music. The Aleph 0 had a richness with organ and bass viol that was very seductive, and its transitions from deep to mid bass are exceptionally realistic.

Mid-bass to midrange performance is excellent. There is no warmth or suck-out here, just musically convincing detail and information. What was most impressive, however, was the amount of detail the Aleph 0s obtained in this region. I particularly like the Aleph 0's ability to resolve the midrange information in low-level passages, to reproduce the details—good and bad—of voice, and do so in a way that provides excellent transient and dynamic performance without making the midrange seem a bit analytic. I have yet to hear any amplifier that provides more midrange information in a more musical manner.

The upper midrange and treble is the region where the Aleph 0 differs most clearly from other amplifiers, and therefore the region I would listen to most closely in auditioning it. The Aleph 0 can provide a special magic with clean recordings, a reference-quality front end, and top-quality speakers.

I suppose a few users of older tube amps may find the Aleph 0 has too much detail, and some listeners to more conventional

transistor amplifiers may miss the additional upper midrange energy that many amplifiers provide. This is an aspect of the Aleph 0's performance you have to judge for yourself, and more is involved than differences in apparent energy or timbre. The Aleph 0 brings a special character to the air, harmonics, and transients of the upper midrange and treble.

Its dynamics are very fast without appearing etched or unnatural. It has consistently excellent transparency. The Aleph 0 has real musical life, and if you listen closely, you will find that this life is made more realistic by an exceptional ability to resolve low-level musical detail.

The Aleph 0s have a touch more soundstage depth than width, but since CDs tend to have flattened depth, this graces virtually every recording around. Their ability to resolve depth is excellent, and they place instruments nicely without artificially highlighting location. The Aleph also does a very good job of reproducing low-level concert hall sounds; it recreates the life in a hall, if the recording has such information.

The Aleph 0 showed no sensitivity to load, performing well with the Thiel CS-5s, ribbon panels of the Apogee Studio Grands, the Quad ESL-63s, and Spondor BC-1s as well as the B & Ws. There is virtually no mechanical noise, and no hum or hiss is apparent with your ear near the speaker. While warm-up time is long, and some attention must be paid to heat as well as to ensuring that no d.c. comes in from the preamp, this amplifier is very easy to live with.

The Aleph 0 is unusual in that it is so much the product of one designer's views and taste. I am not in a position to judge the validity of Nelson Pass's technical arguments for Asymmetric Class A, although they are interesting. What I can say is that the Aleph 0 is an outstanding performer, and it seems to live up to all of its designer's objectives.

The Aleph 0 brings you much of the special magic of the best triode amplifiers without the penalties in terms of power, dynamics, deep bass, and reliability. It is also intensely musical. Some amps are more exciting or analytic than musical; the Aleph 0's upper octaves, sweetness, and transparency involve you deeply in the performance.

Anthony H. Cordesman

B•I•C, continued from page 55

SWA-100 is used with most integrated receivers. An 8-ohm resistive load produces a -3 dB point of 60 Hz while a 4-ohm resistor produces a 120-Hz high-pass. Of course, very few loudspeakers act as nicely as resistors. The last curve is the high-pass response into a sealed-box speaker of precisely the type that would benefit from a subwoofer. This shows that the satellite is driven by a signal which deviates ± 4 dB from an ideal crossover. I consider this unacceptable for high-quality audio.

If you are unsure about the SWA-100's high-pass characteristics in a system, the satellites can be left full-range. That is, retain their original connections to your system and simply add the input connections to the SWA-100.

Use and Listening Tests

The B•I•C amplifier and subwoofer were easy to add to my test system. The SWA-100 was inserted at line level between my preamp and power amp. The V-12 was plugged into the SWA-100 and that was that. My power amp is of medium input impedance, so I knew the high-pass output would be okay.

Test instruments are not necessary for optimizing a subwoofer addition, if one has patience and listens carefully. I used the Oscar Peterson Trio's "You Look Good to Me" from the *We Get Requests* CD (Verve 810047-2), which features a natural recording of plucked and bowed acoustic string bass. I started with the subwoofer volume control on the SWA-100's front panel all the way down. I advanced it slowly until I heard a slight increase in fullness and I stopped. I listened to pianist Oscar Peterson and to a male speaking voice to determine if any unnatural boominess had been added.

I suspected a problem in the crossover range, where both satellites and subwoofer

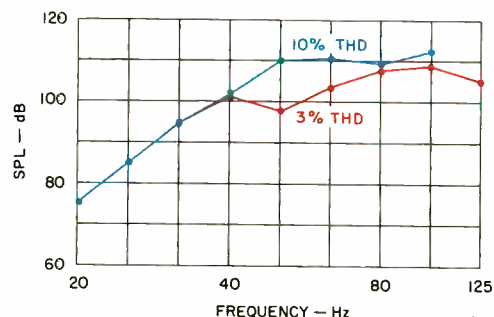


Fig. 4—Maximum SPL at 1 meter.

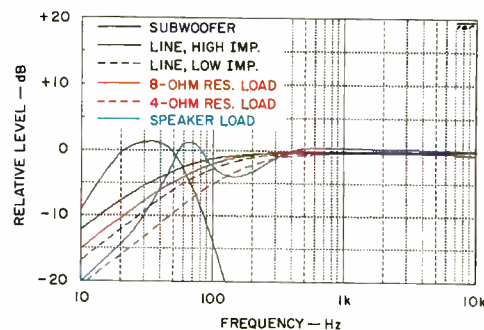


Fig. 5—Low-pass and high-pass response of AWS-100.

contribute equally, so I reversed the polarity of the speaker connection to the subwoofer. The sound became fuller, so I left it that way. After more listening, I reduced the subwoofer volume slightly and marked the position with a small piece of tape. I was done with setup.

A variety of music was auditioned over Celestion 700 satellites with the B•I•C amp/sub combination. All of the Celestion's fine qualities were preserved, but with the bass seamlessly extended to 30 Hz. Perfect.

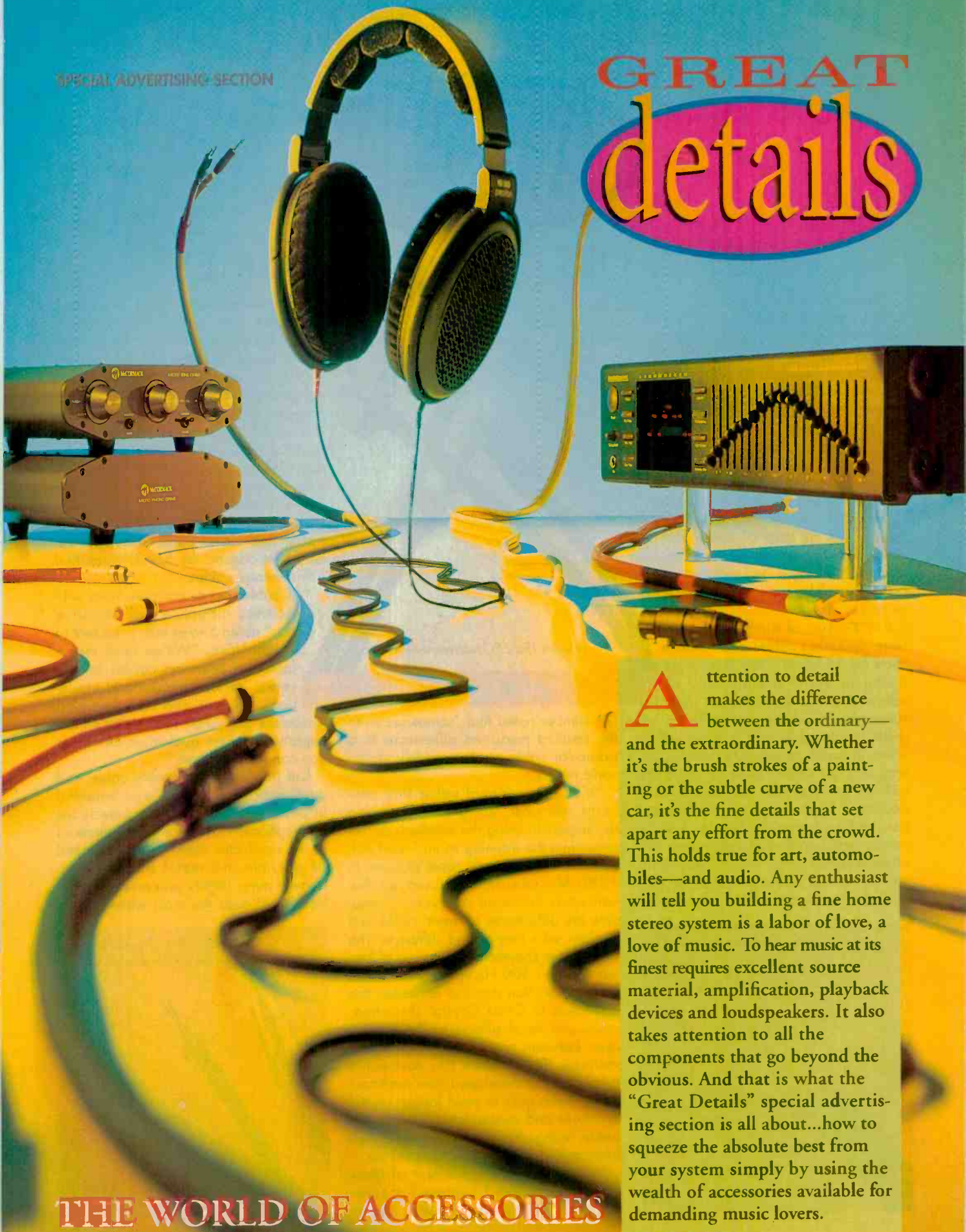
Videophiles and bass enthusiasts will want more, however. The B•I•C SWA-100 and V-12 will not deliver the sound of a space shuttle launch in your living room. The combination really just adds a good 12-inch woofer. For many budget systems in small to medium-size rooms, this pair is exactly what is needed.

David L. Clark

**THE B•I•C COMBO
SEAMLESSLY EXTENDED MY
SATELLITES' FINE SOUND
DOWN TO 30 HZ.**

SPECIAL ADVERTISING SECTION

GREAT details



Attention to detail makes the difference between the ordinary—and the extraordinary. Whether it's the brush strokes of a painting or the subtle curve of a new car, it's the fine details that set apart any effort from the crowd. This holds true for art, automobiles—and audio. Any enthusiast will tell you building a fine home stereo system is a labor of love, a love of music. To hear music at its finest requires excellent source material, amplification, playback devices and loudspeakers. It also takes attention to all the components that go beyond the obvious. And that is what the "Great Details" special advertising section is all about...how to squeeze the absolute best from your system simply by using the wealth of accessories available for demanding music lovers.

THE WORLD OF ACCESSORIES

GREAT details

THE WORLD OF ACCESSORIES

"We've all heard of audiophiles who spend between \$5,000-\$10,000 for outboard digital-to-analog converters. They are very serious about the finest musical reproduction. Yet of all the components available for a superb audio system few offer the sonic payoff—dollar for dollar—of top-quality interconnects and cables," said Bill Low, president of AudioQuest.

"Every step in the audio chain should color the music as little as possible," Low added. "In fact, the best components cause the least change in the audio signal. Our philosophy is to design high performance, value-oriented cables so you'll hear all the dynamics music has to offer."

Ray Kimber of Kimber Kable has been designing cables and interconnects for 15 years. "We started out trying to show friends how to achieve better sound from their stereos and were among the first to address measurable and audible differences in audio cables. My design goal was simply to achieve sonic neutrality with as many system combinations as possible." Kimber explored the interactions of the physical properties of audio cables including mutual inductance, distributed capacitance, uniform power response as well as radio frequency (RF) and electromagnetic (EM) interference.



Van den Hul LSC interconnectors.

THE LINK TO EXCELLENCE

Mr. Kimber noted that "sometimes even the smallest measured differences in a particular cable result in widely varied sonic results."

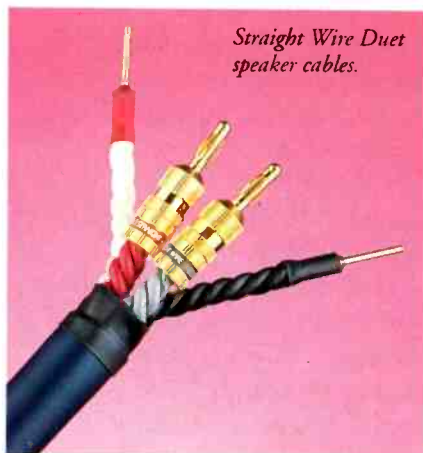
"It's the emotional value that concerns me most, using manufacturing techniques to bring the emotions of live music into the listening room," said A.J. van den Hul. An early cable pioneer, in 1980 Mr. van den Hul used an Advance-test Spectrum Analyzer to measure the differences between cable and explain why they sound different. The best cables showed a regular set of harmonics from 500 Hz upward while others did not. Van den Hul attributed this distortion to Cross Crystal Distortion, molecular level effects at the boundaries between crystals in the conductor material. To eliminate this noticeable harshness, he developed new manufacturing techniques to yield longer crystal structures and special jackets to prevent cable aging. Van den Hul cables and interconnects are sold in 50 countries.

When Noel Lee, president of Monster Cable, offered improved speaker cable in 1979 there was very little in

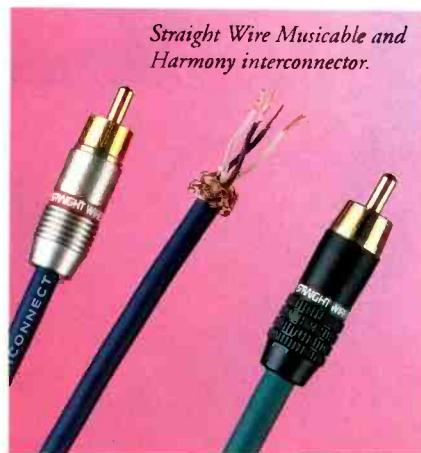
the way of competition save "zip cord," the same wire used for lamps and household appliances! Considered one of the founding fathers of the modern A/V cable industry, Lee used his technical background as a laser-fusion design engineer at Lawrence Livermore Laboratory and his passion as a musician to develop high performance cables. Today, Monster Cable, named for the size and power of the cable, has over 1,000 products available including a wide range of speaker cables, interconnects, and video cables. Monster recently introduced the first THX-certified home theater cables.

"All cables act as complex filters with capacitive, inductive and resistive facets," noted Steven Hill, president of Straight Wire. "We've been manufacturing premium cables for 12 years. Various conductors, insulations, designs and manufacturing processes are employed. What's most important are the qualitative difference you can hear—and see."

Cut into any high-quality cable and you'll notice more than "wire wrapped in plastic." There are myriad decisions and options. First there is the material of the conductor itself. To be as neutral as possible, the metal should be extremely pure. Highly processed silver is best but it costs the most while copper



Straight Wire Duet speaker cables.



Straight Wire Musicable and Harmony interconnector.

Hear it like they played it.



GOLDEN NOTE
NOMINEE 1991

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GREAT details

is a very affordable option. Yet there is a variety of copper available ranging from Oxygen-Free High Conductivity (OFHC) copper to Long Grain Copper (LGC). Each has its specific characteristics and tradeoffs between price and performance. A common reference shoppers encounter is "4N" or "4 nines" as a statement of metal purity (99.99%). In 1993, the first all-carbon and metal/carbon audio conductors were introduced—offering consumers more options.

Once the conductor material has been chosen, extensive research decides how the metal is braided and the magnetic effects those twists and turns create. Next is the cable insulation that can be either PVC, polypropylene, polyurethane or Teflon. Each material has its own distinct properties and affects the wire within differently. Add the connections and the design of the plugs themselves and it's easy to see the industry has come a long way from zip cord.

Building cables that meet the rigorous standards of audio enthusiasts is a challenge of the highest order. Fortunately music lovers have a variety of cables and interconnects available ranging from the very affordable to those that cost the price of a car!

"Value, bang-for-the-buck, is critical," said AudioQuest's Bill Low. "The best interconnects we make are the Triple-balanced Diamond series that use Functionally Perfect Silver (FPS) as a con-

same benefits to a wider number of enthusiasts." The Triple-balanced Emerald uses Functionally Pure Copper (FPC-6), Teflon insulation, Air Hyperlitz construc-



Monster XP 2S HT and XP 3F HT Home Theatre speaker cables.

tion and welded FPC plugs for almost one-third the price. The fine sounding double-balanced Topaz features LGC Copper, polypropylene insulation, solid conductors and Teflon plugs. AudioQuest has a wide range of speaker cable as well from the Type 4 which uses LGC copper and a spiraled solid hyperlitz construction, the Functionally Perfect Copper (FPC) Midnight and the highly regarded Dragon uses FPS Silver.

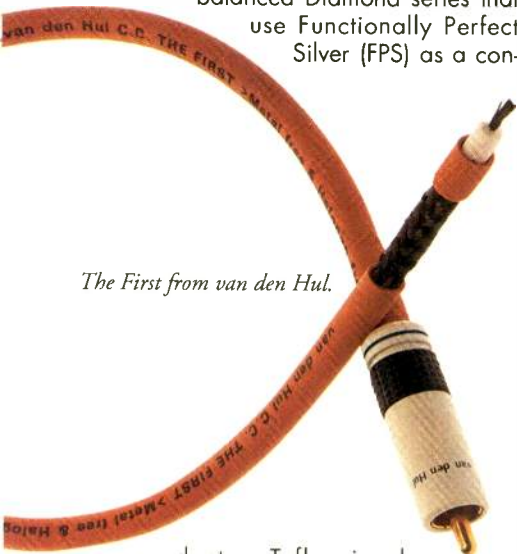
Monster Cable's most popular high-performance cables include the Interlink Reference 2 interconnect and Powerline 2 Plus speaker cable. Reference 2 consists of two Bandwidth Balanced conductors—plus a separate shield—each with three precision-wound multiple gauge wire networks. Proprietary Microfiber insulation is used for sonic transparency. Turbine Design 24k gold contact RCA plugs allow for accurate passage of the audio signal. The popular Powerline 2 Plus speaker cable uses a Time Correct design, Magnetic Flux Tube and patented Bass Control Conductor. It delivers superior soundstage, imaging, depth and ambience.

Kimber Kable's Model #88 Black Pearl is considered one of the finest reference speaker cables on the market (and it's also the most expensive). Their bargain-priced PBJ interconnects have

also won raves from enthusiasts.

The First is A.J. van den Hul's original pure carbon interconnect that uses 50,000 individually braided insulated conductors of patented Linear Standard Carbon (LSC). Reviewers have described the results with phrases such as "a knockout," "a breakthrough" and "it redefines the art." The First is recommended as a link between the source and the pre-amp while The Second connects the pre-amp and amplifier. The Second uses LSC conductors wrapped in a heavy silver-clad OFC braid with low resistance for exceptional resolution. The Revelation loudspeaker cable is a hybrid metal/carbon design for superior signal conductivity. Van den Hul also has a variety of cables and interconnects using different materials to suit almost any audio requirement.

Straight Wire has over 40 different cables to choose from. Which one should you use? According to president Steven Hill, "We can direct you to a dealer who can help or if there's no Straight Wire dealer in their area, we can create custom wires and connections, no matter how complex the system." All Straight Wire cables have lifetime warranties and "Try Before You Buy" no-obligation home audition. One of their newer interconnects is the Virtuoso with an 85 percent pure copper center covered with 15 percent pure silver. Each strand is covered with a special .0005-inch insulation. The Flexconnect series cables are considered by many a "best buy." The Flex 4 uses four



The First from van den Hul.

ductor, Teflon insulation, Air-Hyperlitz construction and welded plugs. They deliver outstanding sound," Low said. "We dedicate a similar pursuit of perfection to our other interconnects including Lapis, Emerald, Quartz and Jade. Using different materials, we're able to bring many of the



Monster XP3F HT home theater speaker cables.

polypropylene-covered 16-gauge OFHC copper conductors twisted inside a firm jacket.

Quality cables and interconnects are also available from Esoteric Audio, XLO Electric and Apex Audio. Esoteric Audio's Audiophile series features hyper-balanced Artus interconnects with multiple-stranded center conductor and

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Julian Hirsch, Stereo Review, July 1994



“ I'm impressed by how little distortion and noise the C-101 produces . . . it is outstanding in these regards. ”

Edward Foster, Audio, August 1994

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→ Non-Slip Rubber Grip
For Easy Handling

→ Special "Gunmetal" Finish

→ Turbine Design® 12 Turbine Contacts
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The AudioQuest interconnect line-up.

terconnect features 99.9997% pure silver, extra shielding for better RF rejection and a Teflon dielectric. Apex's Signature series is part of a complete line including the Allegro ICTL (Impedance Controlled Transmission Line) speaker cables and Allegretto LLTL (Line Level Transmission Line) interconnects. XLO

air-cellular dielectrics. Their Series II loudspeaker cables use OFHC copper insulated with Teflon to prevent surface oxidation and eliminate cable noise generated by strand-to-strand interactions. Apex Audio, another highly regarded cable designer, plans to introduce a Signature interconnect early next year to complement their reference Signature grade speaker wire. The in-

Electric's Standard Series features high-quality interconnects and speaker cables. The Type 0.6 speaker cable uses OFHC copper with a Teflon dielectric and delivers remarkable imaging and neutrality. Also of note are the XLO/PRO Type 150 interconnect and the ER-14 that offer high performance and affordability.

Similar to the critical decision making

THE HOME THEATER CONNECTION

"The only difference between TV and Home Theater is audio," Bill Low said. "Enthusiasts should treat the audio and video signals in their Dolby Pro Logic or THX systems with the same respect as their music-only components," added AudioQuest's president. Low noted that accurately reproducing the spoken word has always been a key criterion of quality Hi-Fi. Therefore, cables from a VCR and a center channel speaker deserve your undivided attention. "If Dan Rather sounds much better when you use top-quality cables and interconnects imagine how *The Fugitive* will sound!"

The design challenge for superior video cables is just as rigorous as their audio counterparts. AudioQuest's Video Pro uses FPS silver as a conductor, Teflon insulation and welded RCA plugs.

The Monster Video Series 3 interconnect features improved dielectrics for maximum signal strength and reduced "ghosting." A specially designed metal-to-metal shield reduces electromagnetic and RF interference. Monster Cable's M Series Home Theatre Speaker Cables provides top-quality connections for lovers of music

and movies. In fact, Monster was first to receive certification to use their cables and interconnects with THX approved Home Theater components. The M Series features cables designed for the front three speakers in a multichannel system (MP3F HT), the MP2S HT for the surround speakers, an MSW subwoofer cable and an M756 HT Interconnect that has a special six-channel side-by-side configuration. Monster recently introduced high-quality, low-profile SuperFlat cables specifically designed to run along baseboards or under rugs for complex Home Theater setups.

Straight Wire offers the Silver Link II with a silver plated copper conductor with a foam polyethylene insulation and a double shield for improved RF rejection. Straight Wire cables are supplied with the highly-regarded JBL Synthesis Home Theater systems. The Videolink 75 from van den Hul is a 75 ohm coaxial cable with a matched crystal OFC 12-strand center conductor wrapped with a metal foil shield and Teflon insulation.

Bottom line? Video and Home Theater connections deserve your undivided attention.

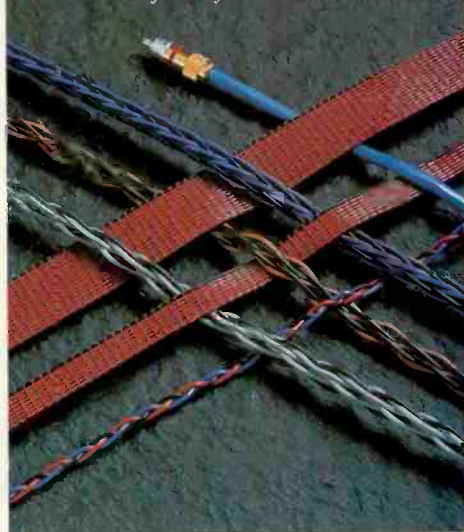
GREAT details

required for choosing superior components picking the right cables requires dedication and commitment. Yet the sonic payoff is well worth it. Fortunately help is nearby. "Select a dealer who has given you good advice in the past," Ray Kimber of Kimber Kable noted. "Above all else, trust your own ears. These two highly advanced instruments will tell you a lot—good and bad!"

PRIVATE LISTENING

The same singleminded attention to detail that produces the finest interconnects and cable is also apparent in the best headphones. "Several things set top-quality headphones apart from the competition," said Sennheiser's John Bevier, Manager, Consumer Products. "Quality of materials is critical as is the level of precision manufacture. Many people think all magnets are the same, that they're simply dug out of the ground. High-quality headphones exclusively use magnets made from specially-refined ores that have a greater capacity to hold a charge. For superb sonic performance precise manufacturing with quality materials is an absolute

Kimber Kables for the finest sound.



GREAT details

must. And as self-contained sound systems, headphones must reproduce music as clear and distortion-free as possible. It takes a lot of engineering expertise to do the job well."

Sennheiser is one of many quality companies with that real-world experience. They designed the first open air headphones in 1967, were first to use wireless infrared technology in an audio application 17 years ago, and currently have a full line ranging up to the \$12,900 Orpheus. While the Orpheus is considered the Headphone Holy Grail (only 300 were made), Mr. Bevier points to the 9.2-ounce HD 580 Precision (\$349) as the reference dynamic set preferred by many audiophiles. The circumaural (ear covering) HD 580 Precision uses powerful Neodymium-fer-

rous magnets to control the motion of the diaphragm. The diaphragm features a new Duofol two-layer technology for reduced distortion. Triple-wound aluminum voice coils act as an interface between the magnets and diaphragm. They feature an acoustically transparent open-air (or hear through) design and velvet-covered ear cushions ensure hours of listening comfort. Frequency response is 16-30,000 Hz with a sensitivity of 97 dB. The result is clear, natural tonality with superb bass response.

"For those who want private listening on the go, the affordable HD 320 Expression Line is an excellent combination of sonic quality and light weight," said Mr. Bevier. "The HD 320 weighs just 4.2 ounces yet it's packed with technology including Neodymium-ferrous magnet system and a computer-designed Radial Bead diaphragm." The diaphragm is made of low resonance, polycarbonate material for wide band acoustic clarity. Triple-wound copper voice coils are connected to the inert diaphragm to create a Fast Attack piston system that reproduces the demanding dynamic range of CDs, MD and DCC.

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HOLD THAT DISC!

Compact discs have taken over the music industry. In fact, CDs outsold cassette tapes for the first time in 1993. According to the Electronic Industries Association, CD players are in over 40 percent of U.S. homes. Everyone loves the hiss-free sound and wide dynamic range. The only remaining question is where to store all the discs!

You could buy a new 100-CD changer yet there is a more economical way to store your discs. Case Logic's PF200 holds 200 CDs in file drawers for easy access plus it readily fits on component shelves. Cal Oak offers affordable wooden shelving for 64 or 80 discs. Bell'Oggetti has the CD-001 CD Rack for 76 discs or the CD-333 three-piece system that holds 120 discs. CD Storage Plus+ by Sorice offers the A300 300-disc holder. Gemini, Geneva, Recoton and Discwasher also offer a variety of CD holders for the home and taking your music on the go.

While there is no shortage of choices, the surprise is how affordable CD holders can be (many are under \$100). Now it's easy to tame the jewel box jungle.

the ultimate surround sound

Life is stressful. You could spend a few thousand dollars rushing to a weekend getaway at a rejuvenating retreat. You could mortgage your home for one of those "quiet as a recording studio" motor cars you've seen on television. Or you can keep the family fortune and relax in the sanctity of your own home with a pair of Sennheiser headphones. Discover the ultimate in surround sound...at a budget you can easily afford.

HD 55
HD 35



HD 440 II
HD 435



HD 340
HD 320



HD 250 II
HD 25 SP



HD 520 II
HD 540 II
HD 560 II



HD 580



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GREAT details

*Sennheiser HD 320
Expression headphones.*



The supraural (on-ear) headphones have comfortable cotton-covered ear cushions.

Other top headphone manufacturers include Koss, beyerdynamic, Etymotic Research and Sony. Broadcast and recording professionals have used Koss headphones for over 30 years. Their Studio Pro series is highlighted by the PRO/4XTC with a frequency response of 23-22,000 Hz. It uses Neodymium iron boron magnets, a high-velocity dynamic element and has comfortable cloth ear cushions. beyerdynamic head-

*NCT's Noisebuster
noise-reduction
headphones.*



phones have won raves from the enthusiast press, particularly the DT 770 and DT 911. One of the newer editions is the DT 511, a circumaural, open design with Neodymium magnets and large moving coil diaphragms. It features velvet, replaceable cushions and has a FR of 10-22,000 Hz.

As inventor of Walkman and DiscMan—and a Hi-Fi leader—it only stands to reason Sony would have an extensive line of headphones for almost any application. Recently they an-

nounced a new Soundfield Entertainment headset. By using special binaural technology, DSP, a built-in gyroscope and an open air design, the headphones create three dimensions of sound instead of two-channel stereo.

Rather than an open air or a circumaural shape Etymotic Research designed the ER-4 Series of in-ear headphones. They feature transducers specifically developed for flat frequency response with isolation from external noise. The ER-4S provides 20-25 dB of external noise exclusion that lets you hear the full range of today's digital music and prevents listener fatigue.

On occasion people want to turn down the volume in today's raucous world—particularly low frequencies that tire them out. And users of personal stereos would like to hear their music instead of non-emergency noise as they bike or jog along. Noisebuster (\$149) from Noise Cancellation Technologies solves the problem. The Noisebuster is a personal active noise reduction head-

phone designed to electronically reduce low frequency noise. NCT uses high-speed analysis of selected undesirable noises in a chosen environment. Based on that analysis, an equal but opposite sound wave, called "anti noise," is generated which reduces the offending noise or vibration. Noisebuster effectively

reduces offending noise by 50 to 95 percent with a range of 20-1,200 Hz while enhancing the audibility of speech, music and warning signals such as car horns. They're worn by air travelers, office workers, users of multimedia computers, and anyone else trying to save their hearing for more important tasks—such as listening to a new Compact Disc. The Noisebuster is a lightweight headset that gets connected to a small controller clipped to your belt or clothes. Personal stereos can be easi-



*Sennheiser
HD 580 Precision
headphones.*

ly connected to the controller by a plug adaptor. In June, Noisebuster was selected by the Electronic Industries Association (EIA) for a prestigious Innovations '94 award.

MAGIC BOXES

Tiptoes from McCormack Audio are perfect examples of a "Great Detail." A decade ago few people understood superior components had to be properly seated on a floor or shelf. Today this is common knowledge and over one million Tiptoe mechanical grounding spikes were purchased the past 10 years. McCormack Audio recently introduced another "Great Detail," the Micro Series. Definitely larger than Tiptoes, they have the same drive for musicality inherent in any audio product designed by Steven McCormack.

McCormack's Micro Series are a trio of compact components—Line Drive, Phono Drive and Headphone Drive—that deliver true high-end sound in convenient-size chassis (9 1/2 wide, 3 high by 9 deep, in inches). According to McCormack's Joyce Fleming "The Micro Line Drive (\$595) is a wonderful 'little system' control center with superb sound and great flexibility." She noted there are three inputs, one tape loop and two outputs. "Enthusiasts can select either passive operation with no gain or active operation with low, medium or high gain. And it's very easy to make these internal adjustments." Ms. Fleming noted there are dual volume controls for perfect balance, a mute switch and actively-buffered tape circuit.

The Micro Phono Drive (\$495) is a high-quality external phono stage for



Which scares you more, a horror film with the sound turned off, or a horror show on the radio? The answer is easy because it is the movie's soundtrack which carries the pathos and emotion. You can enjoy sound without pictures, but who wants pictures without sound?

It's What You Don't See That Counts.



It doesn't cost more to do it right! AudioQuest offers a full range of cables, but the biggest improvement you'll hear is going from big

fat stranded cable to the least expensive cables from AudioQuest. For the complete story, please call or write for our *Cable Design* booklet - or better yet, visit an AudioQuest dealer and listen for yourself.

It just so happens that cables are the part of your system which can help or hurt the performance the most... and for the least money. Whether you have two-channel stereo or multi-channel stereo, you have to have cables. You can't completely fix a bad system with good cables, but you can seriously degrade a good system with badly designed cables.

You won't see the cables and you won't see the sound - but you will experience the difference!

audioquest

GREAT details

use with a line-level-only preamplifier. It has one input, one output, no controls. Simple internal adjustments let you choose between medium or high gain and to select the proper input loading. "Fewer preamps are equipped with headphone jacks so there is a growing need for headphone amplifiers," Ms. Fleming said. "The Micro Headphone Drive (\$595) combines great flexibility and performance." There are two inputs and one output so it can serve as a mini preamplifier plus there are two top-quality headphone jacks. "The OPAMP input stage and MOSFET output stage deliver a low noise, low distortion signal that can easily drive any dynamic headphone. The sonic performance is certified high-end," Ms. Fleming said.



*The McCormack
Micro Series.*

"Downsizing components has several positive characteristics including shorter signal paths and lower prices. In addition, they can fit in cramped quarters."

Fine-tuning a sound system for a specific space—whether at home or in the car—is a difficult challenge. Fortunately with the proper equipment, it's a challenge that can be overcome with dramatic results. "Every room and car inte-

rior has unique acoustic characteristics and deficiencies," said Tom Walker, president of AudioControl. "Windows, walls, hard floors, curtains and furniture all influence what you hear. This is especially true for Home Theater systems. If you spend a top dollar on top components, it's critical they're properly adjusted so they sound as good in your home as they did in the showroom."

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headphone designed for a truer representation of the audio signal and enhanced clarity. And a flat response from the headphone speakers delivers exceptional mid-range and highs as well as extended bass response. • Comfortable and lightweight, NoiseBuster is perfect in a wide variety of other situations as well. Use it to throttle back jet engine roar and reduce office air conditioner rumble and computer hum. NoiseBuster also cuts lawn mower racket, stamps out exercise treadmill drone and permits mega-concentration in multi-media settings. • Whatever your choice in music, NoiseBuster won't leave you singing the blues.

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GREAT details

AudioControl has designed affordable home equalizers since 1977. "Our Model 520 was the first easy-to-use home equalizer. It had five equalizer bands as well as EQ curves and center frequencies designed for two-way speaker systems," Walker said. "We were the first company to religiously use a good 18 dB/octave Tchebychev alignment subsonic filter in all of our designs. The sharp

*AudioControl
C-101 Series III
equalizer/analyzer.*



NO CINDER BLOCKS PLEASE

Once, piling components on top of each other was the extent of A/V furniture. What a difference a few years make! Today there is an exciting world of audio/video furniture available to match any decor—and budget. Early American, Arts and Crafts, Mission, Traditional, and Contemporary are just a few of the home entertainment furniture styles at stores around the country.

Leading the way into America's homes is Ethan Allen, CWD (Custom Woodwork And Design), Thomasville, Lane, Techline, Bell'Oggetti and others.

The key trend is attractive furniture that holds an entire Home Theater system (except the rear surround speakers). Furniture manufacturers are now working closely with TV makers to ensure there are no problems fitting today's 35-inch direct view sets or even 55-inch rear projection models. Space is available to hold a variety of audio/video components, front left and right speakers and even the center channel for Dolby Pro Logic. It's simply a matter of matching your taste and your budget. The options are there. And please leave the cinder blocks outside!

slope provides maximum speaker protection with a minimum of intrusion into the low bass. No more bass loss due to shallow filter slopes," he noted.

One of company's most popular components was the C-101 home equalizer "with the ability to make any audio system sound better," Walker said. The new C-101 Series III equalizer/analyzer (\$459) features improved electronics and cosmetics. By using the built-in digital pink noise generator, real-time audio spectrum analyzer with the supplied

calibrated microphone and 20-foot cord, consumers can accurately measure the acoustical response of a listening room. Octave-spaced sound controls allow for proper adjustment and paired left and right sliders prevent unbalanced adjustments. "The C-101 Series III can be used with basic single receiver system to a multi-amp, multi-zone Home Theater." The C-101 Series III has a 10-band real time audio spectrum analyzer, high-speed, low-noise circuitry with a FR of 10-100,000 Hz with distortion less than .005%. AudioControl has won 35 awards over the years. "Part of the reason is we're constantly combining useful functions into one unit like the C-101," Walker said. The Richter Scale is a combination 1/2 octave bass equalizer, warble tone test analyzer and a two-way 24 dB/octave Linkwitz-Riley electronic crossover. "It's anything a good subwoofer would need," Walker added. And the company continues to break new ground. In 1985, they introduced trunk-mounted equalization for car stereo and started a new category.

The EQX combined a 12-band equalizer with an audiophile grade 18 dB/octave electronic crossover. "With advanced technologies like constant-Q 1/3-octave equalization, real time audio analysis and digital fundamental restoration, AudioControl continues to lead in the field of signal processing," Walker said. ●

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piano trios



cellent space and perhaps 15 feet from the performers. Dorian used its usual venue, the fabulous Troy Savings Bank Music Hall in up-state New York; Arabesque has been recording farther downstate, in the concert hall on the State University campus at Purchase. Admittedly, the Troy hall—or could it be Dorian's engineering?—yields a slightly richer bottom end and a longer reverberation time, but both ring true acoustically. The hall is palpably there, but it doesn't blur the music. Sonically, both outclass even the most expert of conventional studio recordings.

The Saint-Saëns F Major Trio predates by several years the 1870 watershed before which French instrumental music was without social standing. In fact, the trio was not performed publicly until later. It is a work full of strong musical ideas and striking effects. His pupil Fauré also treated the form with a vigor that may surprise you if you know him only from his more delicate song settings. The greatest power of all is wielded by Fauré's pupil Ravel, in the trio that is the latest of the five on these two sets and a seminal work of modern music. The Debussy is a charming youthful work.

That leaves the trio of Cécile Chaminade, whose age places her at

**American Trombone Concertos:
Concertos by Paul Creston,
George Walker, Gunther
Schuller, and Ellen Taaffe
Zwilich**

*Christian Lindberg, trombone; Malmö
Symphony Orchestra, James DePreist*
BIS CD-628, CD; DDD; 67:41

Lindberg is the world's first full-time classical trombone soloist, and this is his 13th CD for BIS, covering early music to some of the many works now being created for his instrument. He has also done a solo music LaserDisc featuring works utilizing his acting talents.

The contemporary interest in the trombone really began with Paul Creston's *Fantasy for Trombone and Orchestra*, heard here. The neo-classical concerto by black composer George Walker eschews jazz, but Gunther Schuller's "A Little Trombone Music" uses wind and percussion sonorities influenced by the big bands.

Schuller's score demands the most extreme high notes that the work's dedicatee could play. Ellen Taaffe Zwilich wrote two trombone concertos for the Chicago Symphony; the one for tenor trombone is performed here.

A varied sampler of complete selections from some of Lindberg's many recordings for this label has also been released on this label.

John Sumier

**French Piano Trios
by Saint-Saëns (No. 1),
Debussy, and Fauré**

Golub Kaplan Carr Trio
ARABESQUE Z6643, CD; 70:36

**Piano Trios
by Ravel, Chaminade, and
Saint-Saëns (No. 1)**

Rembrandt Trio
DORIAN DOR-90187, CD; 74:10

First, hearty thanks to both companies for recording the long-ignored Saint-Saëns No. 1 (so how about No. 2, guys?) and, more important, for delivering what I consider to be just about ideal chamber-music perspective: The sense of being on stage in an acoustically ex-



Photograph: David Hamsley

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the center of the present group. In a Paris which uniquely nurtured so many creative women during those years, she had no need of diffidence; she developed a strong voice of her own, as this delicious and involving trio proves. It is to our discredit that mention of her name among musical cognoscenti today is most likely to evoke only a smirk. So perhaps heartiest thanks of all are due for this incunabulum.

The playing is superb throughout both discs: Mature, committed, passionate, perceptively—and, of course, fluent. In head-on comparison of the Saint-Saëns, Arabesque's trio captures the mystery of the Andante a hair more effectively, but the Rembrandt comes up with a slightly more joyful Scherzo. Dorian manages a mellower sound, but that is not to say it is fundamentally superior to Arabesque's. And on the basis of the engag-

ingly played Schubert violin sonatas that Arabesque has captured in the same hall with two of the same artists, Golub and Kaplan (Z6636), that company seems to be compiling as impressive and consistent a catalog in Purchase as Dorian is doing in Troy. Bravos all around!

Robert Long

Immortel Grégorien

Various choirs of monks in France, Spain, and Belgium

STUDIO SM 12 20.02, CD; 1:56:38

Everyone involved in the marketing of classical music recordings is still trying to figure it out, but somehow a compilation reissue CD of Gregorian Chants titled simply *Chant* soared to Number One on Billboard's Classical chart in only a week after accomplishing much the same feat in Spain. Now the Grego-

Lament
The Brodsky Quartet with Elvis Costello, vocal; Wilhelmenia Fernandez, soprano; Susan Monks, cello and Mary Scully, double bass
 SILVA CLASSICS SILKD 6001, CD; 71:09

True, the tea-party niceties of the concert room can have a stultifying effect on some music-making and some music-makers.

The Brodsky will have none of that. It covers everything from a wide-eyed folk idiom to gnarled modernism with equal panache and with no regard whatever for what might work in traditional venues. Voice or double-bass are added as needed. The major contribution is Stravinsky's "Five Pieces for String Quartet," a semi-conventional anchor in an eclectic collection. Acoustics are as frankly sound-studio as the presentation. Challenging new-wave classicism.

Robert Long



IN THE WINDS

Trittico

Dallas Wind Symphony, Frederick Fennell
 REFERENCE RECORDINGS RR-52CD
 DDD; 62:25

Vincent Persichetti: Divertimenti for Winds

Winds of the London Symphony Orchestra,
 David Amos
 HARMONIA MUNDI HMU 907092
 CD; DDD; 76:27

Frederick Fennell, who observed his 80th birthday in July, has been called the Godfather of Wind Bands and Guru of Wind Literature. He founded the Eastman Wind Ensemble and caught audiophiles' ears with his still-spectacular LPs for Mercury Living Presence.

Fennell has devoted his life to elevating the stirring music of the wind band to a wider audience, while continuing to conduct everything from full symphonies and opera to the popular repertory. He has chosen five composers for this album, starting with Vaclav Nelhybel's "Trittico," whose fresh and compelling harmonics and rhythms prove why the Czech composer has become a favorite.

Albeniz's "Feast Day in Seville"—an orchestral original—has an added impact and realism due to the evocation of the



wind bands one might hear in Seville on just such a day. Dello Joio's Variants on a Medieval Tune employs the familiar "In Dulci Jubilo." A

funeral march of Grieg takes us to the final spectacular Symphony No. 3 by Vittorio Giannini—an encore from the Mercury days. Its fourth movement makes a brilliant demo track.

Vincent Persichetti (he died in 1987) was a composer who enlarged the wind band repertory. He had a ready market for the 14 near-staples of the genre that he created in the explosion of wind ensembles and concert bands in the high schools and colleges of the U.S. following the Second World War.

Half of those works are in this collection, four in first recordings. In them, Persichetti hews to the accessible and utilitarian. Exuberance is a word that comes to mind hearing most of these well-crafted works, and a note of whimsy is also often present. His intriguing melodies are diatonic and lyrical. "Pageant" is a stirring track and perhaps best known is the opening Divertimento for Band, Op. 42.

John Sunier



rian (and by extension all early liturgical monody and polyphony) floodgates are opened, and there is a deluge of chant CDs vying for display space in the shops.

Of the albums that I've heard, this double-disc set proved the most varied and moving. Maurice Robreau of Studio SM has specialized in recording this music for over 40 years now, and this set functions as a sampler to their large catalog of Gregorian Chant. The notes speak of "the black record times" (before tape recording); many tracks are mono, but the acoustics are so natural and compelling and the voices so lovely that one hardly notices until the stereo tracks bring in an additional depth.

An exceptional feeling of actually being inside the secret cloisters with the monks is produced by including such touches as the monastery's bells, footsteps of the monks in procession, and the chirping of birds outside. The recordings made in the cathedrals depart from the ascetic purity of the monks to include women's voices, pipe organ, and, on one piece, a brass ensemble that sounds straight out of the Berlioz Requiem! An absolutely riveting selection is "In Paradisum," in which a women's choir sings in perfect sync and harmony with the cathedral bells outside.

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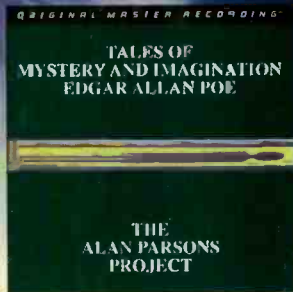


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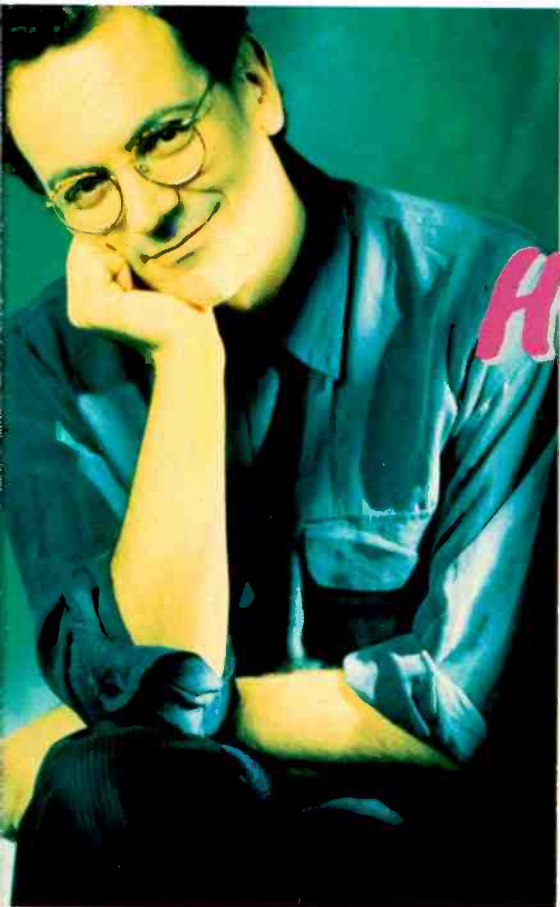


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HECTOR ZAZOU



Sahara Blue

Hector Zazou

TRISTAR WK 57779, 61:37

Sound: A-, Performance: A

Arthur Rimbaud is an avatar of despair and spiritual yearning for many contemporary artists. And eccentric French composer Hector Zazou has gathered many of them together in an ambient homage that explores the atmospheres between the words of the poet. These distinctive voices intone Rimbaud's poetry in French, English, and

Based on Arthur Rimbaud's poems, SAHARA BLUE is directed by Hector ZAZOU. The music was played by the SAHARA BLUE Orchestra, starting John Cale, Gérard Depardieu, Khaled, Anouk Dreyer, Dominique Dalenc, Bill Laswell, Tim Simenon, Richard Louie, Corina and

Arabic. His multi-national cast includes Iranian born Sussan Deihim, Algerian Rai singer Khaled, and Velvet Underground founder, John Cale.

Zazou hasn't created a dry poetry and music tribute. This music swells with atmosphere from the title track, a blues slide piece with Barbara Gogan's ethereal vocals to the Middle Eastern dervish of "Youth." That one is centered around contributions

Photograph: Maria Dawlat

Parklife

Blur

SBK RECORDS/ERG 7243-8-

29194-2-1, 52:47

Sound: B+, Performance: B+

Less than a year ago, the members of Blur were your basic garden-variety English misanthropes, naively mocking and reviling the working stiffs, the conformists, and the bureaucrats in their Tory republic. It's all documented on the '93 release, *Modern Life Is Rubbish*, which gave listeners an earful of whiney U.K. angst that, thankfully, was offset by a soundtrack of guitar pop with all the right references.

Parklife, in comparison, is a pop psychology template that doubles as a latter day "Fanfare for the Common Man." It identifies with and celebrates the mundanity of ordinary folk—the ones who have dreaded jobs so they can dispose of their income on Blur records—in a way that begs the question of whether this might not be simply a tongue-in-cheek exercise in pity. Blur, after all, are currently press darlings in England who, without being global superstars, have a whole lot more in common with the pop life than the simple life.

Whatever the case, singer/wordsmith Damon Albarn is an astute observer of human nature, offering superficially humorous yet, in reality, sad portraits of human vulnerability set to modern rock tunes which shimmer with panache and energy. There's a park bench loony and his litany against the society that beat him down ("Parklife"); a working stiff whose life peaks each week when he gets bombed on his day off ("Bank Holiday"); a guy named Phil who wants to move to a place called Magic America if he could figure out how ("Magic America"), and



Photograph: Zanna

Tracy Jacks, who copes with his midlife crisis by bulldozing down his house ("Tracy Jacks").

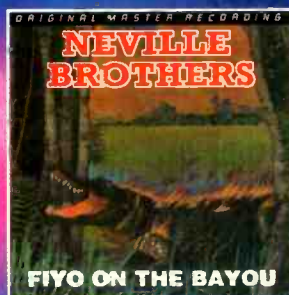


Blur's approach to music clearly involves mercilessly referencing the past, yet the net result is always a respectfully updated treatment. While *Modern Life's* nuts and bolts was vintage Bowie and Kinks, *Parklife* is somewhat more ambitious in its attempt at being a sonic smorgasbord. There's Burt Bacharach-like '60s pop ("To The End") and an instrumental Bavarian drinking song sandwiched between modern rock that evokes influences like Scary Monsters-era Bowie or Split Enz ("Girls & Boys") or vintage Jam ("Tracy Jacks"). Throughout, it's Albarn's U.K. sneer and guitarist Graham Coxon—whose guitar work compliments Albarn much as Kimberleew Rew complimented Robyn Hitchcock in *The Soft Boys*—that give Blur a much needed edge.

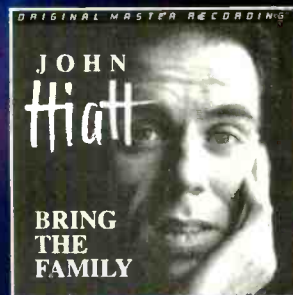
Ultimately, time spent at the "life's a bitch then you die" school of maturity and wisdom has steered Blur away from becoming repugnant. But with the music being their saving grace for lyrical or behavioral insufficiencies, it wouldn't have mattered anyway.

Mike Bieber

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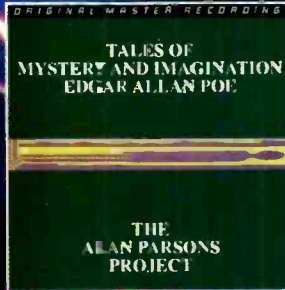
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from Dead Can Dance in an ecstatic trance over Moroccan rhythms. Producer/bassist Bill Laswell sets a recitation by actor Gérard Depardieu against a throbbing techno dance groove and the careening vocals of Anneli Drecker from Bel Canto exhorting the title, "I'll Strangle You."

Sahara Blue should be a textbook album for anyone attempting a tribute album in the future. It's a successful fusion of old ideas and new ideas that, once beyond the allure of the initial concept, Zazu's *Sahara Blue* gets more interesting and reveals more layers with each listening, both musically and poetically.

John Diliberto

7=49

The Moon Seven Times

ROADRUNNER RECORDS RR 9018, 73:24

Many bands have followed the siren call of Cocteau Twins, with jangly guitars, shimmering textures, insistent rhythms, and an ethereal lead singer. Among them was the Champaign/Urbana, Illinois-based Area, and now a group formed out of their ashes, The Moon Seven Times. Although singer Lynn Canfield is no Elizabeth Fraser, she's



developed a slightly wider range than her former ethereal whisper, which helps The Moon Seven Times steer through a more driving sound. The edges are harder and the details are richer with acoustic guitars strumming against a country-ish electric or pointillistic delayed guitar cycles over military-like rhythm fragments.

Like the Cocteau, The Moon Seven Times works in an area of texture and atmosphere, with lyrics being a tertiary concern at best.

John Diliberto

Necktie Second

Pete Droge

AMERICAN RECORDINGS 9 45620, 52:08

Droge's music has more in common with "classic rock"—Bryan Adams, Rolling Stones, etc.—than the Pearl Jammin' company he keeps, but perhaps that's the point. This is the cool young guy who sounds like the old guys. Although derivative, Droge is a clever and talented writer. Given that he's on the same label as The Black Crowes, perhaps he'll be marketed first to the youth of America as one of theirs, and later to the AOR hordes. This guy has a spark, and probably an excellent future if he can find a bit of space to call his own. *Jon & Sally Tiven*



JON ANDERSON Deseo

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FAST TRACKS

Here: *Adrian Belew* (Caroline CAROL 1748-2, 45:03). There are songwriters and there are musicians, and then there's Belew. Artist, sonic horticulturist, a man who charted new territory for the electric guitar, he's on another level entirely. And even though pop songs aren't his forte and *Here* is—with a few exceptions—an album of pop songs, Belew creates incredible and vivid pictures. Check out "Here" and the beautiful "Fly" first **M.B.**

Cohen Live: *Leonard Cohen* (Columbia CK 66327, 71:58). A very classy set from the soft-spoken but suave Canadian poet's 1988 and 1993 concert tours. The rap that his songs are "depressing" is a false one. He is a true romantic and his concerts are an impeccable experience. **M.T.**

Welcome to Struggleville: *Vigilantes of Love* (Capricorn 2-42025, 48:38). Strong, often pointed, bracing rock 'n' roll from this Athens, Ga. band, whose singer/songwriter Bill Mallonée sounds eerily like Bruce Cockburn with a kick-ass band. **M.T.**

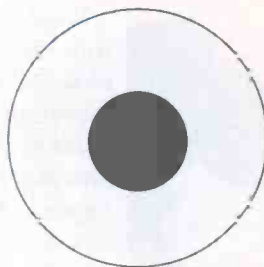
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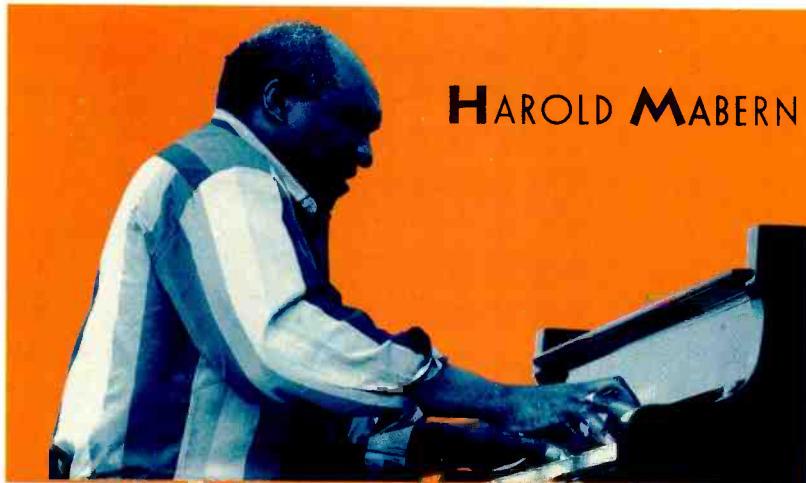
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JAZZ ~ BLUES

R E C O R D I N G S



The Leading Man
Harold Mabern
 DIW/COLUMBIA CK
 66148, 61:37

Sound: A-, Performance: A-

With Our Own Eyes
Mulgrew Miller
 RCA/NOVUS 63171, 60:29
 Sound: A-, Performance: B+



When pianists Harold Mabern and Mulgrew Miller joined forces with James Williams last year (all three hail from Memphis, Tennessee) to establish their four-keyboard Contemporary Piano Ensemble—with help from Geoff Keezer and Donald Brown—the project was a

celebration of the group's clearest and, to date, most significant inspiration: That towering figure of Memphis' musical heritage, Phineas Newborn, Jr.

Harold Mabern represents the most direct line to Newborn, having been introduced to the seminal pianist by another notable Memphis player, Charles Thomas. Mabern harks back to a Memphis musical scene that is now legendary; in fact, he earned what is perhaps his greatest popular notoriety performing with fellow Memphian, saxophonist George Coleman.

For Mabern, the lessons of Memphis go beyond Newborn's double-octave techniques and orchestral voicings. "Back in Memphis," Mabern says, "we were all forced to play rhythm and blues. We didn't realize what a joy that was until later on. I think of myself today as a blues pianist who understands jazz."

On Mabern's new DIW/Columbia release, *The Leading Man*, this spirit is well-evidenced. Mabern puts his imprint on the music of John Coltrane and Charlie Parker, but also he offers renditions of an obscure ballad, "It's a Lonesome

Town," as well as the recent pop hit, "Save the Best for Last." And he wraps up the album with "Mercury Retro," which is filled with cleverly shifting free improvisation.

The Leading Man, Mabern's follow-up to his powerful trio recording *Straight Street*, augments his trio sound and puts drummer Jack DeJohnette and bassists Ron Carter and Chris McBride with saxophonist Bill Easley, trumpeter Bill Mobley, and guitarist Kevin Eubanks.

:blues

Jimi Hendrix

MCA MCAD-11060, 72:31

Hendrix' visionary and incendiary guitar playing had its roots in the deep blues; that's the premise behind the latest Hendrixiana. :blues showcases the blues side of this rock 'n' roll icon, with 11 tunes culled from various places. Most are previously unreleased, with one cut arriving as an "import" and "Hear My Train A Comin'" from the Rainbow Bridge album rounding out the package.

Although copious liner notes suggest that Hendrix's blues prowess was the result of the same mysterious bit of Southern folklore associated with Robert



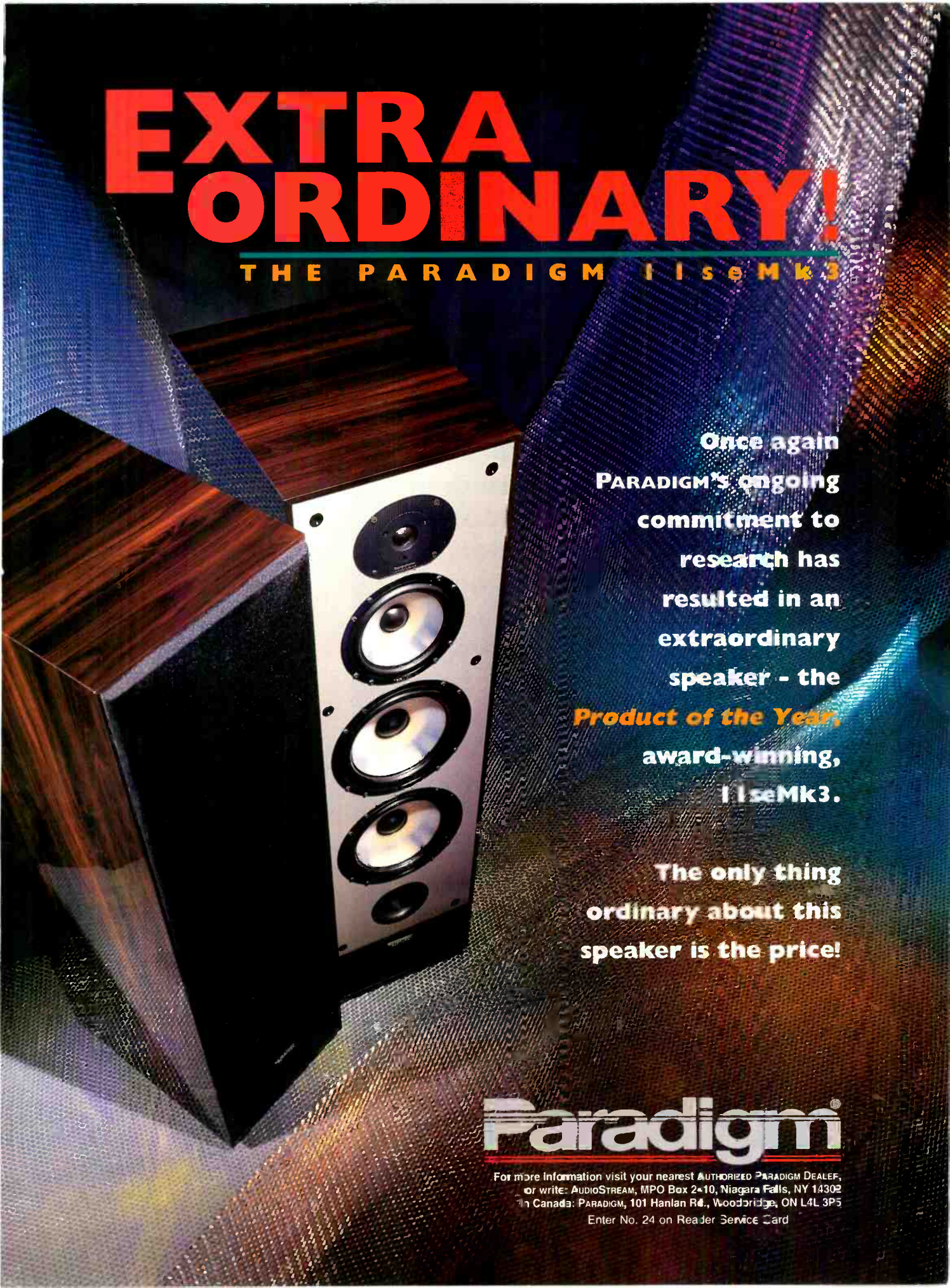
Johnson, it's probably closer to the truth to say that Hendrix simply had something that isn't easy to explain, something which surfaces, of course, when he's playing a guitar. This thing is there as he coaxes a soulful acoustic reading of "Hear My Train" from a buzzing 12-string, within the grooves of "Voodoo Chile Blues," or the wailing pseudo-slide (a tone achieved simply through overdriving an amplifier) on the traditional "Bleeding Heart," a tip of the hat to Elmore James.

Michael Wright

Photographs: David Gahr

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In this context, Mabern pays tribute to some less obvious inspirations. "B & B" is a dedication to trumpeters Clifford Brown and Booker Little, and within Mabern's taut group arrangement, Mobley beautifully interprets their dual legacy. And Eubanks handles the six-string chores with aplomb for Mabern's version of Wes Montgomery's "Full House." But it's Mabern's relentless and honest keyboard and his well-defined group sound (drawn largely from Phineas Newborn's harmonic ideas) that make these disparate compositions into powerful music.

Mulgrew Miller, a fellow Memphian, continues the lineage of Newborn and Mabern. Like Mabern, Miller has earned wide recognition manning the piano chair in several groups, including Woody Shaw's and Tony Williams' bands. But since leaving Williams' group last year, Miller has asserted himself as a forceful leader as well; his new release, *With Our Own Eyes*, should do much to advance that cause.

Where Mabern expands his group for his new recording, Miller pares back for a 10-song trio with bassist Richie Goods and

drummer Tony Reedus. Having toured and worked together consistently, the trio is tight and responsive to one another's ideas.

Miller's approach is a more complicated, more flowing be-bop than Mabern's, owing in no small measure, to be sure, to his tenure with Williams. Like Mabern, Miller casts his stylistic net broadly, relying on his own keyboard approach as a unifying element. On *With Our Own Eyes*, this serves him well. A fascinating take on "Body & Soul" reharmonizes the whole affair, before introducing the melody only near the end. Michel LeGrand's "Summer Me, Winter Me" is given a beautiful reading, and the trio cuts loose on the James Williams' romp, "Another Type Thang"

Still, one listen to Miller's "When I Get There"—one of seven original compositions—should leave no doubt as to his grounding (like Mabern's) in rhythm and blues. Along with Mabern and James Williams (who produced Mabern's record), Memphis musical soil remains fertile, no matter where its roots are transplanted.

Larry Blumenfeld

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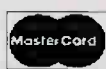
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Southern Exposure
MACEO PARKER
 RCA/NOVUS 63175-2, 55:46

This excellent album, Maceo's debut for Novus after three projects with Verve, pairs the one-time James Brown sideman with



three different bands, two of which have some serious connections to New Orleans. The result is unrelentingly funky. And I'm not talkin' funk as a musical style here (i.e. Parliament/Funkadelic, Red Hot Chili Peppers, et al.). I'm talkin' about butter beans- catfish-and-chitlins funky, I mean sweaty-Saturday-night-roadhouse funky. It's the kind of funk you live, not the kind you learn off of instructional videos. The Chili Peppers will never get to the depth of this funk.

Perhaps the most expressive alto saxophonist since Hank Crawford, Maceo Parker has the ability to sing through his horn with the soulful finesse of a Percy Mayfield or the gospel-holler intensity of a Wynonie Harris. He states his case convincingly on a spirited remake of Joe Zawinul's "Mercy, Mercy, Mercy" with the Rebirth Brass Band. And he funks up the place on The Meter's "Keep On Marching," featuring former Meters guitarist Leo Nocentelli and current Meters George Porter, Jr. on bass and Herman Ernest III on drums.

Maceo's token stab at straight-ahead jazz is represented by a swinging rendition of Jerome Kern's "The Way You Look Tonight," featuring his old J.B. bandmates Pee Wee Ellis on tenor sax, and Fred Wesley on trombone. But he's clearly no Cannonball Adderley. For Maceo, solid ground is funky-butt stuff like his own "Splashin," which recalls his urgent alto work on James Brown's "Lickin' Stick." Even Cannonball couldn't get to this.

Bill Milkowski

FAST TRACKS

Time Stood Still: *Bob Moses* (Gramavision R2 79493, 60:22). Veteran drummer Moses takes another eclectic outing, fusing hip-hop grooves with big band dynamism. The couple of Rap attempts aren't effective, but his percussive heavy attack mixes African and Cuban grooves with a techno edge to exhilarating effect. **J.D.**

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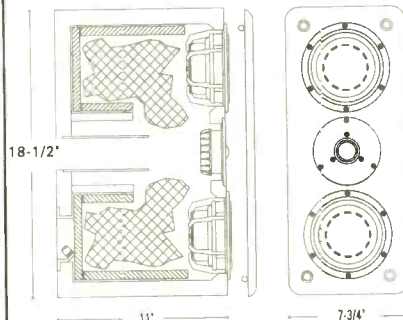
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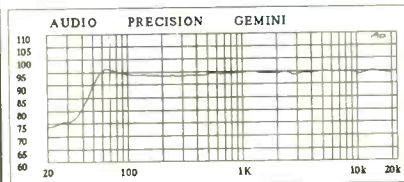
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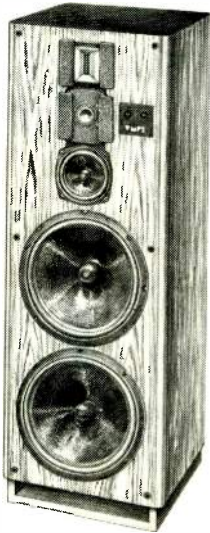
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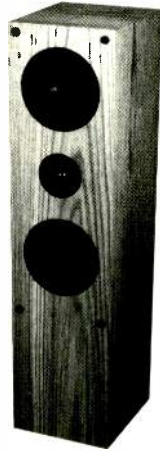
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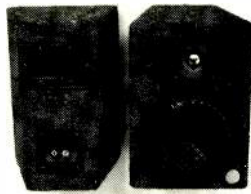


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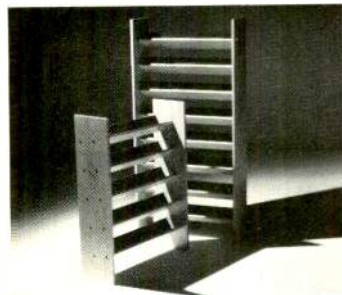
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The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry, no matter how small, should be recorded to ensure the integrity of the financial statements. This includes not only sales and purchases but also expenses and income. The text suggests that a systematic approach to record-keeping is essential for identifying trends and making informed decisions.

In the second section, the author addresses the challenges of budgeting and cost control. It is noted that many businesses struggle to stay within their budgets due to unforeseen expenses or inefficiencies. The document provides several strategies to mitigate these risks, such as regular monitoring of expenses and the implementation of strict cost-cutting measures where necessary. It also highlights the importance of having a contingency plan in place to handle unexpected financial setbacks.

The third part of the document focuses on the role of technology in modern accounting. It discusses how software solutions can streamline the accounting process, reduce the risk of human error, and provide real-time access to financial data. The text mentions various types of accounting software and their benefits, such as improved accuracy and faster reporting. It also touches upon the importance of data security and the need for regular backups to protect sensitive financial information.

Finally, the document concludes with a section on the importance of professional advice. It suggests that consulting with a qualified accountant or financial advisor can be invaluable, especially for complex financial situations. The text explains that professionals can provide expert guidance on tax implications, investment opportunities, and overall financial strategy. It encourages business owners to seek out qualified professionals to ensure they are making the most of their financial resources.

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PRESTIGE RECORDS'
BOB WEINSTOCK**

THE EQUIPMENT AUTHORITY

AUGUST 1994

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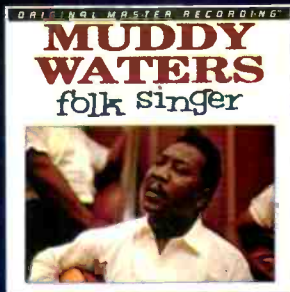


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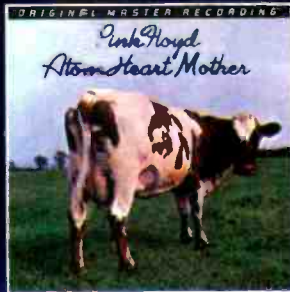
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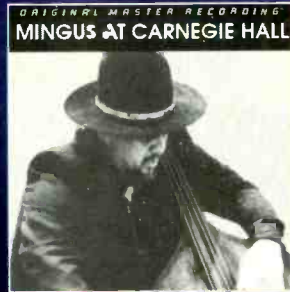
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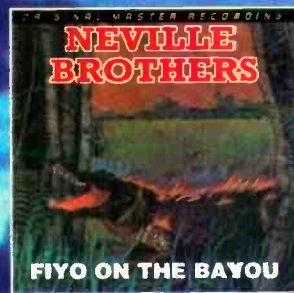
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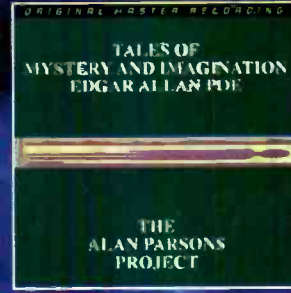
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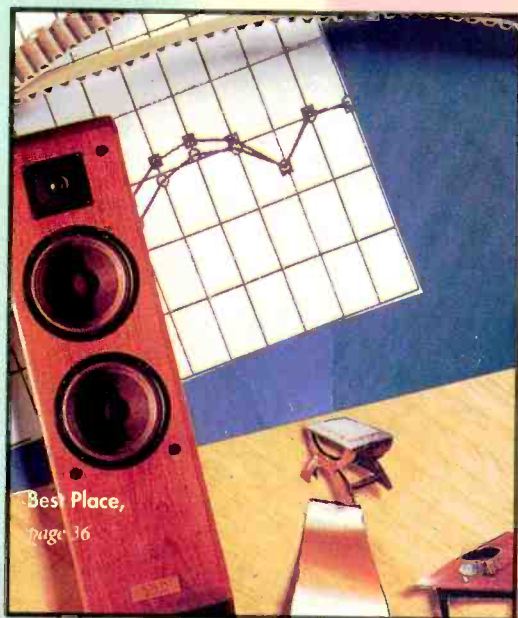


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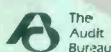
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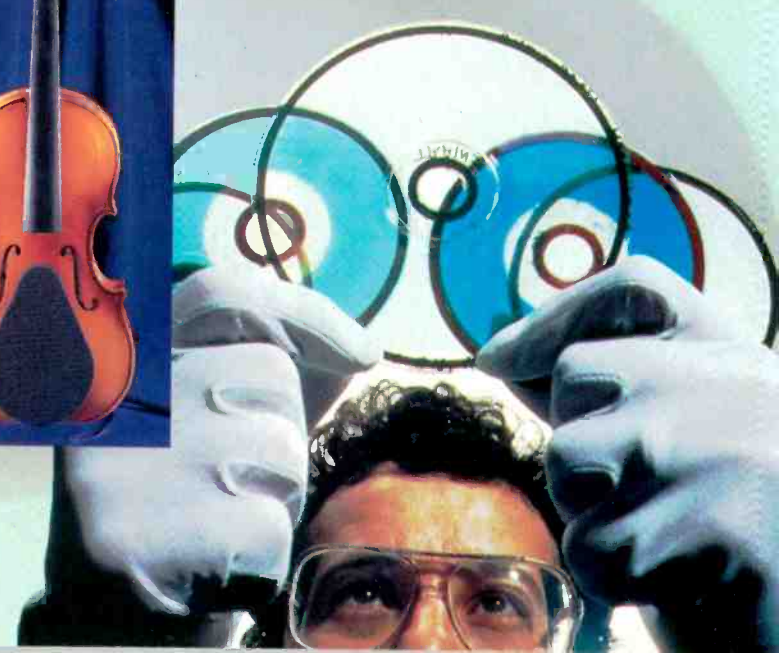
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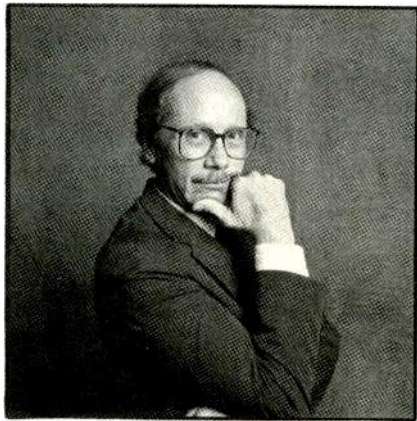
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Most magazines do research on their readers' opinions about magazine contents on a fairly regular basis. We are no exception. We do this to keep track of what you really want us to do between the covers and not just depend on editorial intuition or letters and phone calls. Several sorts of research can be done; we've just done two studies—one using focus groups on subscribers versus former subscribers and the other a mail survey. Since we learned and relearned some things that were important to me, I thought they might be interesting to you.

Our two focus groups each had 10 people in a room with a moderator who asked questions and kept a discussion going. The survey was an nth-name type performed by an outside specialist and it got what I'm told is a "fine" response rate.

The biggest "fact" to come out of the studies was that you readers want lots of equipment coverage, even more if we can find ways to put more "Equipment Profiles" into the magazine. (We're working on that, not incidentally.) This section of the magazine was ranked Number 1. While it was not a surprise to me that all other columns and sections were in second place, it both surprised and pleased me how strongly our "Profiles" dominated the rankings. It might be said that nothing else did better than third place. The reason I am happy with this is that I have long been convinced that our "Profiles" are the heart of this magazine and are the basic reason you buy *Audio*.

There are three sorts of equipment you most want reviewed and you are pretty definite about their relative importance—speakers are by far the most important, with amps second, and preamps trailing.

Second on the list of editorial favorites was the "Audioclinic" column, which placed higher up than I had anticipated. Even though the "Auricles" column does cover equipment, its rank was essentially equaled by our letters column, "Signals & Noise"; Edward Tatnall Canby's opinion column, "Audio ETC," and our pop/rock record column.

On the survey, the popular types of feature articles were ones on new technologies, basic electronic and sound theory, hints and tips for better sound, listening room design, and the history of high fidelity. Some in the focus groups expressed an almost nostalgic desire to see us return to publishing big construction articles. While quality you-build-it articles have been tough to get, we are working on an amplifier construction piece that should run shortly. Let me know how you like it.

Herewith is the first entry in Dr. Pitts' Fractured Dictionary: Alternative Physics, that branch of non-science wherein magic is performed with much arm waving in front of lots of mirrors in the midst of many clouds of blown smoke for the satisfaction of the electronically disadvantaged from whom pieces of green paper are extracted; said to take place in other universes; no feat of alternative physics has yet been verified by blind testing in this universe; greatness of the feats in direct ratio to the number of extracted pieces of green paper; termed "alternative" because its principles, when known and not "proprietary," do not match those of other practioners of alternative physics or those of standard science in this universe.

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THE EQUIPMENT AUTHORITY

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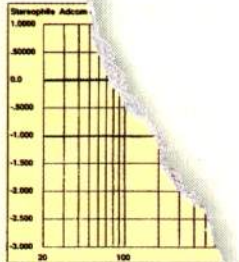


Fig.1 Adcom GDA-600, fr
(top); de-emphasis err
channel dashed, 0.5dB

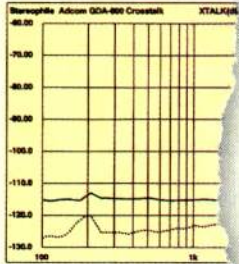


Fig.2 Adcom GDA-600, cro
dashed, 10dB/vertica

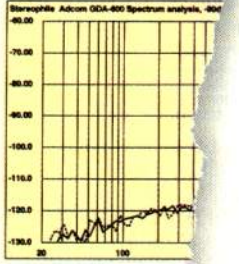


Fig.3 Adcom GDA-600
1kHz tone at -9
spuria (1/8-octave
dashed).

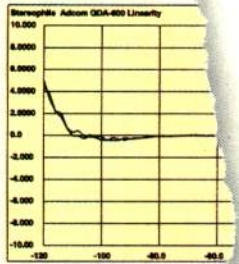


Fig.4 Adcom GDA-600, de
linearity (right chan
2dB/vertical div.).

“Nothing less than a steal.”

—Robert Harley, *Stereophile*

There's something in this review of our GDA-600 digital-to-analog converter that the competition doesn't want you to see. Maybe it's the fact that the GDA-600 makes digital formats sound richer and more musical. Or that it has advanced 20 bit conversion architecture and a Class "A" analog output stage. But what they really don't want you to see is that the GDA-600 costs much less than you might expect. For the full review see *Stereophile*, Volume 17, No. 3, (March '94). Or, if your copy has been stolen, give us a call.



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More Reflections on Mr. Hi-Fi

Dear Editor:

I read of Leonard Feldman's death with great sadness. I met him on two different occasions in Washington and heard him speak with great passion on audio and video topics. His passion mirrored my own.

I first met him at Audio Associates in 1986, at a seminar he gave on digital audio. After lecturing and answering questions, he reached into his jacket pocket with a twinkle in his eye and produced what looked like a miniature video cassette. It was a DAT and pretty much took everyone by surprise since DAT was not on the front burner of the audio world at that time. Len was genuinely excited about the prospect of a new digital tape technology.

When it was time for the door prize, lo and behold, my name was called out, and I went up to receive my prize and shook Len's hand. It was a very enjoyable evening.

The second, and last time, I saw Len Feldman was at an audio show in a hotel in the Tysons Corner area of Virginia. The show was wonderful, but what really took the cake was the debate and discussion between various speaker manufacturers, mediated by Len.

He was a great speaker who could really hold an audience's attention. He loved audio and it showed. I will miss him and his lectures. Len, may you live forever in "Audio Heaven." We will never forget you.

*Claude A. Whiting
Centreville, Va.*

Dear Editor:

I have always admired Leonard Feldman. My admiration only increased when he testified to Congress about the shortcomings of the CBS "notch" encoding technique for records. That took guts, especially since he was writing for *Audio* when it was owned by CBS.

I also admired the way he kept up on advances in technology and learned the nuances in such great depth. He was able to explain them in a way that was always very easy to understand.

Anyone who writes well soon realizes how difficult it is. To maintain a high level of integrity, honesty, and technical precision the way he did is truly amazing. I have read many technical articles in my life and have learned to interpret what is said and, even more important, what is not said. When I read Leonard Feldman's writing, I didn't strain to find out what I wanted to know. His writing was obviously not intended to be flashy or controversial, but to convey information. Most writers don't realize the constraints of editorial space limitations and therefore will never completely realize how much information he was able to pack into so few words.

I thank him for the wealth of information that I took from his writings.

*Ed Long
Oakland, Cal.*

Editor's Note: Mr. Long is a Contributing Editor to *Audio*.

Dear Editor,

I just heard, from Ken Pohlmann, the sad news of Len Feldman's recent death. It is a true loss to your fine publication and the fraternity of audio journalists.

I first met Len while I was at Clarion and came to appreciate his expertise and perspective. But most significantly, he gained my respect for the wonderful way in which he conducted himself.

The last time I saw him was the summer of 1989, when he represented *Audio* at the Lexus LS400 long-lead press conference held for audio publications. I felt a great deal of pride for the job we had done with the Nakamichi and Pioneer audio systems when Len paid his very high complements.

Best wishes for your magazine. It is an interesting and valuable reference on all aspects of "enthusiast-level" audio. Also, we were very pleased with Ivan Berger's "Roadsigns" column (February 1994) on the new Lexus GS 300.

*Fred M. Deutsch
Audio & Electronics Planning Mgr./Toyota
Torrance, Cal.*

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Ageless and Priceless "Reality Lessens"

Dear Editor:

I just read Edward Tatnall Canby's "Audio ETC" (December 1993) and want to share a couple of thoughts. In 1957 when I was a student newly bitten by the audio bug, I opened a hi-fi store that I operated part-time while in graduate school. It was the only hi-fi shop within a hundred mile radius of our town in the Missouri Ozarks.

At one point I wrote a letter to Mr. Canby who I imagined as an ancient, wizened Au-

dio Master. I probably sought his opinion on the purity of my Marantz Model 9 amplifiers; whether I should get a second Capps condenser microphone to make stereo recordings on the Concertone tape recorder; did he think the new AR speakers beat the Bozaks; the Scott tuner, etc. I am embarrassed to remember the beseeching tone of all this but it was true.

Mr. Canby graciously answered my letter with no less than two pages of handwritten comments addressing my many questions. I was honored and re-read the letter many

**EACH MAN MUST SEARCH
FOR HIS HOLY GRAIL;
FOR SOME OF US,
HI-FI PROVIDES
A VULGAR SUBSTITUTE.**

times. It was saved in an old trunk in the basement until destroyed by water from a leaking faucet some 10 years ago. The letter is gone but I remember Mr. Canby's closing comment exactly: "Each man must search for his Holy Grail; for some of us, High Fidelity provides a vulgar substitute."

You see, Mr. Canby was giving "Reality Lessens" back in 1957 too! It is marvelous that he continues to produce articles that inform, entertain, and instruct. And how is it that I have progressed from a callow youth to the edge of old farhood and Edward Tatnall Canby has apparently not aged?

Charles W. Fowlkes
Bozeman, Mont.

Coverlines or Coverlies?

Dear Editor:

On the cover of the December, 1993 issue, it says in quotes, "I'd sell my Mercedes to buy Quicksilver's M135 tube amp." Bascom H. King did *not* say that.

A fellow reviewer said (as a suggestion to Mr. King) and I am taking the quote from page 64, "Sell the Mercedes and the wife's mink coat... go out and buy yourself a pair of M135s, forget about amplifiers, and simply enjoy the music."

Mr. Pitts, the quote you printed on the cover is *not true*. Besides, your editorial philosophy has been that all amps sound the same, or else so much alike that no one can pass a double blind listening test.

Not only have you been printing false information, but now you are printing untruths on the cover. What next? (You have my permission to print this letter if you have the courage.)

Tony Mauldin
Lewisville, Tex.

The Editor-in-Chief replies: Ever hear the phrase—close enough for government work?

AUDIO/AUGUST 1994

8

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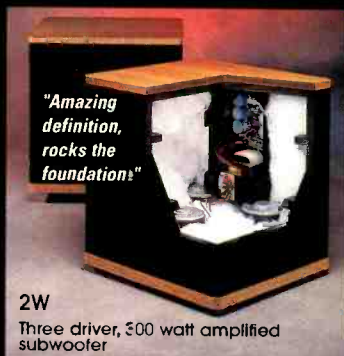
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WHAT'S NEW



**Audio Advancement
Headphone Amp**

This miniature headphone amp not only uses tubes but has a transformerless, Class-A output

stage. The Audio Advancements EarMax runs on a 12-V rechargeable battery or from a car battery via an adaptor. The entire amp fits in a 3.35-inch cube, weighs 13 ounces, and comes in gray, blue/green, or purple. Price, including power supply: \$489.

For literature, circle No. 100



Chase Surround Decoder

Completely passive, the Chase HTS-1 decoder has no built-in amplifiers but redistributes the power from your system's amps. Its switching and inputs allow it

to be used with systems having anywhere from two to five channels of amplification, and it can derive surround ambience from most surround formats.

Price: \$99.95

For literature, circle No. 101

**Koss Noise-Cancelling
Headphones**

Active noise-cancellation technologies in the Koss Quiet Zone headphones reduces the masking effect of noise below 1,400 Hz. The earphones, whose diaphragms are coated with titanium nitride for more upper-frequency detail, have a

rated frequency response of 15 Hz

to 20 kHz. Tiny microphones in the headset sense ambient low-frequency noise and transmit it to a pocket-sized controller; the controller feeds equivalent noise signals, in opposite phase, to the earphones, where the two noises cancel. A two-pin adapter is included for airline use. Price: \$299.99.

For literature, circle No. 102



**B-I-C Home Theater
Cabinet and Speakers**

Spaces are provided in the B-I-C AV-2 cabinet for all the components of a home theater except the speakers—and most of those are built in. The

built-in speakers include all three front channels plus two 10-inch subwoofers; two rear satellite speakers are supplied as well. The cabinet can hold up to a 35-inch TV plus four other A/V components;

the side compartments can hold video or audio discs or tapes. Dimensions are 57 1/2 in. H x 52 1/2 in. W x 19 in. D.

Price: \$999.

For literature, circle No. 103



**B & O Compact
Music System**

So highly automated that its doors open when a hand approaches them, Bang & Olufsen's Beosound 2000 is only four inches thick and can be wall-mounted. Other automatic functions include synchronous recording from CDs, automatic record level, 30 AM and FM station presets, and a "Start/Go" button to rewind and play a tape

in one action. All active buttons are illuminated in each operating mode. The system's handle doubles as an active FM antenna. The speakers are self-amplified, with electronic crossovers and Adaptive Bass Linearization; grilles are available in four colors. Prices: \$1,595, including remote control and table stand; wall bracket, \$25.

For literature, circle No. 104

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take
home
size."



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WHAT'S NEW

Avalon Speaker

Avalon's Monitor two-way system has a front baffle 3 inches thick, to minimize vibration. The 1-inch tweeter has a titanium dome, while the 7-inch, long-throw woofer's cone is a Nomex/Kevlar composite. Rated anechoic response is 60 Hz to 24 kHz, ± 1.5 dB; in rooms, its -3 dB point is below 48 Hz. The speaker is 18 inches tall (42 inches, with optional stand), 8½ inches wide and 10½ inches deep, and weighs 31 lbs. (53 lbs. with stand). Prices: Speakers, \$2,695 per pair; stands, \$340 per pair. For literature, circle No. 105



Hubbell Speaker

The aspect of the HS542 that Hubbell Sound Systems talks most about is its crossover. Its tweeter and mid-bass crossover components are physically separated to prevent crosstalk or other interactions, and only such parts as poly capacitors, non-inductive resistors, air-cored inductors, and Straight Wire cabling are used. The crossover and the drivers' roll-offs combine to produce a third-order Butterworth characteristic with a crossover point of 3 kHz. Price: \$799 per pair. For literature, circle No. 106

DCM Subwoofer

The DCM Sub-710 is a compact subwoofer with 50 watts of amplification built in. The drivers are two 6½-inch woofers, and frequency range is rated as 32 to 80 Hz. Price: \$399.

For literature, circle No. 107



Hoffman Classic Audio Loudspeaker

This loudspeaker looks like a violin because it is one, transformed by Hoffman Classic Audio into the Violin Speaker. The 1-inch, fabric-dome tweeter and 4½-inch, polymer-cone woofer give it a rated frequency response of 60 Hz to 20 kHz, ± 2 dB. Sensitivity is 88 dB, and impedance is 6 ohms. Price: \$1,800.

For literature, circle No. 109

RCA Video Acoustics In-Wall Surround Speaker

The Video Acoustics VA-2200, from RCA, is one of the few in-wall speakers with the image diffraction recommended for surround channels. Each system's 5½-inch woofer fires directly into the room, while its 3½-inch midrange and 1-inch tweeter fire into an angled reflector. Power handling is 120 watts. The molded enclosure can be mounted to wall studs to reduce wall vibrations. Price: \$549/pair. For literature, circle No. 108



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EDWARD TATNALL CANBY

BOULEVARD OF BROKEN BRAHMS

What ever happened to the search for that elusive 1889 Edison cylinder of Johannes Brahms playing his own music and (perhaps) speaking his own name? Since the February issue, my last mention of it, a prodigious amount of information has indeed come my way concerning this minute bit of ancient audio. Progress has gone on apace—



by which I mean, unfortunately, at a snail's pace. We have been the victim of a common disease today called Anti-Communication, much like antimatter: Those noxious segments of the Information Superhighway that inspire near-total bottlenecks in rapid data transmission! A vast spate of letters, for instance, mailed to me after the February issue, reached me more than eight weeks later. Say no more. You get me. My snails have been unusually slow this year. Probably the weather.

And yet this little one-minute sonic episode, the oldest piano recording extant today and the only one by the famous composer, is of considerable historic importance, the more so because in its existing forms it is almost unintelligible. For

that very reason its history, in this age of advanced digital restorations, is far from over.

It has been a fascinating exploration for me during these numerous months. The more information that comes in, the more astonishing

are the ramifications, the contradictions, the unanswered questions, the "clamshell" silences (often understandable)—all of which mingle inextricably with the lil' snails. Seafood galore!

Remarkably, at this point the recording, after more than a hundred years, is actively "under development" via the latest state-of-the-art digital analysis, and this is not the first such treatment. Another was published in Vienna, in 1983, in the form of a 45-rpm EP disc. The 1994 treatment, as you may guess, is using the new approach of Yale math Prof. Ronald

Coifman and other Yale University specialists. (See September 1993.) This enterprise is not yet definitive, and so I will be a clam myself until more news comes in.

I have also heard of assorted restorations on LP (always with other material, necessarily), but the outstanding U.S. source for most of the "sightings" and hearings reported to us was released in 1977, non-digital, by the International Piano Archive (IPA) in New York. This restoration—the sound still mostly unintelligible—is likely to be found in many archives, libraries, and radio stations and is surely our major source in this country.

All of these, alas, stem not from the original cylinder but from a set of archival acetate-disc copies made from the cylinder in 1935 in Berlin, including a long-missing limited pressing. There were evidently numerous trial attempts at that time, with considerable well-meant doctoring of the sound afterwards—hence, almost certainly, some of the distortions now heard by listeners.

There is astonishing confusion over the details of that 1935 operation. (There may or

may not have been the broadcast often mentioned.) But it is known that the copies were produced by

**THIS SONIC EPISODE
IS OF CONSIDERABLE
IMPORTANCE, THE MORE
SO BECAUSE IT IS
ALMOST UNINTELLIGIBLE.**

playing the cylinder on an old acoustic machine and then recording the resulting sound via microphone! Shades of a recent

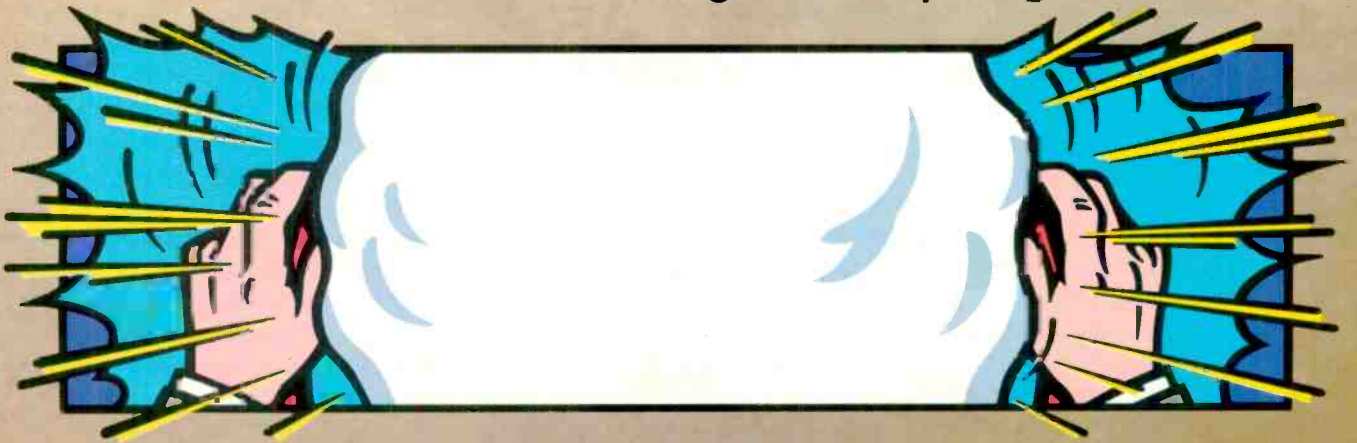
similar operation by an English CD label.

Then there are the London discs, apparently from the same source, discovered not far back in an English archive, wholly unidentified. (The English, I might observe, are well known for not cataloging their collections.) These were left in the



(airbag control)

You don't have time to brace yourself, much less think.
Meanwhile, it's thought of everything.



It happens so fast. How can an airbag trigger so suddenly? Let's just say it's the moment our little black boxes have been waiting for all their lives. **Delco Electronics**

will of the man who put out the pressing from the 1935 copies—he was president of the company, Lindström, and probably was on hand for the actual Berlin procedure. He later moved to England; speculation says these might be trial runs for the Berlin copying, carried away by him at the time. Were they? Nobody knows.

All of today's available versions of the recording come from one or another of these London discoveries, if I am right, and that includes specifically the 1983 Vienna 45 release. However, few of the other existing versions indicate a source, and here come the clams. The IPA LP made in New York says it is derived from "a tape." Tape of *what?* This is an old clam; there are much newer ones too. (IPA is now relocated as IPAM at the University of Maryland.)

But what of the cylinder itself, the Edison original? It has never been lost. It is alive, though not well, in Berlin today, where it has remained since it arrived there in 1935—assuming it is indeed the same cylinder! More on that later.

Something went wrong at the actual recording session in 1889 at the home of the Fellingings, Viennese friends of Brahms. The composer, several accounts agree, was very nervous about the whole thing and apparently started playing before the machine was ready—it was "misaligned," whatever that might mean. He would not make a second recording with the machine correctly set up (this poses some nice mechanical mysteries), and so the Edison operator, one Theo Wangemann, left the cylinder with the family. (Interim mystery: If Brahms started playing too soon, why is there an announcement on the cylinder that was apparently made by the very man who did the setting up, Theo Wangemann?) The Fellingings kept the cylinder for many years and often played it (i.e., it may have been faulty, but it did play).

There is a large blur in the cylinder's history at this point, almost 40 years, until it was somehow taken to the Berlin archive in 1935. The disc copies were made at that time as an archival precaution and as a gallant attempt at state-of-the-art (!) 1935 restoration. A man named Fritz Bose, probably not related to our Amar Bose, was the expert in charge. It was he who decided to use an old acoustic player rather than a modern pickup.

In all I have read so far, there is no clarification as to how the famous cylinder got to Berlin, though there may be information in a book (German) written by one of the Fellinginger family. This is curious—anything could have happened, once the Fellingings relinquished what we might call control. It would have been easy enough for someone in possession of the cylinder, between Vienna and Berlin, to make a reasonably good copy and secrete the precious original for himself; who indeed would know the difference? Enough to say that I was wrong in my account (in February) of that so-called pantograph copying. The pantograph was not at all what I thought but, rather, a tight, tiny metal connector that tied an Edison player to another's recording head to make a single real-time copy that closely matched the

original. One of my correspondents has actually seen one of these in operation and heard the result, indistinguishable from the original, he says. I'll take his word for it.

As for the present state of the cylinder in Berlin (the archive was in the East zone and thus out of touch with the West until the recent reunification), it is in sad disrepair. At some time an operator evidently activated a cylinder scraper, probably by accident. This was attached to an Edison player to remove a layer of grooves to make a new recording, much as we erase a tape. The scraping was stopped in time, but the grooves are very shallow, which makes for immense difficulty in the copying. As I get it, this occurred after the 1935 copies were made—hence the repeated choice of those discs for later restorations, right up to the present. In addition (perhaps at the same time) a piece was broken off at the beginning, making it impossible to play all of the spoken introduction, though the name Brahms—Johannes Brahms—is clear

enough, at least to my ears. Yes, I have heard the 1983 version—or, rather, a copy on tape, which I trust to be authentic. In the alternative "original" on this 45—that is, the unchanged sound of the 1935 disc—the name seems to be something like

"Robert Brahms," but in the restoration it is quite grandly "Johannes Brrrahms," with a greatly rolled "r."

Even worse, the cylinder's structure is weakened and cracked. And the Austrian engineers in 1983, who made arrangements with Berlin to have the cylinder on loan for several days, had to wrap tight rubber banding around each end before they dared put it on a machine. This covered up a segment of the music, as well as the opening spoken words.

They tried six times, using variable styli and point pressures, all to no avail (it says in a 1984 article by the engineers, translated into English). So in the end they decided to use the 1935 disc copy. Better sound. Without a doubt, however, those six attempts still exist on 15-inch tape in Vienna, though never used. That's a challenge! They may be the last copies ever to be made of this cylinder. Unless some ingenious soul fills it with reinforcing plastic or such to strengthen the structure enough to play, or at least turn at speed. A tracing of the grooves by laser? That is bound to come up sooner or later as well. It might make a crucial difference.

There is much, much more to tell, notably about events in this country (all of the above is strictly European). Note that I have omitted most names and sources of information in this month's account. Give you the (relatively) big picture first. All those names will come forth eventually, clams and snails allowing. The best is yet to come!



BRAHMS' CYLINDER IS ALIVE, BUT NOT WELL, IN BERLIN, WHERE IT HAS BEEN SINCE 1935.

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channel speaker and you have a superb sounding compact home theater speaker system! For higher output capability add a second SB-Series Subwoofer. Operate them with a dedicated amplifier for astonishing results! Then add two PARADIGM speakers for the rear and a PARADIGM center channel speaker and you have a sensational home theater speaker system... better than many costing several times as much!

For more than a decade PARADIGM has earned a solid reputation for superb musical performance and unparalleled value! Built on this tradition, the SB-Series sets an entirely new value standard... *until now this quality of bass performance was simply not available in this price class!*

SB-SERIES DESIGN FEATURES

- ▶ **Single driver, high velocity, low noise, bandpass systems with critically tuned resistive ports.**

- ▶ **Bass reflex port.**

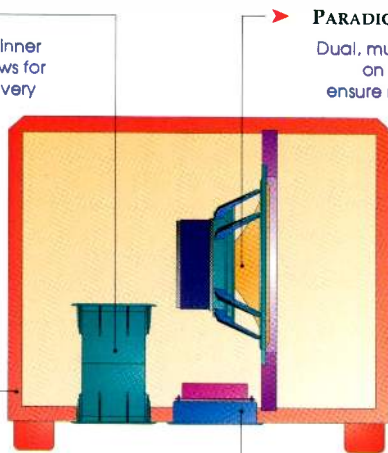
Multiple 3" ports with inner and outer radius allows for high air velocity with very low turbulence.

Ports "fire" down to further reduce unwanted midrange output.

- ▶ **Enclosure.**

Multiple-cavity design.

Inert high-density hardboard limits unwanted panel resonances.



- ▶ **PARADIGM built bass drive unit.**

Dual, multi-layer 1 1/2" voice-coils (2" on SB-120) with kapton formers ensure musical accuracy and long term reliability.

Massive magnet structures with symmetrical field geometry optimize cone movement for maximum output and lowest distortion.

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Oversized power inductors roll off unwanted midrange output.

- ▶ **Highly flexible:**

A single SB-Series Subwoofer can be configured to operate in stereo or in mono (when using two subwoofers).

- ▶ **Convenient hook-up:**

Main speakers can be connected to either the receiver/amplifier or to the SB-Series Subwoofer.

- ▶ **All four sides and the top are finished allowing SB-Series Subwoofers to fit easily and elegantly anywhere in your room.**

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DESIGN

Single driver, dual voice-coil, bandpass systems with critically tuned resistive ports.

CROSSOVER

4th order electro/acoustic at 100Hz. Frequency- and phase-corrected.

SB-120:

BASS/MIDRANGE DRIVER

310mm (12"), 2" voice-coil, aluminum former

LOW FREQUENCY EXTENSION*

26Hz (DIN)*

FREQUENCY RESPONSE

±2dB from 33Hz-100Hz

SENSITIVITY- ROOM/ANECHOIC

95dB/92dB

SUITABLE AMPLIFIER POWER RANGE

15-250 watts

MAXIMUM INPUT POWER†

150 wattst

NOMINAL/MINIMUM IMPEDANCE

8ohms/6ohms

INTERNAL VOLUME

103 litres/3.62cuf

HEIGHT, WIDTH, DEPTH

43cm x 49cm x 72cm/16 3/4 in x 19 in x 28 in

WEIGHT

26kg/57lbs each

SB-100:

BASS/MIDRANGE DRIVER

255mm (10"), 1 1/2" voice-coil, kapton former.

LOW FREQUENCY EXTENSION*

36Hz (DIN)*

FREQUENCY RESPONSE

±2dB from 40Hz-100Hz

SENSITIVITY- ROOM/ANECHOIC

94dB/91dB

SUITABLE AMPLIFIER POWER RANGE

15-200 watts

MAXIMUM INPUT POWER†

100 wattst

NOMINAL/MINIMUM IMPEDANCE

8ohms/6ohms

INTERNAL VOLUME

60 litres/2.1cuf

HEIGHT, WIDTH, DEPTH

43cm x 44cm x 49cm/16 3/4 in x 17 in x 19 in

WEIGHT

19kg/42lbs each

SB-80:

BASS/MIDRANGE DRIVER

210mm (8"), 1 1/2" voice-coil, kapton former.

LOW FREQUENCY EXTENSION*

40Hz (DIN)*

FREQUENCY RESPONSE

±2dB from 50Hz-100Hz

SENSITIVITY- ROOM/ANECHOIC

93dB/90dB

SUITABLE AMPLIFIER POWER RANGE

15-150 watts

MAXIMUM INPUT POWER†

80 wattst

NOMINAL/MINIMUM IMPEDANCE

8ohms/6ohms

INTERNAL VOLUME

35 litres/1.23cuf

HEIGHT, WIDTH, DEPTH

43cm x 27cm x 49cm/16 3/4 in x 10 1/2 in x 19 in

WEIGHT

15kg/33lbs each

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* DIN 45 500. Listening rooms reinforce bass. This reasonably indicates the audible (approximately -3dB) low frequency performance that can be achieved in most rooms.

† Maximum Input Power indicated is with typical program source, providing the amplifier is clipping no more than 10% of the time.

JOHN EARGLE

PYRAMIDING PLATFORMS

Like the Compact Disc, the LaserDisc was designed primarily to deliver a continuous stream of serial data. In the case of CD, that data is digital, and the data rate was originally based on the requirements of two channels of 16-bit audio at a sampling rate of 44.1 kHz. With LaserDisc, the data is often a mixture of analog and digital, and the primary function is as a video storage medium. In their original intended applications, both media were normally asked to play continuously from beginning to end, but they have the added capability of directly accessing specific bands, tracks, or "chapters."

The CD and the LaserDisc have been adapted to alternative uses. The Compact Disc, for example, does duty as a read-only memory (ROM), as a storage medium for high-resolution photographs, and as the storage medium for a number of user-interactive systems. Both media have reasonable access times to any "address" on the disc, on the order of a handful of seconds. As long as the alternative use does not demand too rapid a movement from one point on the disc to another, the disc functions well as a read-only memory. (The real secret to programming for these alternative uses is to reduce the frustration of waiting during look-up period by having some relevant activity take place on the screen while the disc is being scanned for new data.)

The ability to work interactively is not built into conventional CD and LaserDisc players. Instead, it is provided by additional processing capability, which may be either external or internal. In some cases, the mechanical performance of the transports may be upgraded for the greater load that will be placed on them.



I recently tried out Pioneer's Model CLD-A100, a combination LaserDisc and CD player (with separate drawers for each) that accepts plug-in modules for LaserActive applications. As supplied, the standard unit will play only ordinary LaserDiscs and CDs; for interactive purposes it is necessary to plug in a "control pack," a small box that slides into the front of the chassis

and has input jacks for handheld controllers. The control pack functions as a computer and generates on-screen menus, translating user input from the controller unit. Two control packs were included with the system I received, one for educational discs and for NEC Turbochip and TurboGrafX-16 software, the other for Sega Genesis cartridges and discs. (Only one control pack is included in the system price of about \$1,000. The player costs \$735 alone; additional control packs cost \$485 each for games and \$350 for karaoke.) I evaluated a variety of LaserDiscs, both standard and interactive, but did not evaluate any CDs or interactive movies.

Because it's also a CD player, the CLD-A100 can read digital as well as

LaserActive game module in Pioneer's CLD-A100 LaserDisc player (right) and in use (above).

A stereo system

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be complex.*

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can be simple
and approachable.*

*Uncomplicated
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can be said
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harman/kardon

Sega control pack and controller (left), pack and controller for educational discs and NEC games (right), plus remote control and software.



analog LaserDiscs soundtracks. Most recent music-oriented LaserDiscs, such as operas and concerts, now include digital sound, and the combination of crisp, stable color images and digital stereo is a joy to behold.

Those of you familiar with CD-based interactive programs may have, at least sometimes, been frustrated by sluggish performance and clumsy graphics. There is a limit to how quickly data can be taken from the CD to feed a hungry processor. With the LaserDisc as a source, the data rate is far more rapid, and programs can

**LASERDISC'S CRISP,
STABLE COLOR IMAGES
AND DIGITAL STEREO
ARE A JOY TO BEHOLD.**

be updated more quickly. As a result, the system is often well ahead of the user; it is waiting for *you* to make an entry.

Programming for interactive video is still in its early stages, and, it would seem, so are some of its conceptual aspects. For example, a disc given over largely to a tour and study of the Egyptian pyramids lets you browse through a wide range of direct and peripheral topics related to pyramids and the Pharaohs. Then, in the midst of all this informative stuff, you come across a video game.

Still other programs are basically video games and, as such, are the most interactive of all; your own commands at the controller determine what happens directly on screen. Some of these games tax the system to the limit. Graphics may be jerky and of limited resolution, presumably because they are being generated on a real-time basis. The control unit itself may get in the way; obviously, a joystick would be a more

natural way of trying to avoid an enemy missile than trying to coordinate your thumbs and the controls!

A further comment on the quality of the graphics is implied by the warning that appears on all interactive LaserDiscs. Summarized, it states that a very few individuals may be subject to seizures upon viewing interactive video and that care should be taken. The pronounced flicker in the display is apparently the cause.

For the most part, interactive LaserDiscs are handsomely packaged, with generous information on how to work each program. You are told which button on the control unit does what, and a detailed hierarchy of menus is given.

Overall, it is easy to walk away overwhelmed by the simple-mindedness of much of the programming. On the other hand, much progress is being made, especially in educational areas. Many concepts in physics and mathematics may be elucidated if a student can sit in front of a computer with the appropriate interactive videodisc, which is being done every day on college campuses.

Is this a good time to buy an interactive LaserDisc system? It depends on you, and your family's, needs and tastes. The basic unit can function as a LaserDisc player and provide movie and music entertainment of the highest technical order. While discs are relatively expensive, they can be rented for next to nothing. The choice of a platform for the interactive portion is more complex and should be made only after you have surveyed the available software. All of these may be obsolete sometime in the relatively near future, but I would hazard a guess that any investment you might make in a LaserDisc library would still benefit from backward compatibility of any new playback hardware. A



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IVAN BERGER

SONGS ON A SANDWICH



IBM researcher Kurt Rubin holding two-layer optical discs that can be sandwiched together as shown below.

The guy wearing the gloves, Kurt Rubin of IBM's Almaden Research Center, seems to be holding five discs. But you could say he's holding 10—or one; it all depends on how you look at it.

Each of the discs in Mr. Rubin's hand is a two-layer optical recording, and these recordings are de-

signed to be sandwiched together into a disc with up to 10 recording layers and a corresponding increase in information-storage capacity. Such a sandwich disc would be quite fat (about a half-inch thick, in IBM's initial mockup) because it would include not only the five two-layer data carriers but spacers between carrier discs and a rigid plastic substrate like that on today's CDs. In practice, says IBM, discs with four or more layers will be made of thinner materials.

The experimental disc system relies on optical disc equipment's extremely shallow depth of focus. Today's optical drives focus so finely, IBM says, that "light focused on any

layer is 10,000 to 100,000 times more intense than that hitting any adjacent layer."

The reflective backings used on today's CDs and LaserDiscs cannot be used on a multi-layer disc, as they would block the passage of light to other layers. Instead, the system relies on a balance between transparency of the layers and reflectivity of the surfaces and requires higher powered lasers than today's CD players do. The number of surfaces in a disc stack is limited by laser power, layer transparency, and cost. Prerecorded discs could have more layers than recordable ones, since recordable discs must be able to absorb some of the laser light during recording. However, players built to handle multi-layer discs would still be able to play today's single-layer audio, video, and data discs.

This experimental IBM system is also compatible with systems that raise data capacity by using shorter wavelength (blue) lasers or lenses with high numerical apertures for more precise focus. Such systems are being worked on by 3M, Sony, IBM, and many others.

It's unlikely that 10-layer audio CDs will ever appear, for the same reason 10-CD albums aren't around now—too little material whose length would justify this. But CDs with two to four layers would make sense, and adapting today's player designs to handle them might not be difficult. (Retrofitting existing players might not be cost-effective, though.) Today's players already have movable lenses to maintain focus even on warped discs. The Almaden researchers have found that it took only "relatively minor modifications" to adapt an existing CD-ROM drive to play audio and video tracks on two-layer, read-only discs.

CD Wins—At Last?

If trends continue, 1994 will be the first year that CD became the world's most popular recorded sound carrier. In 1993, according to



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Q - S E R I E S

This question may confuse those who believe that the measure of a loudspeaker is the number of its drivers. It will also elude those who have never bothered to question conventional driver placement, which always separates the woofer from the tweeter.

In fact, the most acoustically correct location for the tweeter is precisely at the *center* of the woofer. This strategic placement creates a single sound source, allowing high and low frequencies to reach your ears at the proper time, regardless of where the speakers are placed or where you are sitting. (No wonder KEF's patented Uni-Q® is the technology of choice for advanced Home Theater applications.)

Perhaps the greatest benefit of the KEF Q Series speakers is that they sound as good in your home as they do in the showroom.



Speakers From Space

Not all British design is as traditional as Rolls-Royces (remember the Jaguar XKE?), as these three new British speakers show.

All three use B & W drivers; two are from B & W itself.

The four dynamic drivers of the Nautilus have independent, exponentially tapered "lossy waveguide" (transmission-line) enclosures. The 12-inch woofer's enclosure is coiled like the shell of the sea creature from which the speaker gets its name. Billed as "B & W's best loudspeaker ever," the Nautilus has rated bandwidth of 10 Hz to 25 kHz, +0, -6 dB, with response flat within ± 0.5 dB from 25 Hz to 20 kHz. The price is \$35,000 per pair.

The trumpet-like B & W Emphasis is a two-way system with a 6½-inch woofer. Its fourth-order vented woofer enclosure uses quarter-wave bass loading and a flared reflex port. The tweeter is mounted on a stalk for optimum dispersion. Frequency response is 45 Hz to 25 kHz, ± 3 dB, and the price is \$9,000 per pair.

The Blue Room House Pod uses similar B & W drivers. This is no surprise, as its designer, Simon Darwood Ghahary, first taught himself speaker design by making systems out of cast-off components from B & W's Steyning, Sussex, plant. (The plant's rubbish heaps are so well gleaned by local schoolboys, reports *New Scientist* magazine, that they need to be emptied only twice a year.) Like the Emphasis, the House Pod has a fourth-order vented cabinet. Response is rated as 45 Hz to 20 kHz, ± 2 dB, and the systems cost \$1,900 per pair.

While the swoozy, futuristic shapes of these three speakers make a design statement, they also add rigidity and reduce internal standing waves. The time may come when the term "speaker box" refers only to the package a system like one of these came in.



Nautilus



Emphasis



House Pod

the International Federation of the Phonograph Industry (IFPI), cassette sales dropped for the first time. The drop was a mere 2%, but combined with a 19.4% rise in CD sales from 1992 to 1993, it was enough to bring CD sales to more than 96% of cassette sales figures.

Cassettes continue to be the dominant medium in developing countries, but Compact Discs are the largest sellers in nine of the 10 countries that buy the most recorded music. And in the 10th such country, Mexico, cassette sales for 1993 dropped 19% while CD sales rose by 39.3%.

Hearing About Hearing

A workshop on "What We Know About Hearing" will be presented from Thursday, August 18 to Saturday, August 20, at the Indiana University School of Music, in Bloomington, Ind. The workshop is presented by Synergetic Audio Concepts (Syn-Aud-Con), a group which has long been engaged in additional education for sound professionals.

The workshop staff will consist of Dr. Jont Allen of Bell Laboratories, Dr. Larry Humes of the Indiana University Speech and Hearing Department, and Dr. Mead Killion of Etymotic, Inc. The conference will cover the ways listener physiology affects the sound reaching the eardrum, and how sound technology can exploit these factors.

For more information, contact Syn-Aud-Con at 12370 W. Co. Rd., 100 N, Norman, Ind. 47264. Telephone number is 812-995-8212, fax is 812-995-2110.

AR Heads West

The centers of the U.S. speaker industry have long been California (where the movie industry is) and the Boston/Cambridge area (where Acoustic Research was founded, in the 1950s). The presence of AR, which once dominated the speaker industry, built up a rich stock of speaker-building expertise, and a proliferation of speaker companies. Such companies as Advent, Allison, Boston Acoustics, Cambridge SoundWorks, KLH, RDL, Snell, and others can trace their ancestry back to AR. Today, even such British companies as Celestion and KEF are headquartered in the area.

So it came as something of a shock to learn that, after 40 years or so in Massachusetts, AR was moving to Benicia, Cal. There, it will be part of the new Specialty Audio Group of International Jensen, AR's owner for the past four years.

The AR Powered Partners' line of small, self-powered speakers will now be handled by Advent, another Jensen-owned company founded in the Boston area, which also once dominated the loudspeaker field.

Even AR's new location has some historical resonance: A plaque in the nearby town of Napa honors a speaker pioneer who long preceded that company: Peter Jensen.



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But It Looked Okay on the Meter

Q I was doing a charity recording of a "live" rock-club date, featuring musicians who seldom are in a position to play together. The recording was a unique, never-to-be-repeated event. I decided to use my Tascam 38 half-inch eight-channel open-reel recorder. I meticulously aligned it for 3M 996 tape.

At the session I bridged into the vocal mike circuits, premixed stereo vocals to two tracks, and premixed stereo drums to two other tracks. The remaining four channels were used for two lead guitars, bass guitar, and, on the last channel, harmonica and acoustic guitar solos. This was intended to give me a chance to optimize the balance when the session was done.

At the sound check, all levels were adjusted for the proper mix and recording level was checked, using the VU meters on the Tascam. The rest of the night proceeded without a hitch. Three sets and seven reels of tape later, I came away with a certain euphoria from having captured this rare event for history.

A day later, I set up the deck for playback and mounted reel 3. Reel 3 was the first half of the second set—the best of the evening. I found that nothing was on the tape! A quick review of the other six reels confirmed my worst nightmare. Nothing on any of them either.

I immediately descended into analysis mode, fighting off anger as I did so. The deck must have broken down, I told myself. This excuse quickly evaporated as I confirmed with scratch tape and an FM tuner that the deck was fine and recorded perfectly.

I went over each detail of mixer and mike preamplifier connections, yielding nothing obvious. I went into hypothesis mode: Perhaps the reels of tape were wound such that the backing was against the heads. Nothing doing!

It finally dawned on me. Perhaps, in a surge of overconfidence, I had plugged the mixer into the deck's outputs. That couldn't be! How could I have gotten such perfect levels even when the deck was in "reproduce"?

I quickly pulled out the maintenance manual and reviewed the wiring. The VU meter circuits in my deck are resistively coupled directly to the output jacks, with no intervening buffer amplifier! The mixer drove the meters directly, making for the perfect illusion of a "perfect recording."

Needless to say, I have burned into my mind a valuable and painfully learned lesson, which I share with any of you who may own similarly configured equipment.—T. Burkhard, New York, N.Y.

A I've owned at least two other makes of recorder wired like that Tascam—Magnecord and Ampex. The only reason I never made the same mistake was that the connectors for the output were different from those used at the inputs.

If it makes you feel any better, Mr. Burkhard, any of us who have been in the sound recording field for more than 40 years can tell his own horror stories. Here is one of my modern highlights of recording horror: I own a portable audio/video recorder that has the interesting ability to handle six (count 'em, six) stereo track pairs on a single tape. This is true only if the machine is switched to the "audio" mode.

Like you, I was making a recording that could not be made again. Sound was fine in my headphones. But when I got home, the playback was erratic. Worse, I lost my new recording as well as the other recordings on that tape. Leaving the machine in the "video" mode not only results in a recording made with no sync but also in the destruction of data on all of the stereo channels.

Welcome to the club!

Load vs. Tube and Solid-State Power

Q Many solid-state amplifiers' power output ratings almost double as the impedance of the load decreases by half. Yet tube amplifiers, even the best ones, seem to be rated at a more or less constant power regardless of the impedance connected to them. Please explain this difference and any

impact it has on matching amplifiers to loudspeakers.—Tom MacGregor, Barre, Vt.

A The power output of a solid-state amplifier would not increase when the impedance of its load decreased, if we truly matched impedances between the amplifier and its load. But the solid-state amplifier's output impedance is far lower than the load impedance (the amplifier's damping factor is the ratio between these two impedances), so the lower the load impedance becomes, the closer it approaches an impedance match with the amp's output.

We can never obtain a true impedance match, and we don't even want to. If we managed to match these impedances, the output stage would be destroyed as it tried to supply a huge amount of current to the load. This is much like attempting to match the impedance of a home appliance to that of the power line—simply a practical impossibility.

Tube equipment behaves differently, because the load is not connected directly to the output devices as it is in solid-state equipment. Most tube amps have output transformers whose primary winding is connected to the tube plates. The secondary winding is tapped in various places, and the speaker is connected between one end of the secondary and one of the intermediate taps. The tap chosen depends upon the impedance of the load. The highest load impedance (typically 16 ohms) is usually connected to both ends of the secondary winding, with 8- and 4-ohm taps at intermediate points.

This maintains a constant load on the output tubes regardless of the load impedance being driven. Because the match to the tubes does not change, the amount of power delivered to the load will be more or less constant, regardless of the load. If the secondary of the output transformer was not tapped, all loads would be connected across the full winding. We would then observe a significant decrease in output for lower load impedances.

If you have a problem or question about audio, write to Mr. Joseph Giovanelli at AUDIO Magazine, 1633 Broadway, New York, N.Y. 10019. All letters are answered. In the event that your letter is chosen by Mr. Giovanelli to appear in Audioclinic, please indicate if your name and/or address should be withheld. Please enclose a stamped, self-addressed envelope.



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Building and Equipping a Small Recording Studio

Q What equipment would you recommend for use in a small recording studio intended mainly for recording vocals? The dimensions of the area I have to work with are about 5 feet x 5 feet. I need to eliminate any undesired sounds. What kinds of materials would be required to build this type of room?—George Marrow, Jr., Washington, D.C.

A It is difficult for a performer to work in a room as small as the one you are planning. I have to hope that the singers won't be sharing space with the recording equipment and the engineer. If nothing else, the equipment is bound to add some undesired noise that will be picked up by the microphones.

Although I understand that this room will be used for vocals, what about the music behind the singers? How is that to be generated? If it is supplied by synthesizers, MIDI sequencers, or multitrack tape overdubs, fine.

At the least, you must use very heavy carpeting on the floor and really good acoustic tile on the ceiling and probably the walls. Don't forget to line the door with the tile.

External sound often enters a room because the walls are set to vibrating. If this is your problem, you will have to make these walls as massive as you can. The stiffer they are, the less they will vibrate.

I have obtained excellent results by lining all walls and the ceiling with thick, dense fiberglass, held in place with chicken wire. (No, it is not pretty to look at, and some people feel very closed in when working in this environment. But if this can be overcome, it works well.) The boominess often associated with small spaces is very much reduced. You may find a need to add more highs because of the lack of reflection from room surfaces. You will also want to add reverb, because the sound is *very* dead.

In order to determine the equipment you will need, you must list what work you plan to do. Obviously you will need some kind of a mixer. It doesn't need to be an elaborate one, with "track solo" and "monitor sends" and the like. You may well want the opportunity to place some special-effects processors between each mixer

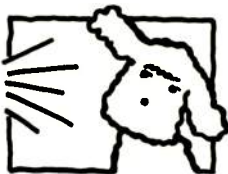
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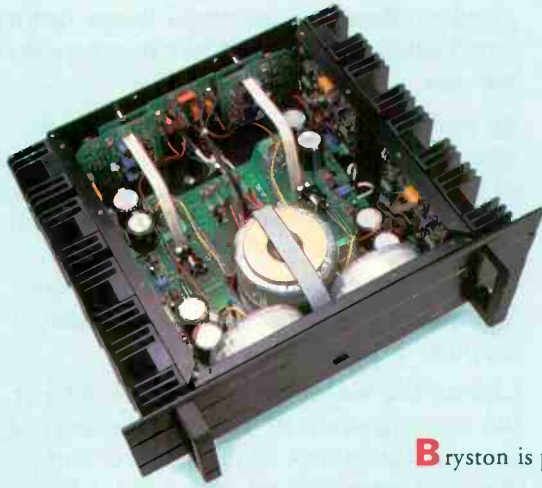
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The Sensible Sound Issue #47

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position and the mixer bus for that stereo channel. Chances are that you only need two outputs.

The recorder can be a very good cassette machine, although I would choose an open-reel, VHS Hi-Fi, or DAT recorder. Chances are that you will want to copy your masters onto cassettes, so the cassette recorder still has a place in your studio.

If you only plan to use a sequencer, you won't need a multitrack recorder. If, however, you need to sweeten the music with instruments not available in your sound modules, then you will need a multitrack tape recorder of some kind—digital or open-reel.

The choice of microphones is a very subjective one. Many sound technicians use dynamic mikes. They're great when a singer really shouts it out and runs the risk of overloading a condenser mike or overloading the input the mike is feeding. I personally use some ribbon mikes made just for vocals, because I like a natural-sounding voice, free from peaks. But many find such peaks exciting and enhancing to the performance.

Negative Feedback, Pro and Con

Q Negative feedback is considered to improve amplifier performance. Why, then, do some high-end audio equipment makers avoid using it?—Ray Segura, New Orleans, La.

A Negative feedback definitely lowers distortion, but too much of it reduces sound quality. Years ago, a leading maker of audio gear introduced a high-quality line of preamps that used a tremendous amount of negative feedback, not only around the circuit as a whole but also around individual stages. To me, the preamps sounded mushy, as if the signal had to be pushed through them. When I removed some of the feedback from one of these units its sound improved remarkably.

However, preamps and power amps have different properties. Many power amplifiers, for example, employ Class-B output stages because Class-B circuits have good electrical efficiency and run cooler than other biasing arrangements would allow. This means lower costs for power supplies and cooling facilities.

However, Class-B circuits have inherently high distortion—especially at low power output levels, where they're operating in a more nonlinear portion of their input/output curve. Adding negative feedback to such a stage dramatically reduces the distortion. Class-B or even Class-AB circuits would be virtually unusable for high-fidelity applications without negative feedback.

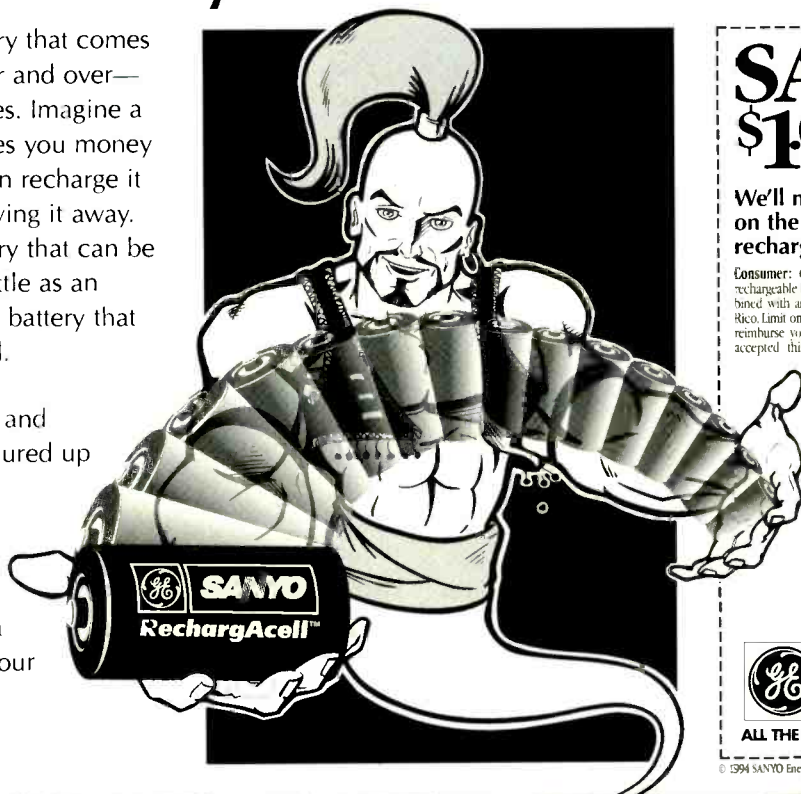
A high-end manufacturer, less concerned with cost, can lower distortion in other ways. He can, for example, use an output stage with inherently lower distortion (such as one using triodes instead of pentodes) and can also bias it for Class-A operation, despite much lower electrical efficiency than Class B. Even at low power levels, the input/output curve is always linear.

Measures like these allow a manufacturer to eliminate feedback or drastically reduce it. (For example, some amplifiers have no overall loop feedback but do use local feedback on early stages.) Yet I can't help wondering if the sonic performance of amplifiers that used no negative feedback at all couldn't be improved by using at least a bit of it.

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JAMES ROZZI

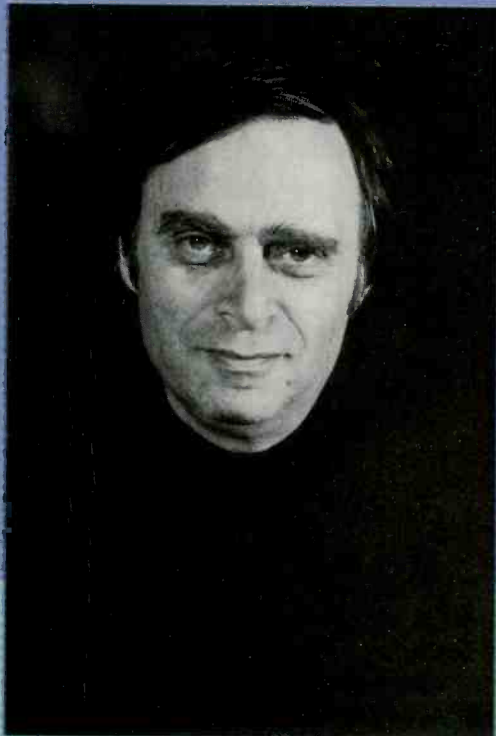
Without the Prestige label, the jazz record industry never would have achieved proper documentation of an art form based on the otherwise fleeting sounds of improvisation. Many hundreds of recording sessions, done by a virtual Who's Who of American jazz, took place in the decades following founder/producer Bob Weinstock's first record date in January of 1949. While Prestige's subsidiaries of the

1960s dealt with such diverse art forms as international music, folklore, and the blues, Weinstock's jazz vision as put to wax is his true claim to fame. Often compared to Blue Note Records, a company unquestionably responsible for further developing jazz with its encouragement of original compositions, Prestige differs by assuming the role of a veritable time capsule, capturing the standard repertoire of jazz's finest as perfected night after night in the clubs of New York. J.R.



CK

Photograph: Michael Price



By the time the musicians had unpacked, Rudy Van Gelder was ready.



When people think of Prestige Records, The Modern Jazz Quartet comes to mind.

When people think of Prestige Records, names like Miles Davis, Sonny Rollins, Eric Dolphy, The Modern Jazz Quartet, and John Coltrane immediately come to mind, and yet you grew up during the big-band era. Do you recall your musical tastes making the transition from swing music to modern jazz?

I had a record store before I started recording, and I carried every jazz artist you could think of. One day, Alfred Lion, who ran Blue Note Records, came in and said, "I have something new: Thelonious Monk." I said, "What the hell's that?" Alfred said, "It's be-bop." I listened and the

more I listened, I realized it had a charm to it. It was interesting. I was strictly into swing at the time. Be-boppers were calling people like us "moldy figs." The next thing I knew, I became obsessed with be-bop. I was attracted like a magnet down to the Royal Roost and Birdland. This was something that was unbelievable. The only other time I was so moved by music was when I saw the Bunk Johnson band that came from New Orleans.

How did you decide which musicians to record at your first sessions?

My first choice, naturally, would have been Charlie Parker and Dizzy Gillespie, but they were under contract to various companies. In fact, Bird would record for both Savoy and Dial, and they were always having contract disputes. I just went one jump forward into music more modern than that.

You were still in your teens at the time. With your first session comprising seasoned musicians like Lennie Tristano and Lee Konitz, how did they take to your presence in the studio?

I got a very rude awakening about the recording industry when I did my first session. Tristano was the leader of this "cult," the Tristano school. It was supposed to be Lee Konitz's session, but the cult decided that Lennie should be leader because he had a bigger name. Anyway, there they were, and they played it right down, a song called "Subconscious-Lee." I said, "That's good. Boy, that's good." Tristano said, "No. We didn't get it right." So, over and over, the same shit, and it all sounded good, man! Konitz blew his ass off. Well, we finished and I put the first two sides out. I went to put the second two out, and I called

Tristano on the phone. He said, "Don't put those sides out. They're not quite good enough." I said, "They're good; they're good!" He said, "If you put them out, I'll put a curse on you and that will be the end of your record company." I said the hell with it. What's he going to tell me about curses? I've got a Jewish mother. I put

them out, and the critics gave them five stars.

It's no secret that the jazz record industry had a number of tough, almost gangster types at that period. How did they react to your emergence on the scene?

This is funny. One day, I was walking up Broadway, away from the Roost, when a big Cadillac pulled up. The door swung open and Teddy Reig [of Savoy Records] yelled, "Get in!" I was a good athlete and afraid of no one, so I got in the car. Teddy was a huge, gruff man who must have weighed 400 pounds. He said to me, "You—you're upsetting the jazz world! You're paying too much money to these guys, and you need to start squeezing extra sides out of them." I had often wondered why Savoy would issue two different sessions on opposite sides of one record, and there was my answer.

You mentioned Alfred Lion of Blue Note Records. Many people see Prestige as being Blue Note's only serious competition of the day. How do you compare the two companies?

JAZZ SHOULD
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AND SHOULD SWING—
THAT'S THE
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I WANTED.



Photographs: David Gahr

I loved those Blue Note records. Even before I was in the business, Alfred Lion was my hero. The man was a giant. He had integrity. He made a fine product and recorded everybody from Sidney Bechet right up to Ornette Coleman. But aside from us using the same engineer in Rudy Van Gelder, we handled things differently. Blue Note's sessions were always prefaced by rehearsals with written arrangements. I found charts and rehearsals were the kiss of death. I believe jazz should be free and loose, and should swing. That's the atmosphere I always wanted to create, not the stress and strain of trying to work out some chart. Why are charts necessary when the musicians are so creative?

Did the musicians appreciate the lack of structure in the studio?

They liked it; they had a good time. They'd kid around and laugh it up. We had fun, but if it got rough, if I could see the guys were down, if they were up late or something, I'd say, "Okay, let's play some funky blues," and I'd let them go for 20 minutes.

It must have made life in the studio a bit easier when you eventually hooked up with Rudy Van Gelder.

I was having terrible problems with my studios. I was very annoyed with them. Sometimes they would run sound tests for an hour. From the very first session, when Rudy used his parents' living room, to the very end, I never said a word about recording to Rudy. By the time the musicians had unpacked, he was ready. He did not have to take tests. That was the beauty of recording with Dr. Rudy Van Gelder. He was a genius at sound recording.

When did you record your first bona fide bop session? Looking at the discography, I see it was in May of my first year, 1949: Kenny Dorham, J.J. Johnson, Sonny Rollins, John Lewis, Leonard Gaskin, and Max Roach were on the session.

Kenny Dorham was a very underrated player. Even when he was with Bird, he still didn't get enough recognition. J.J. was so far ahead, it was ridiculous. The way the man played...and he's one of the finest people you could ever meet, a wonderful person and a good family man. Sonny Rollins was too much! At that time, Sonny Rollins was a joke to all of the musicians. They loved him because he was a be-bopper and he knew everybody—played with everybody in the neighborhood group up in Harlem. But he hit so many clinkers that they would crack up when he played. They would tease him, but his ideas were so



great. Despite the clinkers, they all knew, just like I knew—because I signed him to a contract—that he'd be a force someday. And sure enough, he was.

When do you feel Rollins came into his own as a player?

Everyone wanted to see Sonny Rollins succeed, and the session when he really hit was the one that produced *Saxophone Colossus*. That day, the man showed a giant was emerging. I had known Sonny's playing for years prior to this date, but I sat there and couldn't believe what I was hear-

**SONNY ROLLINS
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SOMEDAY.**

ing. It was incredible! Sonny is a wonderful person, one of the most unpretentious, laid-back people you could ever meet.

Prestige had a great deal of commercial success with Stan Getz.

When I recorded Stan Getz, I did not do it with commercialism in mind, but I had a tiger by the tail, as they say. I was confused, actually. He kept recording all these simple tunes, playing the melody, like a formula. I didn't understand it, but you don't argue with success. Symphony Sid was the one who started Getz selling. He had a jazz radio show that aired in 30 states east of

Symphony Sid made Stan Getz. He played the shit out of Stan Getz.



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Miles Davis disappeared after his Capitol sides, but I tracked him down and recorded him.



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Help us remember some of your other more commercially successful artists?

Our first real hit came in the form of “Moody’s Mood for Love.” It was originally an instrumental of saxophonist James Moody improvising over the changes of “I’m in the Mood for Love,” but Eddie Jefferson put words to it. When King Pleasure recorded it for us, that tune took right off.

Most of our best-sellers were vocalists: H-Bomb Furguson, King Pleasure, the Cabineers, Mose Allison, Etta Jones. Instrumental sellers were the “soul jazz.” Miles Davis also sold very well.

Tenor saxophonist Gene Ammons must have had an impact on the soul jazz market.

Gene Ammons was the father of soul and funk. He started that music in 1950. I liked R&B. I heard a lot of bands play, and I knew there had to be room for an update, a modernization of rhythm and blues with a jazz flavor. The black people needed something to relate to besides all the singers and vocal groups. Everything we did had a good rhythm section and swung. Nothing was ever phony, just to make sales. Even when we got heavy into the funk, with organ groups and guitar and all of that, they were like the blowing sessions we did before, but with a different groove. They cooked.

Blue Note started producing soul jazz and funk as well.

Somewhere along the line, Alfred Lion got the taste for the big seller. Maybe it was *The Sidewinder* by Lee Morgan or a Jimmy Smith Record. I felt the main reason he would have rehearsals at that point in time was to be sure the guys would know funky blues tunes like those to record. See, I was willing to gamble on standards done in a commercial vein, as Lion was willing to go with arranged funk tunes. Gene

Ammons did “Canadian Sunset”; Groove Holmes played “Misty.” These were big hits for us. Miles even had a hit with *Blue Haze*. In the end, nobody ever knew if you were going to have a hit, but that was the prize. That’s what paid the bills and paid for other projects.

What were the circumstances that led to your recording Miles Davis?

Miles had vanished after he did those Capitol sides with the [*Birth of the Cool*] nonet; nobody knew where he was. Somebody had said that he might be at home in East St. Louis, so while I was in Chicago on business, I tracked him down. His father was a dentist, so I knew that his number would be in the phone book. I had met Miles at a Dial session where he recorded with Bird, but he didn’t remember me. Anyway, he said if I’d send him money to get to New York, he’d be happy to record. I said that I was interested in doing a series of recordings, and that I wanted to sign him to a contract. He said all right, just get him to New York and we’d talk about it then.

So, our basic idea was just to make records with different people, to record with the best people around. That’s what we did until the end, when he had the quintet with John Coltrane, Red Garland, Paul Chambers, and Philly Joe Jones. But everything up to that point developed from where we would sit down and talk about it. Miles would mention who was in town, who he would like to record with. I’d

say who I’d like to hear him record with. We’d kick ideas around.

Was Miles ever difficult to deal with?

No, not really. We’d get into these staring sessions. He’d ask for more money, and I wouldn’t answer. Then I’d look at him and he’d look at me; we’d just stand there. We went through this a lot. I’d give him the money, but I’d always say, “Okay, that means

we have to do another album.” He’d say, “I don’t want to do another album.” I’d say, “And I want better people than the last!” So, that’s how those sessions with Milt Jackson and Monk came about. Those were some of our best sessions, because before he’d get the money—this was part of the game—I’d make him think real hard about who he was going to get. Everybody wanted to play with Miles. One of the greatest compliments I ever received came from Miles. He never listened to a playback. He’d just ask me, “Do I want another take?” If I said, “No, it’s good,” he’d say, “Okay, let’s do the next tune.” He respected my judgment, as most of the musicians did.

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Photographs: David Gahr

Were you introduced to John Coltrane's playing prior to his sideman role with Miles?

No. In November of 1955, Miles brought his quintet into the studio, and that's when I first heard Coltrane. Bird had just died a few months earlier, but when I heard Coltrane, even though he played tenor, I couldn't help but think, "Here's the new Bird." His style and ideas were raw, but it was obvious that he was heading in an exciting, new direction. I approached him at that session to sign a contract. When he signed, I figured the usual three or four LPs a year, then take it from there, but two feelings about him surfaced the more I heard him play: First, I realized just how important he was and how quickly things were coming together for him, and second, I was taken

by his demeanor. He was such a great person.

How did Coltrane end up on so many sessions?

The company was doing well, so for a certain period of time while I was supervising sessions, I had every Friday booked at Van Gelder's studio, often without anything in particular in mind. I had stopped going to clubs because I wasn't hearing what I wanted to hear. So, for my own gratification, I'd set up session personnel for the enjoyment of hearing certain musicians stretch out together. Most recordings were just loosely organized jam sessions. That's why most of the tunes are standards—and blues, which sold the records. Our profits from big sellers like Miles and Gene Ammons subsidized the recording of not-so-well-known people. That's how Coltrane was able to record so much, with everyone from Paul Quinichette to Idrees Sulieman to Ray Draper to his many sessions as a leader. But really, he was a beautiful person. That was the underlying thing—he was a beautiful person.

What led to the sale of Prestige to Fantasy in 1971?

It was obvious by that point that good records didn't mean anything. Good jazz just stopped selling. People lost interest in Monk and Miles and musicians like that. All that was selling was the soul jazz. We were selling more records than at any time in the history of the company, but it had become more of a merchandising business than anything. One of the main reasons I sold Prestige was in disgust at three-quarters of the records I was making at that time. I was pissed, man! We also had a problem with distribution. A lot of the independents were being consolidated into the bigger labels, which had their own distribution. Our distributors were going bankrupt left and right, and these people were the backbone of the industry for us.

Another thing that bugged me—really bugged me—was if Prestige or Blue Note discovered a musician and recorded him, bigger companies like Atlantic and CBS were waiting in the wings and would grab him away by offering more money than we ever could. I became totally disillusioned.

Fantasy has done a very nice job of keeping my product on the market. It makes me feel good to know that anybody who wants a Prestige record with half a merit will find it available through Fantasy.

How do you feel about current trends in digital recording and remastering?

Well, I think nice sound is good, but good performance is better. What did it matter that all of these old records had a horrible sound? Do you have to hear some fu-

sion with tremendous sound, with all kinds of crap going on, and eight mikes on the drums? Just give me Max Roach, when you can hardly hear the drums, but you hear the cymbal going *shhhhh*. That other crap is all meaningless. Man, I don't care whether it's on sandpaper or toilet paper! The important question is, is the music really there at all? If it's there, dig it, listen to it, and be thankful it's been preserved. A

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Our first real hit came in the form of *Moody's Mood for Love*, originally an instrumental by saxophonist James Moody.

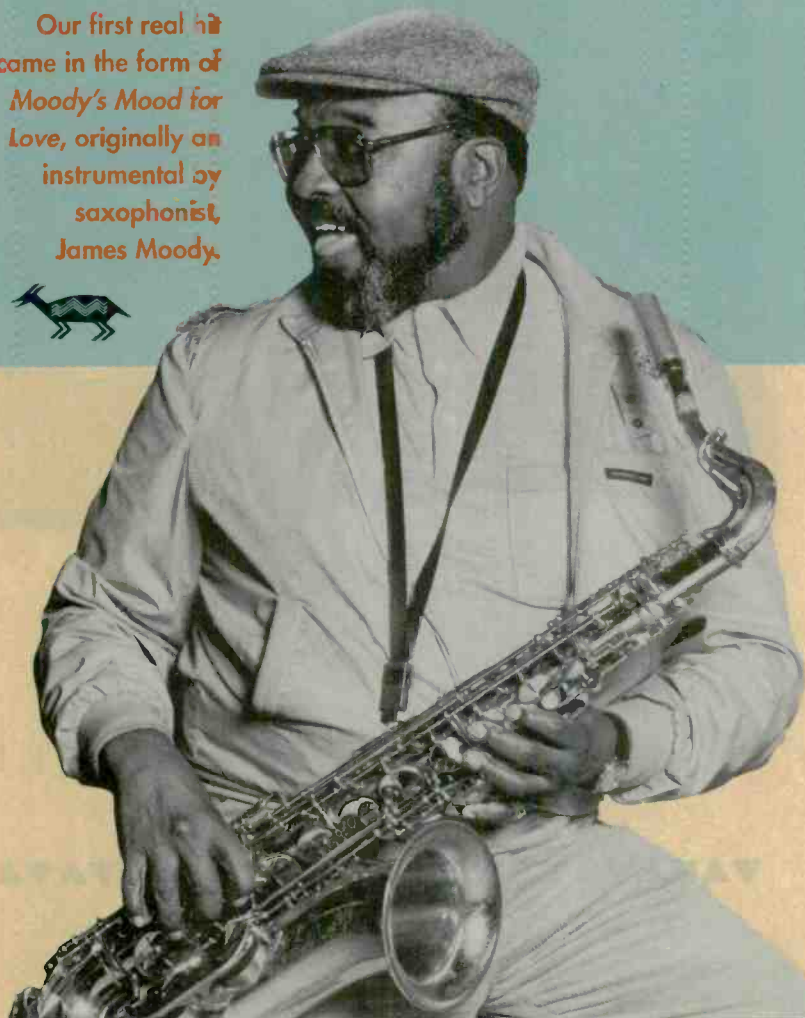




ILLUSTRATION: ELLEN WEINSTEIN



ROY ALLISON

THE
BEST PLACE
FOR YOUR
SPEAKERS?

Anyone who is familiar with my work knows that I've spent a lot of time on the problem of the ways speakers interact with room boundaries (walls, ceiling, floor) and how this affects sound. This work has led my current company, RDL Acoustics, to develop a simple, inexpensive (\$5!) program, *Bestplace*, for Windows or Macintosh computers; it can tell you a great deal about how your speakers will interact with your listening room.

Bestplace can tell you just where to place your speakers in your room to achieve the optimal interaction with room boundaries. You only need to enter three simple measurements; the rest is pretty much a matter of clicking on an on-screen "button" or pressing your computer's "Enter" key.

Let's look briefly at why and how the interaction between speakers and room boundaries occurs. The movement of the cone in a direct-radiator loudspeaker is determined almost completely by its own internal construction and its enclosure, not by

YOUR
COMPUTER
KNOWS!

any external forces. However, the sound power the cone motion produces is very much dependent on the cone's acoustic load—the radiation resistance, specifically. Throughout the lower half of the audible frequency range, nearly five octaves, a loudspeaker's ability to radiate sound power is sensitive to its nearby environment. Therefore, its power response is affected by its lo-

cation in a room. The changes in response with location can be large, both additions to and subtractions from the loudspeaker's free-space power output. The variations with location are not intuitively obvious; they are calculable, but the math is quite tedious to perform without the aid of a computer. That is why we

Roy Allison, founder of Allison Acoustics, joined with Edgar Villchur and others to form RDL Acoustics, in Bellingham, Mass., in 1992.

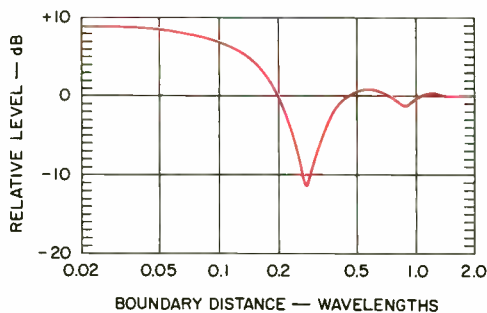


FIG. 1—AUGMENTATION OF THREE ROOM BOUNDARIES WHEN THE SPEAKER IS EQUIDISTANT FROM ALL THREE NEARBY INTERSECTING BOUNDARIES.

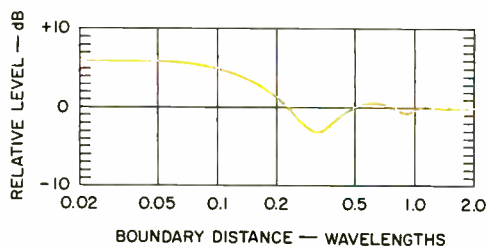


FIG. 2—AUGMENTATION OF TWO EQUIDISTANT INTERSECTING BOUNDARIES, WITH THIRD BOUNDARY REMOVED.

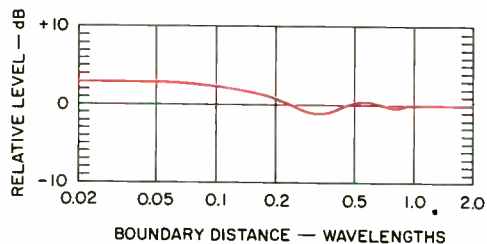


FIG. 3—AUGMENTATION OF A SINGLE NEARBY ROOM BOUNDARY: OTHER BOUNDARIES ARE FAR AWAY.

have developed *Bestplace*, a computer program to calculate and plot a room's augmentation to a speaker's anechoic power response. The only data you must enter in the program are the distances from the center of the woofer cone to the three nearest room boundaries. These numbers determine how the speaker's output will be changed by its environment.

THEORY

Suspended centrally, equidistant from opposite pairs of boundaries in a room, a loudspeaker system's power response is, for practical purposes, the same as it would be in an anechoic chamber. If it is moved down so that the woofer is *very close* to the center of the floor, low-frequency power output increases 3 dB because the reflected pressure, in phase with the direct output from the cone, doubles the radiation resistance. Moving the speaker again, so that the woofer is brought very close to the intersection of the floor and one wall, doubles the radiation resistance again, with another 3-dB increase in power output. If we next move the woofer very close to a three-boundary intersection—i.e., the floor and two walls—we would once again increase the output by 3 dB. Not bad: An eightfold increase in efficiency just by changing the location of the speaker!

But wait. You knew there had to be a catch, and there is. "Very close" in this case means at a very small fraction of a wavelength. This is easy to manage at low frequencies but rapidly gets more difficult as the frequency rises and the wavelength becomes shorter. The formula for wavelength (in inches) is 13,560 divided by the frequency; a 10th of a 30-Hz wavelength is 45 inches, but a 10th of a 300-Hz wavelength is only 4½ inches. It wouldn't be easy to design an enclosure that would put the center of a 10-inch woofer just 4½ inches from each of three intersecting room boundaries.

It is interesting to see the changing effects of boundary reflections on speaker output as the reproduced frequency rises. Waterhouse [1, 2] and Waterhouse and Cook [3] investigated the matter quantitatively, developing the formula described in the sidebar "The Waterhouse Equation." I confirmed their findings experimentally [4, 5] as they apply to loudspeakers in listening room environments, and pointed

THE WATERHOUSE



Waterhouse developed an expression for the ratio of power radiated by a small sound source, located near three mutually perpendicular room surfaces, relative to the power that would be radiated by that same source in free space—that is, with no boundaries nearby. ("Small" in this context means small in comparison with the wavelength of the frequency radiated. The usual direct-radiator woofer becomes progressively "smaller" as the frequency decreases below about 500 Hz.)

This ratio may be either a positive or negative number and is the sum of

out the design consequences. Ballagh [6] and Adams [7] have also made significant contributions.

Figure 1 shows what happens when the woofer is at the same distance from all three boundaries. At 0.1 wavelength, the power response has fallen nearly 2 dB from its maximum of 9 dB; at 0.2 wavelength, it reaches 0 dB, the free-space value, and at 0.28 wavelength, it has plummeted to 11.3 dB below its anechoic value! The power response then rises and ripples a dB or so above and below 0-dB augmentation. For perspective: If the woofer is 24 inches from each boundary, this distance is 0.1 wavelength of 56.5 Hz, 0.2 wavelength of 113 Hz, and 0.28 wavelength of the notch frequency, 160 Hz. The notch is created because the strong reflections combine at the woofer cone's surface in phase opposition to the direct output, reducing the radiation resistance at that frequency far below its free-space value. Above 0.5 wavelength (282 Hz in our example), the perturbations are minor.

Figure 1 shows the worst-case condition—fortunately. Suppose we have a large distance from one boundary, effectively putting the woofer equidistant to only two intersecting boundaries. The resulting

SE EQUATION

eight parts. The first part is the original free-space power, which is augmented (or diminished) by the sum of seven reflected impedances: Three from the individual boundary surfaces, another three from the two-boundary intersections, and a seventh one from the three-boundary intersection. The maximum possible output occurs when the source is at zero distance from the corner, in which case Waterhouse's formula has a value of 1 for each term. The total is then 8, for a gain of 9 dB. Of course, zero distance is not possible in the real world, and the gain drops rapidly as the distance between the source and the corner increases.

augmentation curve then looks like that in Fig. 2, where the maximum gain is 6 dB but the notch depth is reduced to 3 dB. Carrying the process one step further, by having only one nearby boundary, produces the curve in Fig. 3, which shows 3-dB maximum gain and only a 1-dB notch. There is a linear increase of 3 dB each time we bring the woofer close to another boundary but a decidedly nonlinear increase in the notch depth.

SMOOTHING THE AUGMENTATION CURVE

The problem of uneven augmentation would obviously be minimized if we could neutralize one room boundary. There are a few ways this can be done. One way is to mount the speakers in the wall, flush with its surface. Another way, feasible with true bookshelf-size speakers, is to place them in bookshelves surrounded by books. A third way, possible only in very large rooms, is to place them far from a third boundary. This would have to be at least 12 feet from one wall in order to limit the boundary's effect to below 50 Hz.

For one reason or another, none of these options is available to most of us. We must deal with three room surfaces close enough to our speakers to influence their behavior.

We can make that influence a good one, or at least a fairly neutral one, by taking advantage of the fact that the notch from a single boundary is mild. This can be done by making the woofer's distances to the three nearest boundaries as different as is practical, so that—rather than suffering the single crevasse in power output when all the distances are nearly the same—there are several much smaller dips and a smoother curve overall.

In most loudspeaker systems of medium to large size, the woofer is located not far from the center of the front panel, which limits the maximum value attainable for the distance ratio. If the woofer is on the top panel (or, in a floor-standing system, close to the bottom of the front or side panel), the minimum distance between the center of the woofer and one room surface can be as little as 6 or 7 inches. (Three of the four mid-size speakers I've recently designed are like this; the other is a bookshelf model.) Even with this advantage, however, performance should be optimized by evaluating the impact of the other room boundaries.

The *Bestplace* program (based on the Waterhouse formula) was developed to aid in this process, by allowing you to see in advance the effect of possible changes in speaker location. The program plots, in addition to the room augmentation curve for the distances entered, a power output curve for my company's speakers in that location. However, it is made more generally useful by a "Not an RDL speaker" option in the curve menu; only the augmentation curve is plotted with this selection. Figure 4 is a *Bestplace* augmentation curve corresponding to the curve in Fig. 1, obtained when 24 inches is entered for each of the three boundary distances. In Fig. 5, the distances are 10, 36, and 60 inches, yielding a much smoother curve.

If you know the anechoic power output of your speaker (not the on-axis anechoic frequency response), you can add it to the augmentation curve

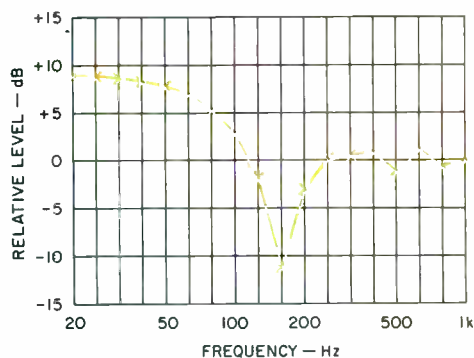


FIG. 4—AUGMENTATION, IN THIRD OCTAVES, FOR A WOOFER 24 INCHES AWAY FROM EACH OF THREE MUTUALLY INTERSECTING BOUNDARIES: PLOT HAS BEEN REDRAWN FROM *BESTPLACE* OUTPUT.

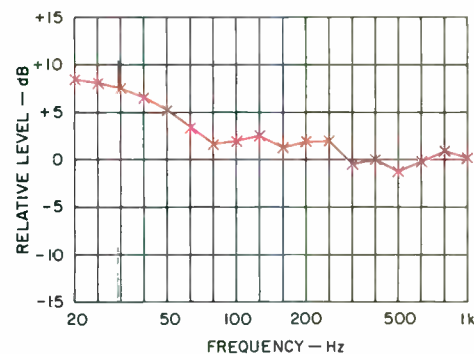


FIG. 5—AUGMENTATION, IN THIRD OCTAVES, FOR A WOOFER SPACED 10, 36, AND 60 INCHES FROM NEAREST ROOM BOUNDARIES: PLOT HAS BEEN REDRAWN FROM *BESTPLACE* OUTPUT.

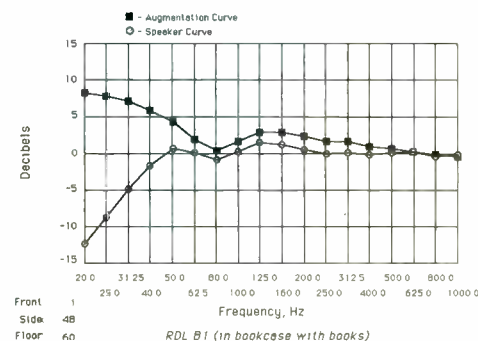


FIG. 6—*BESTPLACE* PRINTOUT, MACINTOSH VERSION, FOR RDL ACOUSTICS BOOKSHELF SPEAKER SURROUNDED BY BOOKS.

PROGRAM NOTES

(1) In the PC version of *Bestplace*, callout numbers for the frequency division (vertical) lines are not centered under the lines but begin just to the right of them. The program just couldn't seem to understand what was really wanted.

(2) All models of physical processes rely on assumptions which may not be fully valid; the model is not the process. One assumption made here is that the room walls are rigid and perfectly reflecting. Unless you live in a brick enclosure, this assumption doesn't completely hold true at very low frequencies. Therefore, the rise you'll often see in a speaker's augmented power response at the low end of its range is no reason for alarm unless it is more than several dB; more than likely, this rise will help compensate for the bass that leaks through the walls.

(3) The IBM version, as described, runs under Windows. On the same disk, for PC users who don't have or can't tolerate Windows, is an alternative version that runs under Lotus 1-2-3. Its file name is Boundary.WK1.

(4) As stated, the smoothest augmentation occurs when the distances to room boundaries are distinctly different. To achieve this, make the longest distance (call it A) as large a multiple of the shortest (C) as is practical. Then a good starting number for the intermediate distance (B) is the square root of the product of A multiplied by C.

(5) The Editor of *Audio* had the program lock up on his PC because it did not have enough memory; this was cured with an expansion.

Bestplace gives you to obtain your speaker's power output in that location. Note that a near-field woofer measurement is not the same as a full-space (or anechoic) total power measurement, on which the Waterhouse formula is based. To convert a near-field measurement to a rough equivalent of full-space power, you must subtract 3 dB below the frequency at which the cabinet's

front panel becomes a half-space baffle. The region of the transition frequency depends on the size of the baffle, but if you gradually phase in the change in level from 300 to 600 Hz, you probably won't be grossly off. As a corollary, if you are making calculations based on flush-mounting your speaker, you can use a near-field woofer measurement directly and not have to make the conversion. Flush mounting (or bookshelf mounting with surrounding books) is essentially a half-space environment to start with, which is what a near-field measurement simulates.

USING THE PROGRAM

When *Bestplace* is loaded in Windows, the welcome screen offers two choices. One button generates a help menu; the other, labelled "OK," clears the screen except for a three-choice menu bar at the top. These choices are "File," "Run Program," and "Help." "Help" brings down the same menu as can be accessed from the welcome screen.

"Run Program" drops a single-item menu labelled "Create graph." Pressing that button brings up a screen headed "Input Graph Parameters." The first selection, "Select a speaker type," scrolls a list of RDL Acoustics models and then the choice of "Not an RDL speaker," the general-use selection. Following the window for speaker choice is one with boxes for entering distances from the center of the woofer to the three closest room boundaries. Once these are entered, you are offered a choice of "Cancel" or "Graph" buttons to press. If you choose "Graph," a graph of boundary augmentation versus frequency will be displayed, based on the distances you have entered. If you selected an RDL model to investigate, its power output in that location will also be shown. (Figure 6 shows such a graph, from the Macintosh version of the program.)

When the graph has been plotted, you can plot a new one for a different combination of distances by clicking on the "Run Program" menu again. The menu bar remains on screen with the graph. You may also press "Help." Or, if you press "File," a drop-down menu offers three choices: "Copy to Clipboard," "Print," or "Exit."

Bestplace is available on diskette in both IBM and Macintosh versions; in the case of IBM, on either 3½- or 5¼-inch diskette. The cost is a nominal \$5, postage included. You may place an order by writing to RDL Acoustics (26 Pearl St., No. 15, Bellingham, Mass. 02019) or, if you want to use a credit card, by phone (800-227-0390). Be sure to specify which version you want. Both versions of the program can be downloaded free of charge from the RDL Bulletin Board (800-227-0391). If you'd like technical papers on room boundary effects, including the Waterhouse formulas and verification measurements, they are available free of charge from the same source. A

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ACOUSTIC RESEARCH LIMITED MODEL 2 PREAMP



The Limited Model 2 preamplifier is one of several components designed by some of the audio industry's top designers for Acoustic Research, a company best known for its pioneering development of acoustic-suspension speakers. An interesting discourse on the AR Limited engineering philosophy in the excellent and informative owner's manual states: "It has long been recognized that hi-fi systems, even the very best, are somewhat lacking when compared to live music." Despite improvements in source material, loudspeakers, and electronics, "Live music still reigns, and audio systems are still second." (I'll drink to that!) Although the Limited series

designs were optimized to play music, AR admits that they do have some slight personality but feels that it isn't imposed on the music.

In the numerous areas still open to audio designers, AR focused the development of the Limited series on two major points:

**TO OPTIMIZE SIGNAL
TRANSMISSION,
THE LIMITED MODEL 2
IS BALANCED
FROM INPUT TO OUTPUT.**

Signal equalization (which is handled in a very nice Limited series equalizer, the Model 6) and signal transmission. In order to optimize signal transmission, the Limited series' engineers decided that balanced operation was to be used wherever possible. Accordingly, the Model 2 is basically a balanced design, from input to output. Two balanced and three unbalanced inputs are provided, but the unbal-

anced inputs are converted to balanced by an input op-amp. Each unbalanced input circuit's gain can be adjusted in three steps by moving jumpers on the main board, yielding overall gain of 0, +6, or +14 dB. This feature helps to equalize the output levels of various unbalanced sources. With the balanced inputs, the overall gain is fixed at about 0 dB.

The four front-panel rotary controls are arranged in two pairs, one pair at the left of the front panel and the other at the right. The functions of these knobs, from left to right, are signal selection, output polarity and muting, balance, and volume. A small red LED at the top center of the panel tells when power is on. On the rear panel are the signal input and output connectors, a ground post, an IEC a.c. power-cord socket, and the a.c. power switch.

Within the Model 2, a large p.c. board takes up the whole internal area. All components—except the four-gang output-level attenuator, the a.c. power switch, and the RCA unbalanced input/output connectors—are mounted on the p.c. board. Power-supply components occupy about one-third of the board area, with the remainder devoted to signal circuitry. High-quality

SPECS

Gain: Balanced main input to line output, 0 dB; single-ended main input to line output (variable), 20 dB max.

Input Impedance: Balanced, 24 kilohms; single-ended, 50 kilohms.

Output Impedance: Balanced, 100 ohms; main single-ended, 50 ohms; tape, 1 kilohm.

Maximum Input and Output: Balanced, 20 V rms; single-ended, 10 V rms.

THD and IM Distortion at Rated Output: 0.002%.

S/N: 110 dB, A-weighted, re: 1 V.

Slew Rate: 20 V/ μ S.

Dimensions: 19 in. W x 4 in. H x 13 in. D (48.3 cm x 10.2 cm x 33 cm).

Weight: 15 lbs. (6.8 kg).

Price: \$2,200.

Company Address: 535 Getty Court, Bldg. A, Benicia, Cal. 94510.

For literature, circle No. 90

parts are in abundant evidence here, and the build quality of this preamp is first-rate.

Circuit Description

I was unable to obtain a schematic diagram of the Model 2 from AR, so the following is not as complete as I would normally report.

Unbalanced inputs are converted to balanced by two PMI OP275 dual op-amps per input pair. With all input signals in high-level balanced form, they are then fed to the input selector. This is a four-section, fully enclosed, and environment-proof switch with silver-plated brass contacts. The selected input is routed to the polarity/muting switch and also to the tape-out buffer. (Another OP275, along with a pair of discrete TO-5 transistors as output devices, is used for each channel's tape output). Signal out of the polarity/muting switch is passed on to the balance and volume controls.

THE OUTPUT SECTION IS FAST, AS SHOWN BY THE SQUARE-WAVE TEST AT 100 kHz.

The volume-control attenuator in the Model 2 is something to drool over. It consists of a four-deck, 59-position switch. Each deck is a p.c. board, with Dale miniature metal-film attenuator resistors mounted on it. Each attenuator divider point is picked up by a wiper contact that is, in turn, connected to a circular track that takes the attenuated signal out to the wiper terminal of the deck. An elegant detent mechanism completes the picture. These attenuators look very much like my memory of units used in the Cello Audio Palette, a totally beautiful piece of gear if there ever was one. I would surely like to have a couple of these attenuators to put in some of my own preamp designs!

Output amplifier circuitry consists of four unity-gain buffers that present high impedance to the output of the volume-control sections and present low impedance and current-driving ability to the main signal outputs. A number of TO-5 metal-can discrete transistors, along with a complementary pair of TO-220 output transistors mounted on heat-sinks, are used in each of the four output sections. In

my opinion, a topological flaw exists in the Model 2's unbalanced output: The two input phases of a channel are not combined, as they would be in an amplifier with differential inputs and outputs; instead, each phase is passed straight on to the corresponding output phase. This means that both phases of a balanced input are not represented in each output phase. This matters because some signal sources (such as the Sonic Frontiers SFD-2 hybrid D/A converter, which I have heard but not reviewed) deliver better sound from their balanced outputs than from their unbalanced output.

Power-supply circuitry starts out with a generously sized toroidal transformer feeding full-wave-rectified secondary output into a pair of 8,200- μ F, 44-V filter capacitors. A pair of high-current integrated-circuit regulators are used in an unusual configuration that employs an external low-noise reference voltage. Four power-supply isolation buffers follow the main voltage regulators. One pair supplies the single-ended input stages; the other pair supplies the four active output-stage circuits. Final delivered supply to the circuitry is +15 and -15 V.

Measurements

Gain and sensitivity data for the Model 2 is enumerated in Tables I and II, respectively.

Frequency response with unbalanced input and output is shown in Fig. 1 for instrument, IHF, and 600-ohm loads. Data shown is for S2 (single-ended input 2) configured for +14 dB gain. Output level was set at maximum. Response in the unbalanced mode was essentially the same for the three input-amplifier gain settings. Further, response in the balanced-in and balanced-out mode was essentially like that

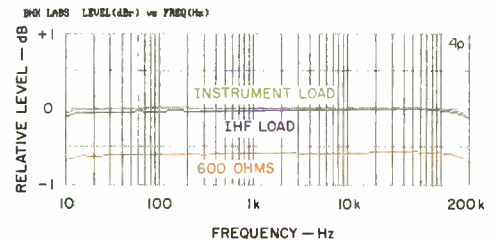


Fig. 1—Frequency response.

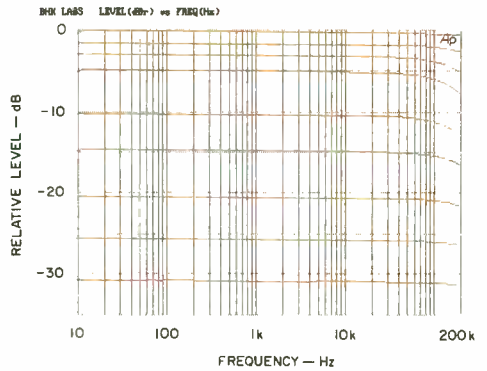


Fig. 2—Frequency response with various volume-control settings.

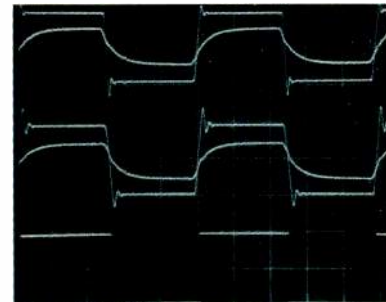


Fig. 3—Square-wave responses for 100 kHz with output polarity at zero (top) and at 180° (middle), and for 20 Hz (bottom).

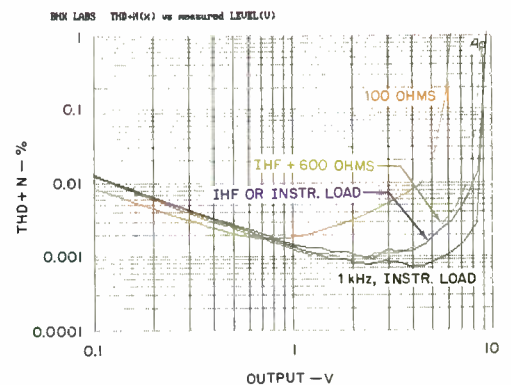


Fig. 4—THD + N vs. level and load. All curves are for 20 kHz except where noted.

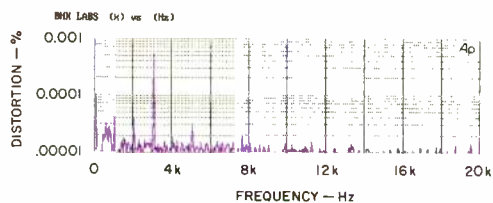


Fig. 5—Spectrum analysis of harmonic-distortion residue; see text.

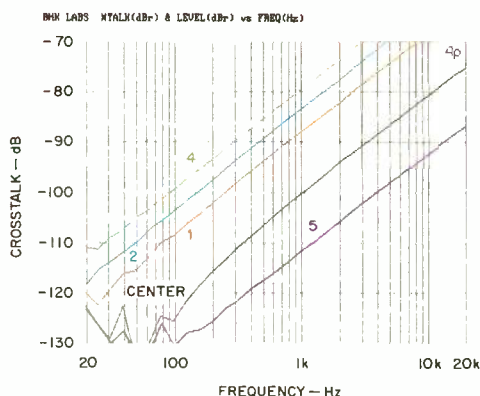
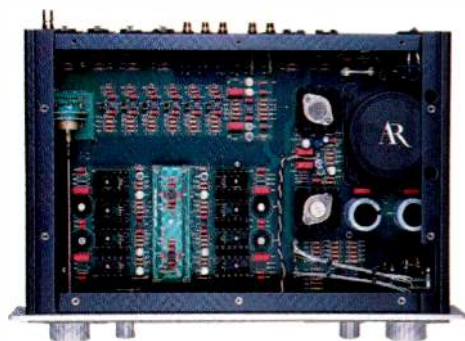


Fig. 6—Crosstalk, left-to-right direction, for various settings of balance control.

TABLE I—Gain, in dB, with various inputs (S1, S2, and B1).

	LEFT		RIGHT	
	INSTR. LOAD	IHF LOAD	INSTR. LOAD	IHF LOAD
Unbalanced In,				
Unbalanced Out				
S1, at 1X, to Main Out	-0.9	-0.13	-0.9	-0.13
S2, at 2X, to Main Out	5.9	5.86	5.89	5.84
S2, at 5X, to Main Out	13.88	13.84	13.86	13.82
S1, at 1X, to Tape Out	5.94	5.11	5.93	5.11
S2, at 2X, to Tape Out	11.93	11.11	11.91	11.09
S2, at 5X, to Tape Out	19.99	19.08	19.88	19.05
Balanced In				
B1 to Balanced Main Out	-0.14	-0.22	-0.14	-0.22
B1 to Unbalanced Main Out	-5.02	-5.09	-5.02	-5.06
B1 to Tape Out	-0.14	-0.97	-0.14	-0.97



shown in Fig. 1, except that the output drop with IHF and 600-ohm loads was twice as great because the balanced outputs' impedance is twice as high.

High-frequency response does vary with the setting of the volume control, as shown in Fig. 2 for unbalanced input/output. Worst-case roll-off looks to be about -2.5 dB at 200 kHz.

Square-wave response for unbalanced input and output in the left channel is shown in Fig. 3. As can be seen, this output amplifier is fast. The top and middle traces are for 100 kHz, and the bottom trace is for 20 Hz. The top trace is with output polarity set to "0°," and the middle trace was made at "180°". The faster, larger traces are for volume at maximum; the smaller, slower traces are with volume attenuated 6 dB. Results shown are for my instrument load; IHF loading didn't change much except to reduce the overshoot slightly. Slew-

ing can be seen in the photo. At the higher output level, 10 V peak to peak, three edges are slewing at about 26 V/μS, and the positive-going edge for the "0°" polarity setting is slewing at a faster rate of 50 V/μS. At the reduced level, 2.5 V peak to peak, rise- and fall-times are close to 100 nS for the "0°" setting and more like 120 nS for "180°".

Total harmonic distortion versus output level for a number of frequencies and load conditions is shown in Fig. 4. These conditions are: 1 kHz with instrument load and 20 kHz with instrument or IHF load (the two curves are identical), with the IHF load paralleled with 600 ohms, and finally, with a 100-ohm load. I'd say the Model 2 would drive about anything!

A spectrum of harmonic-distortion residue for a 1-kHz signal at 5 V out with unbalanced input/output, IHF load, and +14 dB gain is shown in Fig. 5.

I noticed in my pushing and poking about that the tape output buffers would oscillate on the positive peaks when driven to clipping. This also occurred with the input amplifiers when they were driven into clipping. Since the op-amps are the same

EVEN WITH HIGH-GAIN AMPS AND HORN SPEAKERS, HUM AND HISS WILL LIKELY BE INAUDIBLE.

for both functions, this would seem to be an attribute of the op-amps and/or the particular way they are used in the AR Limited Model 2.

Crosstalk between channels was measured in both balanced and unbalanced modes. In all measurements, the crosstalk was essentially a rising 6-dB/octave function, indicating capacitive coupling between the channels. Figure 6 shows the crosstalk in the poorer (left-to-right) direction, using the unbalanced output and unbalanced input S1 configured for unity gain, and with volume at maximum. The numbers on the curves indicate the balance control's setting as the number of clicks to the right of center. As can be seen, all of the control's positions to the right of center degrade the crosstalk except for the one at the extreme right ("5"), which infinitely attenuates output from the left channel. Results in the right-to-left direction were some 5 to 8 dB better than those in Fig. 6. Results in the balanced mode were similar to those shown for unbalanced signals.

Output noise for unbalanced and balanced modes, and the three unbalanced input-amplifier gains (1X, 2X, and 5X), are listed in Table III. As can be seen, the Model 2 has very low output noise and will likely have inaudible hum and hiss, even with high-gain power amplifiers and horn speaker systems. The IHF signal-to-noise ratios are listed in Table IV.

A few final measurements: The a.c. power-line draw was about 220 mA. Output

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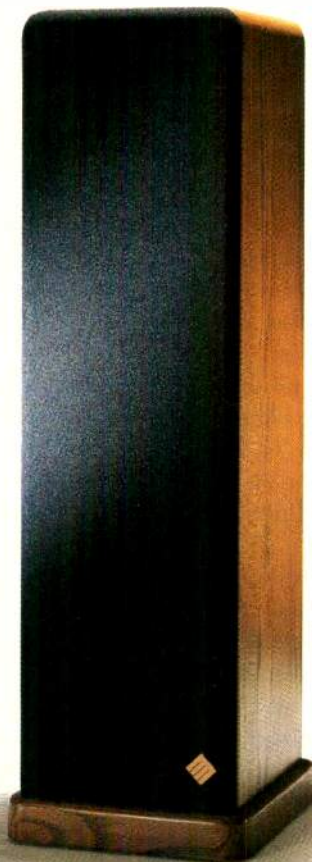
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impedance at the unbalanced outputs was about 43 ohms and was double that at the balanced XLR outputs. Input impedance for the balanced inputs was about 35 kilohms with volume at maximum and 38 kilohms with the volume set for about -20 dB. Input impedance for unbalanced inputs was about 50 kilohms and was constant with volume-control setting.

Use and Listening Tests

Equipment in my system during the review period included an Oracle turntable fitted with a Well Tempered Arm and Spectral Audio MCR-1 Select moving-coil pickup used with a Vendetta Research SCP-2C pre-preamp. Krell MD-10 and PS Audio Lambda CD transports fed Sonic Frontiers' SFD-2, Sentec's DiAna, and other (experimental) D/A converters. Other signal sources included a Nakamichi ST-7 tuner, a Nakamichi 250 cassette deck, and a Technics 1500 open-reel recorder. Preamplifiers used included a Forssell line driver, a First Sound Reference II, and a unit from Quicksilver Audio—as well as no preamplifier at all. Power amplifiers on hand were a Crown Macro Reference and a pair of Quicksilver M135s. Loudspeakers used were B & W 801 Matrix Series 3s augmented with a Klipsch SW15 powered subwoofer.

As is frequently the case when I receive a new piece of gear, I loaned the Model 2 to a friend to try out for a while and get some hours on the unit. He reported favorably on the Limited Model 2's build quality and sound.

When I started formally evaluating the sonics of the Model 2, I had been using the excellent Sonic Frontiers SFD-2 D/A converter feeding balanced outputs into a Forssell tube line-stage preamp modified to have balanced inputs. This combination, driving either my Quicksilver M135s or the Crown Macro Reference, had been delivering extremely good sound with CDs. Best sound from the SFD-2 definitely comes from the balanced outputs, so when I started evaluating the Model 2, I used the balanced inputs for the SFD-2. Because I had determined during measurements that the Model 2 does not combine both input phases of a balanced input into the unbalanced outputs, I coupled the balanced outputs into the Macro Reference, with its in-

puts configured for balanced. Wow! This combination sounded exceedingly good. Definition and detail were of a high order, soundstaging was excellent, and there was an overall sense of musical believability. Although bass quality and definition were very good, bass extension and impact were not quite as good as when using the Forssell line unit driving the Crown in unbalanced input mode. All in all, the Model 2 is an excellent sonic performer. Operation was flawless, and there were no unexpected noises.

I do have a few nits, however. First is the aforementioned lack of differential-amplifier action in the output amplifier. Second, in this sample, the otherwise incredible volume attenuator had more rotary-shaft backlash in the middle of its rotation than at the ends.

In conclusion, the AR Limited Model 2 line preamp is a clear winner. Do go out and audition this one.

Bascom H. King

TABLE II—Sensitivity, in mV, with various inputs (S1, S2, and B1), for IHF load.

	LEFT	RIGHT
Unbalanced In, Unbalanced Out		
S1, at 1X, to Main Out	507.4	507.4
S2, at 2X, to Main Out	254.6	254.8
S2, at 5X, to Main Out	101.6	101.9
S1, at 1X, to Tape Out	277.6	277.8
S2, at 2X, to Tape Out	139.2	139.5
S2, at 5X, to Tape Out	55.6	55.8
Balanced In		
B1 to Balanced Main Out	512.6	512.6
B1 to Unbalanced Main Out	895.1	895.1
B1 to Tape Out	558.8	559.3

TABLE III—Output noise levels, in μ V, with various inputs (S1, S2, S3, and B1), volume-control positions (counterclockwise, worst case, and clockwise), and bandwidths.

	LEFT			RIGHT		
	CCW	WC	CW	CCW	WC	CW
Unbalanced In, Balanced Out						
S1, at 1X						
Wideband	25.3	56.1	21.2	21.2	57.5	19.3
22 Hz to 22 kHz	4.0	12.4	3.9	3.5	12.6	5.0
400 Hz to 22 kHz	3.3	11.6	3.4	3.3	12.0	3.5
A-Weighted	2.5	9.2	2.7	2.6	9.5	2.8
S2, at 2X						
Wideband	25.3	55.5	26.1	21.0	56.9	25.4
22 Hz to 22 kHz	4.0	12.7	5.5	3.5	12.7	5.5
400 Hz to 22 kHz	3.3	11.7	4.1	3.3	12.0	4.1
A-Weighted	2.6	9.2	3.2	2.6	9.5	3.3
S3, at 5X						
Wideband	25.3	55.2	54.1	21.1	56.7	54.1
22 Hz to 22 kHz	4.0	13.0	7.4	3.5	13.0	8.1
400 Hz to 22 kHz	3.3	12.0	7.0	3.2	12.4	7.1
A-Weighted	2.6	9.4	5.5	2.6	9.8	5.5
Balanced In, Balanced Out						
B1						
Wideband	22.3	63.5	26.4	22.6	59.6	26.7
22 Hz to 22 kHz	4.6	17.5	5.7	4.7	18.2	5.8
400 Hz to 22 kHz	4.4	16.7	5.4	4.5	17.2	5.6
A-Weighted	3.4	13.2	4.2	3.6	13.5	4.3

TABLE IV—IHF S/N, in dB, with various inputs (S1, S2, S3, and B1), for worst-case position of volume-control.

	LEFT	RIGHT
Unbalanced In, Balanced Out		
S1, at 1X	105.0	105.0
S2, at 2X	94.6	94.2
S3, at 5X	96.9	96.7
Balanced In, Balanced Out		
B1	101.2	101.0



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EPOS ES11 SPEAKER



Epos Acoustics, a small loudspeaker company owned by the larger British firm Mordaunt-Short (which in turn is a member of the much larger TGI group of companies that includes Tannoy, Goodmans, and KEF), was founded by designer Robin Marshall in 1983. Epos (a Latin noun from the Greek, meaning an epic poem) currently has two speakers in its line, the compact ES11 and the larger, 8-inch two-way ES14, which has been the very successful, principal system of Epos since 1986. These two systems are to be

joined shortly by the ES25, a full-range floor-standing model.

The ES11, which was added to the Epos line in 1990, is a small two-way vented system utilizing a 6½-inch woofer and a 1-inch dome tweeter. Both drivers are custom designed and manufactured by Epos, whose goals were to create an affordable, well-balanced design with high-end aspirations. Among the ES11's novel design features, the most novel is the bass driver's frame, which is an integral part of the loudspeaker's front panel. Other features include an

**THE SIMPLICITY OF THE
ES11'S CROSSOVER
IS SAID TO ENHANCE
DETAIL RESOLUTION
AND WOOFER CONTROL.**

unusual cabinet assembly, an extremely simple crossover network (two parts!), and a bass driver that has a phase plug instead of a dust cap.

The frame of the ES11 woofer is, as I've just noted, an integral part of the front panel and is injection-molded in one piece. According to Epos, "This insures that the coupling between the bass driver and the baffle is precisely and consistently defined, unlike conventional systems where the coupling is influenced by the varying tightness of fixing screws." The molding is very stiff and inert, minimizing vibrations of the front panel. Presumably, replacing the woofer requires changing the whole front panel. The tweeter is separately mounted to the front panel. The rear panel, which contains the input terminals, crossover, and reflex port, is also an injection-molded part.

The front and rear panels are held in place by four long hex-head bolts, located near the cabinet's corners, which pass

SPECS

Type: Two-way, vented-box, compact system.

Drivers: 6½-in. cone woofer and 1-in. dome tweeter.

Frequency Response: 60 Hz to 20 kHz (tolerance not stated).

Sensitivity: 87 dB at 1 meter, 2.83 V rms applied.

Crossover: 6-dB/octave high-pass on tweeter only (frequency not stated).

Impedance: 8 ohms nominal.

Recommended Amplifier Power: 25 to 75 watts per channel.

Dimensions: 14¾ in. H x 8⅝ in. W x 9⅞ in. D (37.5 cm x 22 cm x 25 cm).

Weight: 17.6 lbs. (8 kg) each.

Price: \$895 per pair; available in black ash, walnut, or mahogany; foam grilles for earlier models, \$50 per pair; speaker stands, \$200 per pair.

Company Address: c/o Music Hall, 108 Station Rd., Great Neck, New York, 11023.

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through the front panel and engage threaded inserts in the rear panel. Wood bracing is used internally for added strength. When assembled, and all four bolts tightened, the cabinet's 1-inch-thick medium-density fiberboard walls are sandwiched between the front and rear panels, forming a very strong and vibration-free structure.

The woofer's cone is thermoformed from a polymer material and shaped to optimize on- and off-axis response. The surround is a synthetic high-loss rubber that minimizes mechanical travelling waves on the cone's surface. The ES11's woofer has a phase plug protruding from the center of the cone rather than the more usual dust cap. The phase plug is stationary and is attached to the woofer's pole piece. The voice-coil and attached cone move fore and aft around the plug. The bullet-shaped phase plug is said to provide better polar response than is possible with a dust cap. The roll-off of the woofer's upper frequency has been carefully tailored so that the use of a low-pass crossover filter is not required.

The ES11 tweeter dome is fabricated from an aluminum alloy and is suspended by a polyamide material. The dome is acoustically loaded by a separate rear air chamber, while the voice-coil utilizes a magnetic fluid said to improve reliability and reduce dynamic compression.

The crossover of the ES11 is a "minimalist" design. It contains only two components, a high-quality series capacitor and a parallel resistor, which form the high-pass filter driving the tweeter. The simplicity of the crossover is said to enhance the loudspeaker's ability to resolve fine detail, and the absence of a low-pass filter on the woofer allows better control of its motion by the power amplifier.

The ES11's input connections, which can be bi-wired, do not use the conventional double set of dual five-way binding posts with jumpers. The back panel contains only two sets of flush-mounted double-banana input holes. Single (i.e., not bi-wire) connections are accommodated by

the inclusion of two short banana-plug adaptor links, one for positive and the other for negative. Each link has a single banana plug on each end, one plain and the other containing a piggyback banana socket. In either configuration, bare wire connection capability is not supported; banana plugs must be used! However, Epos does provide an extra set of double-banana plugs that can be attached to bare wires and then used to connect to the loudspeakers.

Measurements

The on-axis anechoic frequency response of the ES11 is shown in Fig. 1. Measurements were taken at 2 meters, halfway between the woofer and tweeter. With 5.66 V rms applied, the result was referenced back to 1 meter. A combination of elevated free-field and ground-plane measurements was used to derive the curve.

The overall curve in Fig. 1 is quite smooth, fitting a fairly tight 4.7-dB window (+1, -3.7 dB referenced to 1 kHz) from 100 Hz to 20 kHz. The bass response is down 3 dB (from the 100-Hz level) at 56 Hz and down 6 dB at 47 Hz. Below 50 Hz, the response rolls off at 24 dB/octave, as is typical of vented boxes. There is a mild but broad peak centered at 800 Hz and a slight, downward shelf at high frequencies. Except for slight irregularities, the curve is quite smooth. The speaker's foam grille does not affect the response much at all. This system is one of few that will not be sonically compromised if listened to with the grille on. Averaged over the range from 250 Hz to 4 kHz, the sensitivity of the EP11 was 85.5 dB, 1.5 dB below the 87-dB rating. The right and left speakers were matched within a close ± 0.5 dB.

THE EPOS ES 11 IS ONE OF THE FEW SPEAKERS WHOSE GRILLE DOESN'T COMPROMISE ITS SOUND.

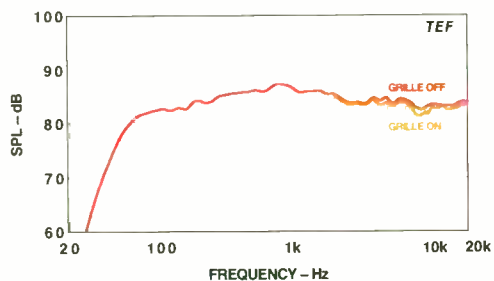


Fig. 1—One-meter, on-axis frequency response.

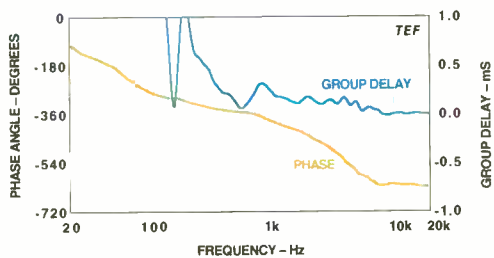


Fig. 2—On-axis phase response and group delay.

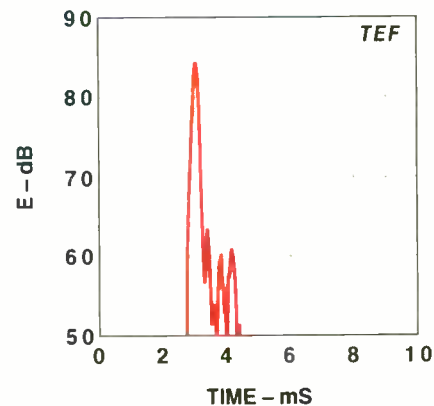
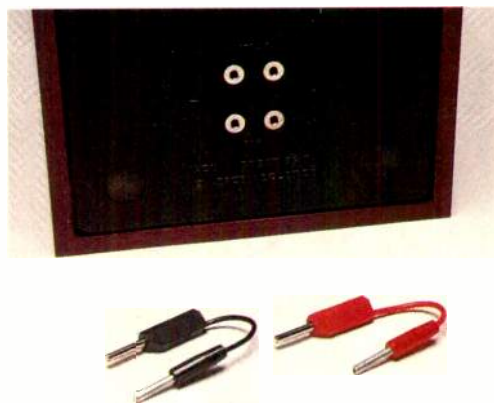


Fig. 3—Energy/time response.



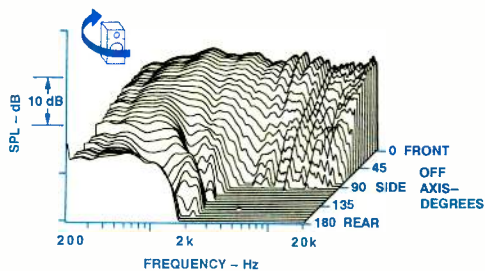


Fig. 4—Horizontal off-axis frequency responses.

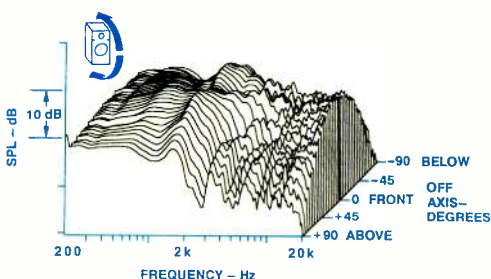


Fig. 5—Vertical off-axis frequency responses.

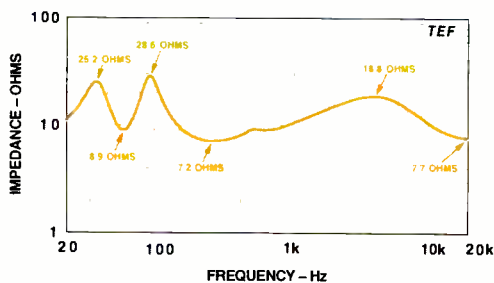


Fig. 6—Impedance.

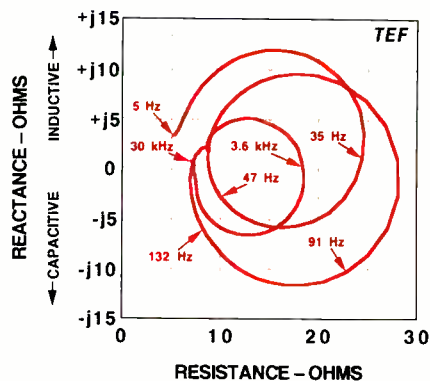


Fig. 7—Complex impedance.

The phase and group-delay responses of the ES11, referenced to the tweeter's arrival time, are shown in Fig. 2. The phase curve is well behaved and rotates an additional 240° between 1 and 20 kHz. The group-delay curve shows a fairly low offset of about 0.15 mS between the midrange and treble. The deviations between 100 and 200 Hz are due to minimum-phase variations in the amplitude response and would disappear if the response were flat through this range.

The ES11's energy/time response is shown in Fig. 3. The test parameters accentuate the speaker's response between 1 and 10 kHz, which includes the crossover region. The main arrival, at 3 mS, is very compact but is followed by minor delayed responses, about 23 dB down from the main peak and extending 1.5 mS after the main arrival.

Figure 4 reveals the horizontal off-axis frequency responses; the bold curve at the rear of the graph is the on-axis response. The off-axis horizontal response is very uniform. In the primary ($\pm 15^\circ$) listening window, the response is extremely uniform, staying within ± 1 dB of the on-axis curve all the way to 20 kHz.

The vertical off-axis frequency responses are displayed in Fig. 5; the bold curve in the center of the graph (front to rear) is on axis. The aberrations in the range from 5 to 7 kHz indicate that the crossover frequency is at a high 6 kHz. Because the woofer and tweeter are separated by $5\frac{1}{4}$ inches (center to center), a significant 2.3 wavelengths at crossover, the vertical off-axis response in the crossover range is quite rough and narrow. The curves in Fig. 5 verify the narrowness of the vertical response at crossover and show that the response is significantly irregular at angles of only $\pm 5^\circ$.

In Fig. 6, the ES11's impedance magnitude, a high minimum im-

pedance of 7.2 ohms occurs at 250 Hz and a high maximum of about 29 ohms occurs at 85 Hz. The curve's maximum-to-minimum variation is about 4 to 1 (28.6 divided by 7.2). Even though this variation is fairly large, the high minimum impedance of the ES11 ensures that the speaker will not be very sensitive to cable resistance. Cable series resistance should be limited to a maximum of about 0.11 ohm to keep cable-drop effects from causing response

STRONG MAXIMUM OUTPUT ABOVE 60 Hz ALLOWS THE ES11s TO BE USED BY THEMSELVES OR WITH A SUBWOOFER.

peaks and dips greater than 0.1 dB. For a typical run of about 10 feet, you can use low-inductance cable of 16 or 18 gauge.

The complex impedance, plotted from 5 Hz to 30 kHz in Fig. 7, is well behaved and exhibits no extraneous resonances. The impedance phase (not shown) reached a maximum angle of $+45^\circ$ (inductive) at 64 Hz and a minimum angle of -40° (capacitive) at 112 Hz. Even though these angles are fairly large, the ES11 will not be a problem for any amplifier (even for two in parallel), because the minimum impedance is quite high.

When subjected to a high-level sine-wave sweep, the cabinet of the ES11 was mostly vibration-free. There were some minor wall resonances of the top and side panels in the 370 to 390 Hz range, and slight activity of the rear panel from 460 to 480 Hz. The linear travel of the woofer was about 0.4 inch, peak to peak, with reasonable distortion; maximum travel was somewhat longer. The woofer overloaded quite gracefully. No dynamic offset was noted.

Minimum excursion occurred at 55 Hz, the frequency of the ES11's vented-box resonance. Cone displacement was reduced by about 50% after the port was closed. Vent noise at and near the box resonance was fairly low.

Figure 8 shows the three-meter room response, with both raw and sixth-octave smoothed data. The ES11 speaker was in

the right-hand stereo position, aimed toward the main listening position, and the test microphone was at ear height (36 inches), at the listener's spot on the sofa. The system was driven with a swept sine-wave signal of 2.83 V rms (corresponding to 1 watt into the rated 8-ohm impedance). The direct sound and 13 ms of the room's reverberation are included. If you exclude room-effect dips at 325 and 425 Hz, the averaged curve fits a tight, 7.5-dB window. Above 2.1 kHz, it fits an even tighter window of about 4 dB.

Figure 9 shows the E_1 (41.2-Hz) bass harmonic distortion with input power ranging from 0.05 to 50 watts (note that 20 V rms generates 50 watts into the rated 8-ohm load). The second harmonic reaches a moderate level of 10.6%, while the third attains a very high 51%. Higher harmonics include an 8.1% fourth, a high 22% fifth, and a 3% sixth. With a 50-watt input, the ES11 reaches a marginally usable 1-meter SPL of 90 dB at 41.2 Hz.

Because the E_1 distortion was very high, a result of being significantly below the ES11's passband, the harmonic distortion of a higher frequency, B_1 (61.5 Hz), was measured and is shown in Fig. 10. As be-

**THE SOUND WAS SMOOTH
AND WELL BALANCED,
WITH A TOUCH
OF FORWARDNESS.**

fore, the third harmonic predominates but only reaches a moderate 7% at full power. Other harmonics are all low, 0.6% or less. The second harmonic, which reaches only 0.4%, is hidden behind the 61.5-Hz fundamental's bleed-through ridge at the left of the graph. With 50 watts in, the Epos reached a fairly usable 1-meter SPL of 98 dB at 61.5 Hz.

In Fig. 11, the bass harmonic distortion for A_2 (110 Hz), the predominant distortion is a low 1.9% second harmonic and 2.4% third. Higher harmonics are quite low, 0.7% or less.

The A_4 (440-Hz) distortion (not shown) rose only to the low level of 3% second harmonic. Higher harmonics were below

the noise floor of my measuring gear.

Figure 12 displays the IM distortion versus power, created by tones of 440 Hz (A_4) and 41.2 Hz (E_1) of equal level. The IM distortion rises to the fairly high level of nearly 19% at full power. The woofer handles both tones of this IM test, which contributes to this speaker's high level of intermodulation.

The ES11's short-term peak-power input and output capabilities are shown in Fig. 13. The peak input power was calculated by assuming that the measured peak voltage was applied across the rated 8-ohm impedance.

The peak input power rises from 10 watts at 20 Hz and, after minor undulations at 80 and 120 Hz, reaches a local maximum of about 1,500 watts at 250 Hz. After falling to 830 watts at 400 Hz (where the woofer exhibited a harsh buzzing sound), the peak input power rises smoothly to a healthy 6,000 peak watts at frequencies above 1.6 kHz.

As can be seen in Fig. 13, the ES11's maximum peak output SPL with room gain rises very rapidly from an unusable 71 dB at 20 Hz to reach a very usable 107 to 110 dB between 65 and 160 Hz. After reaching a peak of 116.5 dB at 250 Hz and falling slightly to 115 dB at 400 Hz, the output rises into the healthy range of 120 to 123 dB above 600 Hz. A pair of ES11s, operating in unison in a typical listening room, can attain even higher levels in the bass range. The strong maximum output above 60 Hz suggests that these speakers can be used either by themselves or as satellite systems with a subwoofer.

Use and Listening Tests

After working with some large systems recently, it was nice to handle a pair of speakers that I could hold under each arm at the same time. The ES11s were supplied to me with sturdy metal stands, which are optional and

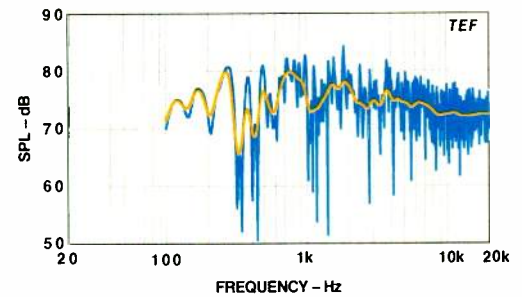


Fig. 8—Three-meter room response.

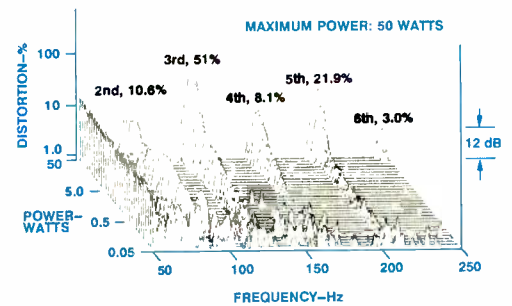


Fig. 9—Harmonic distortion for E_1 (41.2 Hz).

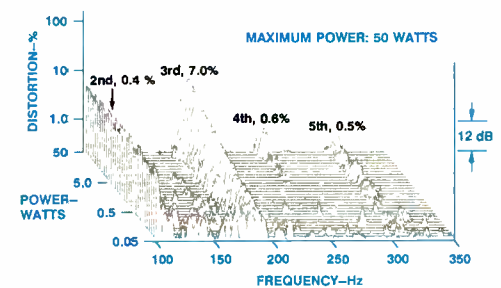


Fig. 10—Harmonic distortion for B_1 (61.7 Hz).

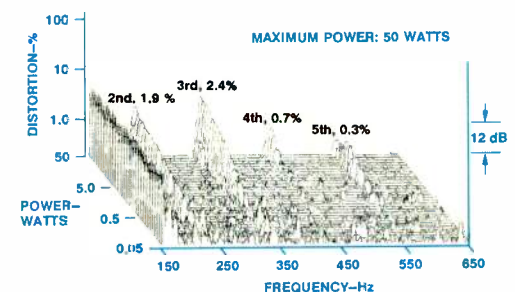


Fig. 11—Harmonic distortion for A_2 (110 Hz).

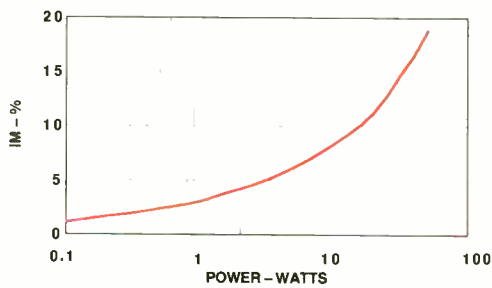


Fig. 12—IM distortion for A_4 (440 Hz) and E_1 (41.2 Hz).

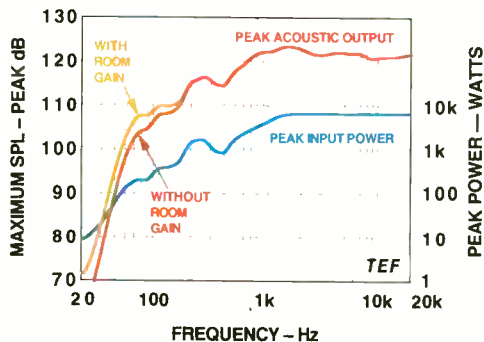


Fig. 13—Maximum peak input power and sound output.

have to be assembled. I chose to use my own metal stands, which are only about 1 inch taller and have spikes on the bottom.

The operating manual is brief but thorough and consists of four $4\frac{1}{4} \times 5\frac{1}{2}$ -inch pages. Topics include power requirements, stands, positioning, connections, breaking in, and warranty. Epos points out that the ES11 was designed to be placed fairly close to the rear wall, within 20 to 30 cm (about 8 to 12 inches), for proper bass weight and definition. For some listening, I set the



ES11s closer to the rear wall than I usually do, about a foot in front of the bookshelves which line the rear of my listening room. I did most of my listening, however, with the speakers in my customary positions, well away from the rear walls.

My review systems were supplied in a very attractive walnut finish. Although Epos specifies that the finish is a veneer, it looked like solid wood; with the front panel removed, I could see what appeared to be unfinished walnut inside the cabinet. Construction and appearance were excellent. When first received, one system had a slight air leak at a point on the front panel's periphery. Tightening the four long bolts that hold the front panel to the cabinet sealed the leak.

My listening equipment consisted of the Krell KRC preamp and KSA-250 amp driving the ES11s through Straight Wire Maestro cabling. My reference speakers were B & W 801 Matrix Series 3s, while Onkyo and Rotel CD players provided source material. Listening was done in the regular (not bi-wired) configuration.

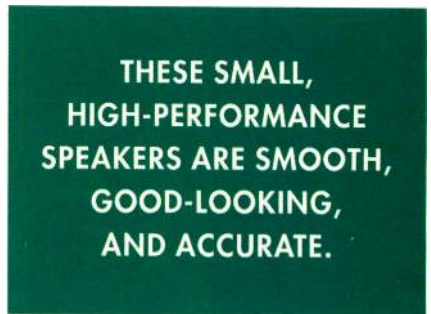
First listening revealed the ES11s to have a well-balanced, smooth sound, with a touch of forwardness, and significantly less bass than the reference B & Ws. Sensitivity was essentially the same as that of the references, and the two systems produced a similar overall balance and tone (excluding the low bass).

Female vocals, such as Clair Marlo on *Let It Go* (Sheffield Lab CD-29) and Trisha Yearwood on *The Song Remembers When* (MCA MCAD-10911), were very natural. There was no harshness, glare, or undue high-frequency emphasis. In fact, the overall high-frequency reproduction of the ES11 was quite similar to the 801's in level, smoothness, and extension.

On more dynamic material such as Bob Mintzer's jazz on *One Music* (dmp CD-488), the ES11s did quite well in handling high-level percussion transients and complex passages. The low-end kick and bass punch of the 801s was completely missing, however. Even though the low bass was

quite attenuated, the ES11s still had enough bass to be satisfying. At very high levels on this disc, the ES11s did start sounding somewhat congested; some audible modulation of the mids could be heard when high-level bass was present.

I also did some listening using Velodyne's F1500R subwoofer as an adjunct to the ES11s. (The F1500R replaced my F1500; the "R" version includes a remote. Having remote control of level and of bass



on/off is a super addition!) The ES11s worked extremely well as satellites. With low bass added, the overall sound competed quite well with the 801s.

On the pink-noise stand-up/sit-down test, the ES11s exhibited significant tonal changes in the upper midrange when I stood up. Their spectral balance on pink noise was quite good but sounded slightly more forward than the 801s did and had significantly less bass. Smoothness, although not quite up to the B & Ws' standards, was nevertheless quite good. On third-octave band-limited pink noise, the ES11s did not have any usable output in the 20-, 25-, and 31.5-Hz bands. Although the output was just barely usable at 40 Hz, it was quite usable at 50 Hz. At 63 Hz and above, the ES11s could generate sufficient levels of clean bass.

On relatively sedate classical music, such as Boccherini's Cello Concertos performed on period instruments (Sony Classical SK 53121), the ES11s were quite open sounding, albeit a shade forward in the presence range. Stereo focus and lateral imaging were exemplary. Coloration was quite low, maybe due in part to the rigidity of the enclosure.

In summary, the ES11s demonstrated quite good performance for their size and price. They should be seriously considered by anyone who desires small, high-performance loudspeakers that are also accurate, smooth, and good looking. *D. B. Keele, Jr.*



Air guitar a little flat?



REMEMBER WHEN YOU WORE BLUE JEANS, had long hair, and played the air guitar? Hi-Fi was fun and music was your passion. Then you became successful and had money to burn. You bought an amplifier that added *warmth*, a preamp with *ambience*, and speakers that gave you *depth*. Isn't it about time you got back to the *music*?

PEOPLE NEED MUSIC. Music is important. Exploring the world of music in the comfort of your own home is therapeutic. It will help you relax, stimulate your imagination, change your mood, and provide entertainment and pleasure for your whole family. **A SOUND INVESTMENT.** At our innovative factory in Scotland, we produce the most advanced and best sounding hi-fi. Skilled and

dedicated people and our unique single-station-build philosophy ensure a standard of construction and reliability simply not possible on a production line. Our modular approach to system and product design allows you to improve or expand your system over time in affordable steps. And, with your Linn retailer on hand to provide assistance long after your initial purchase, you can

expect your hi-fi to last a lifetime. People who love music have built our business, so we look after them. **MUSIC FOR YOUR LIFE.** To learn more about Linn Hi-Fi and the many ways in which Linn can make music a more important part of *your* life, phone Audiophile Systems, Ltd., our U.S. distributor, at 1-800-546-6443.

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AUDIOCONTROL C-101 SERIES III EQUALIZER/ANALYZER



Equalizers and analyzers are AudioControl's stock in trade. The venerable C-101, now in its third (Series III) incarnation, combines both in a relatively small, tasteful package. More important, it offers exceptionally good performance for the genre, especially vis-à-vis noise and distortion, a graphic equalizer's twin Achilles' heels. Consider its competitive price, five-year warranty, and inclusion of an excellent infrasonic filter, and you'll find that the C-101 Series III is a big winner in the cost/performance derby.

The C-101 Series III integrates a 10-band graphic equalizer and a defeatable infrasonic (a.k.a. "subsonic") filter with a 10-band real-time analyzer and pink-noise generator. The system includes a "lab grade" microphone matched to the analyzer. (AudioControl advises that the microphone be used *only* with the C-101 and that no other microphone be substituted for it.) The mike is

on a 20-foot cable that terminates in a phone plug and fits into a jack at the front panel's lower left corner. Above the jack is a "Display Level" control that adjusts the analyzer gain to utilize the display range to its fullest.

At the top left corner is a "Power" switch, but since the C-101 consumes only 10 watts, it can be left on and plugged into a switched outlet of an amplifier or receiver. An unswitched outlet (200-watt maximum rating) on the C-101's back panel replaces the switched outlet you've used for the equalizer and is then switched on and off by your amplifier or receiver.

Four pushbuttons to the left of the display operate the analyzer; a bank on the right controls the equalizer. The top left button ("Display") quenches the dancing lights when you tire of their antics. "Pink Noise" activates an internal pink-noise generator and automatically substitutes the test signal for the normal feed to your amp.

The "2dB/4dB" button controls the analyzer display range, 2 dB per LED for a 16-dB total range or 4 dB per LED for a 32-dB range. "Slow/Fast" adjusts the analyzer response time; "Slow" gives a time-averaged reading that's useful when equalizing loud-speaker response with the pink-noise signal, while "Fast" lets you watch the music's antics.

From top to bottom, on the right of the display, are the four pushbuttons for the

**THE SLIDER SETUP
HELPS YOU EQUALIZE
BOTH CHANNELS ALIKE
OR EACH DIFFERENTLY.**



equalizer. "Equalize" engages or bypasses the 10-band equalizer, "EQ Recording" routes equalized signals to the tape output jacks so the C-101 can be used to equalize a recording, "Tape Monitor" replicates the tape monitor function of the amplifier when the C-101 is installed in a tape monitor loop, and "Subsonic Filter" engages or bypasses the internal 18-dB/octave Chebyshev high-pass filter.

Twenty sliders occupy the right half of the panel. These are arranged in adjacent left/right pairs to facilitate controlling both channels equally (a good idea to avoid the image smearing that can occur when left and right response and phase are modified differently). AudioControl's arrangement provides the best of both worlds. If you



choose to equalize differently to correct different response anomalies in the two speakers, you can do so; if you want to control both in like manner, it's also easy to ensure that you do. The 10 equalizer and analyzer sections are spaced on octave centers from 32 Hz to 16 kHz, which, considering the effective range of both sections and of the characteristics of human hearing, is eminently sensible.

The back panel is simple: Main input/output pairs for connection in a tape monitor loop (or, if you prefer, between preamp and power amp), and tape input/output pairs to connect with the tape recorder you wish to pre-equalize (and/or to replace the tape monitor loop lost to the equalizer when it occupies that position in the main signal path). Between these sets of gold-plated RCA jacks is a small control that adjusts the pink-noise level. At the extreme right are the power cord, the line

fuse, and the unswitched convenience outlet mentioned above.

Recommended hookups are given in AudioControl's "Operating & Enjoyment Manual," which is the finest audiophile operating manual I've seen. Its lighthearted style is easy to read, and it's packed with useful, *accurate* information on how to use an analyzer and equalizer for best results. It doesn't claim that the C-101 makes a silk purse from a sow's ear system (no equalizer/analyzer does that); it does encourage you to experiment with loudspeaker placement (and suggests guidelines) *before* resorting to equalization, and it warns against excessive boost. It's even honest enough to warn that you probably *won't* like the sound of your system after equalizing it for "flat" response. Refreshing!

Circuitry

The C-101 Series III contains two main circuit boards. One extends across the rear of the front panel and supports the main controls, and the other carries all active circuitry and the power supply except for the main transformer. The boards interconnect with four ribbon cables, soldered directly to the boards and affixed with adhesive. The boards are single-sided and use lots of jumpers but impressed me as being of good quality. With the exception of some flux residue, construction appeared to be good.

The equalizer is designed around five 4560 wideband dual op-amps for each channel. Each 4560 handles two non-adjacent control bands. The circuitry is in the front right corner, as far as possible from the power transformer (which is mounted near the rear of the left side wall). Solid-state switches control signal routing to minimize the length of the audio path.

Measurements

Although I measured both channels, I've based the curves and data exclusively on the left. Right-channel characteristics

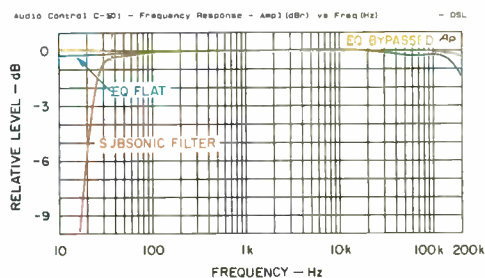


Fig. 1—Frequency response.

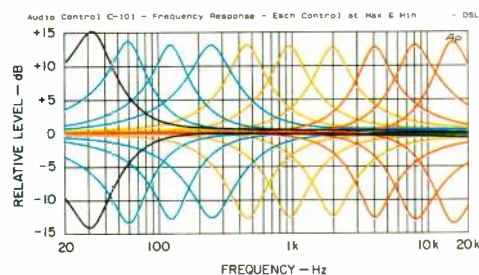


Fig. 2—Response of each slider at maximum cut and boost.

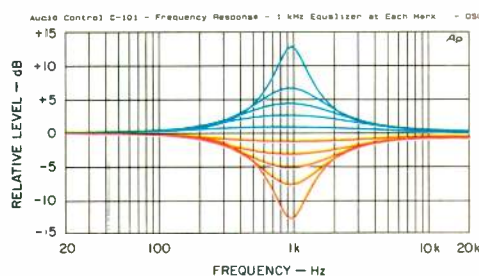


Fig. 3—Response vs. marked settings; see text.

matched those of the left so closely that no purpose would be served by presenting both. Channel gains were close to unity (-0.20 dB) and extraordinarily well balanced (within ± 0.02 dB).

The frequency response of the system is shown in Fig. 1 with the equalizer bypassed (± 0.05 dB from 22 Hz to 105 kHz), with the equalizer engaged and the sliders at their detents ($+0.00$ dB, -0.35 dB from 10 Hz to 100 kHz), and with both the equalizer and the infrasonic filter engaged. (The filter is operational even with the equalizer bypassed.) Chebyshev alignment (specified by AudioControl) implies some degree of passband ripple, but I saw no evidence of it in the data. As far as I can tell, the filter is

SPECS

Rated THD: 0.005%.
 Frequency Response: 10 Hz to 100 kHz, ± 0.75 dB.
 S/N: 118 dB, re: full output.
 Maximum Input: 8 V rms.
 Maximum Output: 8 V rms.
 Input Impedance: 100 kilohms.
 Output Impedance: 100 ohms.
 Control Bandwidth ("Q"): 2.5.
 Control Center Points: 32, 60, 120, 250, and 500 Hz and 1, 2, 4, 8, and 16 kHz.
 Control Range: ± 15 dB.
 Subsonic Filter: 20 Hz with 18-dB/octave Chebyshev alignment.
 Power Requirements: 120 V a.c., 60 Hz, 10 watts.
 Dimensions: 17 in. W x 3½ in. H x 11 in. D (43.2 cm x 8.9 cm x 27.9 cm).
 Weight: 9 lbs. (4.1 kg).
 Price: \$459.
 Company Address: 22410 70th Ave. West, Mountlake Terrace, Wash. 98043.
 For literature, circle No. 92

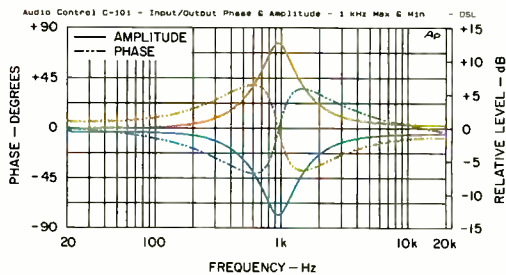


Fig. 4—Phase and amplitude at maximum boost and cut.

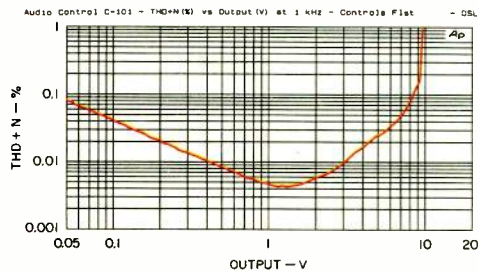


Fig. 5—THD + N vs. output voltage.

Butterworth-aligned, which is the “0-dB ripple” Chebyshev case. The -3 dB point occurs at 22 Hz with a slope of 18 dB/octave. Response is 5 dB down at 20 Hz and (not shown) -23.6 dB at 10 Hz.

Figure 2 is a composite of the response curves taken with each slider individually set for maximum boost and maximum cut, i.e., 20 curves in all. Band centers agree quite closely to the indicated markings, and, although the maximum boost and cut varies with the particular control that is exercised, each provides a range of at least ± 12.5 dB and some provide as much as ± 14.7 dB. Each control’s boost and cut is unusually symmetric, which testifies to good design.

I also plotted equalizer response with various combinations of slider settings: Each alternating between maximum and minimum, alternating in pairs (two up/two down, etc.), alternating in triplets (three up/three down), and so forth. Although the curves aren’t shown, suffice it to say that the C-101 performed pretty much as you’d expect from the “graphic” position of the sliders. Of course, each equalizer section affects those adjacent to it so that, if three are raised, more boost is given to the center band than would be obtained had

the adjacent ones not been boosted as well. But there were none of the anomalies I’ve seen with some “graphic” equalizers whose equalizer sections interact in such a way that the resultant frequency response doesn’t correlate with equalizer positions when more than one band is used.

Figure 3 is a composite of 10 response curves taken with the 1-kHz slider set as close as possible to each marked setting: ± 3 , ± 6 , ± 9 , ± 12 , and ± 15 dB. The actual boosts and cuts don’t correspond precisely with the markings, and at least half the range comes between the “12” and “15” marks. However, I don’t recall ever measuring an analog equalizer in which the markings really did correspond to the actual response modification, so I can’t downgrade the C-101 against its competition in this regard. By limiting the change that occurs with the sliders slightly off center, you needn’t be precisely on the detents to achieve “flat” response. Since the AudioControl detents are none too definite, this is arguably a benefit.

Figure 4 is a composite of the response and input/output phase shift that occur with the 1-kHz slider at maximum boost and maximum cut. Note the symmetry in both the response and phase curves.

The C-101’s THD + N versus output level (at 1 kHz, with all sliders at the detents) is shown in Fig. 5. The downward slope indicates that noise predominates at output levels from 50 mV to somewhat above 1 V and that the C-101 can produce 7 V output with negligible distortion (0.05%). Clipping (1% THD) occurs at 9.65 V. The THD + N at 2 V output (not shown) did not exceed 0.0062% at any frequency from 20 Hz to 20 kHz, and some of this, too, was noise.

I’m impressed by how *little* distortion and noise the C-101 produces. Each equalizer section requires its own operational amplifier and associated components, and each inevitably generates *some* THD and

noise. Ultimately, these contaminants combine in the output stage so that when you design a 10-band equalizer, things can get pretty hairy. With distortion in the 0.005% range and an A-weighted noise of -93.2 dB referenced to 0.5 V (-99.2 dBV), the C-101 is outstanding in these regards. Referencing the A-weighted noise to maximum output level (9.65 V) yields a theoretical S/N of 118.9 dB! Clearly, the C-101 can be used in a variety of applications over a wide range of input levels without audible ill effects. Input and output impedances (100 kilohms and 110 ohms, respectively) and a generous input overload (9.9 V) further testify to universality of application.

A noise-spectrum analysis (not shown) revealed hum-related components at 60 Hz, 180 Hz, and 300 Hz of -90.1 dB, -91.8 dB, and -105.5 dB (re: 0.5 V), respectively. Since these occurred at odd harmonics of the power line, I suspect they were caused by magnetic coupling from the transformer. But the hum was negligible in level, and no other line structure was apparent in the analysis. Channel separation was 72 dB at 1 kHz and better than 51.5 dB from 20 Hz to 10 kHz.

Finally, I verified the “flatness” of the C-101 pink-noise generator by using the sweeping third-octave spectrum analyzer built into my Audio Precision System One and a real-time third-octave analyzer (operating in an Apple computer) that I devel-

THE OWNER'S MANUAL IS THE BEST I'VE SEEN, LIGHTHEARTED YET COMPLETELY CANDID.

oped for loudspeaker evaluation. Both measurements indicated that the pink noise the C-101 generates is more than sufficiently “flat” for its intended purpose on a third-octave ba-

sis, given the 2-dB per LED resolution of the C-101 analyzer. However, the Apple-based measurement was arguably the more accurate, since I could use an averaging time sufficient to integrate the level fluctuations that naturally occur in pink noise at low frequencies.

Use and Listening Tests

Since AudioControl advises against using the C-101’s mike other than with the analyzer, I evaluated it (and the analyzer) in my listening room by comparing the

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response curves of my loudspeaker as measured by the C-101 microphone/analyzer with a measurement made with my Apple-based setup and calibrated lab microphone. The two agreed within the limits of experimental error, which is to say, within the limits imposed by the C-101's resolution of 2 dB per LED.

While I was at it, I equalized my listening system for "flat" response. As AudioControl warned (and which I already knew from past experience), with most program material, the resulting sound was too harsh

and strident. This is not to say that using the C-101 to analyze/equalize a system is fruitless. Once you've "flattened" the system and corrected gross bumps and dips in response, you can modify the tonal balance as you wish. (AudioControl offers advice in this regard.) You're likely to want to lower the high-frequency sliders progressively to impart a gradual high-frequency slope to the overall response, and you may also want to add a bit of bass boost.

One word of warning and one of advice. As an octave-based analyzer, the C-101 can

only adjust octave-to-octave balance; it cannot correct response irregularities that occur over narrower bands. You will get optimum results if you start with a good pair of loudspeakers that have been placed in the room so as to minimize standing waves. The C-101 can help you find those ideal locations. Next, as AudioControl points out in its manual, you will find areas in which measured response seems to vary widely when you move the microphone slightly. These are *not* good listening positions vis-à-vis loudspeaker placement. Change one or the other until you get stable measurements over a reasonable area. I expect that the dissatisfaction that many express with analyzer/equalizers stems from not appreciating the importance of

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listening/microphone placement and not realizing that you are unlikely to want truly flat response.

A component like the AudioControl C-101 Series III is not limited to loudspeaker equalization, and many may not even use it for this purpose. Once it's in your system, you'll not be able to resist the temptation to do a little creative tinkering with the sound balance of your record collection. After you've gathered some experience using the equalizer, you can do quite a bit to spruce up the sound of inferior LPs and CDs. And if you duplicate tapes for your car, you'll find the C-101 extremely helpful in tailoring recordings so they sound almost as good on the road as the originals do at home.

If you are interested in a graphic equalizer/analyzer, the AudioControl C-101 Series III should be high on your list of candidates. It performs outstandingly well on the test bench and is clean and quiet in the listening room. Of course, you can't call any equalizer "transparent," since it's *meant* to alter tonal balance, but if you could, the AudioControl C-101 would get my vote. It does only what you ask of it.

Edward J. Foster

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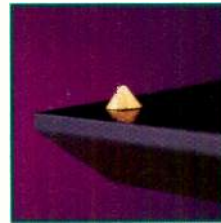
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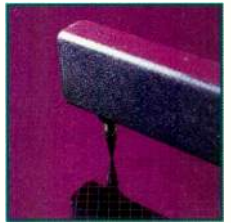
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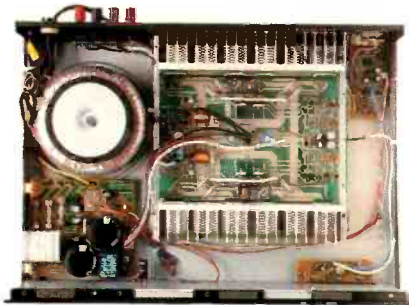
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SONANCE 2120 AMPLIFIER



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Most of us associate Sonance with loudspeakers—in particular, with in-wall speakers. Arguably, Sonance was one of the first to elevate in-wall speakers from the P.A. dungeon to the high-fidelity stratum, and they've done quite well at their trade. Because speakers must be driven by power amps, it's not really surprising that Sonance has branched out of its niche into the electronics arena. But entering a new area is easier said than done; driver

design and circuit design are quite different arts. I must confess to having approached the Sonamp 2120 power amplifier with somewhat of a "show me" attitude, but "show me" it did. The 2120 is really quite a nice piece.

Clearly, the Sonamp 2120 was designed with an eye toward the custom-installation market, the one Sonance is most familiar with. "Auto On" circuitry brings the system to life within 1.5 seconds after detecting the presence of an input, and powers the amp down about four minutes after the signal has disappeared. You can defeat "Auto On" with a recessed back-panel slide switch, in which case the 2120's front-panel "Power" switch functions as you'd expect it to. If you use "Auto On," the "Power" switch should be left depressed.

This can be a little confusing at first, because the red "A.C. On" LED illuminates whenever power is applied, independent of the position of the "Power" switch. If the amp is plugged into a live output, the red lamp is lit; if it isn't, the line fuse has blown. A green "Active" LED lights when the amplifier is really on, i.e., when it senses the presence of a signal in the "Auto On" mode or when the "Power" switch is depressed in the—what shall I call it?—"Non-Auto-On" mode. (The "Active" light will also come on when the 2120 is first plugged in or after power is interrupted and restored. In the "Auto On" mode, it'll turn off after a few minutes if no signal is present.)

"Auto On" simplifies operation in multiroom or home theater applications but is, on the one hand, neither unique to the Sonance 2120 amp nor, on the other hand, the only multiroom nicety that the Sonance offers.

**WHAT YOU CAN EXPECT
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On the back panel are stereo input and output jacks so that multiple

2120s can be daisy-chained ("looped") together without resorting to "Y" connectors. If you use many power amps in your system and are concerned about the power-line surge that may occur when all turn on at once, Sonance has available two line-protection sequential power switches (the AC1 and AC2) that will eliminate the problem.

Recessed screwdriver-adjustable level controls on the 2120's front panel permit you to adjust sound pressure level in each area independently and ensure that you needn't operate your preamp's volume control at such a low setting that channel balance is impaired and/or that the control is difficult to adjust. I like the idea of recessing the gain controls and "Auto On" slider; they're one-time setups that can potentially be misadjusted by accident.

Sonance claims to have designed the Sonamp 2120 with "numerous protection circuits"—including surge, overload, and thermal-protection systems—that automatically reset after a fault has been corrected. Should any of the protection circuits trigger, the green "Active" LED flashes and output may be interrupted by an internal relay. This is all well and good, but not every 2120 "protection device" resets automatically; three internal power fuses and one back-panel line fuse must be manually replaced if blown.

The 2120 uses a discrete output stage (parallel pairs of Toshiba 2SC4029s and 2SA1553s in each channel) mounted to two reasonably generous heat-sinks, one per channel. The heat-sinks are apparently more than adequate, since the 2120 ran cool both on the test bench and in the listening room. Thermal sensors, mounted to each sink between the complementary-symmetry pairs, track and compensate for output-stage temperature. The output-stage drivers are mounted on individual heat-sinks. Most of the audio circuitry is on one main board that uses fairly wide traces to carry power and audio output current. A small board near the input and associated input circuitry.

The power supply is on a separate board, with a good-sized heat-sink used to cool the main bridge rectifier. A small independent bridge apparently is used to power the "Auto On" system. A rather large toroidal power transformer (rated at 600 volt amperes) mounts at the left rear of the chassis, near the line cord and fuse. The generously rated transformer should provide adequate current reserves, and the toroidal construction helps contain magnetic hum fields. But the filter bank used after the rectifier—a pair of 10,000- μ F, 65-V conventional electrolytics—is rather modest for a power amplifier whose output is rated at 120 watts per channel.

Construction appears to be reasonably neat. Although parts quality seems adequate, it's by no means exotic. Input connectors are solder-wiped, not gold-plated, and the five-way output posts

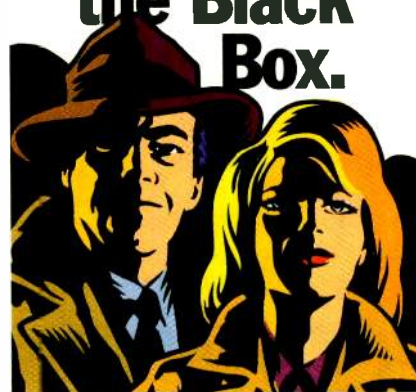
(one set, not two) are more functional than impressive. They are, however, mounted on 3/4-inch centers so they will accommodate GR-type dual banana plugs.

Those who require exotic parts and esoteric circuitry to get their jollies will not find either in the Sonamp 2120. I doubt they'll find them in any \$575 power amp (\$590 for the rack-mounted version) that is rated at 120 watts/channel. The Sonamp 2120 makes no pretense to having "dual-mono" construction, and, although I was not provided with a schematic, I doubt there's anything particularly novel in the circuit design either. What you can expect from the Sonamp 2120 is an honest workhorse with remarkably conservative ratings.

For example, the 2120 is rated at 120 watts/channel into 8 ohms and 160 watts/channel into 4 ohms, at 0.05% and 0.10% THD respectively, from 20 Hz to 20 kHz. At rated output on my test bench, I measured a maximum THD of 0.035% on the poorer of the two channels (0.028% on the better one) when using 8-ohm loads and 0.056% (on each channel) with 4-ohm loads. That's only half to two-thirds as much distortion as Sonance claims. Moreover, the distortion did not rise in the bass

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region (as might be expected, given the smallish filter caps). In practice, the worst case occurred at 20 kHz, and, from 20 Hz to 3 kHz, THD was no more than 0.010% with 8-ohm loads and 0.018% with 4-ohm terminations. Maximum output power at clipping (both channels driven) was 160 watts per channel into 8 ohms and reached a whopping 250 watts per channel into 4 ohms.

With both level controls fully advanced, channel balance was extraordinarily precise—within 0.01 dB, the limit of my test

equipment. Frequency response (on the poorer of the two channels) was within +0.00, -0.15 dB from below 10 Hz to 20 kHz and down 0.5 dB at 55 kHz. The -3 dB point occurred at 170 kHz. Input/output phase linearity was within +4.5°, -7.9° from 20 Hz to 20 kHz. Channel separation was 80 dB or better from 20 Hz to 3 kHz and 70 dB or better out to 16 kHz. (Many dual-mono amps don't do better, and some do worse!)

The A-weighted noise was -93.3 dBW, which implies a signal-to-noise ratio refer-

enced to rated power (20.8 dBW) of 114.1 dB—more than 14 dB better than Sonance specifies! The noise figures are all the more impressive when viewed in conjunction

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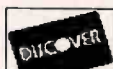
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with the 2120's higher-than-typical gain. With 8-ohm loads, it delivered rated output with a 1-V input (88 mV for 1 watt) rather than the more usual 1.5 V. Of course, you can reduce gain by readjusting the input level controls, so the 2120's extra amplification can only be considered an advantage.

Damping factor was 215 at 50 Hz and 190 at 1 kHz. Because the 2120 uses output protection coils, output impedance rises (damping factor drops) at higher frequencies. I measured an output impedance of about 100 milliohms at 5 kHz and 175 milliohms at 10 kHz.

Apparently someone at Sonance knows his way around circuit design, because the 2120 obviously did quite well on the test bench. It also did well in the listening room. I wouldn't go so far as to say it's the most pristine power amp I've ever heard, but I was surprised at how good it really did sound. It's quiet, bass is tight, and there seems to be adequate current available. High treble is not its strong point; it's a trifle brittle and somewhat alters the harmonic balance between fundamental and overtones in the violin's upper register. However, the difference between the Sonamp 2120 and the best power amps on the market is relatively slight and certainly far narrower than is the corresponding price difference.

For its stated use as a power amp for custom installations, I think you'll find the Sonamp 2120 hard to beat. The same applies for home theater applications. In fact, I'd have little hesitation employing the 2120 in almost any audio system, especially when budget is an issue. At this price, there's no cause for complaint—only admiration.

Edward J. Foster

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ALPHA-CORE GOERTZ MI 1 & MI 2 SPEAKER CABLES

Goertz MI speaker cables from Alpha-Core have a substantially different geometry from the cables I examined in "Speaker Cables: Testing for Audibility" for the July 1993 issue. The Goertz MI cables consist of two, flat, insulated conductors bound together by an outer insulating jacket. Alpha-Core claims the benefits of its design include impedance matching and the elimination of distortion, high-frequency roll-off, crosstalk, skin effect, and emitted EMF effects. The cables are available with copper or silver conductors, and each version comes in two widths. Heavy, gold-plated connectors are available in banana plug, spade, and pin styles. Other accessories include mounting tape and clips. In 25-foot lengths, copper Goertz cables cost \$4.95 per foot for MI 1 and \$7.90 per foot for the heavier MI 2, while the silver cables, MI AG 1 and MI AG 2, respectively cost \$49.80 and \$88.70 per foot.

Goertz MI 1 cable is AWG #13, measures 0.4 inch wide and 0.05 inch thick, and has a resistance of about 4 milliohms per foot (both conductors). Goertz MI 2 cable, AWG #10, is twice as wide, with a resistance around 2 milliohms per foot. For 0.2 dBV of loss with 25 feet of cable, the minimum speaker impedance is about 4.3 ohms with MI 1 and 2.2 ohms with MI 2. Conductors in both cables are 0.01 inch thick, thus eliminating the over-rated skin effect at audio frequencies.

The flat, thin conductors in close proximity serve to lower inductance while raising capacitance. Goertz MI 1 has about 480 pF per foot and MI 2 about 1,000 pF per foot. The inductance for the pair of conductors is quite low, measuring less than 0.1 μ H for 25 feet of cable. These cables have

sufficient capacitance to maintain a flat impedance, much as ribbon cables do (see my 1993 article). From 20 Hz to 20 kHz, the impedance of the Goertz cables increases about 21%. In comparison, the impedance of standard AWG #12 cable increases 583%, which causes a

loss of about 0.5 dB for a 4-ohm load through 10 feet.

The name "MI" comes from "Matched Impedance," a term more commonly associated with r.f. transmission lines. Like other cables around 15 years ago (from Polk, Mogami, Discwasher, and AudioSource), Goertz MI cables have a low characteristic impedance. Such cables are typically more dispersive, though not audibly so. Since the lengths of speaker cables are very small fractions of an audio signal's wavelength, reflections will not be a problem.

The measured response with a loudspeaker load is generally flat; between 2 and 20 kHz the loss increases to 0.2 dBV for MI 1 and to 0.1 dBV for MI 2, a result of the test speaker's impedance minimum of

about 4.5 ohms. This indicates essentially no high-frequency roll-off with the Goertz cables. In comparison, the loss for standard #12 AWG

at 20 kHz is only about 0.8 dBV. Below 10 kHz, the Goertz MI cables perform virtually the same as standard #12 AWG. What frequency is necessary to get a substantial difference with 25 feet of cable and a 4-ohm load? It took 185 kHz to get 3 dBV of difference between MI 1 and #12 AWG.

One option when ordering the Alpha-Core cables is to have them cut to length and ready for termination. You may want to consider that option if you don't have power tools or arms like Pop-eye's. The thin layer of insulation bonded to each conductor is incredibly tenacious and requires substantial effort to remove. Once

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the insulation is removed, attaching the terminals is quite simple. The bodies of these heavy, high-quality terminals are not insulated, so care must be taken to prevent shorts.

I found both cables to be quite stiff, especially MI 2, and routing them can be challenging. They can be folded and bent, although sharp twists and bends tended to buckle and occasionally split the outer jacket. The inner insulation remained intact, and no shorts were found after this abuse. The thin profile lends the cable to installation under a carpet (but be careful to avoid tacks!).

The silver-conductor versions, MI AG 1 and MI AG 2, were not tested. Except for slightly lower resistance, there should be

**BLIND LISTENING TESTS
WITH 25 FEET OF GOERTZ
CABLES VERSUS #12 AWG
LAMP CORD PRODUCED
NO AUDIBLE DIFFERENCES.**

little difference in their performance despite the substantial increase in cost.

Informal, blind listening tests compared 25 feet of MI 1, MI 2, and #12 AWG cable; no audible difference could be found. Younger ears were also employed to see if something in the top octave was being missed. The measured differences still eluded human detection.

Why weren't the cable differences more audible? Our hearing becomes much less sensitive above 4 kHz, falling at about 10 dB per octave. Also, there isn't a lot of musical energy above 10 kHz, and this is easily masked. The result is a lack of significant audible difference in the top octave, while below 10 kHz the cables are effectively the same.

These are distinctive, well-made cables and terminals. Their measured performance is excellent, and they should work well with nearly any speaker as a load. If long cable runs are necessary with a low load impedance, it is possible that Alpha-Core's Goertz cables could make an audible difference. However, shorter runs and typical loads are unlikely to show much improvement over #12 AWG. *Fred E. Davis*

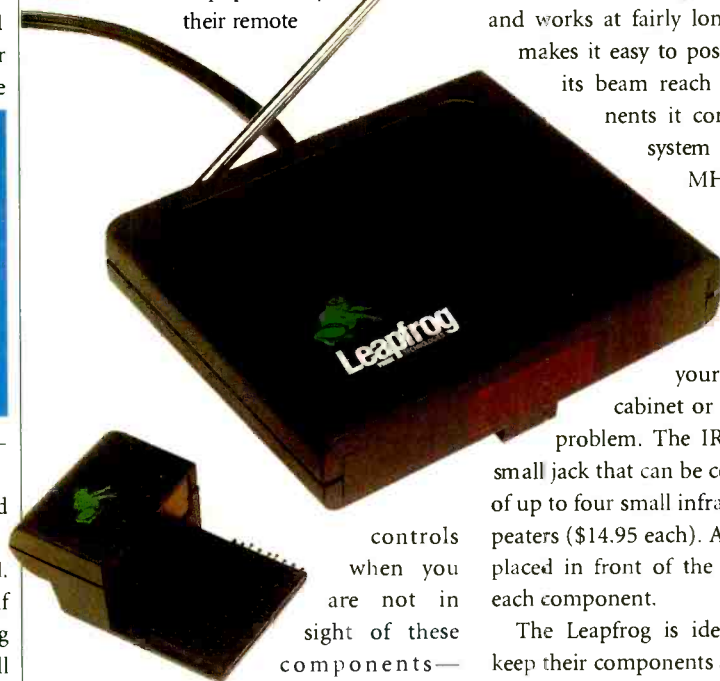
Terk Technologies' Leapfrog acts as a radio bridge between your audio components and their remote controls. It lets you operate your preamp, tape deck, and CD equipment by their remote

broadcasts them in their infrared form. The IR-5 can pick up signals from an IR-4 up to 150 feet away, and easily receives these signals through normal home and apartment walls. The IR-5's infrared output covers a wide arc and works at fairly long distances, which makes it easy to position and still have its beam reach all of the components it controls. Because the system operates at 418 MHz, its signal cannot interfere with audio equipment or FM.

What if you want to keep your components in a cabinet or behind a door? No problem. The IR-5 base unit has a small jack that can be connected to a series of up to four small infrared Model IR-X repeaters (\$14.95 each). An IR-X can then be placed in front of the infrared sensor on each component.

The Leapfrog is ideal for people who keep their components and speakers in different rooms. It makes it remarkably easy to set the exact balance for a given recording without moving your head, and to adjust volume levels to suit a given performance. The Leapfrog permits easy A/B testing, because components do not have to be visible and switching is so quick. And by attaching the Leapfrog to a universal remote control programmed for your equipment, you can use one Leapfrog transmitter to operate your entire system. (Such remotes are available for less than half the Leapfrog's price.) Finally—a high-end accessory that is affordable and really works!

Anthony H. Cordesman



controls when you are not in sight of these components—even from another room. The Leapfrog should also be ideal for outdoor use, where sunlight can swamp an ordinary remote's infrared beams. The Leapfrog system costs \$69.95 for the IR-5 base station and one IR-4 transmitter. Extra transmitters cost \$19.95 each.

The IR-4 is a tiny, battery-powered, infrared receiver and radio transmitter that mounts on any infrared remote control. It is small, light, and unobtrusive and is fairly rugged. If the remote is dropped, the IR-4 detaches without breaking (it's attached with self-adhesive hook-and-loop fasteners) and can easily be refitted.

The IR-5 base station is a small, inconspicuous a.c.-powered device that receives radio signals from IR-4 transmitters, translates them into infrared signals that match those from the original remotes, and

**Company Address: 65 East Bethpage Rd., Plainview, N.Y. 11803; (800) 942-8375.
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CLASSICAL RECORDINGS

kraft

a school playroom. But with such amazing expertise.

What astonishes me is that it all seems to be *written down* in millions of notes on paper. The sounds, five different pieces, are all “by” William Kraft. That is, they aren’t just improvising. (Only once in a while.)

The second reason—and cause for review in this space—is that this is, as you may guess, what we used to call a Test Record. A whopper, par excellence, for those who want to show off their gear, system, fi or whatever. Now more than ever, as

the ads say. Remember “Death and Transfiguration”? Forget it. This is what you need. Wow, what sounds! Just in time for the modest subwoofers I installed (NHT) with the thought of keeping myself somewhat up to date. (They are surprisingly unobtrusive in most classical music.)

Don’t try the CD on a so-called boom box; the little speakers will probably pop right out of their frames. And check with family and neighbors before you start on your big gear.

Edward Tatnall Canby



Percussion by William Kraft
 Barry Silverman, Thomas Raney,
 percussion soloists; Pacific
 Percussion Ensemble; Percussion
 Quartet from Tanglewood, Frank
 Epstein, conductor; members Los
 Angeles Philharmonic, Kraft
 CRYSTAL CD 124, CD; 60:12



playing their strenuous thing: You never heard such whangs and bangs and rolls and whirs and all manner of other sounds—including a few discrete *pitches* out of such as a marimba. (Curious when that instrument has virtually no percussiveness at all and lots of pitch!) Having spent their vigorous lifetimes learning the incredible art of percussion, these guys simply rejoice in their skills. BOOM—what a whack! *Brrring*—what a roll. Like kids gone berserk in

There are two excellent reasons for a CD such as this to exist. Neither, as I see it, has much to do with music—which doesn’t really matter.

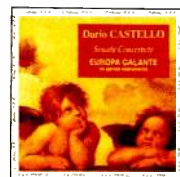
First, here is a bunch of percussion fiends having enormous fun,

Dario Castello:
Sonate Concertante

Europa Galante

OPUS 111 OPS 30-62, CD; 65:00

Here are those Italians again, operating from France (the label is Opus 111) but in all respects out of the sunny south and the city of Par-



ma—at last re-discovering their own native music of the past in authentic current-day terms.

Illustration: Rick Tuika

This composer is an Italian “unknown,” not yet made the big time on Broadway—he might as well, as far as we are concerned, be that well-known artist, Anon. For such reasons he caught my eye—then my ear. Good man, good listening!

You might call this proto-baroque. It is the early 17th century, here, the time of Monteverdi, Gesualdo, the young Schütz (who spent his learning years in Italy)—these being famous names. But Dario Castello? The notes tell us bravely that “his life is cloaked in mystery” and little is known of him. Which is to say, nothing at all. Except the music.

It is more than worthy of the famed Anon! The sound grew on me steadily as the hour-plus sequence of short pieces, “chamber works” a later age would say, unreeled on a twin pair of violins and a changing accompaniment texture of modest variety. A very gently dramatic composer, this, in whose works one hears nevertheless strong hints of the intense dramatic innovations of that musically explosive time.

Not in words. All of it is in the playing, minus any hint of “story” to explain what goes on. Pure musical drama: Sudden, startling changes from fast to slow, dramatic pauses,

brief passionate bursts, rushing scales—very strange! For our ears, no apparent reason. But *some* audience, some group of players, must have been very startled and impressed in early performances.

The very early baroque had not yet discovered LENGTH—except as attached to words, sacred, in song or opera. No extended “movements” here, allegro, adagio, and so on. Instead, each piece is made up of a series of short sections one after the other in dramatic contrasts, no more than a few moments apart. This at first is confusing. Play through, and then it becomes evident that within

Stravinsky: Ebony Concerto; Babin (arr. D. Nygren): Hillandale Waltzes; Morton Gould: Derivations for Clarinet and Band; Bernstein: Prelude, Fugue, and Riffs; Artie Shaw: Concerto for Clarinet

John Bruce Yeh, clarinet;
DePaul University Wind and
Jazz Ensemble, Donald DeRoche
and Robert Lark, conductors
REFERENCE RECORDINGS
RR 55CD, CD; 52:17

Serious audiophiles know Reference Recordings as modest in scope but at the top of the heap when it comes to sonics, and this CD, focused on the brilliant clarinetist John Bruce Yeh, reinforces that reputation. The Chicago Symphony signed Yeh at the age of 19; today he also teaches at DePaul University. The music on this CD runs quite a gamut, from the excellent (Leonard Bernstein, Igor Stravinsky, Morton Gould) through the banal (Victor Babin) to the almost rubbishy (Artie Shaw), but performance quality redeems everything.

During the big-band era, Benny Goodman not only held the uncontested title as King of Swing, he also recorded a number of the most important chamber works involving clarinet; with the violinist Joseph Szigeti, he

even commissioned Béla Bartók’s “Contrasts,” which they recorded with Bartók at the piano. Goodman’s only serious pop rival, Woody Herman, who aptly called his band The Thundering Herd, struck back by commissioning the greatest living composer, Igor Stravinsky, to write the *Ebony Concerto*. The recording they made together found Herman and his men technically on top of the score, but audibly, not really at home with all those jagged, asymmetrical, rapidly shifting rhythms.

How times have changed in half a century. Everyone involved here seems to have no more problem with even the most difficult stretches of these works than they might have with a Sousa march. If from time to time one might wish for an even sharper microtome precision of attack or syncopation, in general the accompanying ensembles match the soloist’s security and brilliance.

Inevitably, Stravinsky in spots sounds a bit square and alien to the jazz idiom, but Herman got his money’s worth in an enduring score. The agreeable but inconsequential Babin waltz variations (for which Dennis Nygren orchestrated the piano part) serve their purpose largely by permit-

ting the solo clarinetist to shine. The main surprise comes with Gould’s *Derivations for Clarinet and Band*, written for, and in collaboration with, Goodman: Solid, expertly crafted music, convincingly interpolating all sorts of authentic jazz elements, to striking effect.

Herman also commissioned the Bernstein work, but disbanded his last Herd before performing it; Goodman unveiled the piece with Bernstein conducting. The movements’ subtitles tell the story: *Prelude for the Brass*, *Fugue for the Saxes*, and *Riffs for Everyone*—instantly recognizable as Bernstein, especially evocative of his energy-packed theater music.

Artie Shaw also had higher musical aspirations: At one point, after his recording of “Begin the Beguín” had made him world-famous and rich, he sought lessons from composer David Diamond. This flimsy non-concerto of his (contrived for the eminently forgettable film *Second Chorus*) bears no witness to that—but here again, as in all these works, the excellence of John Bruce Yeh, his colleagues, and Reference’s engineering make this disc something out of the ordinary. Richard Freed’s exceptionally good notes round off the package.

Paul Moor



these, shall I say, spurts of music is much variety, out of tightly limited means.

The two violins are absolutely equal. There is no favoritism. They share their ideas like twins with their associates in the accompaniment. But there is a certain dreamy quality in their playing, an occasional fading away—I tend to think is due to simply a lack of experience with microphones. That's just a guess. Do they swing and sway in place as they play, in the old traditional fiddler's style? That would do it. For the mikes, you have to stand still.

Edward Tatnall Canby

Mozart: Rondo and Horn Concertos

Ab Koster, natural horn;

Tafelmusik, Bruno Weil

SONY CLASSICAL SK 53369, CD; 63:30

Some fetchingly familiar horn music here as well as some unknown, but there is more: Old buglers, Boy Scouts, Marines, whatever, please take note. Here, in real sound, is what can be done, and was done, in the 18th century, on a simple horn—I mean a “French horn,” entirely without valves. Just the lips and breath, with hand held inside the bell of the instrument all to control the instrument's pitch and tone. Very much like a bugle.

Buglers today mostly play two well-known tunes, the get-up one, reveille (“revalie”) and the tune for the dead, taps, always a scary ordeal for the player. Plenty of other tunes are possible, whether for Marines or Scouts; but every last one, minus valves, is made up of only four, maybe five notes in the natural harmonic series. In my near-Scout years (I was



edged into something called the Woodcraft League, non-military, lots of Indian lore) I once got a bugle into my fascinated hands and tried it out. To my immense chagrin, I couldn't produce any note at all. Just a breathy hiss. No taps for me. I was the more impressed by the good bugler who *could* play those three or four notes. On the natural horn recorded here, I think I would produce the same unpleasant hiss. Or maybe an unseemly blat. And so would you.

This is an all-“period” group, orchestra as well as solo horn. The five compositions include music that has re-surfaced, out of enhanced current musicology—one whole page of lost Mozart music turned up as recently as

1990 and was put with the rest of its musical body, so to speak, a lot of unsuitable orchestration and even sheer post-Mozart composition (the well-known Sussmeyer) was revised—all of which results in an easy natural Mozart—you may forget sequence of the musical events.

Though some of this horn music is new to almost all of us, there are very familiar sounds here, much beloved as played by horns with the usual standard modern valves. If you know what they can do you will be astonished at how easily this horn player, operating like a bugler, can play all the scales, arpeggios, rapid

runs, graceful melodies, trills, just as well as the regular hornists! Some earlier players of this revived older horn were not entirely able to smooth out the horn sound as between natural tones and those altered by the hand-in-bell technique. Not this player. The technique has advanced. Listen and you will hear. The horn tone is now even smoother, more like the human voice, than any produced by the modern instrument. Indeed, there is a controlled variety of tone, soft and gentle, that I find especially impressive. Do we need any more evidence? No—just more music, please.

Edward Tatnall Canby

HENRY COWELL

Cowell: Persian Set; Hymn and Fuguing Tune for String Orchestra; American Melting Pot; Air for Solo Violin and String Orchestra; Old American Country Set; Adagio (from Ensemble for String Orchestra)

Manhattan Chamber Orchestra,

Richard Auldson Clark

KOCH INTERNATIONAL CLASSICS

3-7220-2H1, CD; 64:07

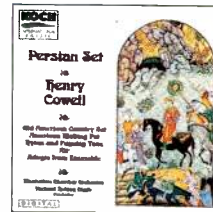
Cowell: Piano Music: The Tides of Manaunaun; Exultation; Harp of Life; Lilt of the Reel; Advertisement; Antinomy; Aeolian Harp and Sinister Resonance; Anger Dance; The Banshee; Fabric; What's This?; Amiable Conversation; Fairy Answer; Jig; Snows of Fujiyama; Voice of Lir; Dynamic Motion; The Trumpet of Angus Og; Tiger

Henry Cowell, piano

SMITHSONIAN FOLKWAYS 9307-40801-2,

CD; 60:36

Henry Cowell's career followed a time-honored pattern: In his early years, during the '20s, he shocked the pants off the international musical world as a wild-eyed radical by the standards of that time, only to wind up, well before his death in 1965, sounding downright conservative. He went down in musical history as the originator of “tone-clusters” (played on the keyboard with the fist or forearm), although Sorrel Hayes points out in the Smithsonian reissue of Folkways' 1963 recordings that the Czech composer Frantisek Koczwara used them (in *The Battle of Prague*) as early as 1788. He also elicited sound from piano strings by every conceivable direct means,



without keyboard and hammers as intermediary. Cowell, born in California of Irish heritage, had a life full of event but not without tragedy;

Dana Paul Perna's (appallingly edited) notes in the Koch set provide a slanted account of the four-year San Quentin penitentiary term he served in the 1930s. Later, as if to make restitution, Washington proudly sent him around the world as a convincing, highly effective musical ambassador.



For recordings 30 years old, Cowell's own piano performances (originally produced by Peter

Bartók, Moses Asch, Marian Distler, and his wife Sidney Cowell) sound amazingly good, thanks to superior electronic rejuvenation. Cowell's informal recorded discourse (13:18) about the individual pieces enhances this reissue's documentary value.

Koch's orchestral set shows another facet of Cowell: His enthusiastic ventures into musical ethnology. Rarely, if ever, does he actually quote authentic folk material, but in every instance—whether African-American, Celtic, French, German, Iranian, Latin, Slavic, or whatever—he had immersed himself so thoroughly into that particular *melos* that his original compositions sound ethnically authentic, in convincing performances, excellently recorded.

Paul Moor

ONKYO INTRODUCES THE WORLD'S FIRST THX RECEIVER

New TX-SV919THX Takes Home Theater to the Next Level

JUNE 1994, RAMSEY NJ — In a development certain to change the Home Theater playing field, Onkyo Corporation began shipping the world's first Home Theater THX Receiver, the Onkyo TX-SV919THX. The company also announced the release of a complete THX Speaker System designed to complement its new receiver, providing a total THX package at a cost well within reach of most enthusiasts.

Experts agree THX has become the new standard for a multi-channel sound experience, both in movie theaters and in the home. Until the Onkyo breakthrough, however, the only choice was very expensive separate components.

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Convenient operation via a multi-colored on-screen menu and programmable remote further distinguish the TX-SV919THX.

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Jimmy Scott



Dream

Jimmy Scott

SIRE/WARNER BROS 9 45629-2,
43:32

Sound: A, Performance: A

Try to imagine Bette Davis doing an imitation of Ruth Brown paying homage to Billie Holiday. Or how about Bobby Short after a hit of helium? That's about the best description I can offer for the eerily stylized, achingly sorrowful voice of the 68-year-old balladeer Jimmy Scott. On the surface, this might seem to have the kitsch appeal of Yma Sumac. But Scott's dramatic delivery and intuitive genius at behind-the-beat phrasing make him one of the most expressive and unique interpreters of American song since the late, great Miles Davis.

An androgynous, diminutive presence, Scott's uncannily high-

pitched, piercing voice is the result of a hormone disorder that has affected him since birth. After getting his big break in 1948 as the featured vocalist in Lionel Hampton's band, he went on to score triumphs through the '50s as a solo artist for the Roost, Savoy, and King labels. But frustration over broken promises and bad business dealings caused Scott to turn his back on the music industry for 20 years, during which time he worked as a shipping and receiving clerk at a Sheraton hotel in his home town of Cleveland. After hearing him sing at the funeral of his old friend Doc Pomus, Sire Records founder Seymour Stein helped instigate Scott's comeback in 1992 with the highly acclaimed *All of Me*, produced by Tommy LiPuma. Since then, he has had an avalanche of press and has garnered the attention

of celebrities such as directors Jonathan Demme and David Lynch, rock 'n' rollers Bruce Springsteen and Lou Reed, and movie stars Alec Baldwin and Kim Basinger. Clearly, it's Jimmy's time once again.

Like its predecessor, the aptly named *Dream* is awash in a romantic late-night ambience that can sweep the listener away. Nearly every track on this Mitchell Froom production is done at the kind of excruciatingly slow tempos that Scott likes to emote over, and nobody does it better. Using his heart-wrenching tones, dramatic use of space, and exaggerated vibrato to great effect, he puts his eerie stamp on a collection of mournful, hard-luck tunes about lost love, including late 1930s' chestnuts like "I'm Through With Love" and "It's the Talk of the Town." But he saves his most impassioned reading

Photograph: David Gahr

LATIN PLAYBOYS

SLASH/WARNER BROS.
9 45543-2, 37:34

David Hidalgo and Louie Pérez are best known as the songwriting linchpins of Los Lobos, while Mitchell Froom is the current producer savant, with albums by Richard Thompson, Jimmy Scott, and Elvis Costello recently notched on his belt. None of that will prepare you for the primal roots music they've put together as Latin Playboys. This is music born from the moment. Sounds are literally found in the kitchen and out in the streets. Structures are assembled from fragile improvisations.



With engineer Tchad Blake's mechanical filters, drum machines and guitars sound like they were salvaged from a futuristic junk heap.

Singing Pérez's lyrics, Hidalgo is by turns beat poet, haiku artist, and that guy mumbling over the steam vent over there on the corner. In the roots music of Los Lobos, his guitar artistry is sometimes lost, but amid these landscapes he creates twists and turns that would make Bill Frisell do a double take.

Latin Playboys traverse a sometimes nightmarish landscape, with the footprints of Tom Waits in the rubble. But it's also full of joy and irony, a celebration of life and lineage. Allen Ginsburg would love this party music for a gone world. *John Diliberto*



for Lucky Thompson's earthy blues number, "You Never Miss the Water."

Peyton Crossley's sensitive brushwork helps set a dreamy tone throughout while bassist Ron Carter and pianist Junior Mance follow along in an elegant, understated fashion. Modern Jazz Quartet vibist Milt Jackson swings his way through the album's lone upbeat number, "I Cried for You," and saxophonist Claston Patience Higgins offers some smokey tenor work on the bittersweet Ellington/Hodges ballad, "It Shouldn't Happen to a Dream."

Jimmy Scott is an acquired taste, much like cognac and caviar. And equally classy.

Bill Milkowski

Last Day on Earth

John Cale and Bob Neuwirth
MCA MCAD-11037, 68:45

On the surface, *Last Day on Earth* appears to be an odd collaboration, but somehow this disparate pair pull things off. On what must be his first recording since the Velvet Underground reunion disc, Welshman John Cale contributes his signature vocals and viola along with keyboard textures, while guitarist and singer/songwriter Bob Neuwirth, an old crony of Bob Dylan, has a rapier wit and a knack for improvising songs. *Last Day* was originally a theater piece by the two, adapted here as a record. Part spoken (with all the necessary Foley effects), part instrumental, and part song, it is not a linearly plotted piece. But the songs are surprisingly sprightly, often haunting, and fun. This makes *Last Day* a challenging piece of listening that defies easy answers, but it is a most enjoyable conundrum, too. I suspect that *The Hitchhiker's Guide to the Galaxy* is a key influence.

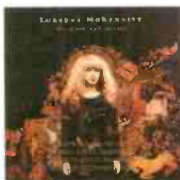


Michael Tearson

The Mask & Mirror

Loreena McKennitt
WARNER BROS. 9 45420-2, 52:49

Loreena McKennitt's music on her previous album, *The Visit*, was primarily Celtic with her harp playing the key ingredient. Here, she filters her Celtic base through the Spanish moors, with Spanish and Arabic influences keenly felt. Hers is a timeless sounding music, resonant of ages past, yet inventive and new. Oddly, the harp makes only



Weight rollins band

IMAGO 72787-21034-2,
CD; 53:34
Sound: B+, Performance: A

Henry Rollins is the MTV generation's very own "Mr. Warmth"—an author/musician/monologist with a bone to pick with everyone, himself included. If an old vaudevilian fart like Don Rickles (the original "Mr. Warmth") is master of the put-down and of obsolete borscht-belt ethnic jibing, Rollins entertains by unearthing everything you'd like to ignore. He's the psychotherapist from hell. Just an hour with any Rollins book or CD may have you combing the bins for Cashman and West records.

But while the Rollins Band (with guitarist Chris Haskett, bassist Melvin Gibbs, and drummer Sim Cain) exists to create music, specifically a Hendrix-meets-mash-pit juggernaut, Henry's poetry of rage adds more than most could bargain for, and it's what makes this band so powerful. That's not to say, though, that Haskett's awesome riff on "Fool," those amazing chords on "Civilized," or the Gibbs/Cain rhythm section doesn't make for equally potent listening. This volatile band jams its behind off.

a cameo appearance, but the richness of textures and strong mysterioso of McKennitt's music more than compensates for this absence. This is a gorgeous album that continues to unfold in unexpected ways with repeated listenings.

Michael Tearson

Through the Hill

Andy Partridge & Harold Budd
GYROSCOPE/CAROLINE 6608, 54:31

In this meeting between effervescent wit and sardonic somberness, somberness wins. Harold Budd is one of the original purveyors of ambient music, while Andy Partridge is the guitar-playing singer/writer with XTC. Here, Partridge leaves his hook-laden melodies and dense production behind, instead bringing an austere minimalism to this music, with



Photograph: Ross Halfin

ROLLINS BAND



And while they jcm, Henry Rollins—a.k.a. rancor incorporated—screams (almost never sings) from a shit list on which nothing is sacred. To man-hating feminists:

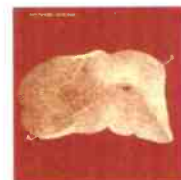
"Sometime somewhere some man hurt you/I'm one of them so I get stuck with the blame." To fans who overstep the line between respect and idolatry: "You're desperate and in need/And then you meet me and your whole world changes/Everything I say is everything you've ever wanted to hear.../I'm a liar!" And if it's with cold, unsentimental detachment that Rollins distances himself from everyone, his hellhound fury locks perfectly with his band, and that's what makes them a real deal.

Mike Bieber

themes played out in repetitious, occasionally off-center cycles.

The sound is one of improvisation; two musicians stuck in a room, tape constantly rolling while they pluck and plink on percussion, pianos, and synthesizers until they finally hit on a pattern that holds more than momentary interest. It's those moments that make it to disc. Many of the songs have the feel of études and studies in static sound fields. Budd is renowned for his spartan yet textured themes, but *Through the Hill* makes albums like his *Plateaux of Mirror* sound baroque by comparison.

These artists have clearly found a communion, and if the music doesn't give that up,



Last of The Independents

Pretenders

SIRE/WARNER BROS.
9 45572-2, 49:17

Those first two Pretenders records are the result of an incredible rock 'n' roll quartet that can never be captured again. How many of us need to hear the late James Honeyman-Scott's incredible guitar solo on "Kid" or Chrissie Hynde's stark confessionality on "Message of Love" on a weekly basis? I do, but as long as Chrissie—one of the most important women in rock 'n' roll history—keeps making records under the identity of "Pretenders," it's really tough not to at least think about that great band.

On *Last of The Independents*, this temptation is even more prevalent;



Chrissie reunites with original drummer Martin Chambers, reforms the band as a quartet, and hires a Honeyman-Scott sound-alike (Adam Seymour) who, on one song, even cops vital elements of Jimmy's solo from "Tattooed Love Boys" with rote precision. But on this tune, "Money Talk," the spirit of vintage

Pretenders' guitar energy is reunited with Chrissie's signature angst. This hasn't happened in quite some time and in fact, it happens throughout the entire record, yielding the revelation that her "new" band deserves to be accepted as genuine heirs to that long-gone original one. And to hear Chrissie balladeering "When I hear my baby cry" on the beautiful "977"—a John Lennon inspired plea against domestic violence—reminds you of her greatness.

Mike Bieber

the three poems do. Budd read his poetry on his previous album, *By the Dawn's Early Light* (Opal/Warner Bros.) but this time the surreal and erotic imagery comes from Andy Partridge. It's as if he and Budd have shared the same life, and that link is revealed in this interior music.

John Diliberto

Cotton Is King

Cotton Mather

ELM RECORDS ELM 9212-2, 47:46

Perhaps it's the lyrical wit and Biblical sarcasm of singer/guitarist Robert Harrison (a former advanced theology student) that make Cotton Mather's mutated, smart-ass pop (with guitar hooks galore) so appealing. From the wild opener, "Lost My Motto," to the end, they combine the Beatles' melodic sensibilities with the urgency of XTC and vintage Squeeze. And they're from Austin, Texas, of all places. All British influences aside, "Cross the Rubicon" settles neatly into a Booker T. and the MGs guitar groove, "The End of the Line" borrows styles from rock 'n' roll's first decade, and the monstrous metal riff of "Miss Information" builds



into a squally ending. Despite occasional weak spots (first single "Payday" could easily be a jingle for the candy bar), *Cotton Is King* contains all the right ingredients to be amongst 1994's strongest debuts.

Tom Ferguson

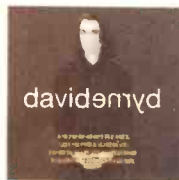
David Byrne

LUAKA BOP/SIRE/WARNER BROS.

9 45558-2, 51:13

Darkly intimate, intelligent, lyrically enigmatic, quirky, and powerful, David Byrne's self-titled solo album works on you in two ways. Haunting confessionals like "A Long Time Ago" and "Self-Made Man" subtly insinuate themselves on your subconscious like some David Lynch-ian dream sequence, while tension-filled, big-beat numbers like "Back In The Box" and "Angels" (a kind of '90s sequel to "Life During Wartime") or the irresistible soca-flavored "You & Eye" help shake your spine loose and guide your feet to the dance floor.

After flirting with a Latin big-band sound on *Rei Momo*, Byrne has stripped things down to a basic rock formula, emphasizing



his catchy songwriting rather than elaborate arrangements. Bassist Paul Socolow and drummer Todd Turkisher are the heart of this new outfit. They kick with authority on the N'awlins shuffle-funk number "Lilies of the Valley" and burn down the house on "Strange Ritual," a dramatic number full of quintessentially Byrne-ish observations about "people in a remote village wearing digital watches" or "a skyscraper made out of abandoned car parts" or "an ambulance driver who wakes up in a Dairy Queen."

Byrne also flaunts some eager guitar chops on a few numbers, including his brutal Sonny Sharrock-ish skronk solo on "Nothing At All." He sings with geeky passion on the sparse closer, "Buck Naked," and even maintains a hint of twisted, tongue-in-cheek glee in the midst of the cloying McCartney-esque ditty "My Love is You."

This is far and away the best album that David Byrne has been associated with since Talking Heads' *Speaking in Tongues*.

Bill Milkowski

FAST TRACKS

Kickin and Screamin: *Allgood* (A&M 31454 0229 2, 39:44). This Georgia quintet represents two distinct audiences: Fans of southern rock who acknowledge them as contemporary torch carriers, and the "jam band" worshipping tie-dyed frat boys who consider icons like Blues Traveler frontman John Popper their gurus. On that often overlooked question of musicality, however, Allgood succeeds in tapping the vibe of Southern folklore with a sound that moves Highway 61 right through the live room at Muscle Shoals. This live EP is a good introduction.

M.B.

After the Rain: *Jack Tempchin and The Seclusions* (Night River Records, 38:20). Jack Tempchin penned some of the better, more country-flavored Eagles songs (among them "Peaceful Easy Feeling"). And now, with the Eagles reunion tour in full tow, he's released his debut record—with an excellent band—which shows off his fine tunemanship; sort of in the Eagles vein but grittier and better. (Night River Records, 103 North Highway 101, No. 1013, Encinitas, Cal. 92024).

M.B.

Sweetheart's Dance: *Pam Tillis* (Arista 18758-2, 32:57). A strong set, possibly Tillis' best yet, with sure-handed production of 10 excellent songs. Pam had a hand in writing only three of them, but all—especially the Tex-Mex flavored "Mi Vida Loca"—are aces. Terrific cover of Jackie De Shannon's "When You Walk in the Room."

M.T.

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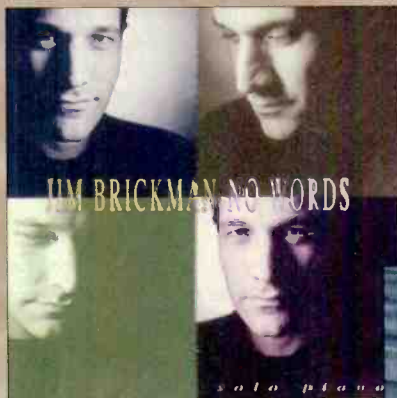
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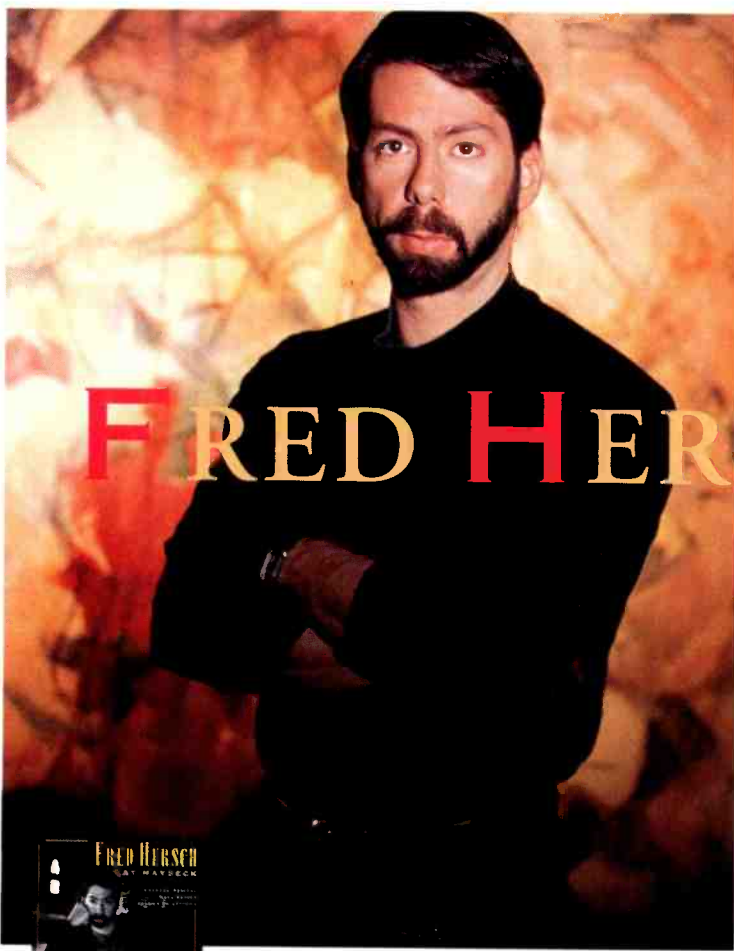


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Photograph: Luciana Pampalone



Fred Hersch at Maybeck
CONCORD CCD-4596, 67:34
Sound: A, Performance: A

The Fred Hersch Trio Plays
The Fred Hersch Trio
CHESKY JD 116, CD; 63:21
Sound: A, Performance: A-

Pianist Fred Hersch released his *Dancing in the Dark* album (Chesky) in 1993, and it went on to earn a grammy nomination. In that year he also released *Red Square Blue* (Angel/EMI), dubbed “jazz impressions of Russian composers.”

This year, to date, Hersch’s name and talents (which also include producer, composer, sideman, and benefit organizer) are associated with six

releases; three benefit albums, one as a sideman, and two—*The Fred Hersch Trio Plays* and *Live at Maybeck*—as leader.

Such output would have us believe Hersch is a man on a mission, and he is. As an increasingly important

voice in AIDS awareness (he was diagnosed HIV positive a few years ago) and gay issues, he’s an iconoclast relative to the heterosexual machismo of the jazz community. And being so out has, no doubt, fueled his creativity. But he’s also an artist with lots of brilliant music to share, enough to warrant abundant releases.

Live at Maybeck, Concord’s 31st in their ongoing solo piano series, is impressive from a number of standpoints. Hersch displays articulate prowess throughout, whether interpreting one of several popular standards here (notably Thelonius Monk’s “In Walked Bud”) or delivering his own introspective take on Herbie Hancock with “Sarabande.”

Meanwhile, *The Fred Hersch Trio Plays* is a superbly recorded disc that houses a series of quite divergent but always pleasing trio works.

All but one of the dozen pieces is an interpretation of a work by a great jazz composer. Hersch, diligent, intelligent, and with consistent sensitivity and modernism, entertains while moving deftly and subtly

through Miles Davis, Monk, Hancock, Ellington, Coltrane, Sonny Rollins, and others. The lone Hersch original, “Evanessence,” is strategically placed in the middle of the 12-pack.

Gliding easily over and through the different time signatures in each of these pieces, Hersch is capable of stopping, starting, and pausing by turns, without missing a beat. He remains delicate in his approach, but is unafraid to challenge himself or his bandmates.

Bassist Drew Gress is always where he should be in supporting Hersch, but it’s the pianist’s excellent rapport with drummer Tom Rainey that is most noticeable. The two seem to viscerally know where the other is, particularly during the album’s many moments of quiet. And Hersch’s ability to make his piano

Folklore

Vincent Herring

MUSICMASTERS 65109, 57:34

Vincent Herring may have been shot straight out of Adderly’s cannon (he currently commands the alto chair in Nat Adderly’s band), but he has exploded on the scene as a forceful



leader with a voice all his own. *Folklore*, recorded live at the Village Vanguard, brims with the same

buoyant spirit that Cannonball radiated and has a similar knack for memorable two-horn lines. Trumpeter Scott Wendholt proves to be a more-than-competent foil, and, with pianist Cyrus Chestnut as the anchor, Herring’s quintet never strays too far from its deep-blues grounding. Herring virtually sails out of Wendholt’s “Window of Opportunity” on the wings of his soprano saxophone for an impressive improvisational flight. Throughout, the young saxophonist displays enough confidence to look past his own horn and base his ideas on a group sound. As Chestnut’s two-fisted brilliance on “Fountainhead” suggests, he’s in good hands. *Larry Blumenfeld*

breathe in an almost Debussy-like manner is matched by Rainey's tender embrace of the cymbals.

Perhaps the only shortcoming here may be in the programming and sequencing of selections, one too many ballads. But it's really difficult to find any heavy fault with Hersch and this fine recording.

Jon W. Poses

Turn On Your Love Light

Bobby Bland

MCA MCAD2-10957, 2:16:35

Bobby "Blue" Bland has long had two strikes against him in winning over new blues fans; he doesn't play guitar, and his urbane music is poles apart from the more popular Delta and Chicago blues styles. Yet, as an extraordinary singer with stature among his peers, and with record sales to back him up, Bland is a giant.

This second compilation of his '60s Duke sides has more hits than the first (like the great gospel-flavored "You're Worth It All" and others). His "Farther Up The Road" inspired Eric Clapton,



while the horn charts from "Turn On Your Love Light" (yes, Bland did it first) were long a staple for dozens of lounge acts. Credit Joe Scott for timeless arrangements that threw the thundering momentum of a small orchestra behind this extraordinary singer.

If only today's bands would study these sides with the same devotion brought to analyzing the latest guitar solo. They'd learn that musicians can punch out polished arrangements with drill-team precision without sacrificing a performance's passion and spontaneity. All you need is a vocalist in the same league as Bobby Bland.

Roy Greenberg

Up and Down

Milcho Leviev & Dave Holland

MA RECORDINGS M002A, 66:16

These two veteran players are at turns challenging and comfortable. Dave Holland is the most gifted bassist of his generation, while Milcho Leviev is a Bulgarian-born journeyman pianist who's been in this country since the early 1970s, playing with Don Ellis. Leviev brings a classical sense of phrasing to his jazz

AT THE DEER HEAD INN

*Keith Jarrett, Gary Peacock,
Paul Motian*

ECM 1531 78118-215, 66:33

Sound: B+, Performance: A



key, so the guy groans, and he requires absolute "appropriate concert-type behavior" at his gigs: No smoking, no coughing, and for God's sake make sure you hit the bathroom before he starts playing. But eccentricities aside, Keith Jarrett, particularly in a trio setting, seems to be getting better, swinging harder, and sort of coming back to the fold, as it were. Perhaps it's safe to say that his pretentious Köln Concert days are long-since over.

At least that's what this less-formal live recording seems to indicate. For certain, Jarrett entered this sentimental project in a different frame of mind. Located in the Allentown/Bethlehem, Pa. area, The Deer Head Inn is the long-standing restaurant and music establishment where Allentown native Jarrett landed his earliest professional work, gigging at times as a drummer and even playing guitar on one occasion for Stan Getz. And this live date is perhaps a re-dedication, or even a catharsis. He reunites with drummer Paul Motian (after



group to play its improvisational heart out with. Quite simply, there's not a weak link in this seven-song, hour-plus-long program.

Jon W. Poses

improvisations that often lends a chamber mood even when he's crashing the keys or pounding out Charlie Parker's "Billie's Bounce." The duo mostly perform self-penned tunes, such as Holland's raucous "Jumpin' In," with Leviev moving from Cecil Taylor-ish sweeps to a splash of ragtime. But they also show a lyrical side, dipping into the underrated songbook of John Abercrombie.



John Diliberto

Lunar Crush

David Fiuczynski John Medeski

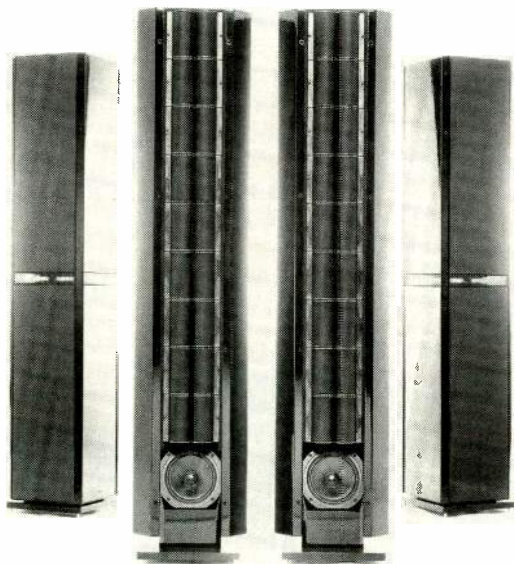
GRAMAVISION R2 79498, 57:02

Downtown N.Y.C. guitar hero Dave "Fuze" Fiuczynski and keyboardist John Medeski possess a more than ample supply of chops.

As served up here, they're covered for the most part by a messy but delicious layer of sonic cheese. But, as the album's opener, "Vog," bears out, this raucous outing is more satisfying—and more substantial—than any manner of store-bought junk food. With Fuze's guitar alternating between angular precision and wobbly fuzz, Medeski skips from clavinet through power organ to Fender-Rhodes; the effect is equal parts of Edgar Winter and '80s Miles Davis. Though vocals by Michelle Johnson and Gloria Tropp nudge the project toward art-rock pretense, the two principals bear more earthy inspirations (try "Slow Blues for Fuze's Mama" as proof). As a result, the not inconsiderable pyrotechnics achieve a distinct brand of postmodern funk.



Larry Blumenfeld



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Mistérios

Wallace Roney

WARNER BROS. 9 45641-2, 59:10

Trumpeter Wallace Roney will never fully sidestep the shadow of Miles Davis, yet his own bristling tone and sense of harmonic invention nonetheless assure that his own horn shines. On his debut for Warner Bros., Roney enjoys some Miles-like trappings—most obviously in the form of quirkily lush orchestral arrangements by a man named Gil (Goldstein, not Evans) and in the presence of producer Teo Macero. Surely, Roney shares more than just a lonely, piercing upper register with Davis: He employs notable restraint to create well-placed silences.



Urged along here by a fine group featuring pianist Geri Allen and saxophonist Antoine Roney (Wallace's brother), Roney crafts a consistent structure over a wide range of compositions by people like Jaco Pastorius, Egberto Gismonti, Milton Nascimento, and others. He single-handedly revives John Lennon and Paul McCartney's "Michelle" from tired inconsequence, and rescues Dolly Parton's "I Will Always Love You" from Whitney Houston bombast.

Larry Blumenfeld

Catch Up With The Blues

Johnny Copeland

VERVE 314 521 239-2, 54:57

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singer. Match Houston's favorite son with top-notch production, as on his latest Verve CD, and few contemporaries can touch him. *Catch Up*

With The Blues might be his best album in a career distinguished by remarkable consistency. The songs are varied and strong, Copeland is in typically fine form, and he trades licks with fellow Gulf Coast guitarists Lonnie Brooks, Clarence "Gatemouth" Brown, and Joe Hughes. Although modern in outlook, *Catch Up With The Blues* is blues without apology, built on the horn-driven shuffles at the heart of the Texas sound. Yet Copeland is equally at home with "Every Dog's Got His

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Day," a soul blues with the Memphis Horns recalling the heyday of Stax. All told, it's state-of-the-art Texas blues that seems shorter than its running time even after a dozen plays.

Roy Greenberg

FAST TRACKS

In the Evening Out There: Paul Bley/Gary Peacock/Tony Oxley/John Surman (ECM 78118-21488-2, 56:19). This album is deceptive since these four intuitive improvisors appear together on only one of the tracks. The rest are solos and duos that sound like they could be outtakes from a previous session, which, given the 1991 recording date, I suspect they were. There are some interesting moments but a lack of vitality to these leftovers.

J.D.

My Guitar and Me: Hubert Sumlin (Evidence ECD 26045-2, 48:28). This 1975 session, one of the first for this legendary Howlin' Wolf sideman, brims with mostly instrumentals with a relaxed yet stinging sound full of fancy flourishes. Sumlin's fingerstyle makes his guitar whine with an almost vocal presence, while four excellent acoustic numbers and a bonus, previously unreleased jam make this reissue a very hot classic.

M.W.

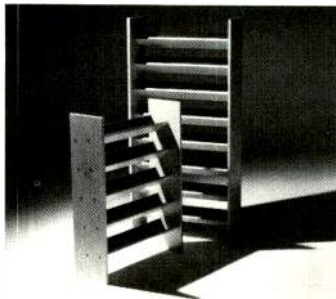
Urbanator (Hip Bop Records 7 38572 800123, 51:34). The jazz/hip-hop thing—like Acid Jazz—is typically a statement of fashion rather than a statement of music. But with Urbanator, the priorities are straight. Here, veterans Michal Urbaniak (violin), Lenny White (drums), and Al McDowell (plus newcomer Jon Dryden on keys) bring musicianship and artistry to an over-hyped experiment that has fallen flat in the hands of others. The one and only Herbie Hancock guests on a reading of his classic, "Chameleon." Kenny Garrett, Michael and Randy Brecker, and other notables also make contributions to this recording.

M.B.

The Soto Koto Band: (Higher Octave Music 7049, 39:24) Dynamic and sophisticated all-instrumental Gumbay music from the world root of blues and jazz, Gambia (remember Roots?). Mostly compositions of Paps Touray these very contemporary African sounds mix hypnotic, danceable guitar/synthesizer sound and percussion with some New Age guest musicians. What a delightfully unexpected "up" sound this release offers!

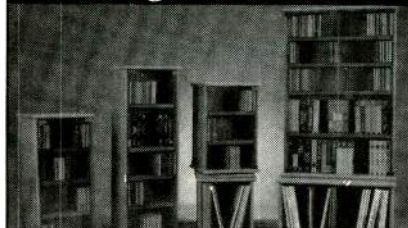
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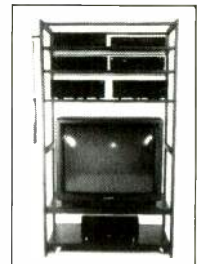


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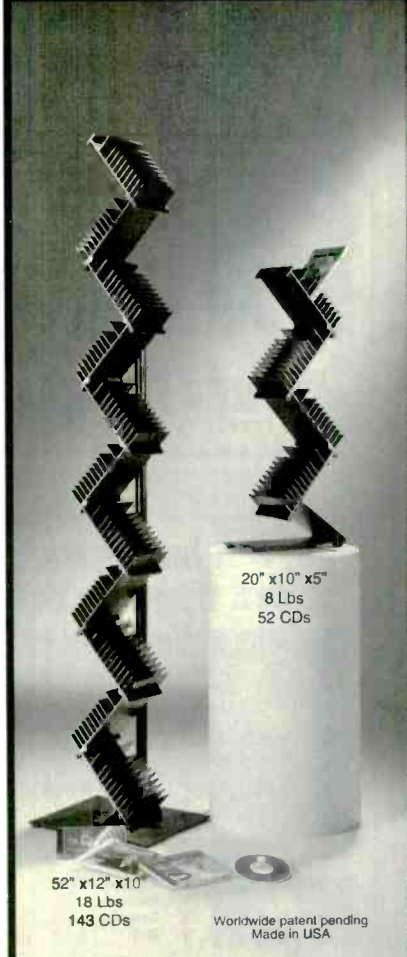


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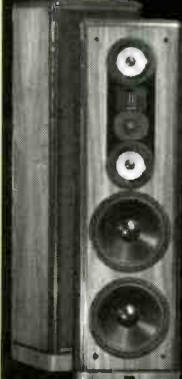


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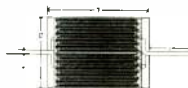
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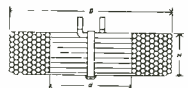
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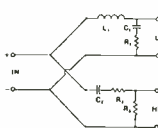
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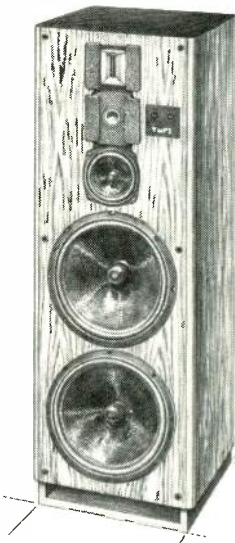


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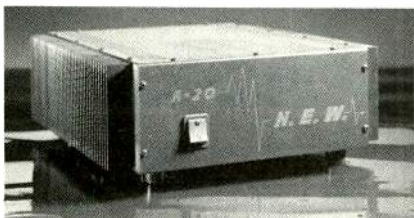
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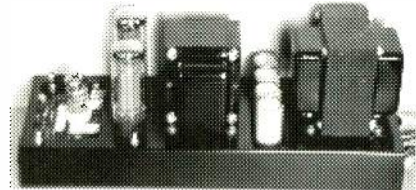
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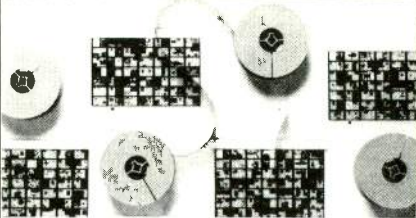


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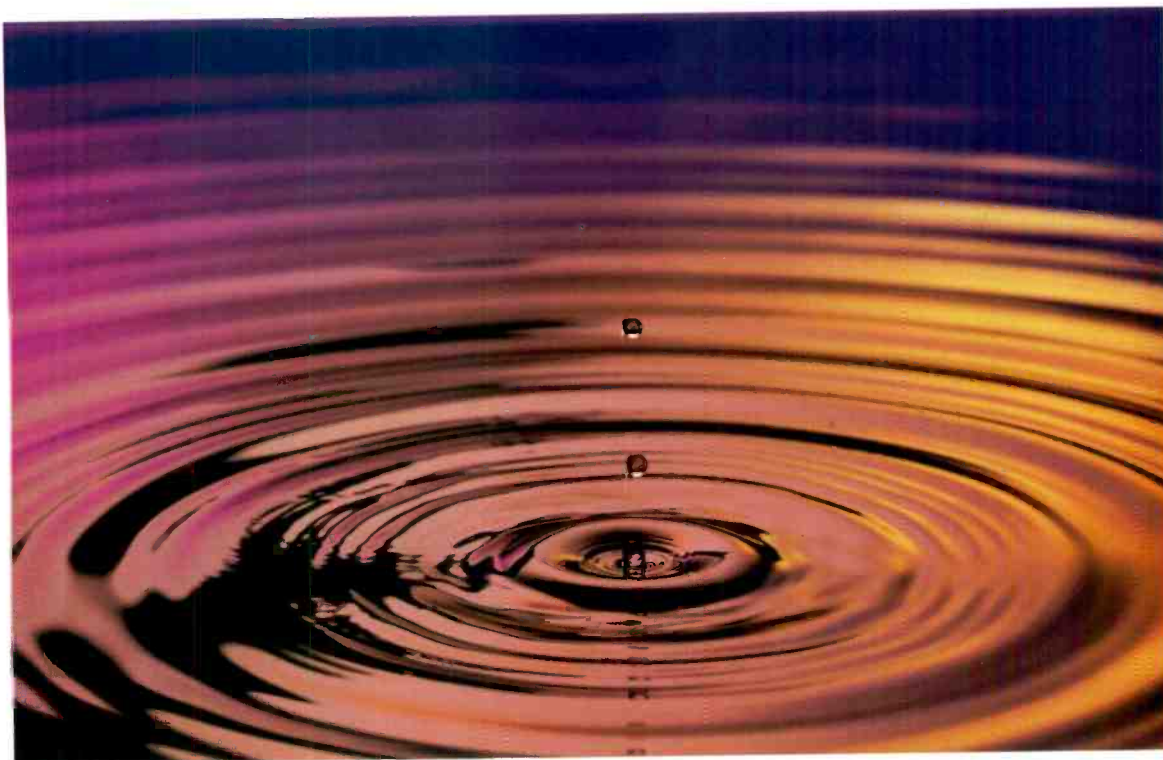
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