DECEMBER 1992

Audio

MINIDISC MECHANICS

THE SWEET SOUND OF TUBES NOBIS CANTABILE AMP

TESTED
CLASS ACT
JBL L7 SPEAKER

A/V RECEIVER ROUNDUP WE PICK THE BEST OF SEVEN
DENON, JVC, K
PIONEER, SAN

US $2.95
UK £1.95
CAN $3.50

12
060030
0 270321 7

ES

THE SOUND OF PURE GENIUS.

It is most evident in a passion for details. The subtle refinements that elevate genius beyond that which is merely exceptional. To honor this ability in gifted young musicians, Sony has created the "ES Award For Musical Excellence," in conjunction with The Juilliard School.

To reproduce, with equal passion, the glorious details of music, we have created the Elevated Standard series of ultra-fidelity components. For a listening experience you will find truly prodigious, call 1-800-828-1380 for information.

© 1992 Sony Corporation of America. All rights reserved. Sony is a Trademark of Sony.


SONY

Audio

AUDIO 45 Years 1947-1992

DECEMBER 1992 VOL. 76, NO. 12

A/V Receivers, page 46

Peter Asher, page 60

FEATURES

A/V RECEIVER ROUNDUP	Leonard Feldman	46
THE MECHANICS OF SONY'S MINIDISC: BEYOND THE CADDY	Leonard Feldman	56
THE AUDIO INTERVIEW: PETER ASHER	Ted Fox	60
1992 ANNUAL INDEX		176

EQUIPMENT PROFILES

NOBIS CANTABILE AMPLIFIER	Bascom H. King	72
YAMAHA CDC-835 CD CHANGER	Leonard Feldman	103
AUDIX SCX-ONE STUDIO MIKE SYSTEM	Jon R. Sank	108
JBL L7 SPEAKER	D. B. Keele, Jr.	114
AURICLE: PIONEER ELITE PD-65 CD PLAYER	Leonard Feldman	126
AURICLE: MOBILE FIDELITY SOUND LAB ULTRAMP PREAMP AND AMP	Anthony H. Cordesman	130

MUSIC REVIEWS

CLASSICAL RECORDINGS	138
ROCK/POP RECORDINGS	148
JAZZ & BLUES	160

DEPARTMENTS

FAST FORE-WORD	Eugene Pitts III	4
SIGNALS & NOISE		6
TAPE GUIDE	Herman Burstein	11
AUDIOCLINIC	Joseph Giovanelli	16
WHAT'S NEW		22
BEHIND THE SCENES	Bert Whyte	33
CURRENTS	John Eargle	38
ROADSIGNS	Ivan Berger	40
THE BOOKSHELF		134

The Cover Equipment: Nobis Cantabile amplifier
The Cover Photographer: ©Michael Groen

Audio Publishing, Editorial, and Advertising Offices, 1633 Broadway, New York, N.Y. 10019.

Subscription Inquiries, (800) 274-8808; in Canada or other foreign countries, (303) 447-9330.

The Audit Bureau

MPA

MiniDisc, page 56

Photo CD, page 38

Nº 30

REFERENCE DIGITAL PROCESSOR

PRIDE IN THE DETAILS . . .

Mark Levinson® components have earned a reputation for their rugged reliability, uncompromising fit and finish and, above all, superior sonics. We at Madrigal Audio Laboratories are understandably proud of this reputation.

The presence of "high technology" in our society has, for some, come to mean the absence of craftsmanship. Mass-produced look-alikes are everywhere, even in the realm of so-called high-end audio. The quality that you see and hear in a Mark Levinson component is not the result of automated mass production—rather, it is the result of painstaking attention to the details of design, and of pride in the art of craftsmanship.

Mark Levinson components are handcrafted in limited quantities and to exacting specifications. All who participate in their production share the feeling of pride that comes from knowing that they contribute to a product that defines quality.

It is with great pride, then, that we introduce the Mark Levinson Nº 30 Reference Digital Processor. Five years of exhaustive research into digital audio yielded a processor worth waiting for, deserving of the Levinson marque.

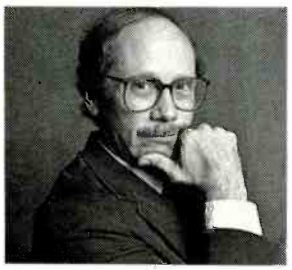
The Nº 30 is a true reference: it neither adds to nor subtracts from the music. It brings to your home the accuracy as well as the essence of the performance. Finally, the promise of digital audio is fulfilled.

The Nº 30 is proof that state-of-the-art digital *and* analog technology can coexist with craftsmanship. The subject here, however, ultimately is music, and the heart of music is in the listening. To fully appreciate the quality of the Nº 30, we recommend that you visit your Mark Levinson dealer for a full audition.

mark levinson®

Mark Levinson® products are designed and manufactured by
MADRIGAL AUDIO LABORATORIES P.O. Box 781, Middletown, CT 06457 FAX (203) 346-1540

FAST FORE-WORD



In those last frantic days of the last Congressional session, a piece of legislation of interest to me, and which I believe will affect you, has been passed. I recently spoke about this bill to the New Jersey State Bar Association's Entertainment and Arts Law Section.

The bill, S.1623, is called the Audio Home Recording Act (AHRA) and puts a new type of "tax" on digital recorders and blank recording media. The Senate passed it by unanimous consent the day before I wrote this. The essence of the bill is that there will be a 3% royalty fee on the factory price of the blank media (read Digital Compact Cassettes and MiniDiscs) and a 2% surcharge on the factory price of digital recorders, with a $1 minimum and an $8 maximum. The money collected will go to performers, record companies, publishers, and songwriters.

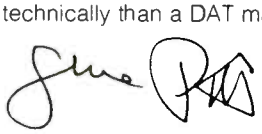
Now note that this is on digital recorders and media, not analog. Further, it says that it is now "legal" to copy in the home, even though it has been possible to do so for 100 years or more—just roll one cylinder machine up to another, horn to horn. I wonder if there aren't enough teeth in present piracy laws? Why didn't this issue get settled long years ago? Why did it have to come to the fore only when technology would allow home consumers the ability to make copies as good as the master tape? Is the record industry not willing to let us have copies or recorders as good as theirs?

The recording industry has complained for some years that they were losing sales to home taping, which they viewed as something close to outright piracy (which I define as copying to sell). While clearly there have been lots of blank cassettes sold, I believe that what one copies in one's own home is a Fourth Amendment or privacy issue, rather than a copyright issue. In my view, the taped copies of both individual songs and whole discs one makes for friends or for use in the car or at the summer retreat are fair use. I cannot reasonably object if you pass along this copy of *Audio* to a friend to read or even if you make a copy of the Annual Index.

The essential thing here is money. I do not make a living from last year's ideas or work. To say that one cannot make compilations that would never exist as commercial releases because they come from three competing labels is . . . well, passing strange to me.

But there was a lawsuit, more threatened than real, though it could have eaten up millions of dollars in lawyer fees, just like the Betamax case that was essentially about the same issue. Now, my lawyer friend, who invited me to speak to the N.J. Bar section, pointed out to me on the way home that in the Betamax case the Supreme Court really didn't decide that it was legally proper to copy on a VCR, saying simply that the Court saw no substantial financial damage from copying. That's the narrow interpretation of the ruling. Well, times have changed, and the movie industry is doing the copying now; they're in the rental business, a whole new industry, and they're fatter than ever. In that regard, the Recording Industry Association of America has just reported that "the industry's midyear dollar value of $3.8 billion represents a healthy 11.33% increase over midyear 1991." (In addition, the RIAA says that both CD unit shipments and dollar value are for the first time larger than those for cassettes.) This tax represents a new revenue stream for them, at the expense of the audio industry.

The bill also requires inclusion of the Serial Copy Management System (SCMS) in all consumer digital recorders. The system prevents second-generation digital copying. Since there are available pro digital recorders sans SCMS, this seems like a minor difficulty. In the end, I am glad to have some sort of digital recorder on the market, supported by software, even if it is poorer technically than a DAT machine.



Audio

V.P./Editor-in-Chief: Eugene Pitts III

Art Director: Cathy Cacchione
Associate Art Director: Linda Zerella

Technical Editor: Ivan Berger
Managing Editor: Kay Blumenthal
Associate Managing Editor: Teresa Carriero
Associate Managing Editor: Douglas Hyde
Directory Editor: Ken Richardson
Assistant Editor/Music: Michael Bieber

Associate Editors:
Edward Tatnall Canby, Bert Whyte
Senior Editors:
Leonard Feldman, D. B. Keele, Jr., David Lander

Contributing Editors/Artist:
M. Aldred, H. Burstein, D. L. Clark, A. H. Cordesman, T. Costa, J. Diliberto, F. Driggs, J. Eargle, S. Elliott, E. J. Foster, J. Giovanelli, B. H. King, E. M. Long, R. D. Long, F. Lovece, J. W. Poses, J. R. Sank, J. Sunier, M. Tearson, J. & S. Tiven, M. Wright

General Manager: Greg Roperti
Production Director: Silvia Coppola
Production Manager: Kerry Tonning
Research Manager: Dru Ann Love
Office Manager: Nadine Goody
Operations Manager: Sylvia Correa
Ad Coordinator: Linda Neuweiler

V.P./Group Publisher: Nicholas Matarazzo
(212) 767-6035
V.P./Associate Publisher: Tony Catalano
(212) 767-6061

ADVERTISING
Regional V.P./Ad Director, East Coast:
Charles L. P. Watson (212) 767-6038
Regional Account Mgr.:
Christine B. Forhez (212) 767-6025
Regional V.P./Ad Director, Midwest:
R. Scott Constantine (212) 767-6346
Regional V.P./Ad Director, West Coast:
Bob Meth (213) 954-4831
Western Mgr.: Paula Mayeri (213) 954-4832
National Record Label Sales: MAG Inc.
Mitch Herskowitz (212) 490-1715
Steve Gross (212) 490-1895

HACHETTE MAGAZINES

Chairman: Daniel Filipacchi
President, CEO, and COO: David J. Pecker
Exec. V.P. and Editorial Director: Jean-Louis Ginibre
Sr. V.P./Dir. Corp. Marketing: Paul DuCharme
Sr. V.P./Dir., Corp. Sales, Mag. Network: Jay Burzon
V.P./Dir. of Strategic Planning, Adv. & Circ.: Patrice Listfield
V.P., Chief Financial Officer: Paul De Benedictis
V.P., Corp. Communications: Jolie Cross Doyle
V.P., General Counsel: Catherine Flickinger
V.P., Mfg. & Distribution: Anthony Romano
V.P., Circulation: Leon Rosenfield

AUDIO, December 1992, Volume 76, Number 12. AUDIO (ISSN 0004-752X, Dewey Decimal Number 621.381 or 778.5) is published monthly by Hachette Magazines, Inc., a wholly owned subsidiary of Hachette Publications, Inc., at 1633 Broadway, New York, N.Y. 10019. Printed in U.S.A. at Dyersburg, Tenn. Distributed by Warner Publisher Services Inc. Second-class postage paid at New York, N.Y. 10001 and additional mailing offices. Subscriptions in the U.S., $24.00 for one year, $42.00 for two years, $58.00 for three years; other countries, add $8.00 per year. **AUDIO®** is a registered trademark of Hachette Magazines, Inc.

©1992, Hachette Magazines, Inc. All rights reserved. The Editor assumes no responsibility for manuscripts, photos, or artwork. The Publisher, at his sole discretion, reserves the right to reject any ad copy he deems inappropriate.

Subscription Service: Forms 3579 and all subscription correspondence must be addressed to AUDIO, P.O. Box 52548, Boulder, Colo. 80321-2548. Allow 8 weeks for change of address. Include both old and new address and a recent address label. If you have a subscription problem, please write to the above address or call (800) 274-8808; in Canada or other foreign countries, (303) 447-9330. Canadian GST Number 126018209. **Back Issues:** For information, write to P.O. Box 7085, Brick, N.J. 08723.

Form Function Flexibility

MICRO II from Infinity. It's the soul of a home theater surround sound system—a high-tech, high performance, compact replacement for your old speakers *and* the ideal speaker system for your balcony, bedroom or patio.

The MICRO II 2-way satellites mate to the subwoofer to reproduce the musical spectrum with lifelike musicality. Broadly dispersed, clean musical patterns are produced by the satellites for superb sound imaging. Harmonically true bass dynamics are developed by a pair of subwoofer drivers in a specially tuned enclosure with curved exit port.

Magnetic shielding lets you place the satellites near your TV without causing color distortion. Or, using the versatile installation brackets, you can mount the satellites to walls, ceiling or entertainment cabinetry—angling or pivoting them for both optimum placement and sonic performance.

Experience the *only* 3-piece system that can satisfy your musical and lifestyle requirements for form, function and flexibility.

Call **(800) 765-5556** for the Infinity dealer nearest you. In Canada, call (416) 294-4833, H. Roy Gray, Ltd.

Infinity®

We get back to what it's all about. Music.

©1992 Infinity Systems Inc. A Harman International Company

Felt Found in Rogers . . .
Dear Editor:

I enjoyed Richard J. Kaufman's September article, "With a Little Help from My Friends," about improving loudspeaker imaging with foam rings or felt blankets. Eager to obtain maximum sound at minimum expense, I rushed to my listening room and pried the cover from one of my Rogers LS3/5A speakers. Lo and behold, I found that Rogers had already enclosed the tweeter with a rectangle of felt.

I have always been pleased with the imaging of the Rogers. Even today, 14 years after purchase, I am still very satisfied with the sound. I guess the felt really does work!

Mark Urban-Lurain
Mason, Mich.

. . . and Spica and Vandersteen
Dear Editor:

In his September article on the effectiveness of foam rings and felt pads in speakers, Richard J. Kaufman says, "I don't know of a currently produced commercial speaker that uses a felt blanket on the baffle."

I think there are at least two. Unless I'm mistaken, the Spica TC-50 has a felt blanket on the entire front baffle (excluding drivers, of course), and the Vandersteen 2Ce (and perhaps other models from Vandersteen) has a felt pad surrounding the tweeter. Both speakers are noted for excellent imaging and smooth highs, qualities that Kaufman noted in his own experiments with foam and felt.

John Holdren
Greenwood, Va.

Editor's Note: Spica confirms that both the TC-50 and the Angelus employ the felt blanket described. According to Vandersteen, the 2Ce has a felt shroud covering the front of its tweeter enclosure; the Models 1B and 3 also use felt in this fashion.—*K.R.*

More Felt Tips
Dear Editor:

I read with interest Richard J. Kaufman's article in the September issue. I have been experimenting with felt tweeter rings and baffle blankets for several years, and I concur with author Kaufman and the "Critic." In fact, my ears suggest that covering the baffle with felt will have a more audible effect than adding a tweeter ring. A "singing" or underdamped baffle will blur the output of all drivers. Small woofers in two-way systems are particularly susceptible, especially if they are surrounded by large baffles. Double-sided tape works well as an adhesive for the blanket, and there is silicone for the truly committed.

Boxes with rounded baffle edges will benefit from a tweeter ring, as will those with sharper edges. It need not be a ring (a square will do), and it need not have a round hole (I find an octagon easier to cut in thick felt). The hole should be about 2 inches in diameter for a 1-inch dome tweeter.

Finally, I would humbly like to point out that the wavelength of 2.7 kHz is 5 inches, not 2.

William Reynolds

Duntech's Foam Original
Dear Editor:

I was surprised at the article by Richard J. Kaufman in your September issue discussing the placement of foam and felt surround on loudspeakers. In the mid-1970s, a company I represented as an attorney, Duntech Labs, placed an ad in your magazine for its Model DL-15 speaker system, with one of its main attributes being foam surrounding the midrange and tweeter to eliminate diffraction effects.

This treatment is subject to a patent issued to John H. Dunlavy, Jr., who was president of Duntech Labs at that time. Mr. Dunlavy has many patents in the antenna field, which has been his main area of expertise for over 40 years. He remains involved in the audio industry and is probably best known for the Sovereign line of Duntech loudspeakers.

I would appreciate your letting your readers know who was responsible for using this technology in speakers.

Donald M. Feferman
Corpus Christi, Tex.

More Books on Hearing
Dear Editor:

I would like to know if Diana Deutsch, the author of your magazine's review of the second edition of Stanley A. Gelfand's *Hearing: An Introduction to Psychological and Physiological Acoustics* ("The Bookshelf," July), might have other, more up-to-date texts or summations of the subject to recommend. I intend to prepare a booklet that combines the insights of the audiophile and audiology communities with respect to techniques that might be used to sharpen perceptual skills in the auditory sensory domain.

Michael D. Riley
Santa Monica, Cal.

Author's Reply: Mr. Riley raises an interesting question. Examples of the new approaches to hearing I referred to can be found in several journals, such as *Music Perception*, the *Journal of the Audio Engineering Society*, and the *Journal of the Acoustical Society of America*, though this may take some digging. You can also consult general reference works on perception, such as the *Handbook of Perception and Human Performance* (Wiley, 1986). John R. Pierce's book *The Science of Musical Sound* (Scientific American Library, 1983) is a beautifully clear introduction to the field, written by an author with a rare understanding of the key issues involved. My own edited volume *The Psychology of Music* (Academic Press, 1982) will go into a second edition shortly, and I anticipate that several texts combining the insights of audiophiles, musicians, engineers, and scientists will be published over the next few years.—*Diana Deutsch, Dept. of Psychology, Univ. of California at San Diego, La Jolla, Cal.*

Hail Lieberson!
Dear Editor:

In a sidebar accompanying his splendid salute to the late great Goddard Lieberson ("The Audio Interview: A Classic at Columbia," September), Robert Long kindly mentions my grandfather, Emile Berliner, inventor of the microphone and the disc record and co-founder of Victor Records, among other accomplishments. In this respect, I am disappointed Long failed to mention that in 1964 Lieberson was presented the Maker of the Microphone Award "for an outstanding contribution to the world of sound," a tribute to his innovation in bringing Broadway to America's back porches.

As one who is oft accused of living in the past—where it comes to the record business, at least—I'd like to point out

BENSON & HEDGES *Special Kings*

A Full Rich Flavor

In The New Pocket Pack.™ Discover "Soft Pack Feel In A Box."

In Short, America's Premium Cigarette

AVAILAELE IN LIMITED AREAS

SURGEON GENERAL'S WARNING: Quitting Smoking Now Greatly Reduces Serious Risks to Your Health.

© Philip Morris Inc. 1992

16 mg "tar," 1.1 mg nicotine av. per cigarette by FTC method.

Since we now have both discrete multi-channel and digital capabilities, why still try to defy the laws of mathematics?

one or two of my laments, alluded to in the article. Decca Records used to own Universal Pictures. MCA, Inc. now owns Universal and has abandoned the famous Decca label in favor of the not-so-famous MCA label. Sony has seen fit to abandon the world's oldest label, Columbia, to push the Sony logo. And where Bertelsmann Music Group continues to use (who wouldn't?) the "His Master's Voice" trademark (created by Emile Berliner in 1900 and now licensed to North American users by General Electric), we see the GE logo atop Manhattan's RCA Building and the BMG logo atop Hollywood's. What a shame.

Oliver Berliner
Beverly Hills, Cal.

Circuit Board of Appeals

Dear Editor:

It was in 1981 that *Audio* published the project of the Total Harmonic Distortion Analyzer by Robert R. Cordell. Circuit Works was listed as the source for the printed circuit board. From the start, the response was far greater than we ever expected, and it has continued all these years. We have made several additional production runs, and we still keep getting calls for more boards. With each order, we enclose assembly addenda that Mr. Cordell has furnished. Fortunately, we still have about 10 sets that are available to *Audio* readers.

This success story is truly a tribute to the brilliant engineering of Mr. Cordell and the vision of *Audio*.

Milton Edelman
Circuit Works
85 West Sylvania Ave.
Neptune City, N.J. 07753

The Job Hunt Is On

Dear Editor:

In April 1990, President Bush issued a directive for Chinese students and visiting scholars. Accordingly, I can apply for a job in the U.S. This is a great opportunity for me, and since I am looking for a job in audio engineering, perhaps some of your readers would take an interest in my skills.

I was a senior acoustics engineer in the Research Institute of TV and Electro-Acoustics, Beijing, China. After I graduated from Nanjing University in 1966, I worked in the field of electroacoustics in this Institute, including transducer and sound system research, design, development, and evaluation. I have a very strong technical background in electrical and electroacoustical engineering, and excellent technique with research, product management, and new product design cycles. Over the years, I have achieved much in electroacoustics, especially with loudspeakers, microphones, and sound systems. I was awarded four prizes for my research work in these fields by the Chinese government. I also have a patent for a miniature electret microphone that was approved by the Chinese government in 1989. Since August 1989, I have been working as a visiting scholar on psychoacoustics and architecture acoustics at the University of Florida.

Cangpu Li
702 S.W. 16th Ave., #208
Gainesville, Fla. 32601

"Virtual Reality" with Fake Sound?

Dear Editor:

In his July "Behind the Scenes," Bert Whyte makes a dramatic statement, which is highlighted on page 21, to wit: "For virtual reality to be successful, we must have sound quality that rivals the visual stimuli."

It is becoming more evident to more visually creative people just how important sound can be to any visual stimuli. If one is able to turn a reasonably fine meal at a highly rated restaurant into a mediocre experience by the ambience or music reproduction system, then one can surmise that sound may often be even more important than visual stimuli.

As a software producer and proponent of "quadraphonic" sound (there. I said it and I'm glad!), I was recently asked a simple but very serious question: If I had only two choices, would I opt for discrete multi-channel systems for recording and reproduction, or would I be satisfied with artificial simulation of multi-channel sound as long as it was digital? My answer, of course: Discrete multi-channel capabilities far outweigh the importance of the actual archival format—analog or digital!

But since we now have the benefit of both—discrete multi-channel systems with digital sound, in both professional and consumer applications—why are we wasting time on attempts to defy the laws of mathematics?

In order to present believable and accurate audio stimuli, a sound field must be created. A sound field requires a minimum of four balanced audio channels and loudspeakers, and a recording technique that emulates the symmetry, time, amplitude, and phase that allow the human ear/brain computer to localize images. A four-channel headphone set is possible to accomplish this task as well (I have one). Suffice to say, you cannot solve four unknowns (the mathematical properties of a sound field) with two simultaneous linear equations! This law applies to 4-2-4 matrix schemes as well as to phase manipulation schemes, no matter how complex the algorithms nor how powerful the computer.

Since most HDTV formats, new consumer and professional digital video formats, and film soundtrack formats of the future all contain [or will contain] discrete multi-channel and digital capabilities, what on earth are we still doing, talking about anything that synthesizes or simulates reality like a cartoon? For special effects, like equalization, echo, flanging, exciters, and so forth, I can buy it. But to suggest that sound fields can be created by defying the laws of mathematics heaps scorn on a professional audio industry that could do without it.

What those of us in the creative community must do is learn how to implement discrete multi-channel audio in order to lend that credibility to our creations, as Whyte suggested with his "virtual reality" comment. Our hands have been bound for too long, limited to two-channel delivery formats. No more, and it couldn't have come too soon to suit me!

Brad S. Miller
Mobile Fidelity Productions of Nevada
Incline Village, Nev.

Editor's Note: Brad S. Miller was the music industry representative on the National Quadraphonic Radio Committee (NQRC), which was cosponsored by the FCC and the Electronic Industries Association (EIA) and was charged with testing and evaluating four-channel broadcast systems. He also was the founder of Mobile Fidelity Sound Lab.—*E.P.*

GET 8 CDs!!

GET 8 CDs!!

With Nothing More to Buy Ever!

INXS: Welcome To Wherever You Are (Atlantic) 11070

Eric Clapton: Unplugged (Warner Bros.) 23690

Guns N' Roses: Use Your Illusion I (Geffen) 35469 †

Elton John: The One (MCA) 35022

GET 8 CDs FOR THE PRICE OF 1

also available on cassettes!

Bobby Brown: Bobby (MCA) 11121

The Baddest Of George Thorogood And The Destroyers (EMI) 84002

Temple Of The Dog (A&M) 31124

Clint Black: The Hard Way (RCA) 35458

Barcelona Gold (Warner Bros.) 63472

Carreras, Domingo, Pavarotti: 3 Tenors (London) 35078

Lindsey Buckingham: Out Of The Cradle (Reprise) 20483

Eagles: Greatest Hits 1971-1975 (Asylum) 23481

Natalie Cole: Unforgettable (Elektra) 83452

The Very Best Of The Righteous Brothers: Unchained Melody (Verve) 44658

John Mellencamp: Whenever We Wanted (Mercury) 74582

Robert Palmer: Addictions, Vol. 2 (Island) 25277

Michael Penn: Free-For-All (RCA) 20668

Pat Metheny: Secret Story (Geffen) 82267

The Doors/Sdtrk. (Elektra) 54289

Mo' Money/Sdtrk. (A&M) 71593

Beastie Boys: Check Your Head (Capitol) 92473

Eric Clapton: Rush-Music From The Motion Picture Soundtrack (Reprise) 05632

Bryan Adams: Waking Up The Neighbours (A&M) 35175

Rod Stewart: Downtown Train (Warner Bros.) 10708

K.D. Lang: Ingénue (Warner Bros./Sire) 44370

Traffic: The Low Spark Of High Heeled Boys (Island) 25169

The Cure: Wish (Elektra) 11116

Frank Sinatra: Sinatra Reprise/ The Very Good Years (Reprise) 80304

Styx: Paradise Theatre (A&M) 25243

N.Y. Rock & Soul Revue (Giant) 63189

U2: Rattle And Hum (Island) 00596

Bon Jovi: New Jersey (Mercury) 00516

Squeeze: Singles 45's & Under (A&M) 35208

Prince & The N.P.G.: Diamonds And Pearls (WB/Paisley Park) 63372

Supertramp: Breakfast In America (A&M) 25246

Garth Brooks: Ropin' The Wind (Liberty) 25535

The Commitments/Sdtrk. (MCA) 74016

Extreme: Pornograffitti (A&M) 43557

Best Of The Grateful Dead: Skeletons From The Closet (Warner Bros.) 83892

Don Henley: The End Of The Innocence (Geffen) 01064

Steely Dan: Gold (MCA) 74339

Kronos Quartet: Pieces Of Africa (Nonesuch) 10472

Tom Petty & The Heartbreakers: Into The Great Wide Open (MCA) 35409

Lethal Weapon 3/Sdtrk. (Reprise) 73322

Gerry Mulligan: Re-birth Of The Cool (GRP) 64001

The Most Happy Fella / New Broadway Cast (RCA Victor) 10463

Al Jarreau: Heaven & Earth (Reprise) 63697

XTC: Nonsuch (Geffen) 35406

Linda Ronstadt: Frenesi (Elektra) 24810

Patty Smyth (MCA) 25090

Moody Blues: Greatest Hits (Threshold) 34284

CD853

Nirvana : Nevermind (Geffen) 15600

Dr. John: Goin' Back To New Orleans (Warner Bros.) 53246

The Best Of Jay & The Americans: Come A Little Bit Closer (EMI) 72262

Ringo Starr: Time Takes Time (Private Music) 35088

GRP All-Star Big Band (GRP) 63298

Battle: The Bach Album (DG) 73670

Anne Murray: Fifteen Of The Best (Liberty) 64657

Metallica: ...And Justice For All (Elektra) 00478

Bob Marley: Legend (Island) 53521

Lyle Lovett: Joshua Judges Ruth (MCA/Curb) 10508

Aerosmith: Pump (Geffen) 63678

ZZ Top: Greatest Hits (Warner Bros.) 83411

Grand Funk Railroad: Capitol Collector's Series (Capitol) 73258

Elvis Presley: The Number One Hits (RCA) 72190

Madonna: The Immaculate Collection (Sire) 54164

Paul Simon: Negotiations And Love Songs 1971-86 (Warner Bros.) 20461

Peter Gabriel: Shaking The Tree- 16 Golden Greats (Geffen) 11089

Soundgarden: Badmotorfinger (A&M) 05637

Neil Diamond: 12 Greatest Hits (MCA) 84050

A Tribe Called Quest: The Low End Theory (Jive) 24809

David Bowie: Changesbowie (Rykodisc) 43693

Guns N' Roses: Use Your Illusion II (Geffen) 25534 †

Billy Ray Cyrus: Some Gave All (Mercury) 41711

Sinéad O'Connor: I Do Not Want What I Haven't Got (Chrysalis) 33512

Enya: Shepherd Moons (Reprise) 53190

Bonnie Raitt: Nick Of Time (Capitol) 54410

Wynonna Judd: Wynonna (MCA/Curb) 64540

Hammer: Too Legit To Quit (Capitol) 25514

Carpenters: Lovelines (A&M) 24763

Daryl Hall & John Oates: Rock 'N Soul, Part 1 (RCA) 13313

Michael Crawford Performs Andrew Lloyd Webber (Atlantic) 74128

The Police: Every Breath You Take— The Singles (A&M) 73924

The B-52's: Good Stuff (Reprise) 53851

Sting: The Soul Cages (A&M) 25218

Fleetwood Mac: Greatest Hits (Warner Bros.) 00796

Van Halen: For Unlawful Carnal Knowledge (Warner Bros.) 10016

Peter Frampton: Classics (13 Greatest Hits) (A&M) 04894

TLC: Oooooooohhh... On The TLC Tip (LaFace) 50167

Wayne's World-Music From The Motion Picture (Reprise) 63551

Tears For Fears: Tears Roll Down (The Hits 1982-1992) (Fontana) 80162

Amy Grant: Heart In Motion (A&M) 25182

Jimi Hendrix Experience: Live At Winterland (Rykodisc) 63650

The Cars: Greatest Hits (Elektra) 53702

Bell Biv DeVoe: Poison (MCA) 00547

Bonnie Raitt: Luck Of The Draw (Capitol) 15567

Talking Heads: Stop Making Sense (Sire) 24560

Yanni: Dare To Dream (Private) 93703

Steppenwolf: 16 Greatest Hits (MCA) 13453

Miles Davis: Doo-Bop (Warner Bros.) 71151

James Taylor: Greatest Hits (Reprise) 23790

The Very Best Of The Boston Pops (Philips) 15319

Megadeth: Countdown To Extinction (Capitol) 63340

Damn Yankees: Don't Tread (Warner Bros.) 53663

Allman Bros. Band:A Decade Of Hits 1969-1979 (Polydor) 35031

BMG COMPACT DISC CLUB

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 5071 INDIANAPOLIS, IN

POSTAGE WILL BE PAID BY ADDRESSEE

BMG COMPACT DISC CLUB
P.O. Box 91412
INDIANAPOLIS IN 46209-9758

Start with **4** COMPACT DISCS NOW pay only shipping & handling with membership

Buy just **1** at regular Club prices within a year

Then get **3** more CDs of your choice, FREE shipping & handling charges are added

Enjoy **8** CDs for the price of 1

Nothing more to buy...EVER!

Olivia Newton-John: Back to Basics-The Essential Collection 1971-1992 (Geffen) 25334

The Who: Who's Better, Who's Best (MCA) 00790

Van Morrison: Moondance (Warner Bros.) 64585

Arrested Development: 3 Years, 5 Months And 2 Days In The Life Of... (Chrysalis) 25357

Jodeci: Forever My Lady (MCA) 90177

Kiss: Revenge (Mercury) 25279

DAS EFX : Dead Serious (Atco/EastWest) 25328

Janet Jackson: Janet Jackson's Rhythm Nation 1814 (A&M) 72386

Santana: Milagro (Polydor) 24813

Two Rooms-Celebrating The Songs Of Elton John & Bernie Taupin (Polydor) 35407

The Steve Miller Band: Greatest Hits 1974-1978 (Capitol) 33199

George Strait: Ten Strait Hits (MCA) 25425

Mötley Crüe: Decade Of Decadence (Elektra) 40298

Color Me Badd: C.M.B. (Giant) 25479

The Beach Boys: Pet Sounds (Capitol) 00513

The Neville Brothers: Family Groove (A&M) 24724

Mauceri: Hollywood Dreams (Philips) 25299

Pavarotti In Hyde Park (London) 40230

David Sanborn: Upfront (Elektra) 11104

Emerson, Lake & Palmer: Brain Salad Surgery (Atlantic) 54608

Faith No More: The Real Thing (Reprise) 63719

Kenny Rogers: 20 Great Years (Reprise) 25449

Art Porter: Pocket City (Verve/ Forecast) 54357

Randy Crawford: Through The Eyes Of Love (Warner Bros.) 10494

Anita Baker: The Songstress (Elektra) 40154

Blind Faith (Polydor) 25073

Juice/Sdtrk. (Soul/MCA) 05633 †

Bobby McFerrin & Chick Corea: Play (Blue Note) 05634

Melissa Etheridge: Never Enough (Island) 25435

Alabama: American Pride (RCA) 20614

Eagles: Greatest Hits, Vol. 2 (Asylum) 63318

Yes: Classic Yes (Atlantic) 50248

Joe Cocker: Night Calls (Capitol) 60071

The Very Best Of Cream: Strange Brew (Polydor) 00468

Fleetwood Mac (Reprise) 04897

Jethro Tull: Thick As A Brick (Chrysalis) 01023

Garth Brooks: No Fences (Capitol) 73266

Starship: Greatest Hits (RCA) 90270

R.E.M.: Out Of Time (Warner Bros.) 24762

Eric B. & Rakim: Don't Sweat The Technique (MCA) 43930

Mr. Big: Lean Into It (Atlantic) 24821

The Best Of The Doobie Brothers (Warner Bros.) 43738

The Benny Green Trio: Testifyin'! (Blue Note) 74312

Lorrie Morgan: Watch Me (BNA Entertainment) 03592

Paul Overstreet : Love Is Strong (RCA) 10745

Roy Hargrove: The Vibe (Novus) 54611

Guys And Dolls/ New Broadway Cast (RCA Victor) 61964

Beauty and the Beast/Sdtrk. (Disney) 10780

Chieftains: The Bells Of Dublin (RCA) 10943

Best Of Dire Straits: Money For Nothing (Warner Bros.) 00713

Little Village (Reprise) 05636

Kiss: Double Platinum (Casablanca) 25149

The Police: Outlandos D'Amour (A&M) 24159

Bruce Hornsby And The Range: The Way It Is (RCA) 63918

The Best Of Don McLean (EMI) 64550

Huey Lewis & The News: Sports (Chrysalis) 44448

Bryan Adams: Reckless (A&M) 51540

Bing Crosby's Greatest Hits (MCA) 04709

Jesus Jones: Doubt (SBK) 44654

En Vogue: Funky Divas (East West) 61717

The Very Best Of Thin Lizzy: Dedication (Mercury) 34826

The Mambo Kings/Sdtrk. (Elektra) 80250

Sergio Mendes: Brasileiro (Elektra) 53869

Kenny G: Live (Arista) 64505

Galway: Greatest Hits, Vol. 2 (RCA) 10746

Tom Petty: Full Moon Fever (MCA) 33911

Howards End/Sdtrk. (Nimbus) 14888 ★

Bill Haley & The Comets: From The Original Master Tapes (MCA) 83879 ★

Enya: Watermark (Reprise) 43249

Joe Henderson: Lush Life (Verve) 05611

Bryan Ferry/Roxy Music: Street Life - 20 Greatest Hits (Reprise) 10490

Tom Cochrane: Mad Mad World (Capitol) 11024

Peter Nero: Classic Connections (Pro Arte) 05653

Najee: Just An Illusion (EMI) 73237

Tracy Chapman: Matters Of The Heart (Elektra) 11050

Paula Abdul: Spellbound (Virgin) 73320

Lynyrd Skynyrd: Skynyrd's Innyrds (MCA) 01150

Aaron Tippin: Read Between The Lines (RCA) 05650

Whitney Houston: I'm Your Baby Tonight (Arista) 10663

Buddy Holly: From The Original Master Tapes (MCA) 20069 ★

Linda Ronstadt: Greatest Hits, Vol. I (Elektra) 63905

The Essential Canadian Brass (Philips) 35043

Boomerang/Sdtrk. (LaFace) 53395

U2: Achtung Baby (Island) 25174

Bob James And Earl Klugh: Cool (Warner Bros.) 63299

Red Hot Chili Peppers: Blood Sugar Sex Magik (Warner Bros.) 11127 †

Wilson Phillips: Shadows & Light (SBK) 40763

GET 8 CDs FOR THE PRICE OF 1

With Nothing More to Buy Ever!

also available on cassettes!

Billy Idol: Vital Idol (Chrysalis) 54038

Slaughter: The Wild Life (Chrysalis) 84072

Van Halen (Warner Bros.) 14620

Shirley Horn: Here's To Life (Shirley Horn w/Strings) (Verve) 11134

Chicago: Greatest Hits 1982-1989 (Reprise) 63363

Norrington: Beethoven, Symphony No.9 (Choral) (EMI Classics) 00467

George Harrison: Best Of Dark Horse, 1976-1989 (Dark Horse) 80307

Vangelis: Chariots Of Fire (Polydor) 24869

Moody Blues: A Question Of Balance (Threshold) 44588

CeCe Peniston: Finally (A&M) 53858

Reba McEntire: For My Broken Heart (MCA) 73624

Lou Reed: Magic & Loss (Warner Bros./Sire) 15470

Marc Cohn (Atlantic) 82983

HERE'S HOW THE CLUB WORKS:

- **Get 8 for the Price of 1!** Choose 4 free CDs or cassettes from this ad, buy just 1 more at regular Club prices (currently $14.98 and up for CDs, $8.98 and up for cassettes) within a year, and then get 3 more Free! Shipping and handling charges are added to all shipments. The BMG Compact Disc Club is unlike other clubs which make you buy 6 CDs, or 8 cassettes at full price to complete your commitment.
- **Free 10-Day Trial!** Along with your 4 introductory selections, you'll receive a "Welcome Package" with complete details of the Club. Enjoy your introductory selections for 10 days. If you are not completely satisfied, you may return them without any further obligation. Send no money now; we'll bill you later.
- **Club Music Mailings**
  - About every three weeks (19 times a year), you'll receive our exclusive Club catalog which contains hundreds of selections from which to choose.
  - Each issue highlights a Featured Selection from your preferred music category. If you'd like the Featured Selection, do nothing and it will be sent to you automatically. If you prefer an alternate selection, or none at all, simply return the Notification Card, enclosed with each issue of your magazine, by the date specified on the card.
  - You have at least 10 days to return the Notification Card. If you do not want the Featured Selection, and do not have 10 days, you may return the Featured Selection at our expense.
- **Stay a member as long as you like.** After purchasing your regular-Club-price selection, you may cancel your membership at any time simply by writing to us. If you remain a member, you'll enjoy additional savings on CDs or cassettes with our special sales and bonus discounts.
- **Save with Instant Bonus Discounts.** Members who choose CDs are entitled to instant sales or discounts with every additional CD you buy. These Instant Bonus Discounts begin with your very first CD purchase. Also, the longer you remain a member, the better the sales get. Other clubs make you buy 6 or more at full price before you "earn" savings like this.
- **Cassettes also available.** Simply check the "cassettes" box on the postage-paid reply card if you prefer to receive your selections on cassettes.
- **If the reply card is missing,** please write to: BMG Music Services, P.O. Box 91001, Indianapolis, IN 46291

CD853 BMG Music Services, 6550 E. 30th St., Indianapolis, IN 46219-1194. TRADEMARKS USED IN THIS ADVERTISEMENT ARE THE PROPERTY OF VARIOUS TRADEMARK OWNERS. © 1992 BMG Direct Marketing, Inc.

†=Parental advisory; explicit lyrics ★Not available on cassette.

COMPLETE THE POSTAGE-PAID REPLY CARD AND START SAVING TODAY!

BMG COMPACT DISC CLUB

Mail to: BMG Compact Disc Club / P.O.Box 91412 / Indianapolis, IN 46209-9758

❶ Please accept my membership in the BMG Compact Disc Club and send my four FREE CDs as I have indicated here under the terms of this offer. I need buy just one more CD at regular Club prices during the next year. After that, I can choose 3 more CDs FREE! Shipping and handling charges are added to all shipments. That's 8 for the price of 1, *with nothing more to buy...ever!*

❷ Send my selections on (check one only): ☐ Compact Discs ☐ Cassettes (1)

❸ **RUSH ME THESE 4 CDs NOW** (Indicate by number): | | | | |

❹ I am most interested in the music category checked here — but I am always free to choose from any (check one only):

1 ☐ **LIGHT SOUNDS** Bette Midler, Frank Sinatra
2 ☐ **COUNTRY** Reba McEntire, Hank Williams, Jr.
3 ☐ **HARD ROCK** U2, Dire Straits
4 ☐ **POP/SOFT ROCK** Bonnie Raitt, Paula Abdul
5 ☐ **CLASSICAL**(2) Luciano Pavarotti, Vladimir Horowitz
6 ☐ **JAZZ** Dave Grusin, Yellowjackets
7 ☐ **HEAVY METAL** Mötley Crüe, Skid Row

❺ ☐ Mr. ☐ Mrs. ☐ Ms. First Name Initial Last Name (PLEASE PRINT)

Address Apt.

City State Zip

Telephone, please ( ) Area code

Signature

❻ Have you bought anything else by mail in the last: ☐ 6 months ☐ year ☐ never

(1) Members who choose cassettes will be serviced by the BMG Music Service. Current Music Service members are not eligible.
(2) Members who choose CLASSICAL as their listening interest will be serviced by the BMG Classical Music Service.
We reserve the right to request any additional information or reject any application. Limited to new members, only one membership per family. Local taxes, if any, will be added. Alternative offer available in Alaska and Hawaii. Offer not available in Puerto Rico, APO or FPO.

Dog and Horn are trademarks of General Electric Company, U.S.A. BMG logo TM BMG Music

Photocopies of this coupon are acceptable.

BMDRV (AS)

INSTANT 50% OFF BONUS DISCOUNTS

FOR MEMBERS WHO CHOOSE CDs!

The BMG Music Services Difference

You earn INSTANT 50% OFF BONUS DISCOUNTS *every time you buy a CD at regular Club prices.* Just buy 1, and take another at half price. With other clubs, you must first buy 6 or more at full price and become a "Preferred Member" before you earn savings like this!

HERMAN BURSTEIN

Attention, Norm Strong!

I believe I have a solution for Norm Strong's dbx woes ("Whatever Happened to Mike Inputs and dbx NR?" in "Tape Guide," January 1992). I have a dbx Model NX-40 encoder/decoder that I would be willing to part with for a very low fee (plus shipping). I don't use the unit, and it is in virtually new condition. It will also decode dbx LPs—rare products, but I will give Mr. Strong the few that I have, gratis.—John D. Cheatham, P.O. Box 1224, Redondo Beach, Cal. 90278

Mike Specs

Q. I am looking for a pair of microphones that are unidirectional, dynamic, and have a range of about 30 Hz to 16 kHz; these are to feed my portable tape deck, whose specs for the mike inputs give only the following: "0.25 mV (−70 dB), for low impedance." I'm not sure of the relationship of mike impedance, in ohms, to the deck's specs. I need mikes with high output. Would this mean mikes with 600-ohm impedance? Is a mike spec for open-circuit sensitivity important in connection with output?—Richard S. Hartley, Dover-Foxcroft, Maine

A. Low-impedance microphones generally have output impedances in the range of 50 to 600 ohms, although a few go as high as 1,000 or even 2,000 ohms. High-impedance mikes are those between about 10 and 50 kilohms. While there is a basic relationship between impedance and output, the relationship is not very linear. The higher the output impedance, the higher *tends* to be the output. High-impedance mikes have the obvious advantage of producing greater signal voltage, which helps make for a high signal-to-noise ratio, but they have the disadvantage of permitting only a few feet of connecting cable—about 10 to 15 feet—before cable capacitance causes serious treble loss.

It is quite possible that a 200-ohm mike will produce more output than a 600-ohm one. In other words, for a given sound input, the 200-ohm mike can be more sensitive than a 600-ohm mike. The sensitivity rating of a mike is ordinarily based on output voltage for a sound pressure of 1 microbar (μbar) applied to the mike. The output voltage is stated as so many dB below 1 V. For example, a given mike might have a spec of −65 dB/μbar, signifying that its output is 0.00056 V, or 65 dB below 1 V, for a sound pressure of 1 μbar.

The specification of your tape deck states that a signal 70 dB below 1 V (which is 0.25 mV, or 0.00025 V) can drive your deck to full recording level. Accordingly, you should look for a mike rated at no less than −70 dB; for example, −65 dB would be okay. As for output impedance, unless you plan to use extraordinarily long connecting cable, perhaps beyond 100 feet, it probably is not important whether the mike's impedance is 200 or 600 ohms.

To find the mike best suited to your needs, it is advisable to deal with a quality audio store, even though you may pay somewhat more than in a store that discounts heavily. Sometimes a store will try to push items it has heavily overstocked or on which it makes maximum profit, rather than try to truly serve the customer's needs. A high-quality dealer may provide a better opportunity to buy a mike on a money-back or trial basis.

Recording Level and Tape Type

Q. Why do most deck manuals advise using +2 or +3 dB recording level for peaks with Type I tape, and +5 or +6 dB with Type II tape? With metal tape (Type IV), they say one can go as high as +7 dB.—Anthony Hudaverdi, Santa Monica, Cal.

A. Type II tapes generally have higher coercivity than Type I tapes. This refers to the force required to magnetize a tape. Thus, a stronger signal must be applied to Type II to achieve a given recorded level. Furthermore, Type II can accept a stronger signal in the treble region before it goes into saturation. Accordingly, the optimum signal level employed in recording—that which maximizes S/N without incurring excessive distortion and treble loss—tends to be roughly 3 dB higher for Type II than for Type I. Type IV tape has still higher coercivity and so can accept a still higher recording level.

Differences in permissible recording level vary not only according to tape type but also according to brand. Whatever type and brand you decide to use, experiment to find the optimum recording level. Also, the optimum recording level may vary somewhat with the nature of the program material. All in all, there is some art to getting the best out of a recording.

Dolby S Progress

Q. I own two cassette decks—both with Dolby B, Dolby C, and Dolby HX Pro—that do a very good job of recording. Recently I read about a new form of Dolby noise reduction, Dolby S. As a typical audiophile, I am always interested in upgrading the performance of components, even those with performance that is very good. However, I don't wish to part with either deck, so I wonder if Dolby S encoding/decoding is available in an outboard unit, similar to the way dbx was once offered. If not, are there plans to do this in the near future?—Frank Ciccone, Wallingford, Conn.

A. As yet, the cassette deck industry has not been in a mad rush to incorporate Dolby S NR, evidenced by the fact that, according to the Equipment Directory in the October 1992 issue of *Audio*, only seven decks offer this feature. One reason is price: Dolby S NR itself adds to cost, and a deck must meet high standards set by Dolby Laboratories before it can include this system. Another reason is that the difference between Dolby C and Dolby S NR is not profound, particularly if you listen at fairly moderate levels, where noise is usually unobtrusive. This is not to say that Dolby S NR has no advantages; it does extend noise reduction to the bass range, and it is less sensitive than Dolby C NR to mistracking (mismatching of the record and playback levels).

I have no information as to whether or when Dolby S noise reduction will be available in a stand-alone unit.

Setting Recording Levels

Q. I am searching for a good way to set tape recording levels. My present method entails skipping through the entire recording, comparing the source material with the taped material for dis-

If you have a problem or question on tape recording, write to Mr. Herman Burstein at AUDIO, 1633 Broadway, New York, N.Y. 10019. All letters are answered. In the event that your letter is chosen by Mr. Burstein to appear in Tape Guide, please indicate if your name and/or address should be withheld. Please enclose a stamped, self-addressed envelope.

Your knowledge of a piece of music and its recording can help you determine the optimum setting of your deck's record level control.

tortion, and making appropriate adjustments. While this is not extremely difficult with my three-head deck, it does take some time. Is there a better way to check for saturation levels? I've read that the human ear is most sensitive to frequencies around 2,000 Hz. Would a test tone of this frequency provide a suitable tape saturation check?—Mark E. Richards, South Bend, Ind.

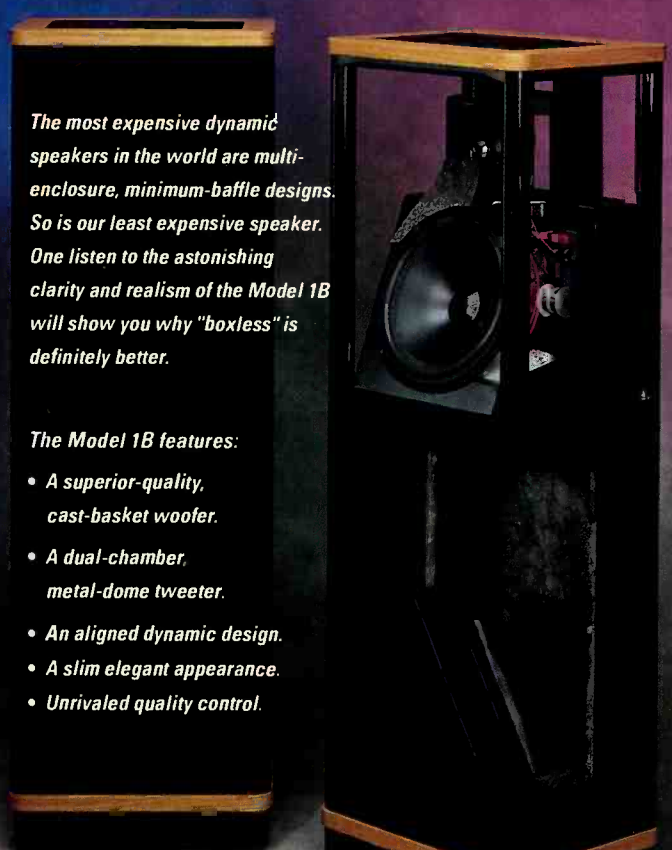
A. Let's assume that you are taping CDs. (Similar comments would apply to phono discs.) Your present procedure seems more laborious than necessary. Your guides to proper recording level should be the record level indicator of your deck, a reference setting of the record level control, and your own experience.

Use a CD with substantial dynamics to find the maximum setting of the record level control which permits undistorted recording to your ear. Note the corresponding reading of the record level indicator on peaks. For a safety margin, back down on the level control to reduce recording level about 2 or 3 dB. You now have a reference setting for your level control. However, this doesn't mean that the control should remain in exactly the same position for all recordings. Based on your knowledge of the CD you wish to copy, you might reduce or advance the setting of the control a bit. For example, if you were to tape Debussy's "Prelude to the Afternoon of a Faun," you might increase the level a little; if you were to record Stravinsky's *Firebird* Suite, you might reduce the level somewhat. When recording, take frequent note of the record level indicator. If it goes well beyond the reference level previously noted, and if it does so frequently, the record level might be too high. It may be desirable to redo the recording at a lower level, but this is unlikely to happen often.

What do I mean by changing the recording level "a bit" or "somewhat"? This is where your experience comes in to inform you. For most music, maximum amplitude tends to occur in the general vicinity of 400 Hz or so. On the other hand, owing to the large amount of treble boost employed in a cassette deck for recording, high signal amplitudes presented to the record head and to the tape may well occur in the range above 10 kHz. Therefore, if you were to check distortion on the basis of single tones, I would suggest 400 Hz and something like 12 kHz (or higher, if your hearing is good). But I don't think that you should use single tones to find the proper recording level. The ear is considerably less sensitive to distortion for mixed tones than for single tones. For example, distortion might become noticeable to a given individual when it reaches 1% on a single tone, but not until it reaches 5% on complex tones. Thus, you should use actual music to determine how high you can set the record level before distortion becomes audible.

Discover Incredible Value!

VANDERSTEEN AUDIO



The most expensive dynamic speakers in the world are multi-enclosure, minimum-baffle designs. So is our least expensive speaker. One listen to the astonishing clarity and realism of the Model 1B will show you why "boxless" is definitely better.

The Model 1B features:

- *A superior-quality, cast-basket woofer.*
- *A dual-chamber, metal-dome tweeter.*
- *An aligned dynamic design.*
- *A slim elegant appearance.*
- *Unrivaled quality control.*

VANDERSTEEN AUDIO
116 West Fourth Street, Hanford, California 93230
(209) 582-0324

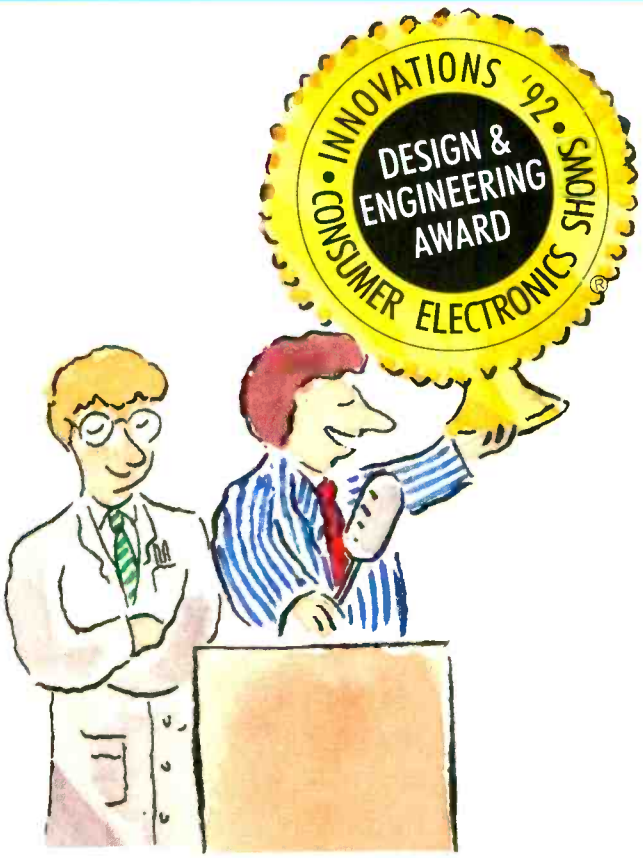
DIMENSIONAL PURITY®

For more than 15 years, VANDERSTEEN AUDIO has built affordable loudspeakers true to both science and music. If you're looking for speakers that accurately reproduce the entire frequency range of music and recreate the full dimensions of the original performance, we can direct you to your nearest carefully selected Vandersteen dealer.

The Vandersteen Model 1B is priced from under $700 per pair.

Enter No. 47 on Reader Service Card

GFA-2535 Multi-Channel Power Amplifier



"We wish to thank Mom; our 3rd grade music teacher; the members of the Academy..."

The Multi-Channel GFA-2535: yet another award-winning amplifier from Adcom.

A pattern appears to be taking shape here: Adcom introduces a new power amplifier, Adcom wins an award. The GFA-535, GFA-555, GFA-555II, GFA-565, and now the GFA-2535 — every single one has earned the immediate praise and plaudits of the industry's most respected authorities...perhaps because Adcom packs more performance and innovative technology into its amplifiers than you'll find in components that cost twice as much or more.

The innovative GFA-2535 is a worthy new standard-bearer. The GFA-2535 is really two GFA-535's in one case, with the flexibility to drive three *or* four channels. With individual level controls for precise control of each amp's volume, it's the ideal foundation for an authentic, ultra-realistic surround-sound theater system, or for a multi-room or multi-speaker audio system.

The Versatility of 3 Channels or 4.

A single switch on the GFA-2535's rear panel lets you select 4-channel operation, or bridge two of the channels for a 3-channel configuration. In the 3-channel mode, the GFA-2535 brings your home theater to life, delivering 200 watts of clean, distortion-free sound to the center channel, and 60 watts to each of the rear channels. Add it to your existing 2-channel amp, and you'll be at the center of a superbly balanced, awesomely powered stage with sound so real, you can practically touch it.

For audio applications, the GFA-2535 in the 4-channel mode acts as a pair of 60 watts-per-channel amps to drive two sets of speakers. With two of the channels bridged, it delivers 60 watts each to a pair of satellites, and 200 watts to a single subwoofer for an incredible display of musical strength so real, you definitely can feel it.

Three channels or four...home theater, home audio...the award-winning Adcom GFA-2535 gives you twice the versatility of ordinary amplifiers...and twice the value that has made Adcom famous.

ADCOM®

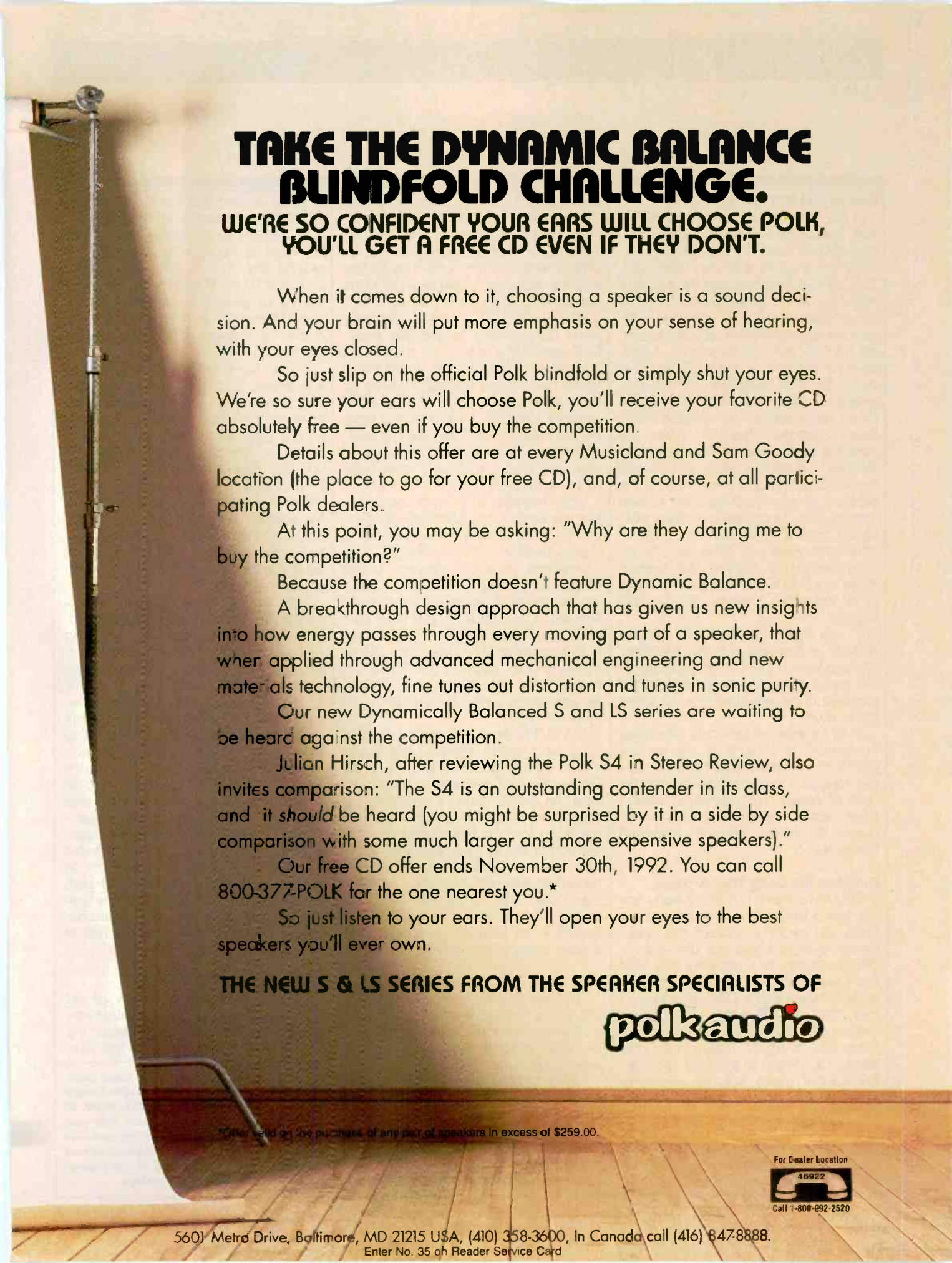
details you can hear

11 Elkins Road, East Brunswick, NJ 08816 U.S.A. (908) 390-1130. Distributed in Canada by PRO ACOUSTICS INC. Pointe Claire, Québec H9R 4X5

Enter No. 1 on Reader Service Card

© 1992 ADCOM


Matthew S Polk



TAKE THE DYNAMIC BALANCE BLINDFOLD CHALLENGE.

WE'RE SO CONFIDENT YOUR EARS WILL CHOOSE POLK, YOU'LL GET A FREE CD EVEN IF THEY DON'T.

When it comes down to it, choosing a speaker is a sound decision. And your brain will put more emphasis on your sense of hearing, with your eyes closed.

So just slip on the official Polk blindfold or simply shut your eyes. We're so sure your ears will choose Polk, you'll receive your favorite CD absolutely free — even if you buy the competition.

Details about this offer are at every Musicland and Sam Goody location (the place to go for your free CD), and, of course, at all participating Polk dealers.

At this point, you may be asking: "Why are they daring me to buy the competition?"

Because the competition doesn't feature Dynamic Balance.

A breakthrough design approach that has given us new insights into how energy passes through every moving part of a speaker, that when applied through advanced mechanical engineering and new materials technology, fine tunes out distortion and tunes in sonic purity.

Our new Dynamically Balanced S and LS series are waiting to be heard against the competition.

Julian Hirsch, after reviewing the Polk S4 in Stereo Review, also invites comparison: "The S4 is an outstanding contender in its class, and it *should* be heard (you might be surprised by it in a side by side comparison with some much larger and more expensive speakers)."

Our free CD offer ends November 30th, 1992. You can call 800-377-POLK for the one nearest you.*

So just listen to your ears. They'll open your eyes to the best speakers you'll ever own.

THE NEW S & LS SERIES FROM THE SPEAKER SPECIALISTS OF

polk audio

*Offer valid on the purchase of any pair of speakers in excess of $259.00.

For Dealer Location
46922
Call 1-800-992-2520

5601 Metro Drive, Baltimore, MD 21215 USA, (410) 358-3600, In Canada call (416) 847-8888.

Enter No. 35 on Reader Service Card

AUDIOCLINIC

JOSEPH GIOVANELLI

Relays Get Dirty, Too

A few years back, you told a reader with intermittent amplifier output that his problem might be dirty switch contacts. I fully agree with your diagnosis, but I'd like to suggest that the problem might be due to dirty speaker relays, if his receiver has any. A friend recently had the same problem as your reader: He had to raise the volume to a high level to get one or both channels to come on. This suggested to me that whatever was blocking the signal (such as oxidation on contacts) was being "punched through" when the potential across the barrier reached a sufficient amplitude. Although cleaning the amplifier's output relays solved the problem for a while, it returned several months later. Repeated cleanings continued to offer relief for a few months after each cleaning. However, the inconvenience of tearing the system down every few months became tiring. (The amplifier weighs nearly 100 pounds.)

It was finally agreed that I would replace all four relays in this amplifier. The problem is gone! I would suggest this repair to anyone experiencing this problem if the equipment is 10 years old or more.

In all my years of servicing electronic equipment, over 90% of the service problems in older equipment are contact-related. I spoke to an expert in the field of relays. He confirmed what I have said: If a relay is acting up, replace it.—Brian Hefner, Newport News, Va.

Dubbing the Long Way Around

Q. I have many LPs that I really enjoy. Is it possible to dub them onto my open-reel deck? I suspect this could be done by dubbing the disc onto a DAT cassette, and copying that onto the open-reel deck. But the instructions for my friend's DAT deck say, in part, "You cannot make a second-generation tape via 'digital input/output.'" Does this, in effect, mean I can dub from a CD player to the DAT recorder but cannot make another recording from that DAT copy?—Albert Z. Skelding, Lynchburg, Va.

A. You can copy your LP directly onto your open-reel deck. You could also dub from LP to open-reel via DAT, but there's no point in it. When you copy an LP or any other program source onto an open-reel recorder, some noise and distortion will be added, and the frequency balance may be slightly altered. (The noise may go unnoticed, however, if the original LP is noisy.) Recording onto DAT and then copying the DAT to open-reel tape won't do anything to alleviate this—DAT recording adds no significant amount of noise (though it does add *some*), but it does nothing to clean up the original signal, either. All this intermediate step will do is cost you time. On the other hand, if you want to keep all your copies on DAT instead of open-reel tape, you'll have more faithful (if expensive) copies of your LPs.

Your friend's DAT deck obviously has the Serial Copy Management System (SCMS), found in virtually all home digital recorders. If you copy a CD by connecting your CD player's digital outputs to your DAT recorder's digital inputs, the tape copy will be marked with an SCMS code. If you then connect your DAT machine's digital outputs to another DAT recorder's digital inputs and try copying the SCMS-encoded tape, the second recorder will recognize the code and refuse to record the signal.

But SCMS does not apply to *analog* input and output signals. When you record from an analog source, such as LP, to the DAT recorder's analog inputs, no SCMS code is added to the tape. Even if the SCMS code was present, it wouldn't be included in the analog output fed to your open-reel deck. And open-reel decks have no SCMS recording-lockout circuits, anyway. You could even copy an SCMS-encoded DAT recording to another DAT recorder, so long as you used only analog connections between them.

Hum from FM Antenna

Q. I am plagued with a 60-Hz hum every time I use either the TV set or the VCR—each connected to my receiver. The hum is not heard during tuner or tape mode.

I shielded the receiver from the TV set. I've added an a.c. line filter. I have checked the house wiring. I have reversed electrical line plugs. The only thing that kills the hum is disconnecting the FM antenna. What causes the hum? Must I continue to disconnect the antenna when I use the TV set or my VCR?—Stuart Leman, Portage, Pa.

A. I think it's safe to say that most of the hum is caused by at least one ground loop. That is, your FM antenna and your TV, VCR, or receiver are connected to ground by different paths. The difference in these paths produces a voltage difference, which causes the hum.

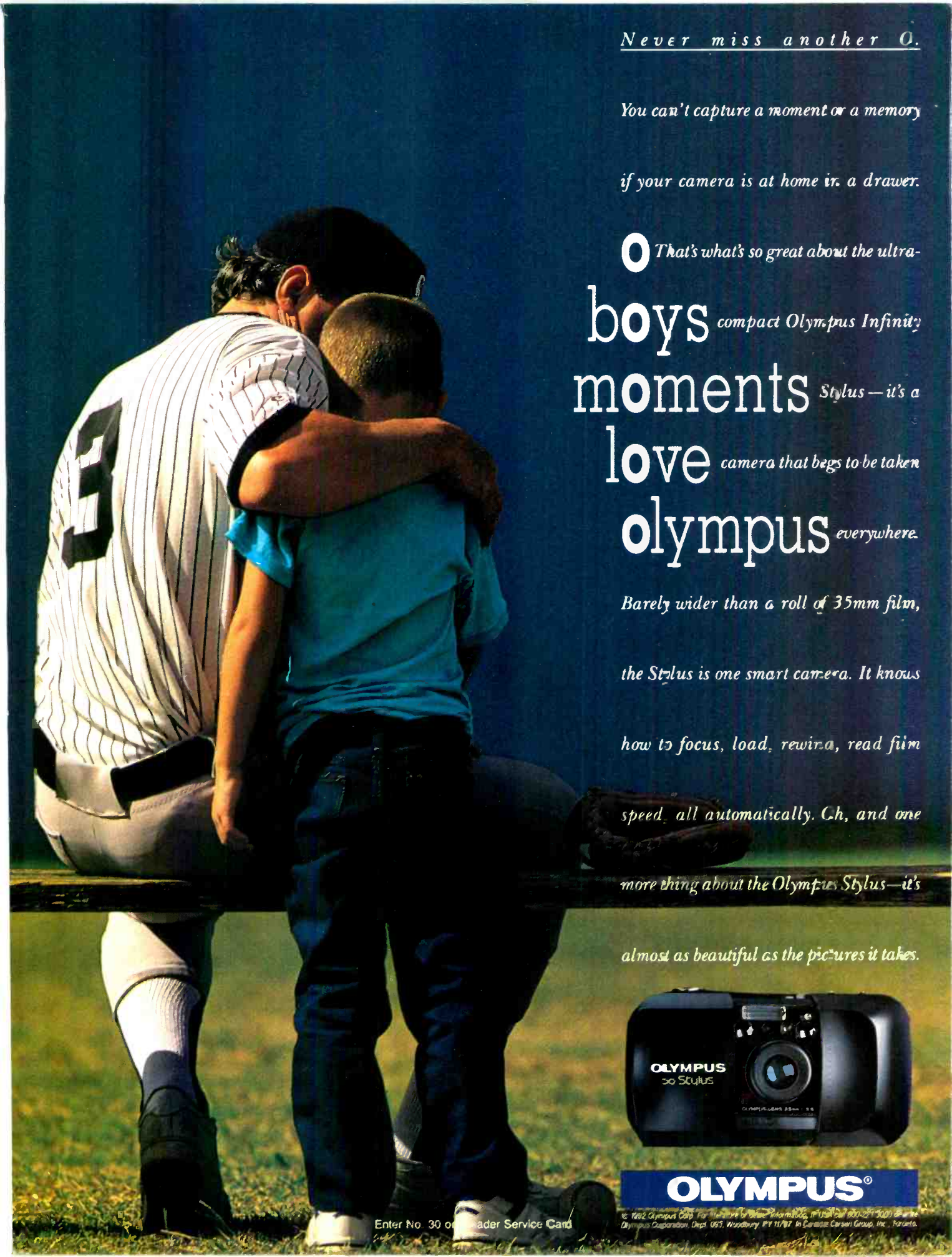
If you have grounded any of this equipment, disconnecting the ground may end your problem. If any of these components has a three-wire, grounded a.c. plug, *temporarily* plug that into a three-to-two-prong adaptor, the kind you use when the wall outlet is not a three-wire type. Do *not* ground the terminal. If the hum disappears, remove the adaptor and plug the component back into the wall as you had it originally. Yes, the hum will return, but at least you've proven that your problem is a ground loop.

You can't cure the problem by disconnecting the FM antenna's ground, because you need that for lightning protection, but you can provide d.c. isolation between the receiver and the antenna while letting the r.f. signal through. This requires an isolating balun transformer, such as the Gemini CV89. If you cannot locate an isolating balun, you can make one by connecting two ordinary 300-to-75-ohm baluns back to back. Connect the 75-ohm side of one balun to your antenna and the other's 75-ohm side to your receiver, and use 50-μF capacitors to connect the transformer's 300-ohm sides to each other. This will permit r.f. to flow, but block d.c., and should cure the hum. To avoid future problems, you might use a second isolated balun between your cable box and the rest of your equipment.

Setting Subwoofer Levels

Q. What is the proper way to set subwoofer level controls to obtain correct, or flat, bass response, assuming that both my satellites and my sub-

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.


Never miss another O.
You can't capture a moment or a memory
if your camera is at home in a drawer.
O That's what's so great about the ultra-
boys compact Olympus Infinity
moments Stylus—it's a
love camera that begs to be taken
olympus everywhere.
Barely wider than a roll of 35mm film,
the Stylus is one smart camera. It knows
how to focus, load, rewind, read film
speed, all automatically. Oh, and one
more thing about the Olympus Stylus—it's
almost as beautiful as the pictures it takes.
OLYMPUS
30 Stylus
OLYMPUS®
Enter No. 30 on Reader Service Card

No matter what you do to balance your system, some recordings will sound just great but others won't.

woofers have been positioned properly in the listening room?

The advice that I get is that the levels should be set by ear, but that does not help because I'm not sure what to listen for or what recording to use when calibrating the system. I have spent many fruitless hours using a Radio Shack sound level meter on a tripod, at what I think is the correct listening position. I use a CD with test tones at 20, 40, 100, and 1,000 Hz. The measurements I make are not consistent from day to day, despite careful siting of the meter. What do I do now? —Chris L. Walker, King of Prussia, Pa.

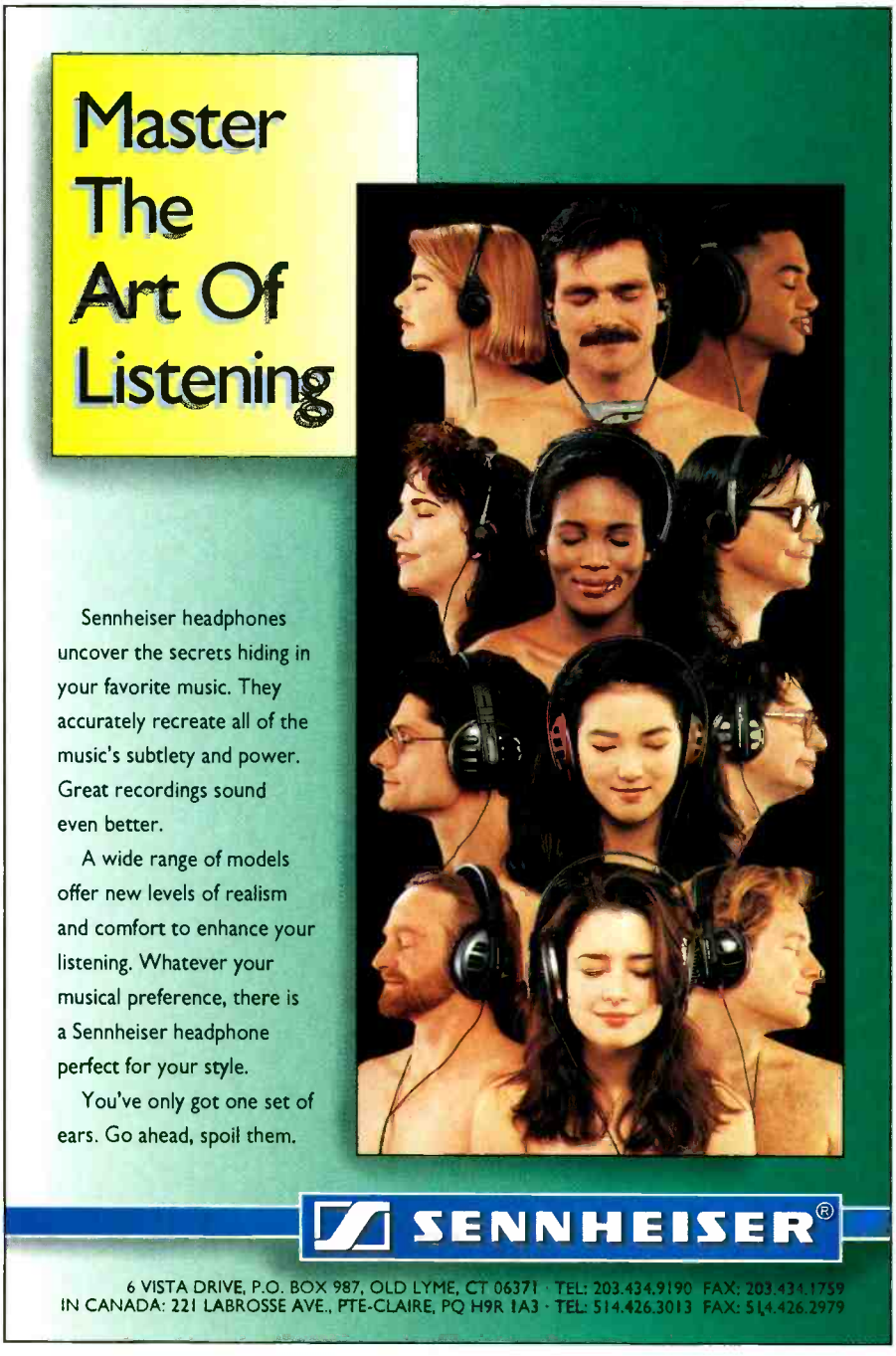
A. For my own part, I go along with the advice you have been given, but let me add something that could help. Locate a piano recording that sounds good on a system you know to be good. When I say "sounds good," I mean that there should be body to the piano when bass tones are struck. Take that recording to your listening room. Adjust the levels of your subwoofers until the piano sounds slightly too "warm," and then back the settings off just slightly.

Because you are using two subwoofers, you have a slight problem. Theoretically you would want equal loudness from each one. As a practical matter, it is probably not important because bass tends to be omnidirectional, so you won't notice that the bass is slightly out of balance if levels are not right. So, adjust levels as I instructed. Then feed a tone into your system and make a rough balance with your sound level meter. Chances are the balance will be different with different tones, and this is why you should not, or cannot, be really fussy about all of this.

If you were to use your test methods, you would first need more tones; that gap between 100 and 1,000 Hz is a serious one. Next, you must take into account that your sound level meter is not flat. The curve that comes with the meter shows this. The deviation from flat response must be taken into account when you interpret measured sound levels.

No matter what you do, there will be discs that sound just great; others won't sound good. You must use a tone control or an equalizer to offset these program differences. In other words, even if your system were perfect, some recordings won't be—at least as far as you are concerned.

(*Editor's Note:* No curve came with my own Radio Shack sound level meter, but I did have it measured once by a friend at an acoustics laboratory and found that it was quite reasonably flat—within ±1.5 dB over most of the audio range, as I recall. Mr. Walker's measurement variations may therefore be the result of slight differences in the position of the meter from one measuring session to the next. The higher the frequency, the greater the difference very slight changes in position will have.—*I.B.*)



Enter No. 42 on Reader Service Card

First in a series

THE COMPONENTS OF EXCELLENCE: BUILD QUALITY

You can tell how good a McIntosh is even before you turn it on.

The MC1000 is a 1000 Watt, Mono Block Power Amplifier

Made in the USA

For a high fidelity component to earn a position at the pinnacle of high-end audio, many criteria, not simply superb sound quality, must come into play. A McIntosh audio component is built to such high standards that it speaks volumes about itself and the company that built it...even before it is turned on.

The look and the design, the feel and 'sound' of the controls, the way the parts mesh together, the strength and heft of its construction; all these McIntosh qualities are not mere adjuncts to superb sonic performance, they are essential to the definition of the highest quality. In fact, for more than 40 years, the design and construction of McIntosh products have set a standard of quality not only for audio components, but for the finest products of any kind.

McIntosh®
Components of Excellence

McIntosh Laboratory Inc., 2 Chambers St., Binghamton, NY, USA 13903-2699 (607) 723-3512

Enter No. 25 on Reader Service Card

Is your home the right place for your speakers?

No matter how good loudspeakers may sound in the lab, in a review column, or in a dealer's showroom – what really matters is how they sound when you get them home.

This is why KEF developed the Uni-Q® Driver... to help reduce the adverse effects of your room's boundaries. Uni-Q works as a point-source of sound, producing a precisely controlled, highly uniform dispersion pattern. This reduces the room reflections that can muddy the sound and destroy the spatial accuracy of the stereo image. The result? Freedom to place the speakers where they fit best, knowing they will also *sound* their best.

Uni-Q's realistic sound, accurate imaging and placement flexibility become especially valuable in home theater and surround sound applications, which require precise localization to effect cinematic realism.

BY PLACING THE TWEETER AT THE CENTER OF THE WOOFER, KEF HAS CREATED THE UNI-Q, A VIRTUAL POINT SOURCE OF SOUND.

The Uni-Q Driver joins such other KEF scientific advances as the Coupled Cavity Bass system, which delivers deep bass from small enclosures; and Conjugate Load Matching, which makes it less strenuous for your amplifier to drive your speakers. Together, these have earned KEF its international reputation for real-world performance.

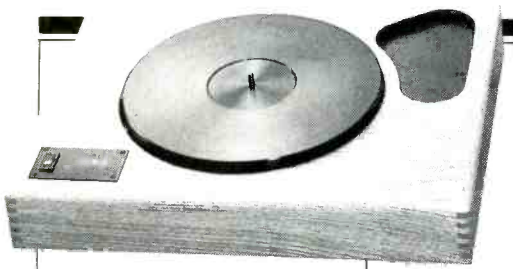
For KEF, the world's finest loudspeakers are those that sound the best in your home.

KEF

The Science of Loudspeakers

KEF Electronics of America, Inc., 1701 Touchstone Road, Colonial Heights, VA 23834

Enter No. 22 on Reader Service Card



SOTA Turntable

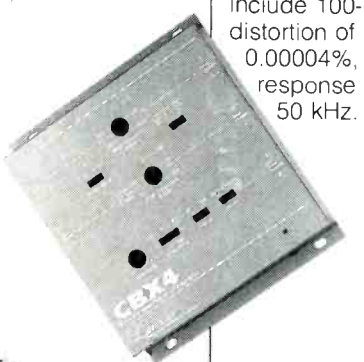
The Satellite from SOTA is a belt-drive turntable, available in light, dark, or black oak or satin black. It is SOTA's lowest-priced turntable but can be upgraded to any higher model with no cost penalty—that is, the total cost for buying the Satellite and upgrading it to a Star vacuum turntable would be the same as the price of the latter turntable. Price: Without arm, $695; with arm and dust cover, starting at $950.

For literature, circle No. 111

Lanzar Car Stereo Bass Processor

The CBX4 from Lanzar combines the functions of a crossover and bass processor. It provides constant bass for any fader and balance-control position, and variable high-pass controls allow or prevent overlap between the woofer and satellite speakers. Other features include bass boost with shelving, a bass-polarity switch, and stereo or mono bass output. Specifications include 100-dB S/N, distortion of less than 0.00004%, and frequency response of 20 Hz to 50 kHz. Price: $279.95.

For literature, circle No. 112



Forté Audio Five-Channel Amp

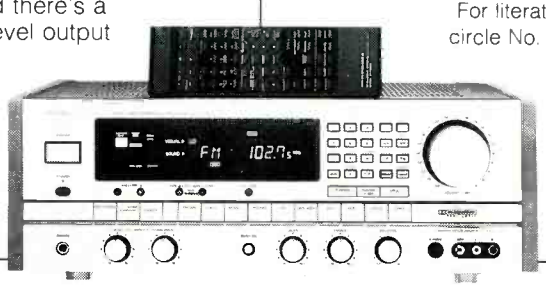
Designed for home theater use, the Forté FT-1 has five channels of amplification, delivering 125 watts into each of the three front channels and 55 watts into each of the two rear ones, all at less than 0.15% THD from 20 Hz to 20 kHz. Frequency response is 3 Hz to 50 kHz, ±1 dB, at rated power, and gain for all channels is 26.5 dB. Price: $1,595.

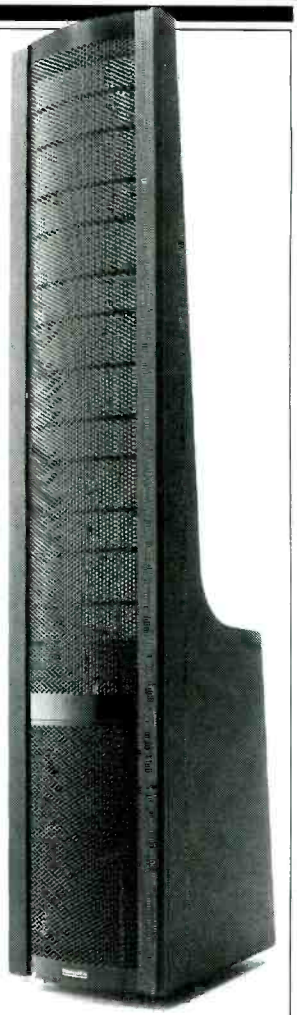
For literature, circle No. 110

Marantz A/V Receiver

With five separate amp channels (110 watts per channel for the main speakers, 75 watts for the center, and 35 watts per side for surround speakers), the SR-92 can drive every speaker in an A/V surround system except a subwoofer—and there's a line-level output for a powered subwoofer or separate bass amp. Preamp-out and main-in jacks are available for all five channels. In addition to a Dolby Pro-Logic decoder, the SR-92 features an AM/FM tuner with 30 AM and 30 FM presets, dual antenna inputs for broadcast and cable FM signals, and an AM section that meets NRSC standards and has response out to 12 kHz. A multi-room mode allows listening to a second program source in another room. Price: $1,099.

For literature, circle No. 113





Martin-Logan Speaker

Unusually compact for its type, the Martin-Logan Aerius stands only 4½ feet high (of which the top 3 feet consist of the semi-transparent electrostatic upper-frequency section) and has a footprint only 10½ inches wide × 13½ inches deep. Frequencies below 500 Hz are handled by an 8-inch woofer in a sealed enclosure of 1¼ cubic feet. Overall frequency response is 40 Hz to 20 kHz, ±3 dB, impedance is 4 ohms, and sensitivity is 89 dB. Price: $1,995 per pair.

For literature, circle No. 114

Critics. They think they're so smart.

PRODUCT REVIEWS

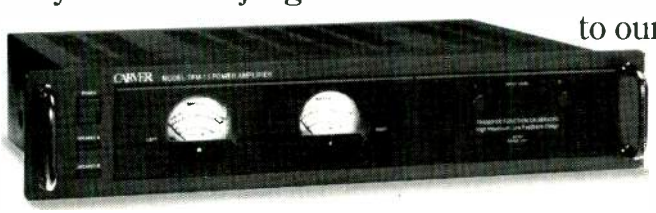
"I was stunned at how big, full, and real the sound was...Carver's Silver Seven amplifiers are probably the best I have ever heard." – *Bascom H. King, –Audio Magazine, Feb., 1991.*

"A flawless portrayal of a musical event... Carver Silver Nines deliver precise acoustical depiction." – *Inner Ear Report, Fall/Winter, 1991.*

"Prodigious power... the TFM-45 is clean, punchy, musical." - *Andrew Marshall, –Audio Ideas, Winter, 1991.*

"The TFM-15 has real bass extension that is phenomenal for a 100-watt amp... the best $400 amplifier yet encountered." – *Gerald Burt and Karl Nehring, –The Sensible Sound, Fall/Winter, 1991.*

Tough job, huh? Listening to great music all day long. Truth is, audio critics *are* pretty darn smart. And superbly trained for judging high-fidelity amplifiers. So, words like "flawless" and "phenomenal" don't come easily. Yet, we think you'll be just as wowed by a Carver Audition. From our flagship Silver Sevens to our sleek *(but oh so potent)* Pro-Phile Amps. Now at your Carver dealer.



CARVER

Powerful • Musical • Accurate

reprints available on request

Distributed in Canada by Evolution Audio, Oakville, Ontario (416) 847-8888

P.O. Box 1237 Lynnwood, WA 98046
(206) 775-1202

Enter No. 10 on Reader Service Card

WHAT'S NEW

Mitsubishi A/V Receiver

An audio/video receiver with the accent on the video, the Mitsubishi HTS-300 not only switches video signals but cleans them up with a digital comb filter. Audio features include Dolby Pro-Logic surround and an amplifier section that delivers 100 watts each to the right, left, and center speakers and 50 watts to each surround speaker. The tuner's 16 AM/FM presets can be displayed on the user's TV screen, with a user-assigned name for each channel. Help menus can be shown on the TV screen as well. Price: $1,699.

For literature, circle No. 116

Lebo CD Case

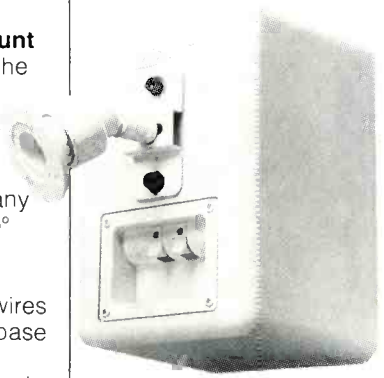
The Lebo Voyager CD case holds 30 single or 15 twin CDs, several CD changer magazines, or a portable CD player with discs. A movable partition held by hook-and-loop fasteners divides the main compartment in two, and a double-zipper enclosure allows easy access to all contents. A separate pocket running the length of the soft, simulated leather case holds accessories or additional discs. Price: $37.95.

For literature, circle No. 115

Scosche Speaker Mount

Made of aluminum, the Scosche 1208 can be fitted to most home speakers and allows the speaker to be swung up to ±90° in any direction around a 360° circle of rotation. The bracket is die-cast aluminum and allows wires to be fed through the base for concealment. It is available in white or black. Price: $24.95 each.

For literature, circle No. 117



Fisher CD Changer

The Fisher DAC243 is a front-loading, five-disc carousel CD changer, with one-bit dual D/A converters. Other features include 32-selection programming, random play, intro scan, repeat play, and a 31-function remote control. Price: $299.95.

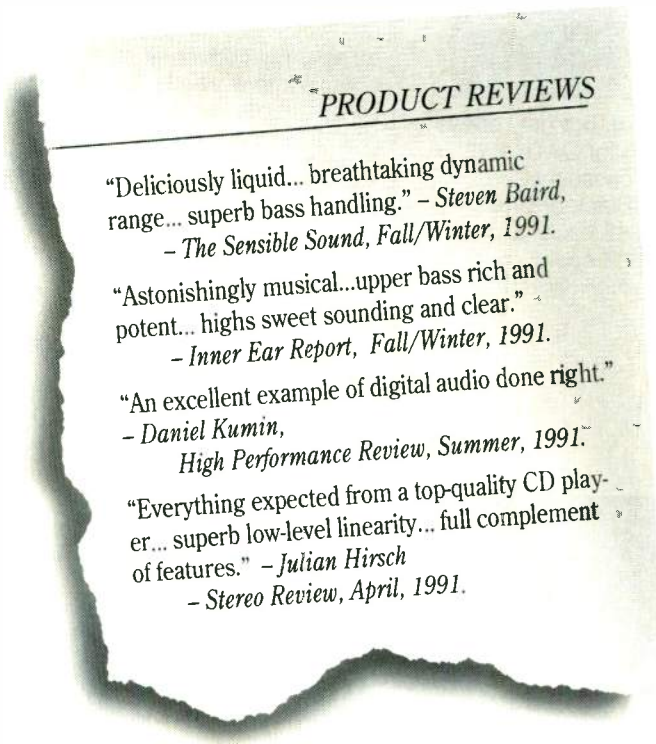
For literature, circle No. 118

Bozak Speaker

The Grand is the flagship model of Bozak Audio Laboratories, a new company. Its main technical feature is a dual-cabinet design, with a sealed enclosure floating on viscous foam within a furniture cabinet to reduce the transmission of cabinet vibrations to the air. The three-way system uses four 6½-inch polypropylene woofers, two 12-inch passive radiators, two 5-inch polypropylene midranges, and a 1-inch inverted-dome titanium tweeter. Rated frequency response is 28 Hz to 20 kHz, +1, −2 dB. Sensitivity is 93 dB. The system is available in dark, light, black, or white-washed oak. Price: $5,000 per pair.

For literature, circle No. 119

Contrary to popular opinion, you *can* please everyone.



A hard bunch, those critics. So pardon our delight at such universal acclaim for our CD players. It's true, Carver's classic tube technology and the latest wonders of single bit D/A conversion make for "astonishingly musical" CD sounds. But please, hear them for yourself. Take your favorite disc to your Carver dealer today. And audition the full line of Carver CD players.

CARVER

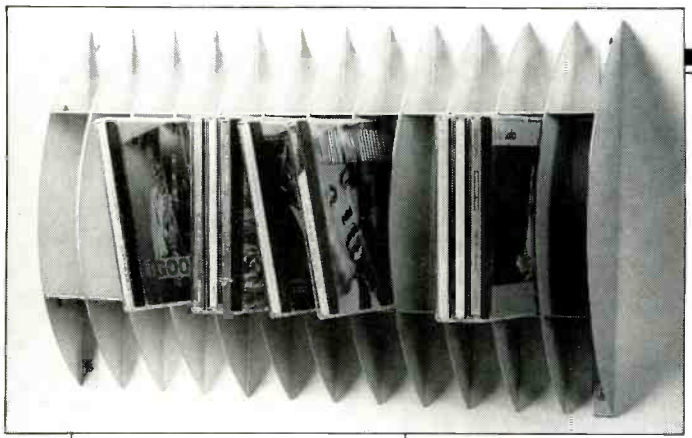
Powerful • Musical • Accurate

P.O. Box 1237 Lynnwood, WA 98046
(206) 775-1202

reprints available on request

Distributed in Canada by Evolution Audio, Oakville, Ontario (416) 847-8888

Enter No. 11 on Reader Service Card



Stimuli CD Rack

Stimuli's Half Moon CD rack is a wall-mounted design that was created to be good looking as well as functional. Constructed from aluminum alloy, one unit will hold 36 Compact Discs, while two, mounted adjacently, will hold 106 due to additional spaces created by the "fins." Two or more racks can also accommodate VHS cassettes, but only one is required for DATs and analog cassettes. Prices: Black or brass finish, $68 each; aluminum finish, $62 each.

For literature, circle No. 120

Design Acoustics Subwoofer

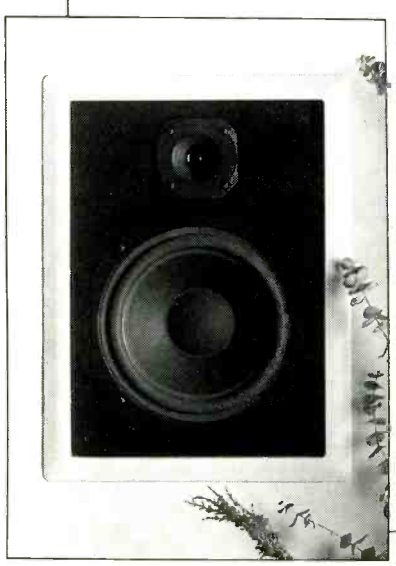
The PS-SW from Design Acoustics is a front-firing, ported subwoofer with a rated frequency range of 30 to 130 Hz and a built-in, 130-Hz high-pass filter to feed signals to satellites. The 10-inch driver has a dual voice-coil of heat-dissipating aluminum; its cone is impregnated with carbon fibers for stiffness. Nominal impedance is 8 ohms, sensitivity is 89 dB SPL with one voice-coil driven and 95 dB with both coils driven; maximum output is 107 dB SPL. Dimensions are 22 inches high × 16¼ inches wide × 11 inches deep. Price: $339.95.

For literature, circle No. 122

McIntosh Preamp

Like many McIntosh preamps over the years, the C40 includes a small built-in monitor amp that can be used to power surround speakers or speakers in a second room. In addition to its 20 watt/channel monitor, the C40 incorporates a five-band equalizer and a compander to expand and dramatize dynamic range or to compress it for recording or quiet listening. Both the equalizer and compander can be switched into the record output circuits. The C40 has balanced inputs and outputs. Price: $2,795.

For literature, circle No. 123



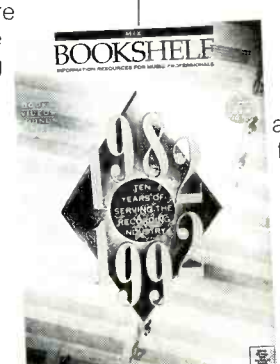
Cerwin-Vega In-Wall Speaker

The W-8x2 uses an 8-inch long-throw woofer and a dome tweeter. Rated at 150 watts power handling, this speaker has a sensitivity rating of 93 dB and frequency response from 40 Hz to 20 kHz, ±3 dB. The speaker has a self-resetting protection system. Dimensions are 16 inches high and 12 inches wide, with a mounting depth of 3½ inches. Price: $530 per pair.

For literature, circle No. 121

Mix Bookshelf Catalog

More than 575 new textbooks, reference manuals, and instructional videos on professional recording and music-related topics are presented in the 44-page catalog



available free from the Mix Bookshelf. To obtain a copy, write to them at 6400 Hollis #12, Emeryville, Cal. 94608, or circle No. 124.

Compliments of the Season

"...[The Glenlivet Distillery] produces a delicate and full flavoured whisky which is unarguably the most famous, if not the greatest in the world."

–Derek Cooper
Whiskies of Scotland

"No excuse is needed for giving this whisky pride of place among the malts, for The Glenlivet has been the prince of whiskies for over a hundred years."

–R.J.S. McDowall,
The Whiskies of Scotland,
New Amsterdam Books

Brighten the holidays
To give someone the highest of compliments with a gift of the finest single malt in existence, just call 1-800-238-4373 to ensure the brightest Christmas in years.

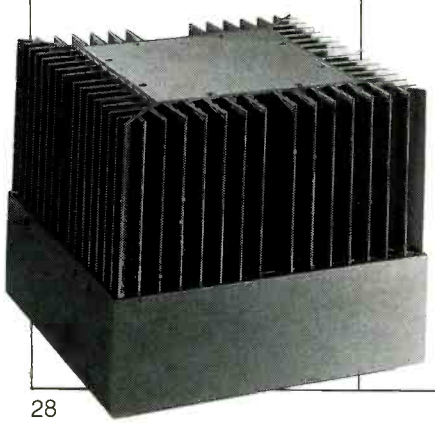
The Glenlivet.®
The Father of All Scotch.

© 1992. Imported by The Glenlivet Distilling Company, N.Y., N.Y. 12-year-old single malt Scotch whisky. Alc. 43% by vol. (86 proof). The Glenlivet is a registered trademark.

Technics DCC Recorder
One of the first DCC recorders on the market, the Technics RS-DC10 not only records Digital Compact Cassettes, it also offers Dolby B and C noise reduction for playback of analog cassettes. Digital tapes can be marked with start, skip, repeat, reverse, and counter codes. The RS-DC10 can also display album and track titles, artist names, and other data encoded on prerecorded tapes. Analog, digital coaxial, and optical inputs are provided. Price: $999.95.
For literature, circle No. 126

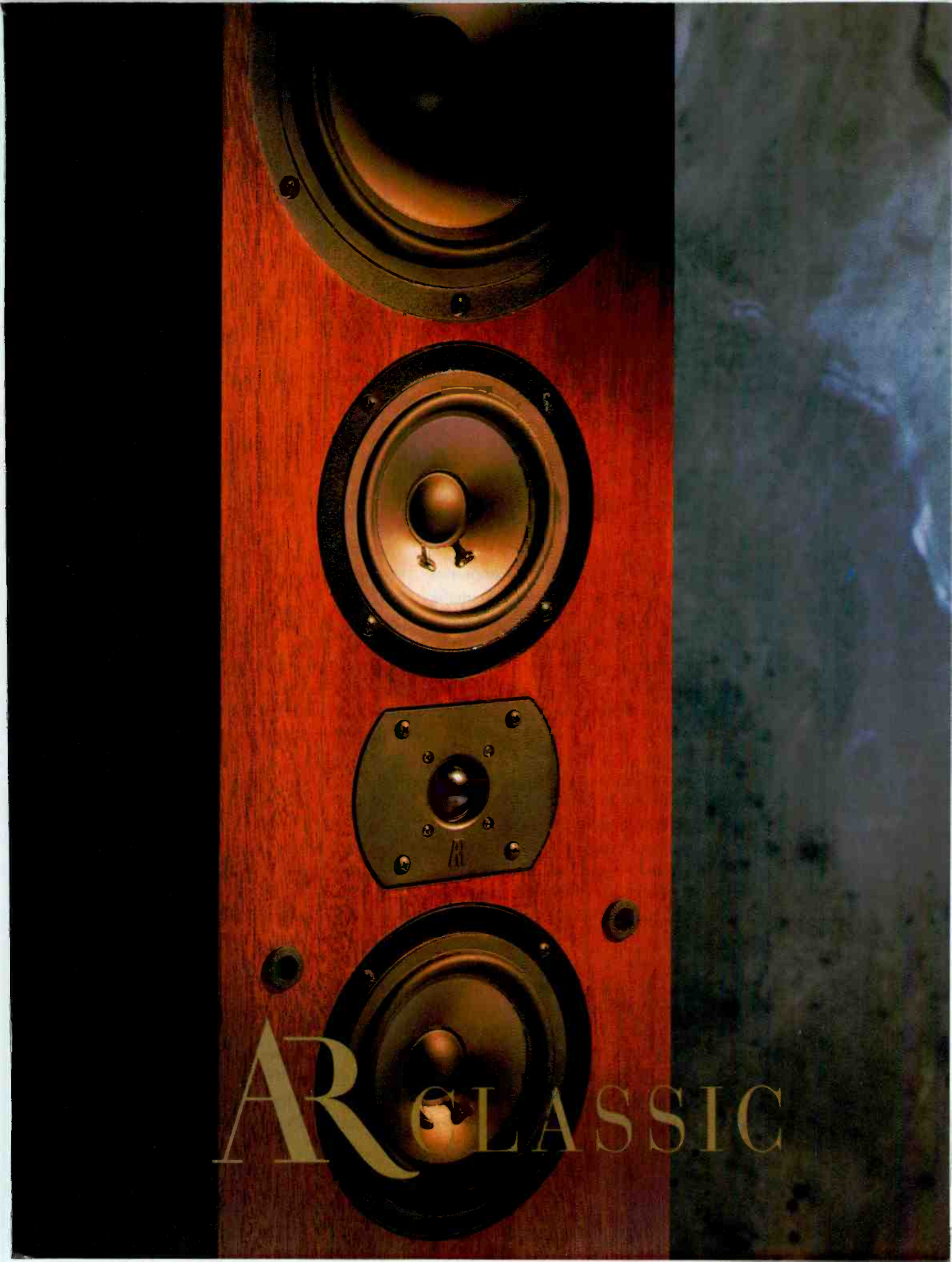
Carver Loudspeaker
The AL-III dipolar speaker uses a 48-inch ribbon midrange/tweeter driver adapted from Carver's Amazing Loudspeaker, mated to a 10-inch woofer. Frequency response is 34 Hz to 20 kHz, ±3 dB, and recommended amplifier power is 35 to 400 watts per channel. The speakers are 6 feet tall but only 14½ inches wide, and the panels flanking the ribbon driver are solid oak. Price: $1,499.95 per pair.
For literature, circle No. 128

Pass Laboratories Power Amp
Designer Nelson Pass calls his Aleph 0 an Asymmetric Class-A design because it uses a single bank of gain devices instead of push-pull circuitry. According to Pass, this is the purest but least efficient form of Class-A operation. Output of this 65-pound mono amp is 75 watts into 8 ohms, at 0.1% THD, and power consumption is 350 watts at idle. Frequency response is down 3 dB at 100 kHz, but flat at d.c. Price: $3,500 each.
For literature, circle No. 125



Memorex DCC Tape
Available in 60- and 90-minute versions, Memorex Digital Compact Cassettes are packaged singly and in two-pack bricks. Prices: DRX-60, $7.49 each; DRX-90, $9.99 each.
For literature, circle No. 129

Fostex Recorder
The Fostex X-18 Multitracker four-track portable recorder weighs less than 3 pounds and runs on batteries. Two of its four independently controlled inputs can be used for mike or line signals, the other two for line only. A pitch control provides ±10% speed adjustment. Levels for each channel can be monitored on five-segment LED meters. Record/play S/N is 58 dB with Dolby B NR; frequency response is 40 Hz to 12.5 kHz. Price: $399.95.
For literature, circle No. 127


AR CLASSIC

AR CLASSIC

Clas-sic (Klas' ĭk) *adj.* **1.** Of the highest rank or class. **2.** Having lasting significance or recognized worth. **3.** Of or in accordance with established principles and methods in the arts and sciences.
- *n.* **1.** An artist, author or work generally considered to be of the highest rank or excellence.

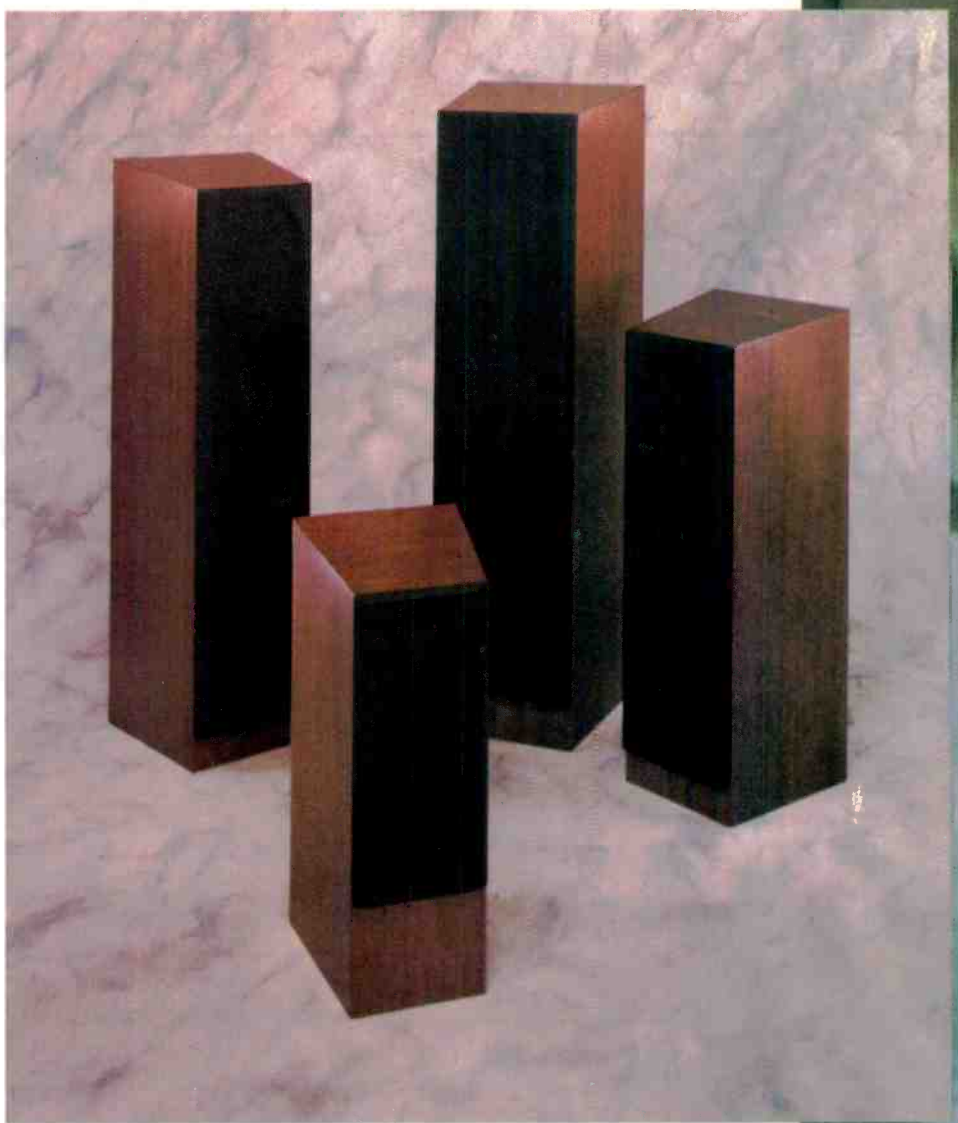
In the loudspeaker world, few companies have had as much influence as Acoustic Research. Since 1954, AR has continuously developed innovative solutions to the problems of music playback in the home. The Classic series of home loudspeakers represents AR's re-dedication to the fundamentals of high fidelity.

The result of intensive analysis of loudspeaker performance in a wide variety of listening environments, the Classic series employs apparently conventional system elements in an unconventional manner. This is not born of a desire to be different, but quite simply because the music sounds more true to life.

Classic models 12 through 30 employ a virtual point-source driver arrangement, known as a Symmetrical Radiation Array (SRA). The tweeter is flanked above and below by two high quality die-cast mid-bass drivers and the spacing of the acoustic centers of the drivers is dictated by the desired crossover frequency and the roll-off employed.

The Acoustic Research SRA features a 2KHz crossover point and 18dB per octave slopes. This configuration is used throughout the Classic SRA series, in conjunction with Acoustic Suspension low frequency systems.

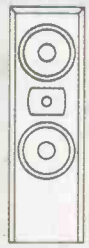
The successful development of the SRA "module" allowed David Day and his team of engineers to refine the low frequency performance. As the SRA handles all frequencies from 150Hz to 20KHz, the low frequencies can be handled by a dedicated driver, designed for use only up to 150Hz. The only exception in the SRA series is the Model 12 which uses dual 6" mid-bass drivers. Models 26 and 30 employ dual low frequency drivers, one at the top and one near the floor. The traditional approach would be to place both low frequency drivers close together at the base of the cabinet, to take advantage of acoustic coupling and floor



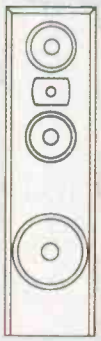
reinforcement. This makes the low frequencies appear subjectively louder, but leads to a significant rise in standing waves in normal listening environments. Placing the second woofer at the top of the cabinet staggers room node excitation points, decreasing standing waves while improving the effective dynamic range of the system.

All the cone drivers in the Classic series are built around die-cast frames which are less prone to ringing than pressed steel. The tweeter is an all new one inch device which features a soft cloth dome. This material was chosen after extensive testing and listening, in preference to all hard dome tweeters. All Classic models feature two sets of gold-plated 5-way binding-posts to permit bi-wiring and maximum signal transfer.

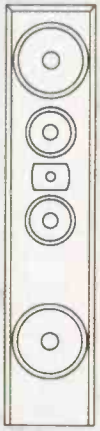
How do they sound? We would like you to judge, but we don't think they have a sound. We designed them to be as neutral as we know how, so you hear only what you put in. The music.



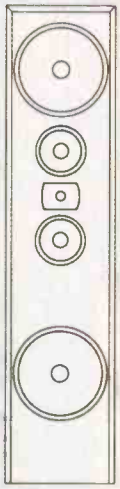
Model 12



Model 18



Model 26



Model 30

Classic Specifications

Classic Model	Model 12	Model 18	Model 26	Model 30
System Type	Acoustic Suspension	Acoustic Suspension	Acoustic Suspension	Acoustic Suspension
Nominal Impedance	4 ohm	4 ohm	4 ohm	4 ohm
Frequency Response	46Hz-20kHz (±3db)	42Hz-20kHz (±3db)	40Hz-20kHz (±3db)	38Hz-20kHz (±3db)
Crossover Frequency	2kHz	200Hz, 2kHz	200Hz, 2kHz	200Hz, 2kHz
Driver Compliment	(2) 6" polypropylene woofers 1" soft dome tweeter SRA driver topology	8" polypropylene woofer (2) 5.25" polypropylene midrange 1" soft dome tweeter SRA driver topology	(2) 8" polypropylene woofers (2) 5.25" polypropylene midrange 1" soft dome tweeter SRA driver topology	(2) 10" polypropylene woofers (2) 5.25" polypropylene midrange 1" soft dome tweeter SRA driver topology
Sensitivity	88 dB SPL (2.83 volts @ 1 meter)	88 dB SPL (2.83 volts @ 1 meter)	88 dB SPL (2.83 volts @ 1 meter)	88 dB SPL (2.83 volts @ 1 meter)
Dimensions (W x D x H)	8-13/16" x 11" x 32-3/8"	9-13/16" x 12-5/16" x 35-1/2"	9-13/16" x 12-5/16" x 45-1/2"	11" x 15" x 51-1/2"

AR CLASSIC

© 1992 Acoustic Research • A division of International Jensen Inc.
330 Turnpike Street, Canton, MA 1-800-969-AR4U

Note: Since it is the policy of Acoustic Research to continuously incorporate improvements into all of its products, all specifications are subject to change without notice.

P/N 16050007

BERT WHYTE

DCC AND MD: TECHNO-TOYS?

The home entertainment industry is about to undergo radical changes. By January, both the Philips Digital Compact Cassette (DCC) and the Sony MiniDisc (MD) should be widely available in this country. In addition, digital signal processing is poised to become the predominant technology in various audio and video control devices, as well as in a number of loudspeaker applications.

Both DCC and MD depend heavily on bit-rate reduction systems, which are but the first harbingers of similar data-compression systems that will be used in a broad variety of other audio and video products. For example, HDTV systems under consideration by the FCC use some form of data compression.

Needless to say, many people take a skeptical view of data compression, especially with respect to audio equipment; they believe that data compression will degrade sound quality. One main concern seems to be audibility of the Precision Adaptive Sub-band Coding (PASC) used in DCC recorders. Preliminary reports (mainly from Europe) on several DCC prototypes were rather mixed. The reviewers were careful to distinguish between what they thought would be acceptable to the public and what far more critical audiophiles would accept. In a comparison between a prerecorded DCC and a CD of the same program, there was general agreement that differences in sound quality were perceptible though "slight" or "subtle," with the CD sound having perhaps a shade "more openness and ambience." A few critics were less charitable. One stated that DCC was "clearly inferior to CD—the PASC is not transparent." Another said the opposite, claiming to be "surprised by the transparency of the PASC."

DCC decks have backward compatibility—they can play standard analog cassettes—but at present they cannot record analog cassettes. The analog playback quality from these early DCC machines did not impress the reviewers, who in the main considered it "marginal."

Sifting through the comments, I'd say it appears that only the hypercritical audiophile with a high-resolution playback system will regard the Digital Compact Cassette as a sonically inferior format. Ironically, one digiphobe who has maligned the Compact Disc now speaks reverentially of the "wonderfully cohesive, smooth sound and musicality of 16-bit linear PCM CDs" as compared to DCC!

Entry-level DCC recorders are expected to cost between $700 and $900, with 60-minute blank DCC tapes running about $8 to $9. This is obviously a bit pricey, but the anticipation is that the cost will be appreciably less in a relatively short time, as was the case with CD. As for prerecorded DCC tapes, there seems to be some confusion as to what they will cost. Philips had hoped to sell a DCC for less than a CD, and then it appeared that the prices would be the same. Some reports circulated that a DCC recording would be more expensive than a CD, but I tend to discount this, as it would be a very significant obstacle to acceptance of the new format. All of the technology for Digital Compact Cassette tape duplication seems to be in place, with some 500 titles expected to be available.

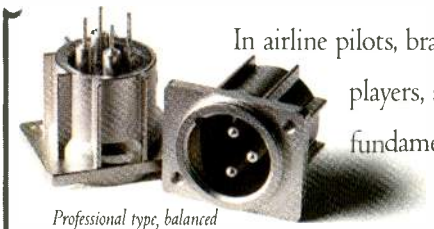
Illustration: Victoria Raymond

The MiniDisc, with its Adaptive TRansform Acoustic Coding (ATRAC) data-compression system, permits up to 74 minutes of digital recording on its 2½-inch disc, employing magneto-optical technology. Sony claims the MD provides sound of "near CD quality." The MDs allow a virtually unlimited number of record/playback/erase cycles and, like CDs, offer quick random access to program material. Targeted to the personal-portable Walkman/Discman market, the MD format allows joggers to enjoy music virtually uninterrupted, since the Electronic Shock Protection (ESP) memory buffer now provides 10 S of playback for the laser to resume proper tracking, instead of the 3 S of the original design.

Sony's MD units will include the Model MZ-1, which will have such automatic recording features as track numbering, storage of both time and date of recording, and location of remaining blank disc space for quick recording plus a function for creating custom titles of recorded tracks or discs. It will have 10-key direct access and a two-line, 24-character, backlit LCD to show primary functions as well as disc title and artist name. The MZ-1 will operate from rechargeable battery, a.c., or car battery. With headphones, battery, a.c. adaptor, and other accessories, the unit will cost $749.95.

The Sony MZ-2P playback-only unit will have such features as shuffle play, random programmability, and the LCD panel for disc and track numbers. It will operate from the same power sources as mentioned for the MZ-1 portable recorder and, with the usual accessories, will cost $549.95. Early next year, the MDX-U1 in-dash car stereo player, with AM/FM tuner and a built-in controller for a Sony Disc Jockey CD changer, will be available at $979.95.

MD-format licensees now include Denon, Hitachi, Kenwood, Matsushita, Mitsubishi, Onkyo, Pioneer, Sanyo, and Yamaha for hardware. For software, some 300 prerecorded MD titles are expected from such labels as Angel, Atlantic, Capitol, Columbia, Denon, dmp, Elektra, EMI, Epic, Sony Classical, Virgin, and Warner Bros. Cost should be similar to that of a CD, as MDs can be replicated in CD plants, using roughly the same technology. As for blank MDs, Sony's 60-



Professional type, balanced output jacks are grounded, and shield the signal against noise.

In airline pilots, brain surgeons, and CD players, steadiness is a pretty fundamental requirement.

In the case of the Elite* line of CD players and the uncompromising Elite transport, their rock-solid stability has rocked the world of music lovers and audio critics. It's apparent from the reviews and the awards that Elite has advanced CD standards dramatically.

At the very apex of CD technology today is our PD-S95 transport. To insure optimum sound quality, it mobilizes an unprecedented array of mechanical and electrical isolation techniques, including rigid acoustic shell construction and discrete power supplies.

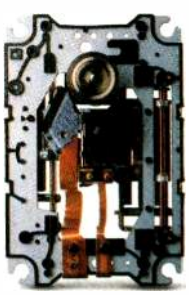
But its most significant innovation – incorporated throughout the Elite line – is the stable platter.

The Elite PD-75 Compact Disc Player. Its elegant urushi finish reflects technical elegance within.

Two basics of physics – mass and inertia – combine to make the stable platter an obviously superior platform to support a disc spinning at high velocity. Next, the stable platter, by supporting the entire area of the CD disc, minimizes wobble and chatter. A wobbling disc presents a difficult target for the laser, while a chattering disc creates resonance, distorting the signal, which distorts the sound.

The stable platter, with its great mass and driven with precision by a new transport mechanism, spins solidly in place generating no vibration. The result is sound that is perceptibly superior.

[How A Concept Called The Stable Platter Turned The CD Upside Down.]



An advanced linear drive motor moves the laser pickup with smooth speed and precision.

Another problem for conventional CDs is gravity. Spinning above the laser pickup and supported only in the center, the disc sags microscopically. Which to a laser beam is significant. But on the Elite CD platter, the disc is turned upside down and lies firmly clamped to a solid surface. Meanwhile, the laser pickup reads the disc's digital code from above, where it is immune to dust settling on the laser optics.

We invite you to visit an Elite dealer and audition the entire line of Elite CD players.

And usher in a new era of stability.

ELITE
BY PIONEER

For the name of a select Elite dealer in your area, please call 1-800-PIONEER. ©1992 Pioneer Electronics (USA) Inc., Long Beach, CA.

Enter No. 33 on Reader Service Card

Anyone can appreciate the noise-free attributes and low distortion of both DCC and MD, but are consumers willing to pay for this?

minute MDW-60 is available for $13.99. The 74-minute MDW-74 will follow in the spring.

The battle lines are drawn. Though neither Philips nor Sony is promoting the idea that its system is a replacement for CD, the DCC and MD formats themselves can be viewed as competing digital recording systems. Both have their positive and negative aspects. Initially, DCC would appear to have the better sound quality, approaching that of CD in most respects. But MD is not far behind, and it has the advantage of a no-wear medium and rapid random access—plus the undeniable portability afforded by ESP.

Many industry seers do not believe that DCC and MD can coexist. My own veiwpoint is that, clever and sophisticated as they are, I would question the formats' viability even in a normal economy. In the midst of a recession, I have strong doubts that either will make a significant impact in the marketplace. Both the DCC and MD introductory models are relatively high-priced, and blank tapes and discs are considerably more expensive than the lowly analog cassette. And yes, anyone can appreciate the noise-free attributes of both DCC and MD, and the unquestionably low distortion. But are consumers willing to pay for this? After all, recording off the air is hardly high-tech. Recording pop tunes on a $2 analog cassette has appeal for many people; will they appreciate the superior sonics of a digital recording of the same program, at close to three or four times the expense? I may be an old mossback, but I do appreciate high-tech audio developments that help reproduce music ever more realistically. Still, I feel DCC and MD are merely nifty new techno-toys that will enjoy an initial flurry of sales but then become relatively low-volume products. The CD, as it stands or embellished with Super Bit Mapping or other refinements, is still my choice—and not likely to be superseded until it's replaced by systems that record in solid-state memory, with no moving parts.

In the meantime, we have plenty of audio equipment that can benefit considerably from digital signal processing or new digital circuitry. Meridian and Celestion have pioneered in improving loudspeakers with digital tech-

Make your Liszt last longer.

Your collection of classics will sound richer and last for ages with a new Shure phono cartridge and stylus. ◆ For the name of the Shure dealer nearest you, or for a free catalog, call 1-800-25-SHURE. ◆ Put it at the top of your "Liszt."

SHURE®

Enter No. 43 on Reader Service Card

THE LITTLE ONE WITH THE BIG VOICE

"The PSB Alphas are simply one of the greatest buys in audio, providing a musically satisfying sound for a paltry $200 ...For their price, the PSB Alphas are a sensational audio bargain. Now get out those checkbooks!"
Jack English, Stereophile, Vol. 15, No.7 (July, 1992)

For your nearest PSB dealer call TOLL FREE 1-800-263-4641

PSB - A UNIQUE VOICE IN THE CROWD.

psb SPEAKERS

Enter No. 37 on Reader Service Card

Remember the first time you heard a CD? It sounded so good, you hoped the music would never stop.

Which is the whole idea behind the CD changer.

Unfortunately most companies, in their rush to produce one, neglected to isolate the disc that's playing from the changer platform. A big mistake. (Not as big as the Hubble telescope, but pretty darn serious.)

One that transfers internal and external vibrations to the playing disc. Creates resonance. Distorts the sound. And defeats a primary reason for buying a CD player in the first place.

Fortunately Yamaha avoided this common problem by developing an entire line of CD changers that are virtually vibration-free. A pretty amazing feat in itself.

Or buy one of Yamaha's new CD changers.

How they do it is something called PlayXchange. A unique design which not only isolates the playing disc from the loading tray, providing vibration-free playback, but also allows you to change four CDs without disturbing the fifth one that's playing.

Yamaha's PlayXchange System. The only carousel mechanism that doesn't transmit vibration to the playing disc. An important feature that permits four discs to be changed without disturbing the one playing.

And because you're supposed to spend your time listening to your CDs and not the machine that plays them, Yamaha's developed a new changing mechanism that's exceptionally quiet, quick and reliable.

But you can't judge a superior CD player merely by its changing mechanism. What makes the difference between a good player and a great one has to do with attention to details.

Take Yamaha's new CDC-835 for example. With Yamaha's S-Bit Plus Technology, twin balanced D/A converters and Class A amplification at every stage, the CDC-835 outperforms most single disc CD players on the market.

S-Bit Plus

Its fluorescent display can be dimmed or set to automatically shut off during playback, eliminating any chance of interference.

And the CDC-835 is equally impressive in the convenience department.

Its TOC Memory memorizes the contents on each disc, speeding up access to specific songs, especially during random disc-to-disc play.

And to give your favorite kind of music even more presence, there's a built-in equalizer with five digital presets.

In fact, the CDC-835 can remember your favorite songs on up to 100 discs and play them back in any sequence. It even remembers EQ settings.

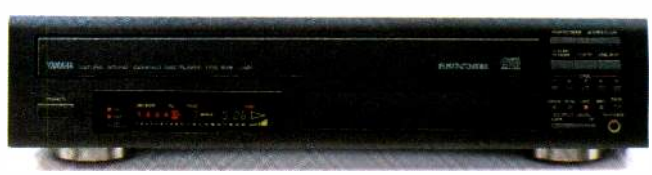
The CDC-835. The only changer with a five-mode digital equalizer.

Then there's 5-Disc Tape Edit. A useful recording feature that arranges the tracks you select so they fit neatly on two sides of your tape.

By now, if you're not quite sold on the CDC-835, you only have two options. You can drop by your nearest Yamaha dealer and let your ears make up your mind.

Or you can buy another changer. Which when you stop to think about it, would be a total shock to your system.

YAMAHA®



©1992 Yamaha Electronics Corporation USA · P.O. Box 6660, Buena Park, CA 90622

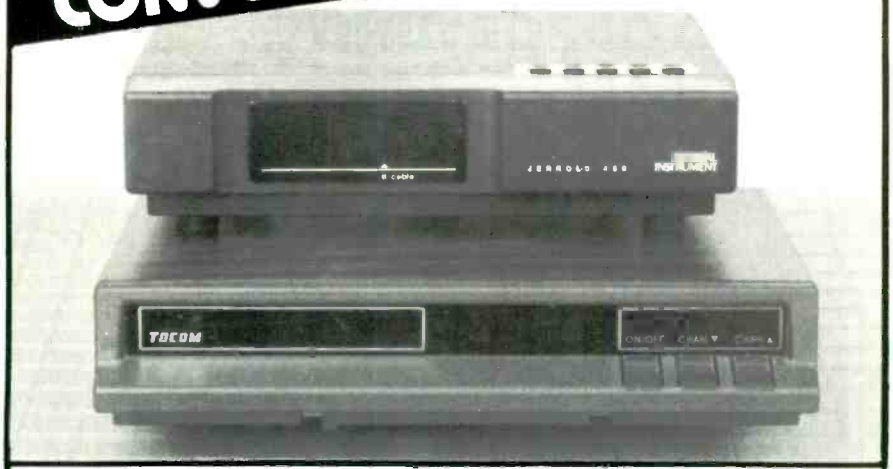
Initially, DCC would appear to have the better sound, but MD is not far behind, and it has the advantage of a no-wear medium.

nology, and several companies are working on other ambitious digital applications in speakers, mainly in the areas of crossovers and controlling frequency, phase, and impulse response. A somewhat controversial development is the application of DSP to loudspeaker/room equalization. This is a very tantalizing prospect and has the potential to bedazzle with what seems to be the ideal answer to some problems of the loudspeaker/room interface. There are pitfalls to this, with psychoacoustics playing a prominent role. If DSP can become sufficiently powerful and cheap, it might help resolve some of the inherent problems.

In the video realm, DSP will have a major impact. In the February issue, I reported on the new Dolby SR-D digital format for motion picture sound; more than a dozen theaters are now equipped to show SR-D films, and other theaters will be coming on-line. More important from a home theater viewpoint is that Dolby Laboratories has developed the AC-3 Adaptive Transform Coding Algorithm, another form of data compression. The SMPTE Surround Standard, now designated the 5.1 surround system, specifies six channels: Left, right, center, left rear, right rear, and 100-Hz sub-bass (i.e., subwoofer). Using Dolby AC-3, the 5.1 system can be encoded at 64 kilobits per second per channel and still provide wide-range high-fidelity sound equal to that of AC-2's 192 kilobits per second per channel. The AC-3 system should enable the 5.1 surround signals to be accommodated on a videodisc. Thus, not only will a new generation of videodiscs provide all the usual benefits of digital sound with respect to high S/N ratio, low distortion, and wide dynamics, but each of the channels in the surround field will be totally discrete!

In closing, I offer a plea that unfortunately may fall on deaf ears. Many owners of home theaters have complained that after acquiring the usual library of blockbuster films, they are disappointed with the "surround sound." The music score is in surround, but few motional dynamics relate to the action. These people, and I count myself among them, would like to see videodiscs rated and labelled as "MS" for Music Surround and "AS" for Action Surround. I wish us luck!

CABLE T.V. CONVERTERS



All **JERROLD, OAK, HAMLIN, ZENITH, SCIENTIFIC ATLANTA, PIONEER** and all specialized cable equipment available for shipment within 24 hours. 60 Day Guarantee. QUANTITY DISCOUNTS AVAILABLE. MC/VISA or C.O.D. telephone orders accepted.

Send self-addressed stamped envelope (60¢ postage) for FREE CATALOG

MIDWEST ELECTRONICS INC.

P.O. Box 5000
Suite 311K
Carpentersville,
Illinois 60110

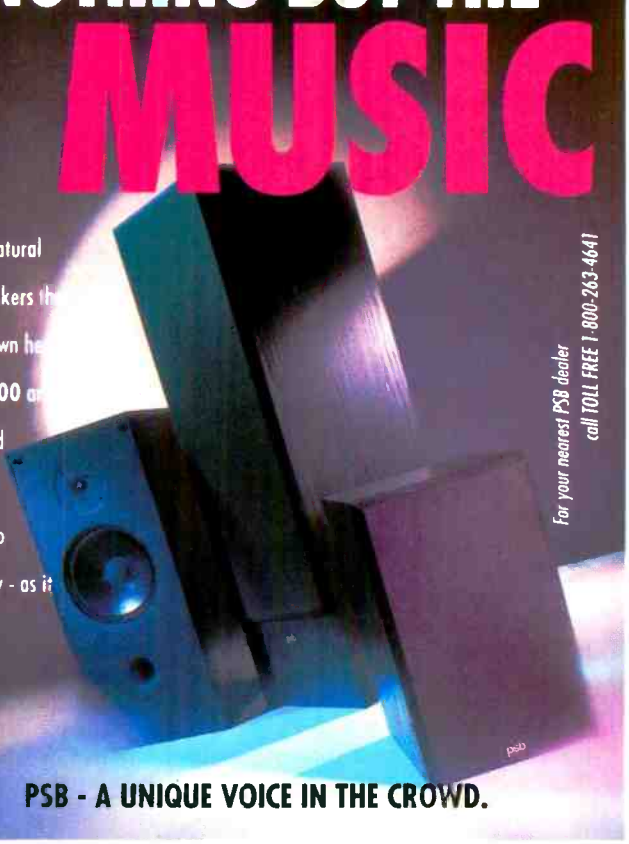
INFORMATION/ORDERS
1-800
648-3030

Note: Decoders and Descramblers must not be used without authorization by your local cable operator.

NO ILLINOIS ORDERS ACCEPTED

NOTHING BUT THE MUSIC

Paul Barton, a concert violinist, and a world-renowned speaker designer and founder of PSB, is a firm believer in natural sound. He shudders at speakers that color musicians' notes. Shown here the **PSB 300, 500 and 800** are part of an affordably priced line of high-performance speakers which allow you to listen to the music naturally - as it was intended to be heard.



For your nearest PSB dealer call TOLL FREE 1-800-263-4641

psb SPEAKERS

PSB - A UNIQUE VOICE IN THE CROWD.

Enter No. 37 on Reader Service Card

JOHN EARGLE

PHOTO OPPORTUNITY

Kodak's introduction of the Photo CD system provides both the professional graphics industry and the photo-shooting consumer with a new way of storing and manipulating high-resolution color images. For the professional, the system can revolutionize the way photographs are archived, transported, and actually processed for mass reproduction. For the consumer, it means freedom at last from having to wait till nightfall to set up the old slide projector; with a new CD reader (a device for playing data rather than audio or video information) or a Philips CD-Interactive (CD-I) player, he can show a discful of favorite slides on a TV set with remarkable resolution.

The basic "input" to the system is not a TV image, but rather an actual color slide, print, or negative. Kodak states that for about $20 a photofinisher can develop and transfer 24 pictures to a write-once Photo CD and will be able to scan prints for transfer to disc by year's end. Once the pictures are transferred, the consumer can effectively retire the original and view the disc's contents over TV. The disc can also be taken to the photofinisher to have photos added to it (up to a maximum of 100), or color prints can be made from it at their original resolution.

Digital retouching is possible using the Kodak Photo CD data in an Apple Macintosh loaded with Adobe Printshop software. Note the three larger photos at right: From top, a dupe of the normal print in foreground, retouched print with one added flower, and bottom print with two new flowers, one in a new color.

The system uses a five-level method of encoding the picture data. The two lower levels can be used for reduced-size multiple screen images and printouts about the size of postage stamps. The middle level is used for normal TV viewing and can be scanned fairly quickly at its resolution of 512 lines and 768 pixels. The fourth level can be used for HDTV purposes, and the fifth, or highest, resolution level is designed for Kodak's 2,048-line × 3,072-pixel Photo CD printer. Just as with digital recording of music, once an image has been encoded, subsequent operations can be done without going back to the optical (or analog) domain. The two higher levels of encoding use a data-compression method known as Huffman encoding; you can think of this as the visual equivalent of perceptual encoding of audio, as is used in the Philips DCC and the Sony MiniDisc.

I recently tested the Kodak PCD 870 player ($549), a combination unit that plays photographic and normal audio CDs. The user has a choice of three outputs: An r.f. output for older TV sets and both composite video and S-video outputs for higher quality on newer sets and monitors. I used the r.f. output, since that is what most consumers would use. (In this mode, the player simulates a TV broadcast signal and can be assigned to either channel 3 or 4, whichever is the unused channel in your community.)

After connection, you simply put a Photo CD into the unit and press the "Play" button on the remote. Picture number 1 will show on the screen and remain there until you give another command. With each new command, a new picture will scroll downward on the screen, taking about 5 S.

In order to see the system in operation exactly the way a typical consumer would, I had access to a record-once CD that had been made from a roll of color film. Prints were included so that I could judge the quality of TV presentation relative to those prints. The CD was packaged in the typical jewel box, and a handy index print was included that showed numbered, stamp-sized versions of each photo stored on the disc. You can simply enter the number of an indexed photo, and the system

goes right to it. The quality of the TV images was uniformly excellent, especially in terms of color value and contrast. If normal NTSC television could be reproduced this well by the time it reached your TV, you might not yearn for HDTV at all!

There are several useful manipulations available in viewing pictures on the disc. The remote control lets you pan the image from left to right and also up and down. The normal TV picture has a 4:3 aspect ratio, while the 35-mm frame is slightly wider. In normal view, the sides of the film frame are slightly cropped, but image size can be reduced to show a full horizontal frame or reduced a lot to show a full vertical one. A "Frame" command puts a small white outlined frame on the screen that can be moved about with the pan controls to highlight a particular part of the total picture. Then, when you press the "Zoom" control, that portion of the picture within the white frame will fill the entire screen.

These commands can be stored as programs for specific discs. In program play, not only are the pictures shown in their programmed order, but each will be individually framed, zoomed, or panned as it comes up on screen. Programs are stored in the player, not on the disc itself. This makes it easy to change a program at a later date, but if you insert the disc into another player, your presentation cues will have to be reentered into it.

Another test disc I used was somewhat more complicated. It was a travelog through Australia, complete with stereo commentary and a set of menus by which I could pick a given portion of the "trip." Once a menu item was selected, the disc traversed it automatically. Still, I could override the program and zoom in on a given scene.

For very dedicated amateur photographers, the prospect of viewing high-quality slides on a standard TV set may not be all that attractive, inasmuch as it would take the HDTV system to begin to do justice to what a routine slide projector can do. However, for many people the convenience of the TV set will probably win out—and there is always the added comfort of knowing that the Photo CD, at its highest resolution capability, *does* do justice to the original picture.

FINALLY, AN OFFICIAL ELVIS SIGHTING!

9" x 11" Wall Clock

The Limited Edition
ELVIS PRESLEY
STAMP CLOCK
Officially Authorized Product
Stamp Design 1992 U.S.P.S.

Handmade in the USA
Exquisite beveled glass
Electronic quartz crystal movements
Available as
9" x 11" Wall Clock $49.95 ea.
8" x 8" Wall Clock $47.95 ea.
4" x 8" Desk Clock $39.95 ea.
plus $3.50 shipping/handling

To order, call
1-800-969-TIME
Visa & MC or send check or money order to:
Clock-Wise®
P.O. Box 1198 Bodega Bay, CA 94923

"Elvis" and "Elvis Presley" are Registered Trademarks of Elvis Presley Enterprises, Inc. Clock-Wise is an official licensee of The United States Postal Service and Elvis Presley Enterprises, Inc.

TITILLATE YOUR SENSES

Music is a powerful stimulant, titillating our senses and awakening our emotions. Paul Barton, founder of PSB and a respected musician and recording engineer, designs loudspeakers which deliver pure, natural sound, free from colorations. The result? Recorded music that parallels the live performance. The acclaimed Stratus Gold and Stratus Mini offer unparalleled performance, splendid appearance and unequalled value. Audition them today!

psb SPEAKERS

PSB - A UNIQUE VOICE IN THE CROWD.

For your nearest PSB dealer call TOLL FREE 1-800-263-4641

Enter No. 37 on Reader Service Card

IVAN BERGER

IT'S THE LONG-RANGER

I go to the beach at Harvey Cedars, N.J. to get away from it all, but I regret getting away from good jazz and classical music on the radio. Even though the place is only about 80 miles from New York, and about 65 from Philadelphia, nothing but nearby rock and pop gets through. But on my last trip, I picked up jazz and classical music in my car every night—from Deutsche Welle and the BBC.

The head unit that brought me all this was the Philips DC777, the only car stereo I know of in the U.S. market that picks up short wave (SW) as well as AM and FM. Short wave isn't its only unusual feature. The Philips incorporates three timers that can tune in a predetermined station at a preset time, even if you're listening to another station or a tape or have the muting on (though not if the radio is turned off). Pressing a button next to the single large control knob swings out a subpanel with a numeric pad for directly setting a station frequency, setting the clock, or setting any of the three timers.

The tuning facilities are fairly extensive. There are two five-station memory banks for FM, one five-station bank for AM, and a 20-station short-wave memory. The arrow buttons can be used for manual or auto-search tuning in either direction, and pressing the Auto-Store ("AST") button captures the five strongest local stations on the currently selected band yet lets you easily retrieve any previously memorized stations. The tape section has auto reverse. For theft protection, you can activate a circuit lock that renders the DC777 useless until its security code is entered (while "Code" flashes on the big display), and you can get an optional pull-out mounting kit for even more security. The built-in amplifier delivers 13 watts per channel at 1% THD, and there are line outputs (which I used) for external amps.

The large knob, which normally controls volume, can also be used as a fader, balance control, or treble or bass control, according to how many times you press the "Audio" button about an inch to its left. (This is now a fairly common way of lessening panel clutter, but Philips was the first I know of to use it.) The bass and treble settings are stored separately for FM, AM (including short wave), and cassette.

The controls beneath the station display are all related to tuning, while the tape-transport controls are just to the right of the tape slot, above the large knob. The buttons for loudness, muting, and "Audio" are on the front of the swing-down subpanel. The only quirky control placement is the on/off switch, which is hidden from the driver's view by the control knob (except in Britain, Japan, and other countries where the driver sits on the right side of the car).

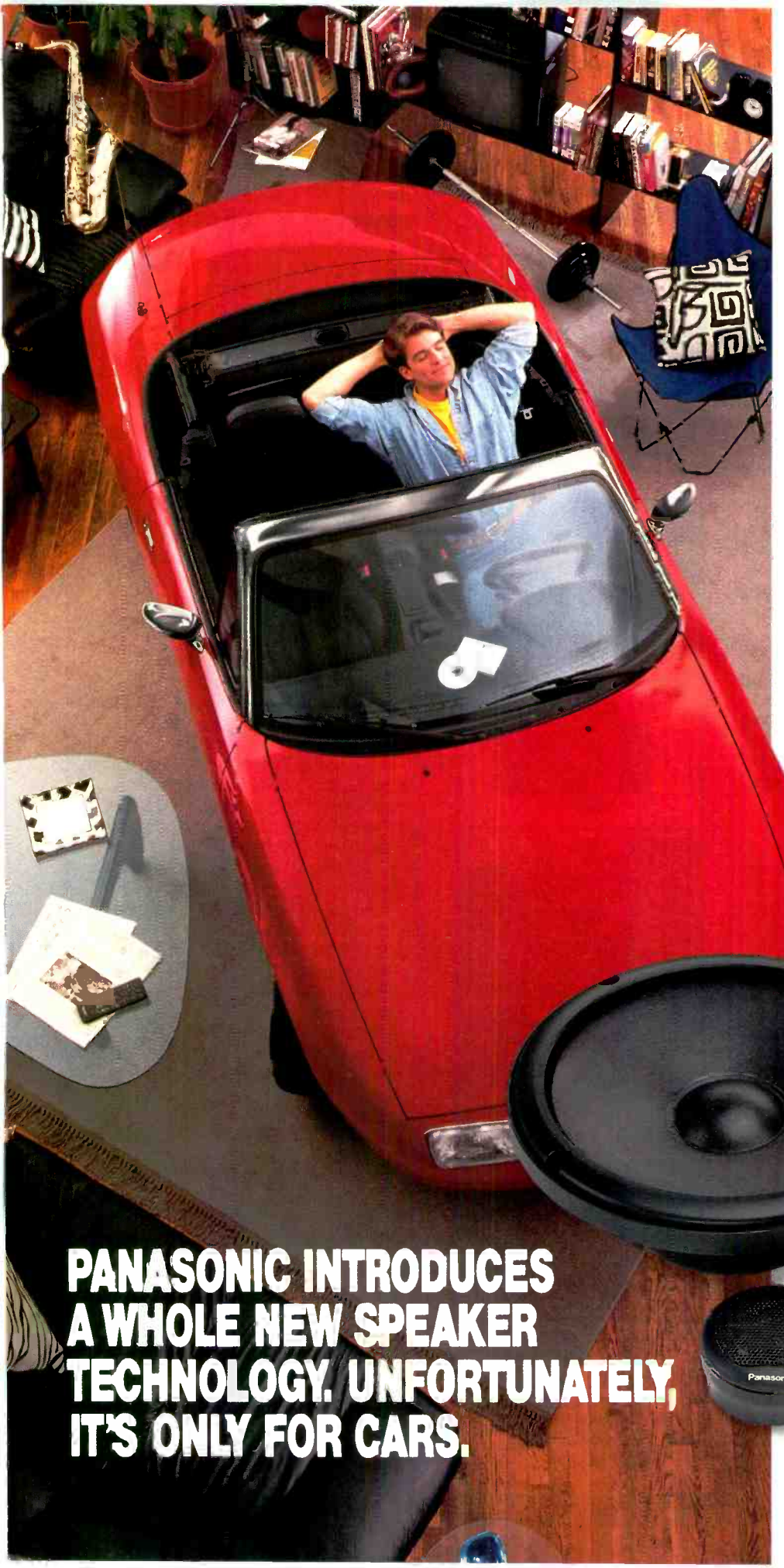
By day, the large display is easy to read even in direct sunlight. At night, with the unit off, the control knob, tape buttons, and on/off switch are illuminated. With power on, everything lights up except the "Loudness" and "Mute" buttons and the small button between the control knob and the "Audio" button that swings the subpanel out.

On FM and tape, I found the Philips had a slight edge to its sound, an over-crispness that made speech very clear yet added a touch of harshness to music. But then, when a manufacturer leaves both Dolby NR and EQ switching off his tape section, you know he's not aiming the model at audiophiles.

That's a pity, because the DC777 is full of very useful features. The timers will keep you from missing your favorite programs (though it would be better if the timers could distinguish weekdays from weekends), and the short-wave section does bring in many interesting programs. Over the weeks I used the Philips, I heard not only jazz and the classics but Oriental music, comedy in an unidentified language, news with a foreign slant, interviews, and sports (soccer, I think).

Unfortunately, finding those programs wasn't easy. Some SW stations came in as clearly as distant clear-channel stations on the AM band would. But when I scanned away from those stations to seek others on the same band, the Philips found more unlistenable than listenable signals. At any given time, most bands yielded nothing listenable, and the bands where I could find a few worthwhile stations varied with the time of day. That's the nature of short wave, whose propagation also varies with the season, the weather, and the level of sunspot activity.

So prospecting for stations is not something you should try to do while



Panasonic introduces car speakers so advanced, special materials had to be used to build them.

After it blows the doors off your car, you'll wish it could do the same for your room. It's the new E-Series from Panasonic. They're not just new car speakers, they're a totally new speaker technology.

For instance, its woofer system represents a radical departure in speaker design. Usually the outermost portion of a woofer's diameter is unable to create sound. Our new discrete-edge design uses the full diameter of the E-Series woofer to create music. And its acoustically dampened resins reduce harmonic vibrations for stunning sound clarity. And if those specs don't tickle your tweeters, wait 'til you hear its dash-mounted tweeters. They can reproduce up to 25 KHz.

The new Panasonic E-Series. Available in 5¼" (EAB-E55) and 6½" (EAB-E66) component systems, as well as a 6" × 9" 3-way rear deck system (EAB-E99). They're the speakers you would do anything to have in your home. Unfortunately, they're only for your car.

Panasonic®
just slightly ahead of our time.®

Enter No. 31 on Reader Service Card

Why This Ad Is Making The Other Loudspeaker Company Nervous.

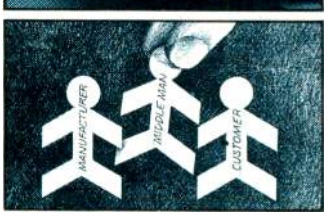
We think the Ensemble II speaker system by Henry Kloss is better than the BOSE AM-5 Series II. And because Cambridge SoundWorks sells direct...it's half the price.

Audio Hall of Fame member, Henry Kloss
All Cambridge SoundWorks products are designed by our co-founder and chairman, Henry Kloss, who created the dominant speakers of the '50s (AR), '60s (KLH) and '70s (Advent). Our high performance, high-value speakers and systems are all manufactured in our factory in Newton, Massachusetts.

Ensemble II performance for half the Bose price.
Ensemble® II is the latest version of the subwoofer-satellite speakers *Audio* magazine said "may be the best value in the world." Unlike the Bose® system, it uses two-way satellite speakers and acoustic suspension subwoofers (with 35% more cone area). It can sound identical to our original Ensemble system.

Audio experts on call 365 days a year.
Our helpful, knowledgeable audio experts (not clerks) are on duty for advice, hook-up information or orders, 8AM-midnight, *every* day, including holidays. They don't know the meaning of the phrase "hard sell." A customer wrote "The quality of your product is matched by your attitude towards your customers."

We've eliminated the expensive "middle-men."
All Cambridge SoundWorks components and systems are sold factory-direct to the public, eliminating huge distribution expenses. Don't be fooled by our reasonable prices—our products are *very* well made, with premium quality components throughout. With our 30-day satisfaction guarantee, you can't lose.



FREE catalog—Pioneer, Philips, Denon and more.
Our full-color catalog is loaded with systems and components from top name brands, including our own. Our systems deliver a lot of performance for the money, especially our Dolby Surround systems, which we feel are the best values in the country. For your free catalog, call 1-800-AKA-HIFI, 24 hours a day.

CAMBRIDGE SOUNDWORKS

A new kind of audio company, with factory-direct savings.

154 California St., Suite 104DEC, Newton, MA 02158 1-800-AKA-HIFI (800-252-4434)
Fax: 617-332-5936 In Canada: 1-800-525-4434 Switchboard: 617-332-5936

© 1991 Cambridge SoundWorks ® Ensemble is a registered trademark of Cambridge SoundWorks.
Bose is a registered trademark of Bose Corp. AR & Advent are trademarks of International Jensen, Inc.

Find out how good we are: experts on call 8AM–midnight (ET) every day 1-800-AKA-HIFI

Enter No. 8 on Reader Service Card

driving. Luckily, you do not have to. Before you hit the road, you can scan for stations, enter them in memory, and set off confident that a few hours' driving won't take you out of range. (The BBC World Service, at 5,975 kHz on the 49-meter band, came in just as clearly in Hartford, Conn. as it had in Harvey Cedars, 200 miles away.) Better yet, you can look up stations in Philips' 161-page *Short Wave Handbook*, which lists station names, frequencies, program languages, and the times and continents where each broadcast is theoretically available. Once you find a few stations you want to hear, enter their frequencies from the swing-down keypad and add them to the station memories for easy access while you drive.

The 20-station SW memory allocates up to five frequencies to each of the first four preset buttons; you use the fifth button to shift between a button's stored frequencies. This allows you to assign one button to a radio service that broadcasts on different frequencies at different times of day, as many SW stations do. In fact, the timers can switch frequencies for you at the same times the station does.

The DC777 covers SW frequencies from 3,170 to 21,910 kHz, the 90- through 13-meter broadcast bands. This includes virtually all the worldwide bands plus a few regional and tropical ones. Amateur and other SW bands that lie between the broadcast frequencies can be reached by using manual tuning or by directly entering frequencies on the swing-out keypad.

According to the unit's British spec sheet, turning the treble all the way down during short-wave listening switches the tuner to a narrower i.f. bandwidth to counter noise and interference even further. Had the manual mentioned that, I'd have given it a try. I found one station slightly vulnerable to alternator and ignition noise, though another station on the same band wasn't.

For $499.95 (plus $49.95 for the pull-out kit and $44.95 more for a remote control), the DC777 doesn't bring you the finest in musical sound or the utmost in FM sensitivity. But it does bring you the world.

You're more likely to carry a car stereo's faceplate in your pocket than to lug an entire head unit around.

What's Coming Off

Detachable faceplates are growing more common. In addition to LA Sound, Pioneer, and Profile, this anti-theft system is now supported by Alpine, JVC, Panasonic, Sherwood, Sony, and others. Typically, units with this feature cost about $10 more than those with pull-out mounts.

Makers of detachable-face stereos point out that units which stay in the dash don't get banged about the way pull-outs do. This could improve reliability, especially of CD players. However, some detached control panels will get lost, dropped, or stepped on, and the connections between panel and head unit are potential weak spots. (One car manufacturer told me that they don't offer removable faceplates because such problems with the factory stereo might reflect badly on the overall reliability of their cars.) So about the only significant selling point is more effective theft prevention: Users are more likely to take a light faceplate with them than to lug around an entire head unit.

I'd thought that the theft deterrence would ultimately hinge on how tight a rein manufacturers and dealers keep on purchases of replacement faceplates. Ideally, replacements should be made readily available to anyone who can produce a broken panel, a receipt for the head unit's purchase, or other documentation as well as to anyone who sends in his warranty card to the manufacturer or whose dealer has records of the purchase—but not to just anyone who walks in off the street.

Some manufacturers, however, find these precautions undesirable because customers squawk like crazy if they lose their controls and can't get new ones fast. They also feel such safeguards are unnecessary, because car stereo thieves don't sell their loot to people who'll go out to a dealer the next day to replace missing parts. Thieves sell to people on the street who are willing to pay spot cash, but only for something they think they can use right away. Pull-out stereos are easy to sell to the unwary because they *look* complete: The knobs and dials are obviously all present, and only in the rear, which people normally don't see, is anything missing. But a plain black box without controls is too hard to pass off as a car stereo, even if it is one.

Or so say the manufacturers. My installer, Tony Igel of Stratford Mobile Sound, is skeptical: "I get three or four people a week coming in to purchase 'replacement' faceplates," he says. "I won't sell them, but I bet somebody else does."

Cooling It

As I've mentioned before, a major trend in amplifiers is fan-cooling (at least 10 companies have power-cooled amps). Fans are needed because most amplifiers convert more than half the energy they draw from the car's electrical system into heat. Raise the efficiency, and you reduce both the need for cooling and the demands on the car's electrical system.

That's why Infinity has introduced some Class-D switching amps, and I've heard that other companies plan to. Switching amps have roughly double the efficiency of normal amp designs because they use transistors only in their most efficient states—switched full on or full off—rather than in the less efficient gain states between those extremes. The Infinity amps, for example, are rated at 80% efficiency (which means only one-fifth of their power draw is wasted as heat) versus about 20% to 45% efficiency for conventional designs. Because switching amps need so little cooling, they can sometimes be installed directly in speaker enclosures, just as Bose has long been doing with their switching amplifiers for factory-installed sound systems.

Blade Technology, of Canada, claims that Class-D amps sound a bit too cold. They've come up with a design, BASH (not an abbreviation for anything), for which they claim 70% efficiency. Incoming signals are delayed a few microseconds while a circuit analyzes the signal and its power requirements; by the time the signal reaches the amplification stages, the power supply is prepared to provide just the right voltage to handle it.

FREE
Audio Catalog

- Call toll-free for factory-direct savings.
- Save hundreds on components and systems from Cambridge SoundWorks, Philips, Pioneer, Denon, Nakamichi, Thorens, Koss and others.
- Audio Experts will answer all your questions, before *and* after you buy... 8AM–midnight (ET), 365 days a year.
- 30-day total satisfaction guarantee.

"Ensemble II, like its companions in the Cambridge SoundWorks lineup, performs so far beyond its price and size class that it can be compared only with much larger speakers at substantially higher prices."
—Stereo Review

1-800-FOR-HIFI*
24 hours a day, 365 days a year (800-252-4434)

CAMBRIDGE SOUNDWORKS
A new kind of audio company, with factory-direct savings.

154 California St., Suite 104DEC Newton, MA 02158
*In Canada call 1-800-525-4434. Fax: 617-332-9229
Outside U.S. or Canada 617-332-5936
© 1991 Cambridge SoundWorks ® Ensemble is a registered trademark of Cambridge SoundWorks. AR & Advent are trademarks of International Jensen, Inc.

Enter No. 9 on Reader Service Card

OUR AUDIO COMPONENTS HAVE THE UNCANNY ABILITY TO PRODUCE INCREDIBLE FEEDBACK.

"I am not aware of an amplifier, anywhere, that delivers this much usable power at such a modest cost."

HCA-800II AMPLIFIER, BOUND FOR SOUND, DECEMBER 1990, U.S.A.

"... internal appearance definitely suggests that of some far costlier high-end components. ... first rate sound at a truly affordable price."

P/FET-900II PREAMP, STEREO REVIEW, JANUARY 1992, U.S.A.

"Parasound comes out on top in the areas of fine detail, clarity and timbral accuracy."

HCA-800II AMPLIFIER, FALL 1992, THE $ENSIBLE SOUND, U.S.A.

"From the very first sounds—even forgetting this price—we noticed unsurpassed spaciousness and detail enveloping us."

P/FET-900 PREAMP AND HCA-800II AMPLIFIER, HOMESTUDIO, DECEMBER 1989, HOLLAND

"... a product that's basically untouchable by the competition."

HCA-2200 AMPLIFIER, BOUND FOR SOUND, DECEMBER 1991, U.S.A.

"It offers more than just a touch of high-end sound at a very affordable price."

HCA-800II AMPLIFIER, STEREOPHILE, OCTOBER 1990, U.S.A.

One thing is coming through loud and clear. A consensus that our audio components are a resounding success.

And it's no accident. Because we take a uniquely pure approach to music reproduction. You see, we put our money into elegant audio engineering and acoustic design. Not into fancy decorations that don't add any sonic value.

On the surface, this may not seem like such a big deal. But, as you can see, we've built quite a reputation by making high-end audio components at affordable prices.

To learn more about our complete family of audio products, give us a call. And discover for yourself why we're generating so much positive feedback.

PARASOUND

Affordable audio for the critical listener.

Parasound Products, Inc. 950 Battery Street, San Francisco, CA 94111 • 1-800-822-8802; 415-397-7100; Fax: 415-397-0144
In Canada, distributed by: Absolute Sound Imports, 7651 Granville Street, Vancouver, BC; 604-264-0414

OUR POWERFUL, HIGH-END AMPLIFIERS ARE ALSO DESIGNED TO INSULATE YOU FROM STICKER SHOCK.

Shopping for high-end audio can be a real jolt to your system.

But it doesn't have to be. Because Parasound offers a complete family of affordable power amplifiers to faithfully reproduce the music you love.

From the HCA-500 at under $400, to the John Curl-designed HCA-2200 at under $2,000. Each one is designed to master difficult loads with true power and grace.

What you'll receive is quality sound that surpasses amplifiers costing two to three times more.

Your authorized Parasound dealer will help you choose the one that's right for you. For further information and reviews, give us a call. And discover amplifiers and other components which are nothing short of electrifying.

PARASOUND

Affordable audio for the critical listener.

Parasound Products, Inc. 950 Battery Street, San Francisco, CA 94111 • 1-800-822-8802; 415-397-7100; Fax: 415-397-0144
In Canada, distributed by: Absolute Sound Imports, 7651 Granville Street, Vancouver, BC; 604-264-0414

A/V RECEIV

Photographs: Kevin Knight

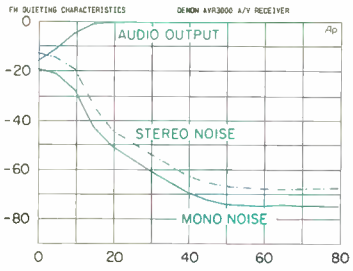
ER ROUNDUP

seven for seven seventy to seventeen ninety-five

LEONARD FELDMAN

The popularization of home theater audio/video entertainment rooms has boosted the popularity of the receiver. Today's A/V receivers, unlike the stereo tuner/amplifiers of yesteryear, include decoders and extra amplifier channels for surround sound. Most popular models have video as well as audio connections to control the entire A/V system. They also have enough amp channels to power from three to five speakers for home theater use; at least one model of those I reviewed here has seven channels. The decoders in the seven receivers tested

At left, from top: Receivers from Sony, Kenwood, JVC, and Onkyo. Below, from top: Receivers from Sansui, Pioneer, and Denon.



FM quieting characteristics, Denon AVR-3000.

include Dolby Pro-Logic circuitry (at least partially digital, in several cases) that enhances separation between the front, center, and rear (surround) channels. These Pro-Logic decoders all allow deliberately limited adjustment of rear-channel delay and a choice of three front-channel modes: Phantom (for systems without center speakers), normal (for systems whose center speakers have less bass than the main speakers), and wide (for systems whose three front speakers have equal bass capabilities). Most have full-range mono line outputs that can feed a self-powered subwoofer.

Other home theater features found in common include a three-channel Dolby Surround mode for systems without rear speakers and universal remotes that are preprogrammed to control other audio and video components and can learn the commands for still more components. And since these are audio as well as home theater components, all seven have phono inputs.

For all their flexibility and versatility, not all A/V receivers are equal. Therefore, *Audio*'s editor decided to conduct a no-holds-barred comparison test and evaluation. Separate comparison charts are included for the tuner and amplifier sections of each receiver, as well as for the video sections and the convenience features and facilities. Ratings from 0 to 10 are assigned for each of the sections and for overall convenience, and, finally, an overall rating is given to each model. All of the receivers are excellent performers, but some are better than others. In addition, overall ratings are based, in part, on price/performance ratio. Obviously, a $1,000 receiver that performs as well and has as many useful features as a $1,300 receiver would garner a somewhat higher rating.

The Denon AVR-3000 excelled for both home theater and surround sound use, thanks to an almost countless number of adjustments.

Denon AVR-3000

This benchmark unit from Denon has five high-power amplifier channels (110 watts per channel for the front left, center, and right channels; 35 watts per channel for the rear channels). Its analog and digital microcircuits deliver outstanding Dolby Pro-Logic surround sound enhanced by powerful digital signal processing (DSP) capabilities. Operating in parallel with the Pro-Logic circuitry, DSP offers surround environments suitable for music-only listening, such as "Classic," "Jazz," "Church," and many more. Additional A/V modes include "Wide Screen" (for greater user control of such system parameters as delay when watching movies), "Live" (with default parameters more suited to live musical performances), and "Mono Movie" (a stereo simulation). Surround parameters can be adjusted to achieve desired effects.

The Denon's measured FM tuner performance was certainly adequate but not as good as I might have hoped insofar as usable sensitivity and ultimate signal-to-noise ratios were concerned. Channel separation, on the other hand, was fairly good, and tuning was accurate and stable. Activating and setting up the 16 AM/FM station presets was relatively simple, and I liked the fact that the less-often-used controls were hidden behind a swing-down panel. The display panel of the AVR-3000 is easy to understand and can be turned off completely if it becomes too distracting.

An interesting touch is the inclusion of *two* remote controls. The more versatile remote not only operates nearly every function of the AVR-3000 but can also operate additional components from Denon and other manufacturers through preprogrammed or user-programmed commands. The simpler remote operates only the AVR-3000's major functions, for easier use by those who do not want all the secondary functions. Even the simpler remote offers a Personal Memory Function, which lets you restore your favorite control and mode settings with the touch of a single button.

This receiver excels for home theater applications and in its surround music listening modes. The number of parameter permutations is almost countless, with variable time delay available even in the Dolby Surround modes. The 53-page owner's manual is fairly complete, though the organization of the text could have been a bit better. The Denon AVR-3000 carries a suggested retail price of $1,300.

JVC RX-1050VTN

This relatively expensive model ($1,500 suggested retail) is the flagship in JVC's Super Digifine series of audiophile receivers. The unit's Dolby Surround decoding is digitally processed, and a proprietary digital acoustics processor simulates the sound fields of theaters, halls, and stadiums. The RX-1050VTN receiver boasts five channels of amplification.

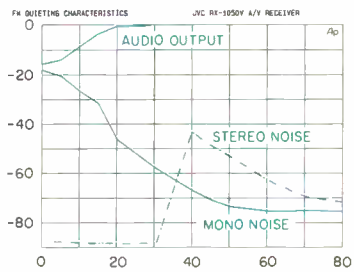
The JVC has S-video jacks for its three video inputs, its monitor output, and its two VCR outputs. An on-screen TV display helps guide the user through a fairly complex set of functions and controls that might intimidate those who refuse to consult the 60-page owner's manual.

The JVC's remote control can also learn commands for other companies' A/V products, and it is preprogrammed for other JVC A/V components. Instead of a button array the remote has a touch-panel LCD, which makes it rather large, but lets "button" legends automatically change to match whatever component is being controlled. The receiver has both optical and coaxial digital inputs, so a CD player equipped with a digital output can be connected directly without having to first convert the digital data to analog signals in the CD player itself. Since the built-in D/A section uses JVC's P.E.M. one-bit D/A converter, conversion accuracy and linearity were superb—in all likelihood as good as or better than the D/A conversion systems found in all but the most expensive late-model CD players.

An unusual feature not found in many A/V receivers is a built-in seven-band graphic equalizer, with memories for three factory-set and three user-set equalization curves. Its display can show the EQ curve in use and be used as a real-time analyzer of signal content. An enhancement to JVC's CompuLink system, called CSRP, lets you store three sets of adjusted acoustic parameters (from a list that includes level, balance, equalization, etc.) for each program source. Additionally, the new A/V CompuLink system can be used to integrate the RX-1050VTN's operation with that of selected JVC television sets and VCRs. For example, when you load a prerecorded tape into the VCR, the rest of the A/V system will automatically set itself to view the VCR's output.

The JVC's FM tuner performance was about average, with 50-dB quieting figures in both mono and stereo somewhat poorer than I would have expected. This did not limit the number of acceptably noise-free stations that I was able to receive, but having the muting and auto-stereo functions combined did limit the number of signals I could receive in stereo.

Both surround and Dolby Pro-Logic performance were beyond reproach, with enough parameter adjustments to take care of just about any listening room and listener position. Since the JVC has no fewer than 57 buttons behind its swing-down panel (in addition to the always-visible controls for source and speaker selection, volume, muting, and power), you may find it takes a bit of learning before you can fully avail yourself of the many features. Once you familiarize yourself with its intricacies, though, you'll find the JVC well worth its price.

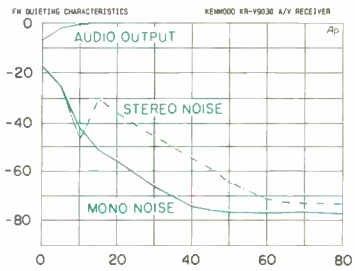


FM quieting characteristics, JVC RX-1050VTN.

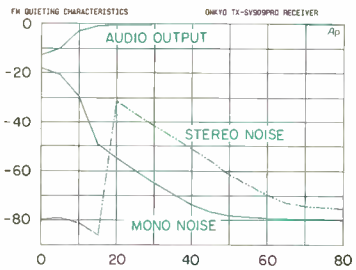
Kenwood KR-V9030

In addition to the usual Dolby Pro-Logic surround modes, this receiver offers a choice of six simulated sound environments: "Arena," "Jazz," "Stadium," "Discotheque," "Cathedral," and "Movie Theater." Other features include six DSP sound-field presets, six surround memory presets with name display, a learning remote, automatic input balance for Dolby Surround, two VCR input/output loops and a front-panel video input, S-video connections, video dubbing facilities, 20 tuner presets, and a station name preset system visible on the front-panel display.

Although the Kenwood is rated at 130 watts per channel at 0.03% THD for stereo, this power rating changes to 75 watts per channel (at a maximum of 0.9% THD) when operated in the five-channel surround mode. Still, I found that the power output in surround was more than adequate, even when driving my relatively inefficient KEF 105.2 speakers as the main pair in a five-channel setup. A built-in test-tone generator simpli-



FM quieting characteristics, Kenwood KR-V9030.



FM quieting characteristics, Onkyo TX-SV909PRO.

fied level setting for surround and center channels in the Dolby Surround mode.

The Kenwood's FM tuner performance ranked with the best of the seven receivers tested; its 50-dB quieting sensitivity was actually better than specified. I could find only two minor faults with the FM section: First, its relatively low alternate-channel selectivity (55 dB) could be a problem in metropolitan areas where FM stations are closely spaced on the dial. In my tests (some 18 miles from major transmitter sites) no such problems arose. A second minor fault was the FM frequency response, which was down a bit more than 3 dB at 15 kHz.

The 39-page owner's manual was one of the best I encountered during this project. Connection diagrams are very clear, and more important, instructions for each of the many operating modes are presented in a numbered, step-by-step format that will be easy to follow even by those who have never operated an A/V receiver. At a suggested price of $979 including its learning remote, the Kenwood KR-V9030 represents extremely good value compared with some of the tested units; I took this fact into account in my overall rating.

Onkyo TX-SV909PRO

The Onkyo has a fully digital Dolby Pro-Logic surround decoder plus seven discrete channels of amplification. It also has the ability to play different programs in two rooms or zones of your house, control menus that display on your TV screen (including diagrams of simulated sound fields and your imaginary seat positions within those fields), and a wealth of other features. Pro-Logic is just one of eight surround and sound-field settings that can create an almost infinite range of audio environments. These include more than the usual number of sound fields (such as two "Theater" and "Hall" settings instead of just one) plus full decoding of Ambisonic-encoded source material. Many feel that Ambisonics offers a superior three-dimensional sound experience, and a number of recordings (including the entire Nimbus catalog) have been made with it. As far as I've been able to determine, this is the first and only receiver to incorporate an Ambisonic decoder.

The Onkyo boasts six video inputs and three video outputs, all with composite and S-video connections, plus five audio inputs, an optical digital input, and five audio line outputs. Users can adjust nearly all tuner and amplifier parameters by using easy-to-follow on-screen menus in combination with the remote control. Other tuning facilities include 40 random station presets (with the ability to assign and scan stations by any of six program-format categories) and the ability to enter station frequencies directly from a 10-key pad. Onkyo's Remote Interactive (RI) system can be used to link the TX-SV909PRO to other Onkyo components for control by the receiver's remote. Considering this unit's versatility, its price of $1,795 seems reasonable.

Setting up the TX-SV909PRO for a full home theater installation may likely take you quite a while, as it did me. But if you follow the diagrams and instructions provided in the well-written 45-page owner's manual, you should have no trouble. One unusual aspect of the surround setup is that the Onkyo provides for an extra pair of enhancement speakers, to be mounted somewhat behind and above the usual left and right front speakers. (This is why the Onkyo has seven output channels instead of the usual four or five.) If you can afford the extra pair of speakers for this configuration, by all means include them; they can add a sense of sonic space that you just can't achieve with four or five speakers.

Once setup was complete, I found that I preferred operating the Onkyo from the comfort of my listening and viewing position instead of trying to adjust all the parameters via the front-panel controls. Watching a movie on LaserDisc, with Dolby Surround augmented by a receiver such as this Onkyo "do-it-all" unit, brings me as close to the actual movie theater experience as any setup I've evaluated to date. But don't overlook the fact that as a straight stereo receiver, the TX-SV909PRO offers unsurpassed performance. Onkyo has always been noted for

Among its many surround facilities, the Onkyo TX-SV909PRO has the only Ambisonic decoder I've seen so far in a receiver.

superb FM tuner designs, and they have obviously incorporated much of what they've learned from designing separate tuners into this outstanding receiver. I listened to CDs and to FM radio in the stereo mode (disabling the surround features) and then switched to one of the surround modes. I was always able to find at least one surround mode that was appropriate for the kind of program material I was listening to. But whether you prefer straight stereo or surround sound for music-only listening, it would be hard to beat the performance of this top-of-the-line receiver from Onkyo.

Pioneer VSX-D901S

A digital signal processing circuit in the VSX-D901S creates five listening environments in addition to the usual Dolby Pro-Logic. Separate audio and video programs can be fed to two different rooms or zones of the house, and with an optional infrared adaptor, the system can be controlled from any room in the house as well.

Any two user-defined control settings (such as input selection, surround mode, or volume) can be stored in memory for instant recall when the "Auto Source Control" button is pushed. For example, you can set the VSX-D901S to switch to the CD input and adjust the volume to your preferred level when the button is pushed; if the CD player is a Pioneer model that shares System Remote (SR) connections with this receiver, it will then start playing. The thumb-indented "Jog" dial is used for a variety of functions: Tuning, scanning a character table to spell out the names of preset stations, changing surround delay time or total sound-field effect, and adjusting a built-in video enhancer. A split-screen video display mode lets you adjust the video enhancer while comparing enhanced and normal versions of the picture on one screen. And, like most of the receivers in this review, the Pioneer can show its operating status on your TV screen as well as on its own display.

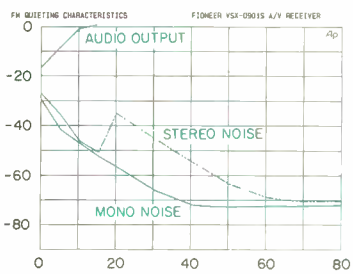
Tuner facilities include direct-access tuning from a numeric keypad and "Custom Memory" tuning by any of five program categories. The tuner's 50-dB mono quieting sensitivity was extremely good—as was its capture ratio, a characteristic that should make the tuner section especially effective in crowded signal areas and in the presence of multipath reflections. Channel separation was excellent as well, though I did notice a 0.75-dB imbalance between left and right outputs in the mono mode. This may be a function of my particular sample, and of course, it can be corrected by offsetting the balance control slightly. The Pioneer's price of $1,140 falls in the middle of this test group. Considering its features, control functions, and effective surround performance, the VSX-D901S is well worth serious consideration.

Sansui RZ-9500AV

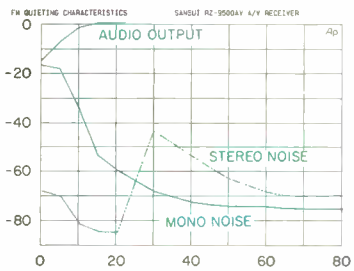
This A/V receiver delivers enough power to handle some of the more inefficient loudspeaker systems around. On a continuous power output basis, its front-channel amps delivered considerably more power than the 100 watts per channel specified by Sansui. Surround (rear) and center-channel amplifiers easily met their conservatively stated ratings of 30 watts per channel and 40 watts, respectively. FM tuner usable sensitivity was excellent—as good as that of the most sensitive separate tuners.

The RZ-9500AV is supplied with a universal remote control, i.e., it can be taught the codes or commands of other components (including those from other manufacturers). When not listening to one of the Sansui's many surround sound options, you can choose the "Source Direct" mode, which bypasses tone controls and surround circuitry for the shortest signal path between the program source and your main loudspeakers.

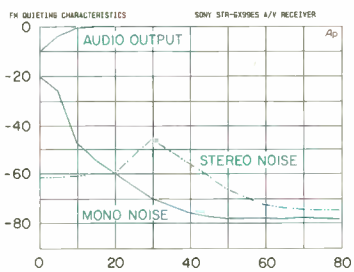
You can tailor and store all the parameters of up to four surround settings in memory. The unit can simultaneously drive a set of front, center, and surround speakers in one room and a stereo pair in another room. Up to 30 AM and FM stations can be preset, and a scan function lets you listen to each memorized station for about 8 S until you select one for listening. Station call letters can also be stored in memory.



FM quieting characteristics, Pioneer VSX-D901S.



FM quieting characteristics, Sansui RZ-9500AV.



FM quieting characteristics, Sony STR-GX99ES.

A clever arrangement of pushbuttons minimizes the clutter that might have resulted if all switching functions were operated by individual rotary or pushbutton controls. Instead, a single pair of "up" and "down" buttons operates such functions as bass and treble, balance, center- and rear-channel levels, and even rear-channel time delay. Secondary buttons select which function the up/down buttons perform.

Detailed instructions are a bit sparse in the Sansui owner's manual, but there's enough information to enable a relatively inexperienced user to hook up the unit properly and to take advantage of its versatility. At its suggested price of $769.95, the Sansui is the least expensive receiver I tested. As such, it represents a bargain for those who cannot afford or don't want all the frills (such as DSP and digital Dolby decoding) found in the more expensive units.

Sony STR-GX99ES

Sony has borrowed much of the technology of their successful digital preamp of two years ago, the TA-E1000ESD, in configuring this top-of-the-line A/V receiver. The unit even borrows the TA-E1000ESD's digital compander, to compress CD signals for dubbing to cassette or for background listening, and to expand the dynamics of older recordings. The number of adjustable parameters in Dolby Surround and in the nine additional surround modes is truly awesome. The receiver's programmable remote control can set such parameters of the digitally simulated listening environment as room size, wall material, and seat position as well as such traditional surround parameters as effects level, reverberation time, rear-channel levels, and center-channel level. Add to that the presence of a three-band parametric equalizer, and it becomes clear that the STR-GX99ES lets you customize your listening preferences to a greater degree than any of the other models evaluated.

Of course, with such versatility comes a certain amount of complexity. To make operation easier, the status of all the main, DSP, and surround functions and sub-parameters mentioned above can be displayed on the screen of a TV set—right down to the position of the listener's seat in the simulated concert hall. A host of other on-screen graphics makes the detailed DSP adjustments completely clear to the novice user.

The surround sound and Dolby Surround reproduction were superb, especially when I took the trouble to customize all the adjustable parameters and sub-parameters of this remarkable receiver. Despite the number of features and controls that contribute to the Sony's versatility, I found I was able to use all of them after about an hour or so of experimenting with the front panel and the remote control.

As for FM tuner performance, mono 50-dB quieting sensitivity was narrowly better than that of all the other receivers, beating out the nearest competitors by a fraction of a dBf. Frequency response of the STR-GX99ES was down by nearly 3 dB at 15 kHz, however, and distortion was somewhat higher than I would have expected from such an otherwise superb receiver.

The amplifier channels (main, center, and surround) all performed well, exceeding published power and distortion specifications by a relatively wide margin. Like most of the receivers in this group, it had only three video inputs, including the front-panel input usually used for camcorders. I think that more would have been desirable. Many people's home theater installations include at least two VCRs (for editing and dubbing) as well as a LaserDisc player, so at least one more set of video input/output jacks would have been useful. It would also have been nice if Sony had incorporated S-video connectors for the video inputs and outputs, as the makers of most of the competing receivers did.

Still, the magnificent ergonomics, the on-screen displays that make adjustments easy to perform, the universal remote control, and the number of possible adjustments with DSP circuitry far outweigh the minor omissions cited. In terms of price, the STR-GX99ES, at $1,000, lands about in the middle of the receivers tested. In terms of surround features, it surpasses all of them.

In terms of price, Sony's STR-GX99ES landed about in the middle of this group; in terms of surround features, it surpassed them all.

FM Tuner Section

Measurement	Denon	JVC	Kenwood	Onkyo	Pioneer	Sansui	Sony
50-dB Quieting, dBf							
Mono	20	23	14	16	13	13	12.5
Stereo	27	46	35	39	35	35	34
S/N at 65 dBf, dB							
Mono	74	75	77	79	73	76	78
Stereo	68	66	73	75	71	71	74
THD at 1 kHz, %							
Mono	0.098	0.09	0.059	0.035	0.11	0.16	0.25
Stereo	0.072	0.16	0.18	0.065	0.10	0.36	0.21
Frequency Response from 30 Hz to 15 kHz, dB	+1, −0.3	+0.4, −1.4	+0, −3.3	+0, −0.2	+0, −0.9	+0.2, −1.5	+0.4, −2.9
Alternate-Channel Selectivity, dB	65	65	55	55	65	70	60
Separation at 1 kHz, dB	53	35	45	62	56	54	35
Capture Ratio, dB	2.0	1.5	2.0	1.5	1.2	1.5	1.2
Number of Presets	16	40	30	40	30	30	30
Tuner Rating (0-10)	8.5	8.0	9.5	9.8	9.5	9.5	9.0

Amplifier Section

Manufacturer's Spec	Denon	JVC	Kenwood	Onkyo	Pioneer	Sansui	Sony
Rated 8-Ohm Power, Watts							
Front Channels	110	120[1]/70[2]	130[1]/75[2]	110[3]	125	100	120[1]/75[2]
Rear Channels	35	30	20	30	45	30	30
Center Channel	110	70	75	110	55	40	75
Rated THD, %							
Front Channels	0.03	0.007	0.03[1]/0.9[2]	0.04	0.005	0.02	0.04
Rear Channels	0.05	0.7	0.9	0.08	0.05	0.03	0.8
Center Channel	0.03	0.7	0.9	0.08	0.005	0.03	0.8
Measurements							
S/N, Line Inputs, dB							
Re: Rated Output	98	100	103	100	98	96	99
Re: 1-Watt Output, 500-mV Input	83	77.3	80	85	82	76	75
High-Frequency Limit (−3 dB) for Front Channels, kHz	210	72	29	55	125	43	23
Amplifier Rating (0-10)	9.5	9.0	8.0	9.0	9.5	9.0	9.0

Notes
[1]Stereo mode.
[2]Surround mode.
[3]Front enhancement speakers (see text), 30 watts per channel at 0.08% THD.

Video Section

Feature	Denon	JVC	Kenwood	Onkyo	Pioneer	Sansui	Sony
Number of Video Inputs	5	3	3	6	6	3	3
Number of S-Video Inputs	5	3	2	6	4	3	0
Number of Video Outputs	3	3	2	3	5	3	2
Number of S-Video Outputs	3	3	2	3	3	3	0
Number of VCR In/Out Loops	2	2	2	3	2	2	1
Front-Panel Video Input	Yes	No	Yes	Yes	Yes	No	Yes
On-Screen Display	Yes	Yes	No	Yes	Yes	No	Yes
Simulcast Ability	Yes	Yes	Yes	Yes	Yes	No	Yes
Video Rating (0-10)	9.8	9.0	8.5	9.8	9.8	8.5	8.5

Convenience Features

	Denon	JVC	Kenwood	Onkyo	Pioneer	Sansui	Sony
Remote-Control Rating (0-10)	10	10	9.0	9.5	9.5	9.0	9.8
Learning Remote	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Surround Modes	10	9	8	8	7	6	9
Dolby Pro-Logic	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Input Level Adjustment	Yes	Auto	No	No	Yes	No	Yes
Subwoofer Line Output	Yes	Yes	No	Yes	Yes	Yes	Yes
Display Rating (0-10)	9.5	8.0	9.0	9.0	9.5	9.0	9.8
Number of A.C. Outlets	3	2	3	3	3	2	2
Control Ergonomics (0-10)	7.0	6.5	8.5	9.5	9.0	9.5	9.5
Overall Feature Rating (0-10)	9.5	9.0	8.5	9.8	9.5	8.5	9.8
Price	$1,300	$1,500	$979	$1,795	$1,140	$770	$1,000
Overall Receiver Rating	9.0	8.0	8.8	9.5	9.0	9.0	9.5

Winners and Runners-Up

Let me say right off, there are no losers here. *All* of these receivers have a lot to offer those novices about to enter the world of home theater as well as those trading up from more basic A/V systems. The rankings shown in the accompanying Tables reflect my personal preferences as well as my lab measurements. Readers with different preferences can use the data in the Tables to assign their own ratings.

After considering all factors (tuner performance, amplifier performance, video performance, convenience features, and price), I find two receivers tie for first-place honors: The Onkyo TX-SV909PRO (with superb tuner performance, powerful center-channel and front-channel amplifiers, plus those extra front-enhancement amplification channels) and the Sony STR-GX99ES (with superb surround capabilities, helpful on-screen graphics, and an almost infinite number of DSP parameter adjustments). Had the Sony offered slightly better FM frequency response, more video inputs, and some S-video inputs and outputs, it would have been the outright winner in this contest. Had the price of the Onkyo been as low as that of the Sony model, it would have beaten the Sony by some tenths of a rating point. As matters stand, my overall rating for both the Onkyo and Sony receivers is an outstanding 9.5, on a scale of 0 to 10. (Nothing is perfect!) Close behind were the receivers offered by Denon, Pioneer, and Sansui. While the Sansui lacks some of the features and enhancements of the other two receivers that earned 9.0 ratings, its "bargain" price of $769.95 (lowest of all the receivers tested) earns it extra points in the overall rating. The Kenwood earned an overall rating of 8.8, trailing behind the runners-up by a very small amount largely because I found its controls rather complex and difficult to use and because of the higher than expected distortion spec of its important center-channel amplifier. With the features the JVC offers, and with its ratings for amplifier, video, and convenience right up there (at 9.0) with some of the higher ranked models, only its high price and less than stellar FM tuner sensitivity prompted me to assign it an overall rating of 8.0. A

Whether for a first home theater or a trade-up from there, all of these receivers have a lot to offer; there are no losers here.

Company Addresses

Denon, 222 New Rd., Parsippany, N.J. 07054. For literature on Model AVR-3000, circle No. 100.

JVC, 41 Slater Dr., Elmwood Park, N.J. 07407. For literature on Model RX-1050VTN, circle No. 101.

Kenwood, P.O. Box 22745, Long Beach, Cal. 90801. For literature on Model KR-V9030, circle No. 102.

Onkyo, 200 Williams Dr., Ramsey, N.J. 07446. For literature on Model TX-SV909PRO, circle No. 103.

Pioneer, P.O. Box 1540, Long Beach, Cal. 90301. For literature on Model VSX-D901S, circle No. 104.

Sansui, P.O. Box 1909, Edison, N.J. 08819. For literature on Model RZ-9500AV, circle No. 105.

Sony ES, Sony Dr., Park Ridge, N.J. 07656. For literature on Model STR-GX99ES, circle No. 106.

Columbia House. The face of jazz.

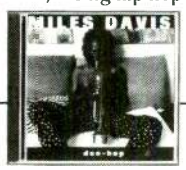
Discover a new facet of Branford's renowned versatility in *I Heard You Twice The First Time*. The Blues are renewed by his modern touch, energy and virtuosity. You'll learn why his celebrity is so well deserved.

This is the place where the biggest names in jazz come together.

From the soaring classics of John Coltrane to the virtuoso stylings of Chick Corea, only Columbia House has the expertise and heritage to bring you face to face with today's greatest artists.

Look to Columbia House–where the jazz is.

Innovation made Miles Davis a legend. His last studio project, *Doo-Bop*, is true to his form, fusing hip hop and jazz into one venturesome, street-fluent entity. More than an album, it's a legacy.



LEGENDARY JAZZ CLASSICS

Betty Carter—'Round Midnight (ATCO) 436•980

Dinah Washington—Dinah Jams (Emarcy) 441•709

Charlie Parker—Now's The Time (Verve) 429•605

The Best Of Count Basie (Roulette Jazz) 435•990

Ella Fitzgerald & Louis Armstrong—Ella & Louis (Verve) 430•710

Erroll Garner—Body And Soul (CL Jazz Masterpieces) 427•955

Nat King Cole— Jumpin' At Capitol (Rhino) 421•982

Billie Holiday—From The Original Decca Masters (MCA) 354•985

Horace Silver Quartet—Song For My Father (Blue Note) 440•255

Charles Mingus—Let My Children Hear Music (CL Jazz Master.) 439•414

The Gentle Side Of John Coltrane (GRP) 438•135

Miles Davis—Kind Of Blue (Columbia Jazz Masterpieces) 353•045

Glenn Miller Orchestra — In The Digital Mood (GRP) 347•492

Sarah Vaughan—How Long Has This Been Going On? (Pablo) 418•509

Duke Ellington—Ellington At Newport (CL Jazz Masterpieces) 354•662

Gerry Mulligan—Re-Birth Of The Cool (GRP) 442•921

Dave Grusin—The Gershwin Connection (GRP) 430•132

Harry Connick, Jr.— Blue Light, Red Light (Columbia) 429•191

Fourplay (James, Ritenour, East & Mason) (Warner Bros.) 428•334

Lee Ritenour Collection (GRP) 425•876

Spyro Gyra—Collection (GRP) 420•950

The Manhattan Transfer—The Offbeat Of Avenues (Columbia) 420•208

The Crusaders—Healing The Wounds (GRP) 419•952

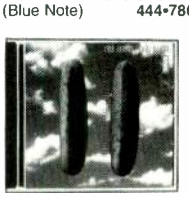
Best Of Herbie Hancock (Blue Note) 419•408

Larry Carlton—Collection (GRP) 407•825

The Best Of George Benson (CTI) 403•246

Kathleen Battle & Wynton Marsalis—Baroque Duet (Sony Class.) 439•372

T.S. Monk—Take One (Blue Note) 444•786



Bob James and Earl Klugh—Cool (Warner Bros.) 439•232

GRP All-Star Big Band (GRP) 440•503

Herb Alpert—Midnight Sun (A&M) 442•913

The Artistry Of Stan Getz (Verve) 433•706/393•702

The Best Of Blue Note, Vol. 1 (Blue Note) 433•466

Joe Sample—Collection (GRP) 430•280

Al Jarreau—Heaven And Earth (Reprise) 439•240

Miles Davis—Doo-Bop (Warner Bros.) 439•224

Najee—Just An Illusion (EMI) 442•251

Stanley Turrentine—More Than A Mood (Musicmasters Jazz) 444•059

Grant Geissman—Time Will Tell (Bluemoon) 443•846

John McLaughlin—Que Nigeria (Verve) 438•473

John Scofield—Grace Under Pressure (Blue Note) 438•085

Special EFX—Global Village (GRP) 436•055

Harper Brothers—You Can Hide Inside The Music (Verve) 436•022

Blue Vocals, Vol. 2 (Blue Note) 435•917

Shirley Horn—Here's To Life (Verve) 439•190

Wynton Marsalis Septet—Blue Interlude (Columbia) 439•463

Stanley Jordan—Stolen Moments (Blue Note) 433•417

Abbey Lincoln—You Gotta Pay The Band (Verve) 432•708

Bobby Lyle—Pianomagic (Atlantic Jazz) 432•286

Shakatak—Open Your Eyes (Verve) 430•413

Nancy Wilson—With My Lover Beside Me (Columbia) 429•225

Michael Franks—Blue Pacific (Reprise) 408•328

Joe Henderson—Lush Life (Verve) 434•696

Bobby McFerrin & Chick Corea—Play (Blue Note) 434•381

Earl Klugh Trio, Vol.1 (Warner Bros.) 430•561

Dave Weckl—Heads Up (GRP) 446•732

David Sanborn—Upfront (Elektra) 438•994

Bela Fleck & The Flecktones—Ufo Tufo (Warner Bros.) 445•809

Branford Marsalis—I Heard You Twice The First Time (Columbia) 445•460

The Dave Brubeck Quartet–Jazz Impressions (CL Jazz Master.) 439•364

McCoy Tyner—The Turning Point (Verve) 445•122

George Howard—Do I Ever Cross Your Mind (GRP) 438•564

Dizzy Gillespie—Sonny Side Up (Verve) 441•733

Flim And The B.B.'s—This Is A Recording (Warner Bros.) 438•192

The Modern Jazz Quartet—Pyramid (Atlantic) 441•717

Diane Schuur—In Tribute (GRP) 436•097

The Best Of Fattburger (Manhattan) 440•842

Grover Washington, Jr.—Next Exit (Columbia) 435•396

Tom Scott—Born Again (GRP) 440•636

Yellowjackets—Live Wires (GRP) 435•388

The Rippingtons—Weekend In Monaco (GRP) 445•296

Pat Metheny—Secret Story (Geffen) 444•422

The advantages of jazz at Columbia House.

By choosing any 8 CDs for only a penny (plus shipping and handling), you become a member of the Columbia House Jazz Club. Once you're enrolled, you agree to buy just 6 more CDs at regular Club prices (currently $12.98 to $15.98, plus shipping/ handling) within the next three years. You may cancel your membership at any time after doing so.

Free Music Magazine: As a member we'll keep you current with the best jazz by sending you the Columbia House Jazz Magazine about every four weeks (up to 13 times a year). Inside, you'll find descriptions of Regular Selections plus hundreds of alternatives to choose from. We'll also send you 6 Special Mailings. In a year, you'll enjoy a total of 19 convenient opportunities to select your favorite music.

Buy Only What You Want: If you choose the Regular or Special Selection, it will automatically be sent. Or, if you prefer an alternate selection–or none at all–simply mail the Response Card always provided by the date specified. You'll always have 10 days to decide. If not, you may return the Selection at our expense.

Bonus Offer: Join right now and get an additional CD at the super-low price of only $6.95. That allows you to take another CD for FREE. That's 10 CDs in all. And if you're not satisfied, just return everything within 10 days–with no further obligation.

Half-Price Plan: Remain a member after fulfilling your obligation and take advantage of our money-saving Bonus Plan. It lets you buy any CD at half price for each one you purchase at the regular Club price. For selection, convenience and price, Columbia House is the best place for jazz. So get in the groove. Sign up now.

COLUMBIA HOUSE Where the jazz is.

1400 North Fruitridge Avenue • Terre Haute, Indiana 47811-1129

8 CDs for 1¢

PLUS A CHANCE TO GET ONE MORE FREE!

See details.

COLUMBIA HOUSE, 1400 N. Fruitridge Ave. **486/593**
P.O. Box 1129, Terre Haute, Indiana 47811-1129

Please accept my membership application under the terms outlined in this advertisement. Send me the 8 Compact Discs listed here and bill me 1¢ plus shipping and handling for all eight. I agree to buy six more selections at regular Club prices in the coming three years—and may cancel my membership at any time after doing so.

•	•	•	•
•	•	•	•

Send my ☑ JAZZ CDs to the following address:

☐ Mr.
☐ Mrs.
☐ Miss Print First Name Initial Last Name Age

Address Apt.

City

State Zip

Do you have a VCR? (04) ☐ Yes ☐ No
Do you have a credit card? (03) ☐ Yes ☐ No

☐ **Extra Bonus Offer:** also send me one more CD now, for which I will be billed only $6.95.

•

...and I'm entitled to this extra CD FREE!

•

MPL-F6-59

Note: we reserve the right to reject any application or cancel any membership. These offers not available in APO, FPO, Alaska, Hawaii, Puerto Rico; write for details of alternative offer. Canadian residents serviced from Toronto. Applicable sales tax added to all orders.

© 1992, The Columbia House Company

Selections with two numbers contain 2 CDs and count as 2—so write in both numbers.

THE MECHANICS

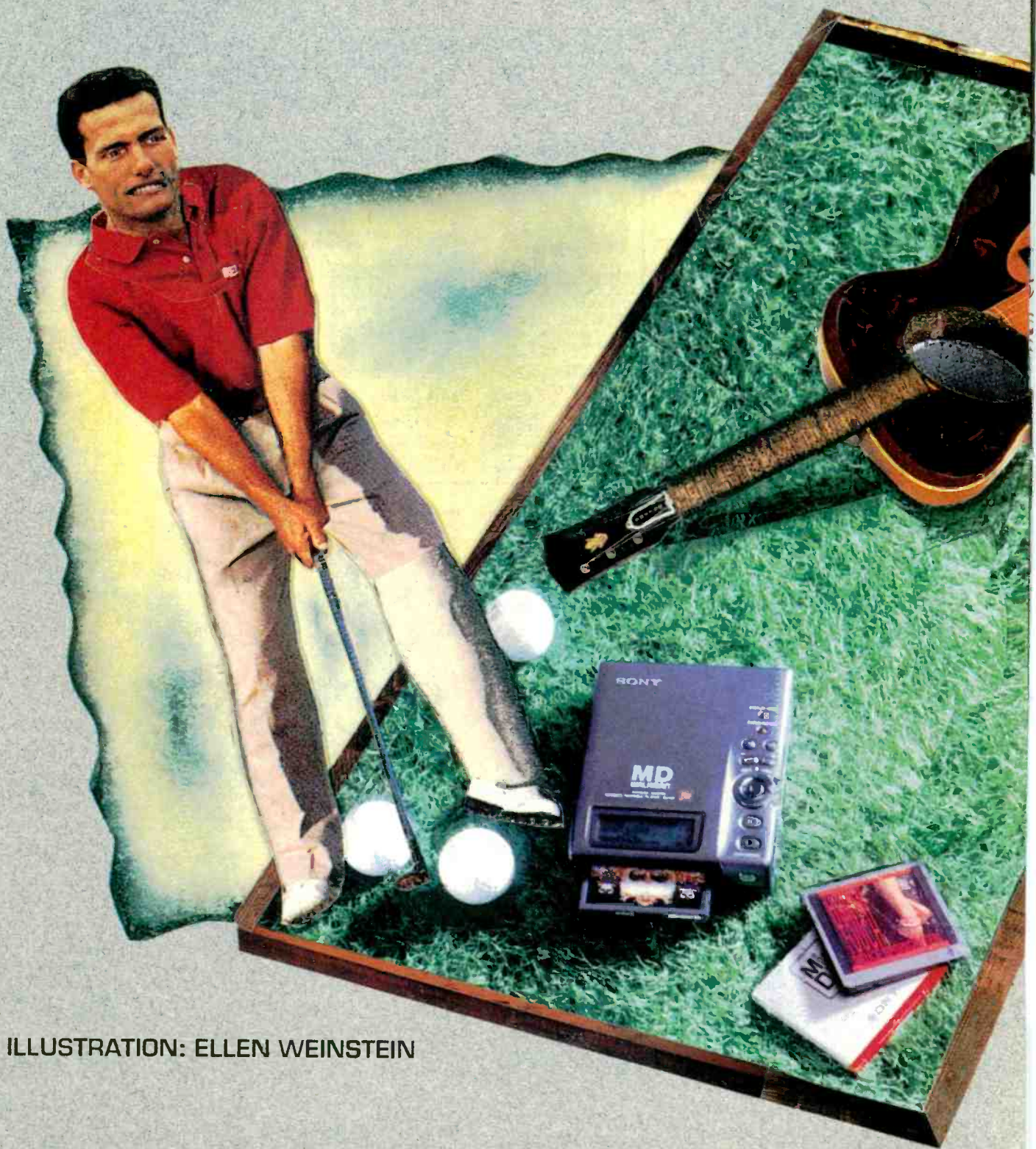


ILLUSTRATION: ELLEN WEINSTEIN

OF SONY'S MINIDISC

Beyond The Caddy

Much has been written about digital data compression, or (if that term offends the audio purist) bit-rate reduction. It has been said that digital data compression is the wave of the future, as far as audio and video are concerned. Indeed, the almost simultaneous introduction of DCC (Philips' Digital Compact Cassette) and the MiniDisc (by Sony) confirm that premise, since both use proprietary forms of data compression known, respectively, as PASC and ATRAC. There is, however, a great deal more innovative technology involved in both of these formats beyond data compression.

Having recently gone on a press trip to Sony's facility in Japan, I now know much about the mechanical and physical aspects of the MiniDisc format and about its specific method of data compression. It is these mechanical and physical characteristics of the MiniDisc that I will address in this discussion.

The MiniDisc has been positioned as a record/playback format especially suited for portable applications, Walkman-type miniature players and mobile or car audio systems. The biggest problem in using optical discs, such as CDs, in portable applications has been skipping or mistracking caused by shock or vibration. This difficulty has been virtually eliminated in the MiniDisc system thanks to the use of a memory chip. The memory acts as a buffer, holding digital data equivalent to approximately 10 seconds of playing time before passing the data on for conversion into analog signals for playback. If the player's pickup is jarred from its position on the disc, the semiconductor memory will continue to supply data to maintain uninterrupted playback. Because the position of the laser pickup is constantly monitored, using address locations that are present in both recordable and prerecorded MiniDiscs, the laser is able to quickly resume its correct position.

To fill the buffer memory, the MiniDisc player must read data from the disc at a faster rate than the decoder uses that data. In practice, this is a reading rate of 1.4 megabits per second, nearly five times the rate of playback. Since data read into the buffer when it's full would be lost, the system only reads data at intervals during normal play. Though the data reaches the buffer in bursts, it's clocked out of the buffer in a steady stream, so playback is not affected. If a shock interrupts the position of the optical pickup reading the MiniDisc, however, the amount of data read in subsequent intervals is increased to make up for the data lost while the pickup was incorrectly positioned. Once the buffer memory's contents are replenished, the pickup resumes reading the signals at regular intervals.

Types of MiniDisc

Two types of discs have been developed for the MiniDisc system. Designed specifically for prerecorded music from record companies, playback-only MiniDiscs are similar to CDs

LEONARD FELDMAN

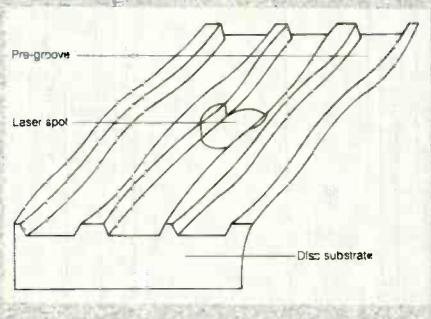


Fig. 1—The pre-grooves molded into recordable MiniDiscs for tracking control have a wobble; see text.

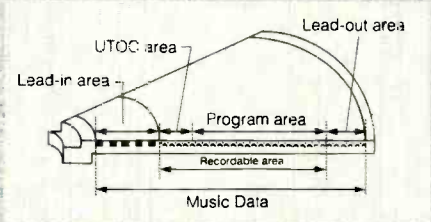


Fig. 2—Cross section of a recordable MiniDisc.

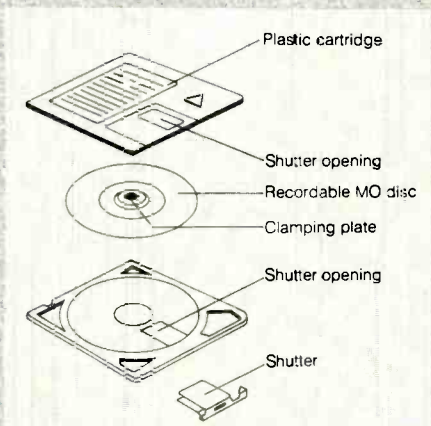


Fig. 3—Exploded view of a recordable MiniDisc and caddy; note that the sliding shutter uncovers windows on both sides of the disc.

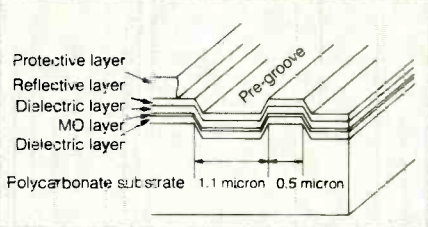


Fig. 4—Layered construction of the recordable MiniDisc.

MiniDisc, unlike earlier magneto-optical recording systems, can record new data over old in one pass.

in many ways. The lead-in area is on the inner circumference of the disc. This is followed by the program area, while the lead-out area is on the outer circumference of the disc. Information is recorded as pits in the disc's substrate in much the same way as with full-size CDs. The discs can be stamped out and mass-produced with an injection molding machine. The entire front of the caddy that protects and holds the prerecorded disc can be used for graphics, since the protective shutter on this caddy opens only on the back side.

One of the most important features of the MiniDisc is complete random-access capability. That's not surprising on playback-only MiniDiscs; they are recorded like CDs—complete with digital addresses for each selection or track—for quick and easy access to any point on the disc. On the other hand, random access is harder to achieve on discs whose final recorded sequence is unknown at the time of manufacture and, indeed, can be changed many times. Thus, the recordable discs must be pre-grooved, for tracking and spindle-servo control in recording and playback. Sony's technique was to give these pre-grooves a wobble, a slight shift in groove position that creates subtle address marks at 13.3-millisecond intervals (Fig. 1).

Sony has devoted part of the recordable disc's inner circumference to a user table of contents (UTOC) area whose data structure is more like that of a computer floppy disk than a normal CD. This allows the track numbers and addresses to be edited in seconds (far more quickly than in systems like DAT, where the track numbers are written at the points where each selection actually begins). It also speeds and simplifies automatic renumbering. For example, if you edit out track 3, tracks 4 and 5 will be renumbered 3 and 4; if you combine tracks 4 and 5, track 6 will then be designated track 5.

Recordable MiniDiscs, unlike the prerecorded type, employ magneto-optical (MO) technology. As shown in Fig. 2, the lead-in area is on the inner circumference of the disc, followed in this case by the user table of contents area, the program area, and the disc's lead-out area on the outer circumference. Since a magnetic recording head and a laser are used on opposite sides of the disc (more on this shortly) the shutter must open on both sides of the caddy (Fig. 3). The recordable MiniDisc's unique layer structure, along with the pre-groove configuration, is represented conceptually in Fig. 4. This MO layer construction has been engineered to enable Magnetic Field Modulation overwriting. According to Sony, it has already been proven both to handle more than one million overrecordings without degradation and to provide excellent long-term storage characteristics. It seems unlikely that anyone would erase and record a MiniDisc so many times!

Principles of MO Recording

Magneto-optical discs can be rerecorded countless times. As the name implies, the recording system uses both optical and magnetic technology. The recordable layer in an MO disc is made of a magnetic material. A laser beam heats a tiny area of the recordable layer to its Curie temperature (typically, about 400° F), which demagnetizes it. If a magnetic field is applied to that spot as it begins to cool, the spot will acquire a north or a south magnetic polarity, corresponding to a digital zero or one.

On conventional MO discs used for computer data storage, all previously recorded signals must be erased before new data can be recorded. Previous systems have used one of two methods to accomplish this: Either two lasers are used, one for erasing and one for recording (much like a tape recorder with separate erase and recording heads), or a single laser is used, with old data erased in the first rotation and new data recorded during a second rotation.

Unlike these conventional approaches, the MiniDisc Magnetic Field Modulation overwrite system writes new signals over old ones. This system uses a magnetic head on one side of the disc and a laser beam on the other side in the same corresponding position (Fig. 5). With the disc situated between the magnetic head and the laser, the laser brings the spot beneath it up to the Curie point, which dissipates its previous magnetic orientation. As this spot on the disc moves away from the laser,

it cools to a temperature below the Curie point and a new magnetic orientation corresponding to the input signal is created by the magnetic head.

The Dual-Function Optical Pickup

The playback-only MiniDisc is recorded and read in much the same way as a CD. Its data stream is represented by pits molded into its base layer and coated with a reflective layer. A 0.5-mW laser beam directed at the pits is reflected back when it strikes the smooth surface between pits. But where it strikes a pit, the light is diffracted, reducing the amount of light reflected back. A pair of photodetectors reads these light fluctuations, which are then decoded into the binary "0" and "1" signals, as shown in Fig. 6.

Recordable discs are different. The data is represented by differences in the polarization of the reflected light, not by differences in its intensity. A phenomenon known as the Kerr effect rotates the plane of polarization slightly forward or back, depending on the polarity of the magneto-optical recorded signal (Fig. 7). A polarizing beam splitter varies the distribution ratio of the reflected light according to the direction of polarization: A photodetector on one side of the beam splitter will receive a larger share of light reflected in the forward direction, while a detector on another side receives a larger share of light polarized the opposite way. The differences between the electrical outputs of the two photodiodes are used to re-create the binary zeros and ones. The fact that light reflected from the disc changes its polarity according to magnetic orientation is fundamental to the MiniDisc's recording system.

Sony recognizes that success in marketing the new format will require the simultaneous release of MiniDisc software by record companies along with the introduction of MiniDisc hardware. Like CDs, playback-only MiniDiscs carry subcode data as well as audio data, which simplifies production from master tapes made for CD. (The MiniDisc does, however, have additional subcode sectors that can be used for such information as lyrics or explanatory text.) MiniDisc also uses the same basic pressing system as CD. Therefore, a significant advantage of the MiniDisc is that CD mastering systems now in use, including the ¾-inch U-Matic cassette media used for mastering, can also be used in MiniDisc production.

From what I was able to observe during my short visit, Sony has explored all aspects of this new technology (work began on the MiniDisc concept back in 1986). At Sendai, about 180 miles north of Tokyo, there was even a production line turning out blank recordable MiniDiscs, with much of that production line already fully automated.

How successful the MiniDisc format will be remains to be determined. It is to Sony's credit that they are not claiming "CD-quality sound" for this new product. Rather, they are saying that under the conditions in which MiniDisc is likely to be used, listeners will be hard-pressed to tell the difference between CD sound and MiniDisc sound.

Many of us attending the technical sessions at Sony headquarters brought along some of our favorite CDs for auditioning. The digital output from a CD player was alternately heard after normal D/A conversion and after being passed through a MiniDisc-format A/D converter (which compressed the digital data as it would be compressed in a MiniDisc) and D/A converter. For some of the music, most of us could not detect significant differences in sound quality. With other recordings, most of us could detect a difference, but not a difference that could be said to have seriously degraded the musical quality.

All of us attending the sessions were, I believe, impressed with the sophisticated technology involved in the creation of this new optical disc format. I'll have to reserve judgment about MiniDisc's ultimate sound quality for a later date, when I get my hands on a MiniDisc recorder/player for more definitive listening tests.

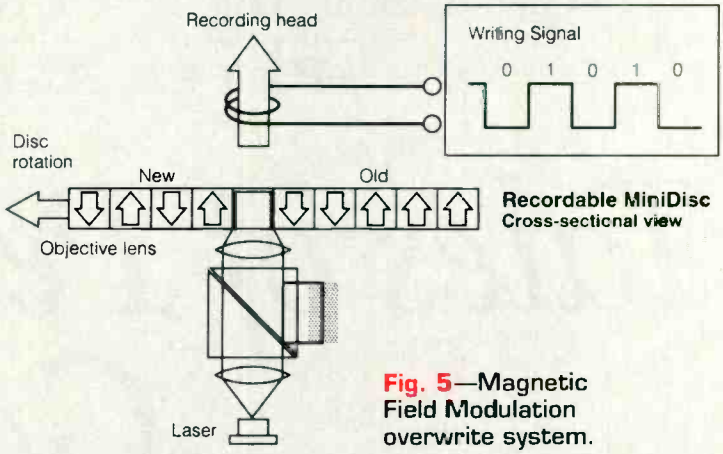


Fig. 5—Magnetic Field Modulation overwrite system.

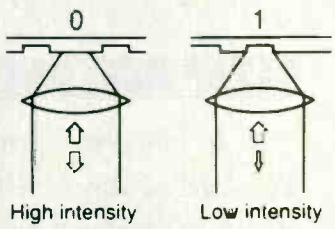


Fig. 6—In prerecorded MiniDiscs, as in CDs, digital signals are represented by pits and lands that cause variations in reflected light intensity.

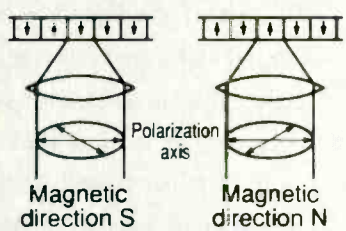


Fig. 7—In recordable MiniDiscs, digital signals are represented by magnetic poles that rotate the polarization of the reflected laser beam.

Photograph: Leonard LaGrua

PETER ASHER

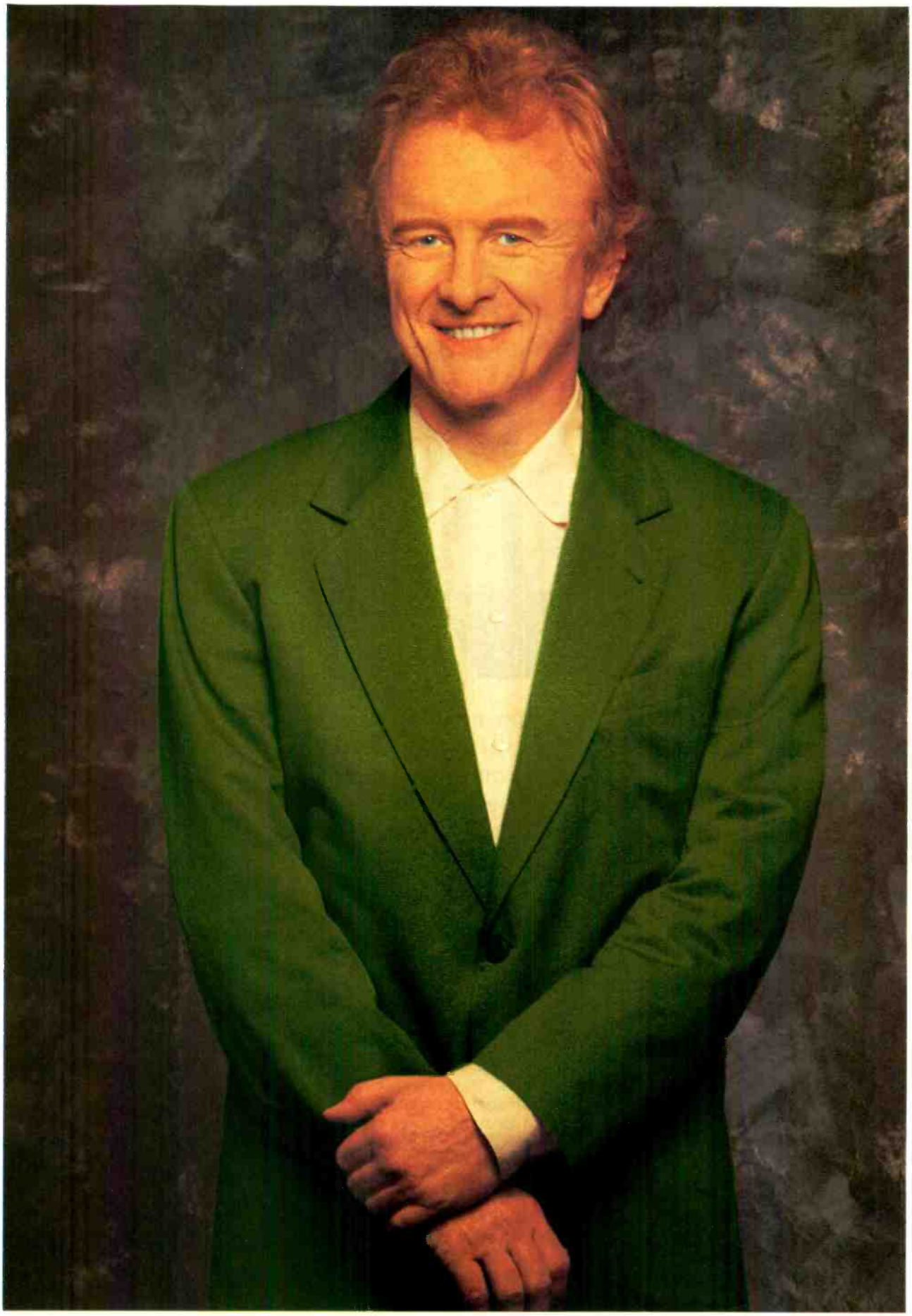
Tales of Peter and Gordon...

and james, linda, 4 beatles, and 10,000 maniacs

TED FOX

Walk into Peter Asher's bungalow on the edge of Beverly Hills, and. you may wonder if he found his interior decorator at the Recording Industry Association of America. The walls are covered from floor to ceiling with framed gold and platinum albums awarded to Asher for his production and management work with clients such as James Taylor, Linda Ronstadt, Cher, Diana Ross, and 10,000 Maniacs. I'll bet somewhere in that collection are the ones he garnered in the mid-'60s, with Gordon Waller, as half of the classic British Invasion act Peter and Gordon. Their smash hit "A World Without Love" was a Paul McCartney castoff and just one aspect of Asher's close relationship with McCartney. The Beatle also dated Asher's sister Jane, and lived in Asher's parents' house. When Apple Records was formed, Asher became its head of A&R. While there, he signed and produced James Taylor, and went on to manage him when they both left Apple. So began the career of one of the most well-respected and powerful producers and managers of the last two decades. *T.F.*

Michael Ochs Archives



PHOTOGRAPH: PAMELA SPRINGSTEEN, ©1992

Do you remember the Peter and Gordon years fondly?

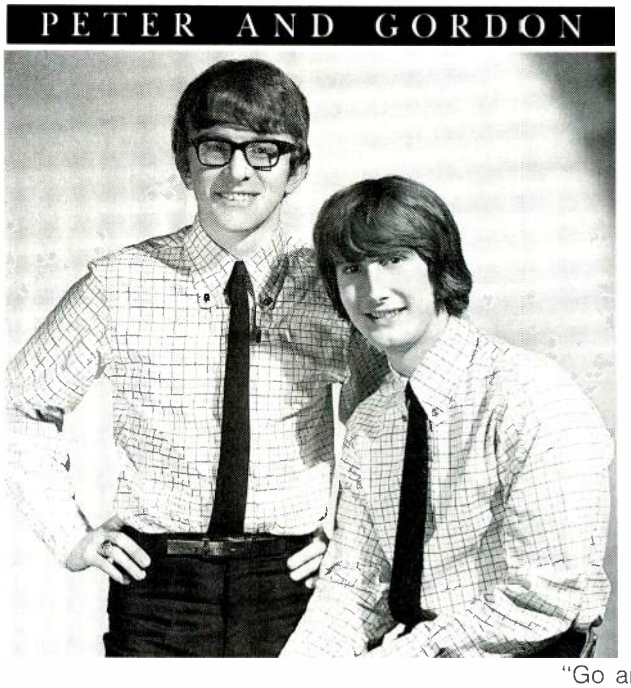
Oh, yes! Not all of them, but overall it was very exciting. I had never been to America before, and I always wanted to come. I was a big folk fan—Woody Guthrie, Sonny Terry and Brownie McGhee. I was a jazz fan too. Everybody I ever wanted to hear was always playing in New York; even the names of the jazz clubs were legendary. Then I became a rock 'n' roll fan partly through my friendship with Gordon, who introduced me to Buddy Holly and The Everly Brothers. I was 18 or 19, and what we went through, in retrospect, was something out of a movie. We were working around town a lot, just the two of us, for our own entertainment and some money. We were playing in a club, and an A&R man in a shiny suit came over and said, "You boys should make a record. Do you want to audition? I'm with EMI Records." That was Norman Newell, a very nice man. We auditioned, and they gave us the record contract.

Soon enough, you had a huge hit with "A World Without Love."

I was very excited when we had a hit. We were choosing the songs for our first session, and I had recently met Paul McCartney and heard this half-written song that he had. The Beatles had decided not to do it. I said to him, "If you finish it, we would love to do it. Because we're cutting three songs for our first record." So he finished it, and we cut it. That was our first record, and it went straight to No. 1. Now, more than 25 years later, I realize how incredibly hard and unlikely what happened to us actually was. At that time I was a philosophy student at London University.

Was your relationship with Paul the reason you started working for Apple?

Yes. We became friends. He was living in my parents' house for a couple of years; we had rooms next to each other and spent a lot of time together. He was also going out with my sister. We remained friends through thick and thin. So when he had the whole idea of Apple, we sat up together many evenings when he was talking about his plan. He asked if I would like to work for the company. This was pretty much after Peter and Gordon had run its course. We had been to America a lot of times and had lots of fun. Nothing was better than being in Los Angeles in the '60s and being an English rock 'n' roll star, having girls scream at you and stuff. I had just started producing records. The first record I ever produced was Paul Jones, the singer in Manfred Mann, a wonderful singer. The first track I did was a Bee Gees song, "And the Sun Will Shine," which was a very minor hit in England and didn't do anything here. But the rhythm section on that was Nicky Hopkins on piano, Paul Samwell-Smith from The Yardbirds played bass, Jeff Beck played guitar, and Paul McCartney played drums. It was a very illustrious rhythm section. Paul had seen me produce other stuff, and he asked if I would like to produce something for Apple. As the thing started to get a structure, he said, "Listen, why don't you be head of A&R and help us start the label, kind of run the label."



Frank Driggs Collection

THE ABBEY ROAD ENGINEERS THOUGHT THEY WERE RECORDING PROPERLY, BUT "PROPERLY" BEGAN TO SOUND DULL AFTER A WHILE.

The Beatles seemed to be looking for people very specifically not *in shiny suits to work at Apple.*

Yes. But they had Ron Kass—who was a shiny suit, but a very nice man and a good record man—to actually run the company. I was sort of second-in-command to Ron, who was actually the boss, who was, in turn, second-in-command to whatever quorum of Beatles happened to be in the building that day.

Aside from the lofty philosophical purpose of Apple to be there for people with different ideas, did they really attempt to do A&R?

Yes, they did. We had A&R meetings pretty much every week that some Beatles would attend and which I would sort of chair. Rarely would they all turn up, but sometimes. And they all had quite different interests. John wasn't interested in much except his Plastic Ono Band stuff or whatever he was up to. [Road Manager] Mal Evans was the big supporter of The Ivys, who George also kind of liked. George had his Jackie Lomax project. Paul was doing whatever he was into at that time. For example, he saw Mary Hopkin on *Opportunity Knocks*, a talent show, and the next day said, "Go and sign that girl." So off we all went to sign her. In addition, I had a number of people working for me, listening to all the tapes that came in, which were really huge in number. They would play me anything they thought was any good. Anything I thought was any good I would bring up at the A&R meetings. But tragically, out of all the stuff that came in, nothing was really good. The good things we did sign came from, for example, Paul seeing Mary Hopkin on a TV show, or me finding James Taylor after having met him in America, or George making the Jackie Lomax record; he knew Jackie from before. Almost nothing that Apple did actually came from the open door policy that we maintained. But we did do it; people did listen to the stuff that came in.

When you were in Peter and Gordon, did you start to take a keen interest in the production end?

Yes. I found the studio fascinating and enjoyed the production of the records very much. It's funny—I saw these old pictures that Michael Ochs had [of Peter and Gordon behind a console at Abbey Road studios]. The funny part is that even at this early stage, that's where I am, and that's were Gordon is. I found that area of things interesting,

and not just technically. I would always stick around for the mix at a time when nobody did—when you were not supposed to. That console is probably worth a fortune today, because all that stuff sounded great! Half-inch four-track—fabulous machine.

Did it bother you when you gave up your singing career?

I never wanted to be a lead singer anyway. I always enjoyed being a harmony singer and still do. I still sing harmony on some of the things I produce or on stage sometimes for fun. But I have never been anything resembling a lead singer. Gordon wanted to make his own records anyway, and we were having less fun doing it. We were not getting on that well. We were still friends, but time moves faster when you are that young, and it had been some four years.

What studios were you working in then with the Apple signees, or before that with Peter and Gordon?

Peter and Gordon was recorded entirely at Abbey Road, or EMI Studios as it was called then. I don't think it was even called Abbey Road yet. James Taylor I did at Trident. Trident was the first eight-track studio that any of us had worked in. I recommended it to Paul, and that's when The Beatles moved over there and did *Hey Jude*. Up to then they had done everything at Abbey Road, I think.

Tell me what Abbey Road was like then, technically.

Everything was their own stuff. They made almost everything. The tape machines, except for the Studer four-track. But the two-track machines and a lot of the equipment was EMI-made. It all looked like a battleship. It was big, gray, with big black knobs and sounded good. The problem was not with the facility but the way the equipment was used. It was very acutely prescribed by manuals, and it was only to be used in that way. And if you asked what would happen if you turned the knobs all the wrong way, you'd be told it was not a possibility. "No. This machine is used this way! For this purpose! And if you're going to compress it, you do it this way and only this much." What The Beatles did later, I suppose around *Sgt. Pepper* time, was they won the right to turn all the knobs the wrong way and see what the hell would happen. We would say, "We want more bass." And they would say, "No, you cannot have more bass. This is the most bass that is technically possible." And we would say, "No!" We would bring in a Motown record and say, "Listen to this! There is way more bass!" And they would say, "No! The groove is not symmetrical, and it's all distorted, and it's technically hopeless." "Yeah, but it sounds great!"

Was it that they just didn't have any understanding of rock 'n' roll?

They just thought they knew how to record things properly, and they did. But "properly" started to sound pretty dull after a while. Then, after that we'd want to do things that were really crazy. "What happens if you overload the tape amazingly?" Sometimes it sounded terrific. They would never ever think of trying anything like that! And the mix-down process, or reduction as it was called, was very formal. When you were ready to mix, these men in white coats—literally—came in and set up this equipment. They'd set up a compressor at a certain fixed setting on your mix, and you just did it that way. You had very few options. I mean, you could turn the voice up or down, but there were very few options. On the other hand, the old tube equipment sounded wonderful. All the microphones we used are the microphones that everyone still kills for—Neumann U-67s and 47s, the best mikes in the world, still. The sounds of those records are unbeatable to this day! The trouble was, they knew what they were doing and wouldn't do anything else!

How long would it take you to make a Peter and Gordon record in those days?

You would usually get a couple of songs in a day, I suppose. And mixing would take an hour, because there wasn't much to do.

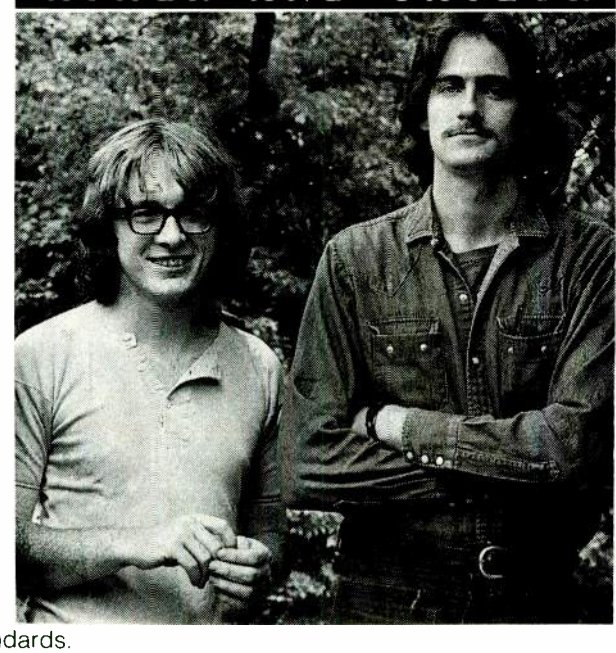
How was Trident different?

It was a combination of things. It was multi-track recording, which we didn't have—we had four tracks. EMI actually had an eight-track and a 16-track for ages, but they would not let anyone use them until they modified them to suit their specific standards. They were like the BBC; everything had to match some very specific technical standards. Whereas the other places would buy a machine and get it out of the box and use it straightaway. Trident was a much looser organization. It was run by the Sheffield brothers, and they did not care what you did so long as you booked in and paid the bills. So suddenly you were aware of a whole new flexibility of what you would do in the studio.

Let's talk about James Taylor.

I brought him to Apple. We met through a mutual friend, Danny Kortchmar. Danny had been in a band that backed Peter and Gordon on a couple of tours, The King Bees, and he and I had become great friends. I used to stay with him and his then wife when I came to Los Angeles. I greatly admired Danny's playing, as I still do. He has also now turned into a great record producer. After The King Bees he was in a band called The Flying Machine with his oldest friend, James Taylor. They had been together since they were 14. The first professional engagement that James ever did was with Danny—Jamie and Kootch. Flying Machine broke up due to commercial failure, and James decided to go to London to seek his fortune. I had apparently met James at a Flying Machine rehearsal some time before. Kootch gave James my telephone number and said, "This is my friend in London. Give him a call and play him your tape." So he did. I loved it and

ASHER AND TAYLOR



©David Gahr

I HAVE BEEN ACCUSED OF MAKING RECORDS THAT ARE TOO PERFECT, BUT NOBODY DELIBERATELY TRIES TO MAKE THINGS SLOPPY.

said, "I just started working for Apple Records and would like to sign you to Apple and produce a record with you." So we did. And James has talked about how unusual it was to come to England and the first two weeks you were there, to be suddenly sitting down with The Beatles talking about your record deal. It was stunning for him. At any rate, that's how it all came about. I took him straight into Apple the next day and said, "This guy is really great. Listen to his tape; I want to sign him." Paul was actively enthusiastic, John was kind of okay about it, George I think liked it—I can't remember—and Ringo I'm not sure heard it at that stage. But they all acquiesced, and we went ahead and signed.

Was there ever any question about who would produce?

No. I really wanted to. I had started to produce records and was very keen to do it. I loved the songs. So, with youthful self-confidence, I just said that I would do the record. In retrospect I think we may have overproduced it a bit, but I was so anxious to make people listen to it, for the songs to stand out. That is why we arranged each song with different instrumentation and put this little link between the songs and stuff. It did set James apart a bit from just a folk singer who had one acoustic song after another.

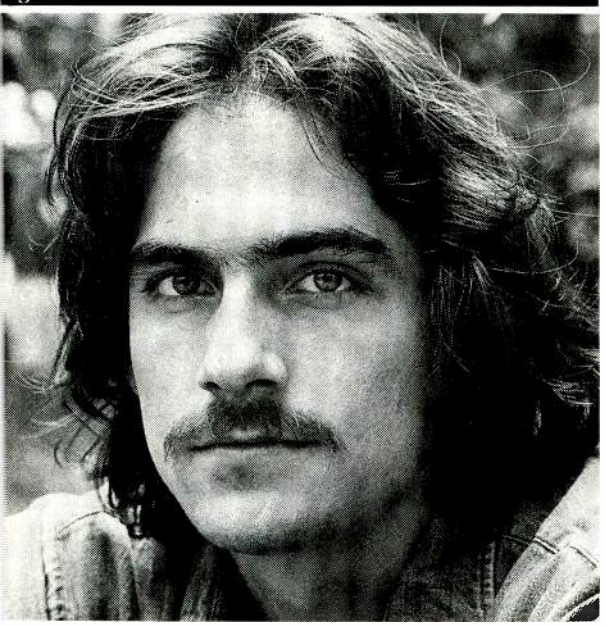
Why do you think it didn't do so well at first?

It ran really contrary to the kind of music which was successful at the time. It was a surprising sort of a record. We were looking to America, and we saw people like Joni Mitchell and Eric Andersen starting to get noticed, and it occurred to me there was hope that people in America would appreciate James for the genius that I thought he was. I didn't have a whole lot of hope for England, but I was hoping for the best.

Did the lack of its success have anything to do with your leaving Apple?

No. That wasn't the issue. We left Apple because Apple was getting pretty weird! And because Allen Klein had come into the picture—who I didn't like and knew a lot of by reputation, true or false, in New York. I am not slandering the man, but I heard from friends in New York that he was someone to stay clear of.

JAMES TAYLOR



He came into Apple and fired, basically, everybody!

Yeah, he fired a lot of people. James met with Allen himself, and subjectively agreed with my estimation about whether we wanted to do business with this man, and so we left.

When did this relationship become a "we," with you as management?

It had become a "we" from the moment I took James into the company. So from then on within the company, I was clearly his man and was acting in a sort of managerial way—in the way that record company people do now. If this is the guy you sign, you nag everyone to make sure he is being treated right. When we left Apple, it was clear that someone had to talk about management. Really by default, we didn't know who should really manage him. What I knew about management was learned by the things that had been done incorrectly on our behalf as Peter and Gordon—mostly just in the matter of general principle that things were never organized, and we were never told exactly the truth about what was happening. Not exactly lying, but sort of. You would be told everything was fine, and you would go off on the tour and get there and find everything is weird and screwed up, not what it was supposed to be. I hated that more than anything.

FROM THE MOMENT I TOOK JAMES TAYLOR INTO APPLE, I WAS CLEARLY HIS MAN AND WAS ACTING IN A SORT OF MANAGERIAL WAY.

My main conviction was to really keep things together and make sure the artist knew what was going on and to tell him the truth. So James and I decided to enter into a management relationship, again with a confidence I am not sure I would feel today. I was plunging into a business I didn't know too much about. And James, with the same kind of confidence, said, "Fine, you do it." He was still a bit crazed at the time. When he came back to America, he actually went into this mental hospital place he had been in before, because he was going through drug hell. I came to L.A. We made a management contract. James had a lawyer who knew nothing about the music business, who I guess represented the Taylor family in some context. I went to Nat Weiss, who was a great friend of mine and still is, a brilliant lawyer in New York who I met because he was representing Brian Epstein and The Beatles at that time. They made a deal. We entered into a four-year contract that ran out 18 years ago. That is the only management contract I have ever signed in my whole life; I have never had a management contract with anybody since then. And that one was actually at his lawyer's request. In fact, when James and I passed our 20th anniversary a couple of years ago, I sent him a copy of the original contract out of curiosity. And I sent him a gold watch on the understanding that he clearly understood that it didn't mean he was retiring! It just meant that was the first 20 years.

So you and James came to America . . . .

Actually, when I first came to America I was working for MGM Records. That was an interlude. Ron Kass was fired shortly after I left Apple, and he then went on to run MGM Records in New York. He asked if I would be head of A&R for MGM. I said, "Certainly"—as long as they would pay all of my expenses getting over to America, because I didn't have any money. None of us had any money at that time. So Ron said okay. I got tickets on the boat and everything for myself and my wife, and we took our furniture and cats to move to New York and then to L.A. Shortly after I had done that, Kirk Kerkorian bought MGM, fired Ron, and brought in Mike Curb, who then fired

©David Gahr

everyone including me. I've actually hardly ever met Mike Curb since then. I don't think he knows that he fired me 20 years ago. But he did—in a blanket firing, which is okay. By that time I had made it out to L.A. and had rented a house for $400 a month. I went to have lunch with Joe Smith. He wanted to make a deal for James, whose contractual status was a little unclear. He had a contract with Apple that was a bit woolly, and the status of Apple as a whole was pretty woolly. Allen Klein was threatening to sue everybody but never did. He *talked* about suing a lot. He did an interview in *Playboy* and said that he had sued James and me for $10 million each. But nothing ever happened. Joe Smith believed in James. He indemnified us against the terrifying lawsuits—otherwise we could not have made a deal.

Where did you do the first album in the U.S.?

Sunset Sound. With an engineer named Bill Lazarus, who was very good. The tom-tom fills on *Fire and Rain* are still a classic piece of recording that he did. He completely did that.

Working with James at this time must have been difficult because of the drug problems. Was this sort of a baptism by fire.?

Well, in the beginning I didn't know much about drugs beyond smoking dope, which everyone did. I was pretty naive about the whole thing. Yeah, he spent a lot of time in the bathroom, but he was okay. James is a very thoughtful, intelligent person, and obviously all junkies do share certain characteristics: They will lie, cheat, and steal. But somehow he remained a nice bloke through all of that. We certainly had some difficult moments when he was on and off the wagon, and there were various bits of hell going on. But I suppose in retrospect it was sort of a baptism by fire. He was in the fire a lot more intensely than I was, so I mostly felt sorry for him getting burned rather than worrying about myself.

What kind of preproduction would you do?

For *Sweet Baby James* we did a lot of preproduction. That was a cheap album. I found the budget the other day, and the deal we made with Joe Smith was that we got $20,000 when we signed and $20,000 when we delivered the album.

Was that an all-in deal? Did all the recording costs come out of this money?

That was an all-in deal, yes. When we did the record, we chose the band we liked; we had Carole King playing piano—who we loved desperately. I was looking for a drummer when I got here and found Russ Kunkel. He had done sessions as a band member, he was in a band with David Crosby, but he had never played on other people's records. I loved his style. We had a couple of different bass players, including Randy Meisner. What we would do is get together at my house in the afternoon—I had no furniture in it, which made it ideal for rehearsal—learn three songs, and go into the studio that night and do them. The album actually cost $8,000 because we did it in five days or something.

LINDA RONSTADT

MANAGING AND PRODUCING AT THE SAME TIME ELIMINATES CONFLICTS; THE MANAGER AND PRODUCER DON'T ARGUE MUCH.

Were the songs written?

Songs were mostly written. Oddly enough, at the end of the album we were a song short and had to finish to get the remaining $20,000. James played me segments of three songs that he had not completed. I said, "Let's just string them all together." Which he did. He asked, "What do we call it?" And I said, "Suite for 20 G," because we were desperate for the money. Since then, people have ascribed all kinds of metaphysical and artistic interpretations to the title. Its meaning is entirely materialistic.

How involved was Carole King in your version of her song "You've Got a Friend"?

Not at all. Hers was an act of supreme generosity in giving James the song. James heard her sing it, perhaps when she opened for him at the Troubadour. He told her, "That is a really beautiful song," and she said, "So why don't you do it? You'd sing it great." She wasn't there when we cut it, because I remember when she came in to hear it after we finished it. She loved it. She cried when she heard it! James was extremely grateful, and is very grateful to this day to Carole for giving him the song.

How do you feel today about how things have evolved? Now, working with 48 tracks, digital or whatever, there seems to be such pressure to be technically perfect.

You always try to get it perfect. I think our standards have changed. I have been accused of making records that are too perfect. Even going back to Linda Ronstadt's old hits, some people said they were too precise. But you know, nobody deliberately tries to make things sloppy; you try to get them good. I am sure James' *One Man Dog* might sound kind of sloppy now. We recorded it at home, we were smoking a lot of dope, we were not taking life terribly seriously . . . . But at the same time we were trying. We loved the songs, and we wanted them to come out right.

Today, would you even contemplate the idea of not going into a top-flight studio to do a record with a star like James?

I would contemplate the idea, yes, if I thought we would get a better record that way. If I thought we would get a better mood or something, yes, I probably would take a lot more stuff in. I would go to greater lengths to make it sound perfect, because the standard of sound has changed.

Why has that standard changed? Is that radio-driven? Is it consumer-driven? Is it just peace of mind?

It's all of the above. And the sheer fact of what you *can* do. You *can* make things sound so amazing now with all

the equipment available. You can make everything sound so big and present and perfect, and you can move things around. What you can do now with computers . . . . Now you can put the vocal in a computer and play with it forever. You can take little words of the vocal and move them around, and tune them up, and spin them in. I do it all the time; it's great. There used to be things you'd use because there was nothing [else] you could do. You couldn't fix whatever mistakes there were. You could keep doing more takes, but you would choose the best one. Same with mixing. You would do a lot of mixing, and choose the best one. Now, with automation, you don't do that. You make the very, very, very best one of everything the way you want it.

And does it make a better record? Some people think it ultimately makes things sound the same.

No, I don't think it does that. I think it makes for good records. I love making them. I still love being in the studio so much, and love making records. It's some of my favorite things. I like the flexibility you have now. It's like everything else. Is it really better to fly on the Concorde than to fly on one of those great old Stratocruisers with beds in them? I don't know! But because it's there, and you can, it's great. But you couldn't go back if you wanted to.

What do you look for when you check out a new studio?

The room, mostly. I really care a lot about how the room sounds, how things sound in the room. I worry less about what's in the control room. Because you can get an engineer who knows how to use an SSL or Neve or whatever, you can work with pretty much anything. I have my preferences. My favorite board is the Focusrite; there are only two or three around. The ones that Rupert Neve made after he left Neve. There is one at Conway, one at Ocean Way, one at Electric Lady in New York that is very old. The Conway board is spectacular, though it's very expensive. [In a studio] I like a bit of space. I don't like small control rooms with no windows because you feel like you are in a cell. I am not claustrophobic at all; I just think if you are going to live in a place for days on end, it gets kind of annoying with no light and you're squished in. But the first thing I worry about is how the music is going to sound in the room. It makes a lot of difference.

So the performance would be the key thing?

Absolutely! Well, of course, after the songs. The songs would be the key, key thing before you even get in there. If you have a rotten song, you're not going to get anywhere.

That brings me to another question. Particularly with Linda Ronstadt you have done some classic cover songs: "Heat Wave," "You're No Good," "When Will I Be Loved," "That'll Be the Day," "Blue Bayou," "Tumbling Dice," "Back in the U.S.A." What do you look for in a cover?

Most of the song choices on Linda's records are Linda's. I had influence and made suggestions, and some of the ones you mentioned may have been originally my suggestions. But the vast majority of Linda's song choices then and now are Linda's. She has a particular genius for choosing songs she can really get her teeth into, in any style. I think her brilliance is that, and the fact that she has such a spectacular voice. But once we decide to do a song, we just sit around and think about a great arrangement that would be somewhat different—not different for its own sake but just a different way of approaching the song based around the way she sings it.

Have you ever gone through a process with her of trying a cover and saying it wasn't working?

Yes. I can't remember which ones, but I know we have, when they just slipped away from us.

Tell me how you and Linda hooked up.

I went to see her at the Bitter End in New York. Someone said that we had to go down and see this girl, that she was great. I did. She was fantastic. She sang brilliantly. That was the "Silver Threads and Golden Needles" period, and she had a couple of The Eagles in the band. She just sounded amazing; she looked amazing. She was like a dream of a California girl, and an amazing singer. I met her afterwards and liked her. It turned out she was actually looking for management at that time. The very first time we ever talked about management, I couldn't do it because I had just started to manage Kate Taylor and made a record with her. It seemed to me there would be a conflict. At that time my management operation was just me, and I didn't really think that I could do both. So I declined. A year or two later it came up again. Linda had a habit of having sort of manager/boyfriends, which didn't always work terribly well. So when the situation arose again, Kate had decided to quit—made one record and sort of quit the biz. So I told Linda, yes, I would love to manage her. At that point she was in the middle of *Don't Cry Now* and was trying to get it finished. I stepped in as one of the several producers involved in that record to try and get it finished, which we did.

Does it create problems for you when you are both managing and producing?

I think it eliminates more problems. The problem is time. The problem [for me] is, I am very busy. I love to produce records and take on more projects than I can do. In terms of any conflicts, with any luck it tends to eliminate conflicts because at least the manager and the producer don't get into arguments about how things should be. So

C H E R

ALL I CAN REALLY BRING TO PROJECTS IS THE SAME CLARITY OF APPROACH AND PLANNING THAT ANY MUSIC RESPONDS TO IN A STUDIO.

if Linda and I decide we want to make a certain kind of record, all I have to do is talk to the record company and explain what we want to accomplish.

Linda seems to have such a wide-ranging career. She's gone in so many completely different directions. Is this something that you've consciously . . .

No. It's her. Linda is song-driven. It is songs she loves and wants to sing. That's why she did the first "standards" album. She knew those songs, and she knew that they were much better than the elevator music everyone had consigned them to be. She knew they were so good that people would like them and buy them. Everyone thought she was wrong, including me. I mean, I thought she would make a good record out of it, but I thought we would be lucky if we sold half a million, if we did really well. It did 2½ million, without a hit. She was right. What seemed, externally, to be major career changes—singing *La Bohème*, to singing Gilbert and Sullivan, to singing mariachi, to singing Nelson Riddle—are not. She is a singer who can sing lots of different kinds of songs and loves different kinds of songs. They are not conscious decisions that I make. I assist her in executing her plans and obviously do a lot trying to make sure it all happens right. But the actual directions in which she wishes to travel follow her own musical instincts.

As a producer, is that ever a problem for you, not knowing what you're going to be doing next?

Absolutely! A problem in the sense of expanding my own musical education, but it's good. I mean, I had only been doing Linda for a couple of years, and I won country producer of the year. I didn't know anything about country music! That was kind of ridiculous. But "Blue Bayou" was No. 1 country and "When Will I Be Loved?" was No. 1 country, because Linda had a lot of country credibility. I was astounded. The Nelson Riddle stuff, I learned through listening and learning it from Nelson and Linda. All I can really bring to all these projects is the same kind of clarity of approach and planning, and sort of musical perception, hopefully, to which any music responds in the studio.

How did the Aaron Neville duet come about?

Linda and Aaron met in New Orleans. I think she went to see The Neville Brothers at Tipitina's or something, and he invited her up on stage to sing with him, which she doesn't usually do. But she has always been such a fan of Aaron's that she did. And she loved singing with him. So when we started talking about her idea for *Cry Like a Rainstorm*, which was basically to do an album with a big rock 'n' roll rhythm section and a big orchestra she already knew that she wanted to try doing some stuff with Aaron.

You have worked with some of the biggest pop divas—Linda, Diana Ross, Cher. Are there any special problems?

No, actually. It has been said of each of them that they are difficult to work with. I have not found it so. I found that if you have done your homework, if you know what you are doing . . . . I think that they are all capable of, justifiably, a certain sort of impatience and intolerance of somebody who doesn't know what they are doing or things that are not arranged properly. But I found all of them to be a pleasure to work with.

Did they seek you out? Did they call and say that they wanted the man who did Linda's records?

Cher . . . . John Kolodner, who I have known for a long time, asked me if I wanted to do Cher for three albums or something. I said yes. I think that was before his plan to bring back Cher succeeded. Some people he had asked had said, "No. Cher—are you kidding?" Because you must remember, it is hard to remember now, but Cher had *no* credibility as a singer at that time. The same way that she had to fight to gain her credibility as an actress, when she had done so, and got her Academy Award, everyone thought she was wonderful, but then no one would take her seriously as a singer again. It was funny. They just remembered her from Sonny and Cher and being sort of silly. I have always liked her voice. I like distinctive voices. It's a really tough, distinctive voice. So I was happy to do that. I forget how the Diana thing came up; I think I was approached by her lawyer.

And Diana Ross is a breeze in the studio? No problem at all?

No problem whatsoever. I have heard horror stories. People have said, "Oh, you mustn't do this, you mustn't do that," "Look out." And the first session that I did with her, on the first song, which was "Somewhere Out There" for *Land Before Time*, people had said, "Don't do that." People were filled with all those stories—which may or may not be true. But I remember I was sitting with my engineer comping the vocal and doing a lot of stuff after she had sung it a number of times. I was worried she would get bored, you know, get impatient, because it takes a long time to do that. So she was sitting behind us, and suddenly she stood up. "Uh, oh, here we go," I thought. But she said, "You guys have been at this for a long time. Can I get you some coffee or something?" It has never changed. She has been incredibly nice and incredibly cooperative. I was with her last night. She is such a wonderful singer; she is really amazing. When she does 10 takes of a song, she never sings it the same way twice. She comes up with completely new phrasing, new and really interesting, brilliant phrasing for a song every time she sings it. So she has been an unmitigated pleasure to work with.

D I A N A R O S S

I OBJECT TO THE WAY PRODUCERS GET TYPECAST; IF YOU ALWAYS DO POP DIVAS, YOU DON'T GET HIRED TO DO A ROCK BAND.

How did the 10,000 Maniacs projects come about?

Howard Thompson, A&R Man at Elektra, had the idea, which I think was

brave of him. It was brave of him, and brave of them. Because it clearly left them open to the criticism of "this hip young band is hiring this old-fart producer because they want to get themselves a hit." Because that's certainly a perception that could have been applied to it. Howard asked if I would like to do 10,000 Maniacs, but I hadn't heard of them. He sent me their existing albums. I really loved them, and I thought Natalie Merchant's voice was extraordinary. I really loved the songs. I met Natalie and liked her a lot. She is very direct, very intelligent. We talked about almost nothing to do with music. She asked if I smoked. I told her that I never had. She said, "Oh, good!" And that was it. I did not know how the meeting had gone. Howard called me back and said that they had liked me, and everything was fine. I was really very happy to do that because I hadn't done a band for a long, long time.

Was it an opportunity for you to get into a different area?

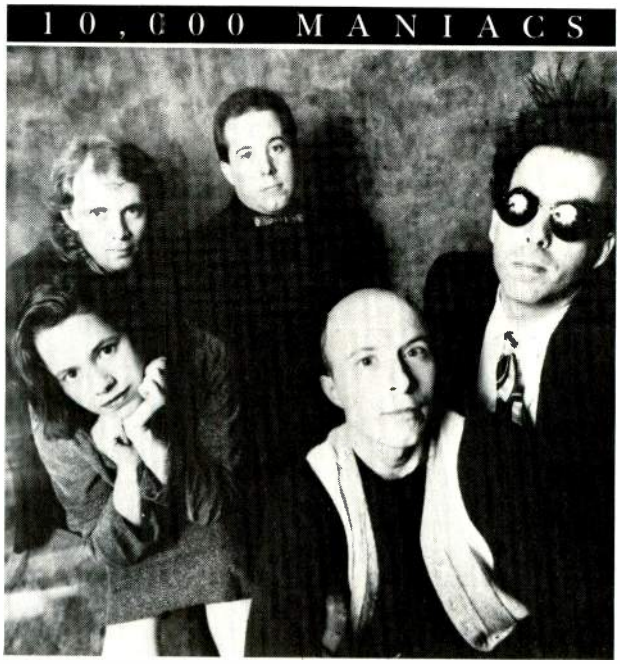
Oh, yes. I really object to the way producers and musicians get typecast like actors do. If you always play the bad guy, they don't hire you to play the hero. And if you always do pop divas or big ballads, they don't hire you to do a rock 'n' roll band. I don't think that is necessarily correct. You can do anything, but people think of you in a certain category only because of recent history, not because of any innate ability or inability on your part. I think that's quite unfair.

Natalie Merchant is another person who is thought of as strong-willed . . . .

The band as a whole wasn't the easiest thing in the world, because they don't get on with each other terribly well all the time. But I don't think any bands do. If you stick any four or five people on a bus together for a few months on the road, they probably end up with a number of aspects of each other that would be less than fun. But, no, I did not find Natalie difficult. Whatever difficulties that arose in the course of either of those records, and there were no major ones, were mostly due to the simple fact that the members of the band were not necessarily the best of friends all the time. Now, as far as I understand it, they are getting on very well.

When you are mixing a record, who are you mixing for? Are you mixing for someone with the perfect stereo system, someone playing the music in a car, or what?

I'm just mixing for me, really. When we have a mix, I take it out and play it in the car and see if it still sounds okay. I



Karen Kuehn/©1988

I ALMOST MISS HAVING AN LP'S TWO SIDES, BECAUSE IN A FUNNY WAY IT WAS A LITTLE BIT EASIER TO DO ALBUM SEQUENCING.

mix on sort of medium speakers, at a medium level. I don't mix on the giant wall speakers that no one in their lives are ever going to hear it on. No. I play it back on those for fun, but I mix on good medium-size, medium-level speakers and just try to make it sound as great as possible. Then, occasionally, you will be specifically requested to do a mix with less electric guitar so Adult Contemporary radio could play it or something, and you do. But I don't take any of those things into consideration when I am making the first mix. I just make it sound the best I can.

When you have what you think is an album sequence that you want, how long do you sit with it?

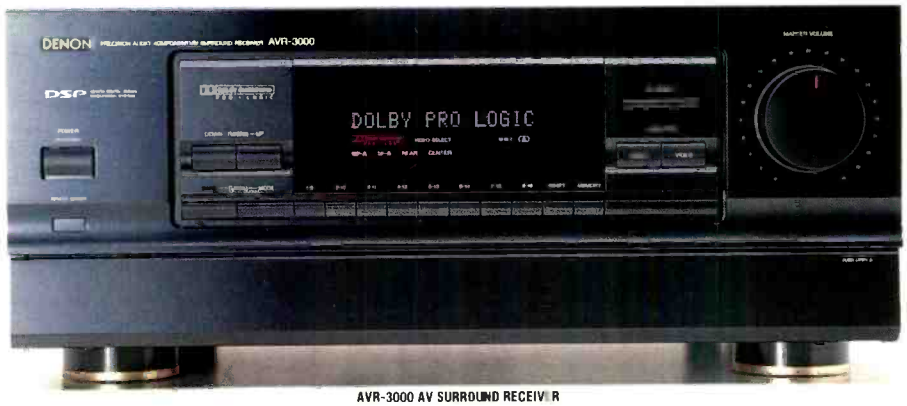
It entirely depends on how much pressure you are under. What you can do now is make a [test] CD of your first rough sequence. Then, of course, you can play that CD back in any sequence. So the good part is that we used to have to—when you thought of a new sequence—you had to make your cassette up of that new sequence, so you had people chopping tape up all the time. Now you get a CD, just program the sequence you want to hear, and sit back and hear it.

How involved do you get in sequencing an album?

Oh, a lot. It's hard. During the course of an album, what I usually do is . . . like on *Rainstorm*, we had one of these magnetic things. We got all the titles up on little plaques. Luckily, up at George Lucas' Skywalker Ranch, they had a machine shop where they can whip you up anything. So all the way through the whole album, just like in church, we would have all the titles we knew we were going to do up on the board. We would keep switching them around. It didn't really get to be acute, of course, until we were mixing and had a pretty clear idea of what they were going to sound like. So we would keep thinking of different orders and would put the various orders together and listen to them, even when we only had roughs. So we were pretty clear about what works next to what before we actually got to the end. Linda is really very good at sequencing too. She has come up with some really good sequencing ideas.

The philosophy of sequencing is still very flexible. It could be something as simple as putting all your good stuff near the beginning, in case that's all a fan is going to listen to. That's certainly a viable theory; it's as good as anything else. I just try to think about what's going to work next to what. I almost miss having an LP's side one and side two. It was a little bit easier to sequence the two sides, in a funny way, because you could put an intermission in the middle. You didn't have to worry about track 5 and track 6 fitting together, because you knew that people had to stop and turn the record over anyway. That's all gone now, and sometimes I really miss it. Some people would specifically say you've got to put the first single as the second track. There are little rules that some people have. I have never particularly paid any attention to that; I have just tried to make the whole thing work together as an album.

For over eighty years Denon has *lived* the definition of high fidelity—producing sound faithful to the original. Whether recording and pressing records or Compact Discs; making the world's first commercial digital recording; building professional recording and broadcast equipment or producing the CD Players ranked Number One in Consumer Satisfication *(Verity Research, 1991)* the Denon name has been synonymous with high fidelity.



AVR-3000 AV SURROUND RECEIVER

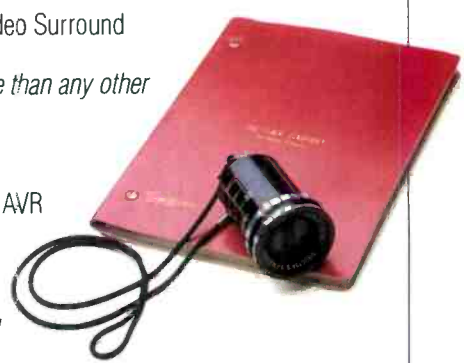
DSP DENON DIGITAL SIGNAL PROCESSING SYSTEM

DOLBY SURROUND PRO · LOGIC

Denon's AV Receivers give dramatic new direction to high fidelity.

By digitally controlling signal placement, Denon has redefined high fidelity for Audio Video Surround Sound—*accurate sound that is more faithful to the director's vision of the cinematic experience than any other AV Receivers in the field.*

AVR-2000 AV SURROUND RECEIVER



Unlike so many so-called AV products, Denon AVR Receivers deliver audiophile signal quality (wide dynamic range, high signal-to-noise, outstanding phase linearity and immeasurably low distortion) and address what the others overlook: low level steering, rear channel fidelity and precise digital delay.

Through the application of highly advanced Digital Signal Processing (DSP), Denon enables you to tailor the sound first to *your* listening room and then to vary the acoustics to recreate new environments. After all, before you can create sounds that differ from the original, first you must be able to recreate the original.

RC-159 UNIVERSAL PROGRAMABLE AND RC-160 SIMPLIFIED AVR REMOTE CONTROLS

DENON

The first name in digital audio.

Denon America, Inc., 222 New Road, Parsippany, New Jersey 07054 (201) 575-7810

Enter No. 16 on Reader Service Card


polkaudio
polkaudio

WHEN WE CELEBRATE YOU SAVE.

FOR A LIMITED TIME, SAVE ON THE RM3000, THE 3-PIECE SPEAKER SYSTEM THAT 1800 AUDIO EXPERTS PICKED AS BEST FOR THE SECOND STRAIGHT YEAR!

Once again Polk's RM3000 walked away with another Grand Prix. Not only was it the top choice in the annual poll conducted by AudioVideo International magazine, but it won despite the fact that the competition had a whole year to catch up.

Stereo Review called us "...the best example of a three-piece speaker system that we have yet heard...try listening to the RM3000. It might eliminate some common misconceptions about how large (and expensive) a speaker has to be to provide plenty of high quality sound."

But big performance from this system is only half the story. Because the RM3000 really knows how to play hide and seek. As handsome as the satellites are to look at, in black granite matrix, gloss white or piano black, they neatly disappear into any size room or decor.

Even our bandpass subwoofer can easily be placed out of sight. Only its powerful, musical bass performance says it's in the room. That's the way it should be in this discrete 3-piece system.

This is the best time to make our cause for celebration your opportunity to save. Choose the RM3000, now and for a limited time, while they're specially priced at all participating Polk dealers.

Nothing else measures up to the size of the RM3000's sound or savings. And you can be the expert on that at your Polk dealer.

THE RM3000, FROM THE SPEAKER SPECIALISTS OF polkaudio

For deep, well-defined bass, Polk uses twin drivers coupled with a sub-bass radiator. This bandpass technology produces greater low frequency performance and smooth response.

For the location of your nearest Polk Audio Dealer, call 1-800-992-2520.
In Canada, call 1-416-847-8888.

46922

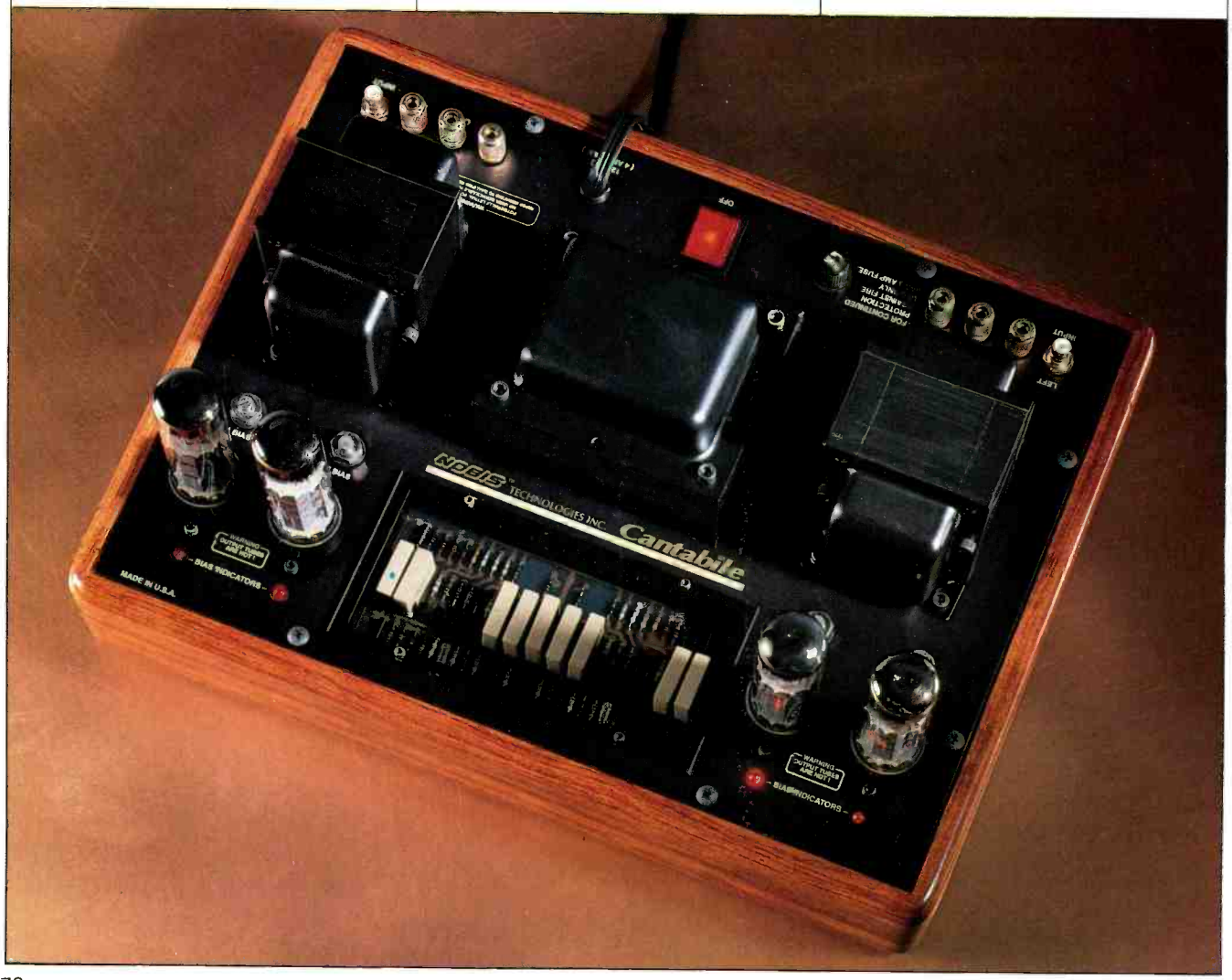
**RM3000 Celebration runs from November 20 to January 18, 1992.

Enter No. 36 on Reader Service Card

1

NOBIS CANTABILE AMPLIFIER

Manufacturer's Specifications
Power Output: 35 watts per channel into 8 or 4 ohms.
THD: 0.3%.
Dynamic Headroom: 1.2 dB.
Full-Power Bandwidth: 30 Hz to 21 kHz.
S/N: Greater than 100 dB.
Input Impedance: 100 kilohms.
Dimensions: 16 in. W × 6⅜ in. H × 12 in. D (40.6 cm × 16.2 cm × 30.5 cm).
Weight: 35 lbs. (15.9 kg).
Price: $1,695.
Company Address: W141 N9316 Fountain Blvd., Menomonee Falls, Wisc. 53051.
For literature, circle No. 90



The Cantabile is yet another in the growing list of new amplifiers using tubes. Nobis is known more for their speakers than their electronics, though they also make the EC-1 electronic crossover used with their DMS-1a subwoofer and recently introduced an all-tube preamp, the Proteus. The Cantabile is a hybrid design, with a solid-state front-end and a transformer-coupled tube output stage, and is rated at 35 watts per channel. Though the owner's manual does not discuss it, the amplifier's nameplate says "Class A," and a brochure that came with the unit refers to Class-A operation of the output stage. I checked on the extent to which the amp does operate in Class A and will talk about this in the "Measurements" section.

Construction of the Cantabile is simplicity itself. Everything is mounted to one flat metal plate, the chassis of the amplifier. This plate sits in a box with nice-looking wood sides and a fiberboard bottom. That's it! As can be seen from the photograph, the output tubes are lined up along the front of the unit. Between the sets of output tubes is a plastic window covering the front-end circuit board. Behind each output tube is a screwdriver-adjust potentiometer for setting that tube's idling current. In front of each tube is an LED indicator used when adjusting tube bias. During bias adjustment, the LED indicators extinguish when the proper bias point is reached, as they do on many other amps with LED bias indicators. What sets the Cantabile's arrangement apart is that each LED comes back on again if the associated pot is turned past the narrow zone where optimum bias is achieved.

The output and power transformers are lined up behind the bias pots, with the power transformer in the middle. Along the rear edge of the chassis are the input and output connections, the line cord and fuse, and a rocker-type power switch. The output binding posts accept either dual-banana plugs or bare wire up to at least 10-gauge. Both output and input signal connectors are high quality. All in all, I found the Nobis Cantabile amplifier an elegant and attractive package.

The signal circuitry of the Cantabile amp is an interesting modern adaptation of several older ideas. The first of these is a solid-state version of the old common-cathode first-stage amplifier. This stage is direct-coupled to the second stage, a split-load phase inverter. Each "equivalent tube" is a cascoded combination of a junction FET driving a MOS-FET.

The second good old idea is taking a portion of the second stage "cathode voltage," low-pass filtering it, and using it to bias the input device. In effect, this forms a sort of d.c. bias servo that compensates for variations in power-supply voltage and temperature by linking the second stage's operating point to them. This scheme was used a lot in early transistorized direct-coupled designs.

The output stage of the circuit is quite conventional and consists of an ultralinear-connected set of EL34 output tubes with fixed bias. Each output tube has its own bias control and LED bias indicator. An IC window-comparator circuit compares the voltage drop across a 10-ohm cathode resistor (representative of total tube current) to a fixed reference and is so arranged that the LED is extinguished when these potentials are equal.

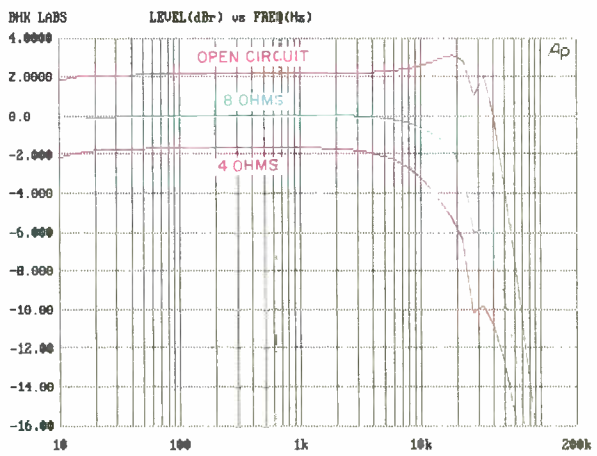


Fig. 1—Frequency response vs. load on 8-ohm tap.

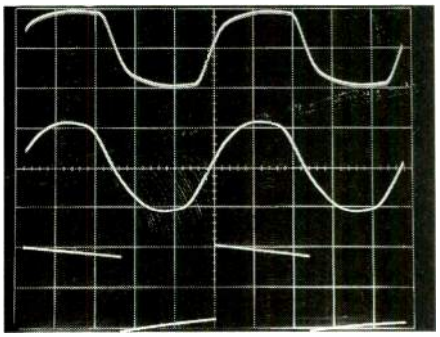


Fig. 2—Square-wave response for 10 kHz into 8-ohm load on 8-ohm tap (top), 10 kHz into 8 ohms paralleled by 2 µF (middle), and 40 Hz into 8 ohms (bottom). Scales: Vertical, 5 V/div.; horizontal, 20 µS/div. for 10 kHz, 5 mS/div. for 40 Hz.

The high-voltage power supply is conventional, consisting of a capacitor input filter fed by solid-state rectifier diodes in a full-wave circuit. The filter capacitor is 800 µF at 450 V d.c., providing a healthy amount of energy storage. This main high-voltage point directly feeds the output transformers' center taps. Another RC filter section feeds a reduced voltage to the solid-state front-end. The tube heaters are

Unlike many tube amps, the Cantabile's performance does not vary with the transformer tap you use.

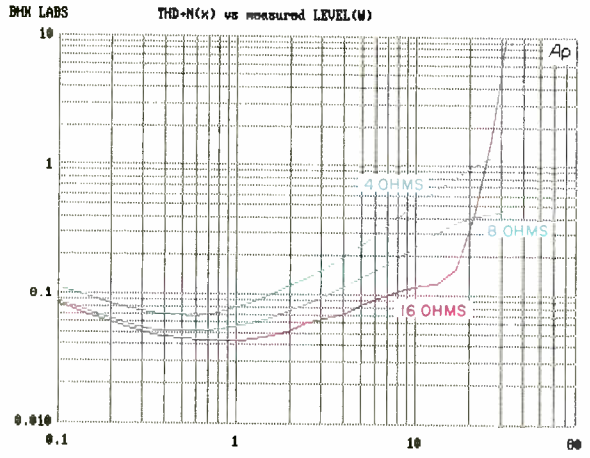


Fig. 3—THD + N vs. power at 8-ohm tap.

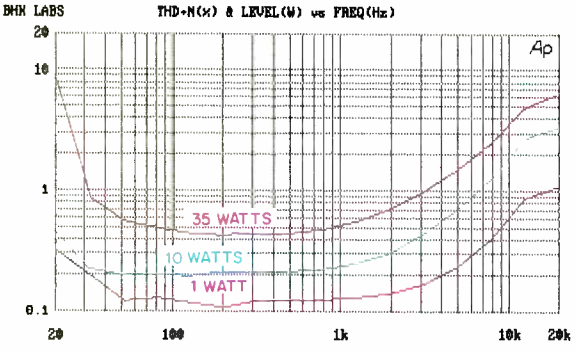


Fig. 4—THD + N vs. frequency as a function of power into 8-ohm load on 8-ohm tap.

a.c. powered. A half-wave rectifier off a tap in the power transformer's high-voltage secondary is fed through a capacitor input filter to the bias-adjustment circuits.

Measurements

Sensitivity and gain were first measured on the 8-ohm taps with 8-ohm loads. The IHF sensitivity for a 1-watt output was 205.5 and 204.5 mV for the left and right channels, respectively. Gain was 22.77 and 22.82 dB, which is lower than the usual power amp gain of 26 dB or more. With about 3-dB less gain at the 4-ohm taps, it may be difficult to get enough playing volume when using passive line preamps with low-output sources. With ordinary active preamps, however, there should be enough overall gain.

Frequency response of the right channel is shown in Fig. 1 for open-circuit, 8-ohm, and 4-ohm loading on the 8-ohm tap. As can be seen, high-frequency bandwidth is not particularly extended and is 3 dB down at about 23 kHz with 8-ohm loading. Some evidence of output transformer resonance can be seen in the region around 30 kHz. Further, judging by the way the output varies with the load, the output impedance is fairly high.

Square-wave response is shown in Fig. 2. The top trace is a 10-kHz signal into an 8-ohm load on the 8-ohm tap. The middle trace shows the effect of adding a 2-μF capacitor in parallel with the 8-ohm load. While rise- and fall-times in the top trace are commensurate with the frequency response shown in Fig. 1, the 2-μF capacitor slows the response and makes the square wave peak at the edge of the audio band. The bottom trace, for a 40-Hz signal into 8 ohms, exhibits satisfactorily little tilt.

Total harmonic distortion plus noise at 1 kHz, as a function of power output and loading on the 8-ohm tap, is shown in Fig. 3. Load tolerance in this design is typical for an ultralinear output stage: Maximum power is obtained when the load matches the tap, and most of that power is still available with half the nominal load; however, power drops off noticeably when the tap sees twice its nominal load. I generated a curve of 5-kHz distortion versus power output for 4-ohm loading on the 4-ohm tap and compared it to a similar curve for 8-ohm loading on the 8-ohm tap (neither curve shown) and found them to be essentially identical. This is not true of some other tube amplifiers, whose performance changes from tap to tap because of poor coupling between the output transformer's secondary winding. The Nobis Cantabile does quite well in this test.

Total harmonic distortion as a function of frequency and power is plotted in Fig. 4. Performance of this hybrid amp is similar to that of amplifiers that use all-tube circuits. A spectrum of the harmonic-distortion residue at 10 watts output (Fig. 5) mainly shows low-order second and third harmonics, although the eagle eye of the Audio Precision test computer reveals the existence of a healthy series of higher order (but low-magnitude) components.

Damping factor for the left channel is shown in Fig. 6. (The right channel's damping factor was slightly lower.) The relatively low damping factor is a sign of the high impedance typical of most tube amplifier circuits. Its effect will be to make the output frequency response to the speakers a strong function of the speaker loads' impedance variations.

Output noise levels and IHF signal-to-noise ratios are presented in Table I. Results are quite good here. Interchannel crosstalk was down about 70 dB throughout most of the audio band.

My measurement of dynamic headroom, using the IHF tone-burst signal, yielded an output power of about 40 watts at the visual onset of clipping. This corresponds to a dynamic headroom of 0.6 dB. Steady-state power output at the onset of clipping was about 37 watts for a clipping headroom figure of 0.24 dB. These measurements were done with 8-ohm loading on the 8-ohm tap.

How Class A is the Cantabile? The theoretical idling power for a push-pull Class-A output stage, assuming no losses, is twice the output power at the onset of clipping into


Special Edition
evocative
performance
the evolution of perfection
CELESTION
89 Doug Brown Way - Holliston, MA 01746
Phone (508) 429-6706 - Fax (508) 429-2426
Enter No. 12 on Reader Service Card

INTRODUCING

A new digital future. Take a good look at the letters DCC. Because if you love music, they'll soon be as common as the letters CD. Created by Philips – the inventor of Compact Disc – the Digital Compact Cassette gives you crystal clear CD quality, along with all the advantages of a cassette.

You're the recording artist. Even better than playing music with CD clarity, DCC records with the same digital sound quality. That means you can make a digital copy of your favorite CD. There's no loss of sound. Zero hiss. After all, it's fully digital.

Music on command. With DCC, you can directly access your favorite tracks. All you have to do is enter the track number, and the player automatically locates and plays it for you. But Philips DCC also has features even a CD player can't match.

See what you hear. Beyond track numbers and elapsed track time, prerecorded DCCs show the song title, album title and the artist's name. Searching for your favorite selection has never been easier.

Built to survive. Just look at

YOUR MUSIC WILL N

PHILIPS DCC

the cassette and you can see the future in it. It's beautifully sleek, with the entire top side devoted to album art. All of the openings are concealed under a metal slider to keep it free of dirt and dust. Best of all, both the cassette and its case are built to survive.

Your favorite artists are here. Already there are literally hundreds of titles available on DCC. From all your favorite artists, in every style, from metal, pop, rap and jazz to country, oldies, classical and swing. And there are more coming every day.

Don't throw it all away. Because you weren't born yesterday, you probably have hundreds of conventional cassettes — the ones we invented over twenty years ago — so Philips designed the DCC900 to play them as well. Imagine — a system that doesn't expect you to simply dismiss the past. Get in touch with the future. Call **1-800-982-3737** for the Philips Dealer near you, because the DCC900 is here, now.

Another First From Philips

PHILIPS

EVER BE THE SAME

This little amplifier had considerable resolution and detail, and I generally found its sound satisfying.

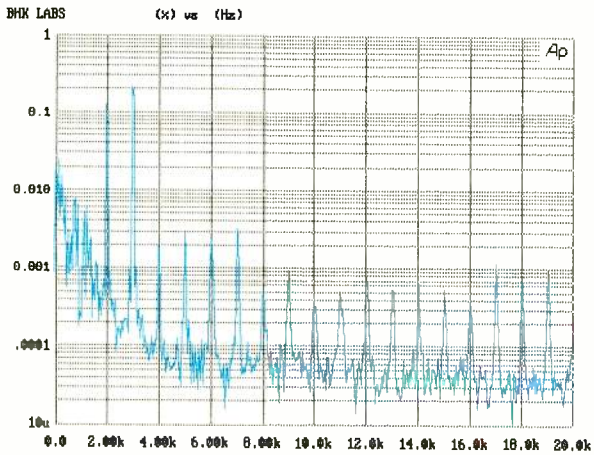


Fig. 5—Spectrum of harmonic-distortion residue at 10 watts out.

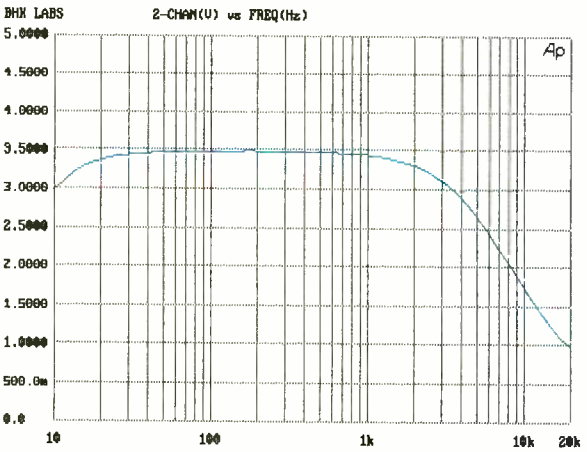


Fig. 6—Damping factor vs. frequency.

Table I—Output noise. The A-weighted IHF S/N ratio was 89.9 dB for the left channel and 91.3 dB for the right.

	Output Noise, µV	
Bandwidth	LEFT	RIGHT
Wideband	430	475
22 Hz to 22 kHz	425	461
400 Hz to 22 kHz	47	55
A-Weighted	77	91

the designed load. In the Cantabile, the plate power at idle is about 27 watts per tube, a total of 54 watts per channel, rather than the 70 watts you'd expect from the amplifier's power rating. One of the requirements for Class-A operation is continuous current to the individual output devices, with no cutoffs during the signal cycle. When I used a 'scope to monitor the voltage drop across the cathode resistors, I found the current was cutting off for part of the signal cycle when I increased the output power to some 15 or 20 watts. Another Class-A requirement is that the power to the output stage stay constant from zero to full output. In this amp, the input a.c. line current varied from an idle value of 1.6 to about 2.0 amperes at an output of 35 watts per channel. Conclusion: Not strictly Class A, but certainly a very rich (high idling power) Class AB!

Use and Listening Tests

Front-end equipment used to audition the Cantabile amplifier included an Oracle turntable fitted with a Well Tempered arm and Spectral Audio MCR-1 Select cartridge, a Krell Digital MD-1 CD transport feeding a PS Audio UltraLink D/A converter, a Nakamichi 250 cassette recorder and ST-7 tuner, and a Technics 1500 open-reel recorder. Phono preamplification was competently handled by a Vendetta Research SCP-2B. Preamplifiers used were a Quicksilver Audio and a passive First Sound Reference II. Other power amplifiers on hand during the review period were a prototype pair of Quicksilver M-135s, a pair of custom triode tube amps, and an Arnoux Seven B digital switching amplifier. Loudspeakers used were Win Research SM-10s and Scientific Fidelity Teslas.

My first impressions of this little amp were that it had considerable resolution and detail, with a touch of upper midrange brightness. After using it awhile and, I guess, breaking it in a bit, I generally found its sound musically satisfying. Compared to the Quicksilver prototypes (which are separate mono units of higher power) the Cantabile sounded more forward and less spacious, with a smaller apparent soundstage. At times, depending on the particular software, the sound could be a bit harsh and bright, even at power levels that were not anywhere near clipping. The speakers didn't "disappear" quite as successfully as with other amplifiers I used; frequently, some sounds would seem to be coming more from the speakers than from points in the space around them. Bass response, though not as prominent as with other amplifiers I used, did have a tight character, without flabbiness. Overall, however, performance was pretty good.

One nit that I must pick is that the locking nuts on the bias pots were set too tight for easy adjustment on my review sample. Normally, fixing this would simply be a matter of loosening a lock nut, making the adjustment, and then retightening the nut to prevent accidental readjustment. In the Cantabile I tested, however, loosening this nut also loosened the pots. This allowed some of the pots to turn during adjustment, which could have caused wires beneath the chassis to short or break.

In conclusion, the Cantabile is an interesting design that works pretty well and sounds pretty musical in the process.

Bascom H. King

MADE IN AMERICA

Ever since the first hominid beat a stretched skin or a hollow log to make sound, man has been enthralled by the pleasures the aural sense can bring.

Perhaps only sight has a more direct affect on our daily existence. Yet it was not until just over a century ago that science gave us the opportunity to bring the delectations of sound home.

Every great change in the flow of technology begins with one small step, and for the loudspeaker industry it began with Alexander Graham Bell's invention of the telephone in 1876. Bell's "wondrous machine" proved it was possible to electrically transmit and receive sound.

That proof was also the challenge of the century, and it launched dozens of the brightest scientific minds of the age on a search for better and better ways to reproduce sound.

The search for a better way began in America, and it is still being pursued by dreamers and innovators from coast to coast.

This is the story of some of those who joined this quest.

ACOUSTIC RESEARCH

For almost four decades the initials AR have denoted innovation and a tradition of excellence and fidelity in the American loudspeaker industry.

Founded in 1954 by Edgar Villchur, Acoustic Research was originally headquartered in Cambridge, MA, the home of Harvard and MIT.

The first two innovations to come from the new firm changed forever the face of the loudspeaker industry worldwide.

The long throw woofer and acoustic suspension enclosure, incorporated in the now legendary AR 1, were shown for the first time at the New York Hi-Fi show in 1954, and the pioneering work of Villchur and his team astonished the industry.

The research continued and in 1958 AR invented and introduced in the *AR3* the first dome drivers. That system, which used a 1.5 inch domed midrange unit and a ¾ inch dome tweeter, rapidly became the standard by which all other speakers were measured. The quality and performance of AR products also allowed the company to be the first to introduce a full 5 year warranty when the industry standard was 90 days.

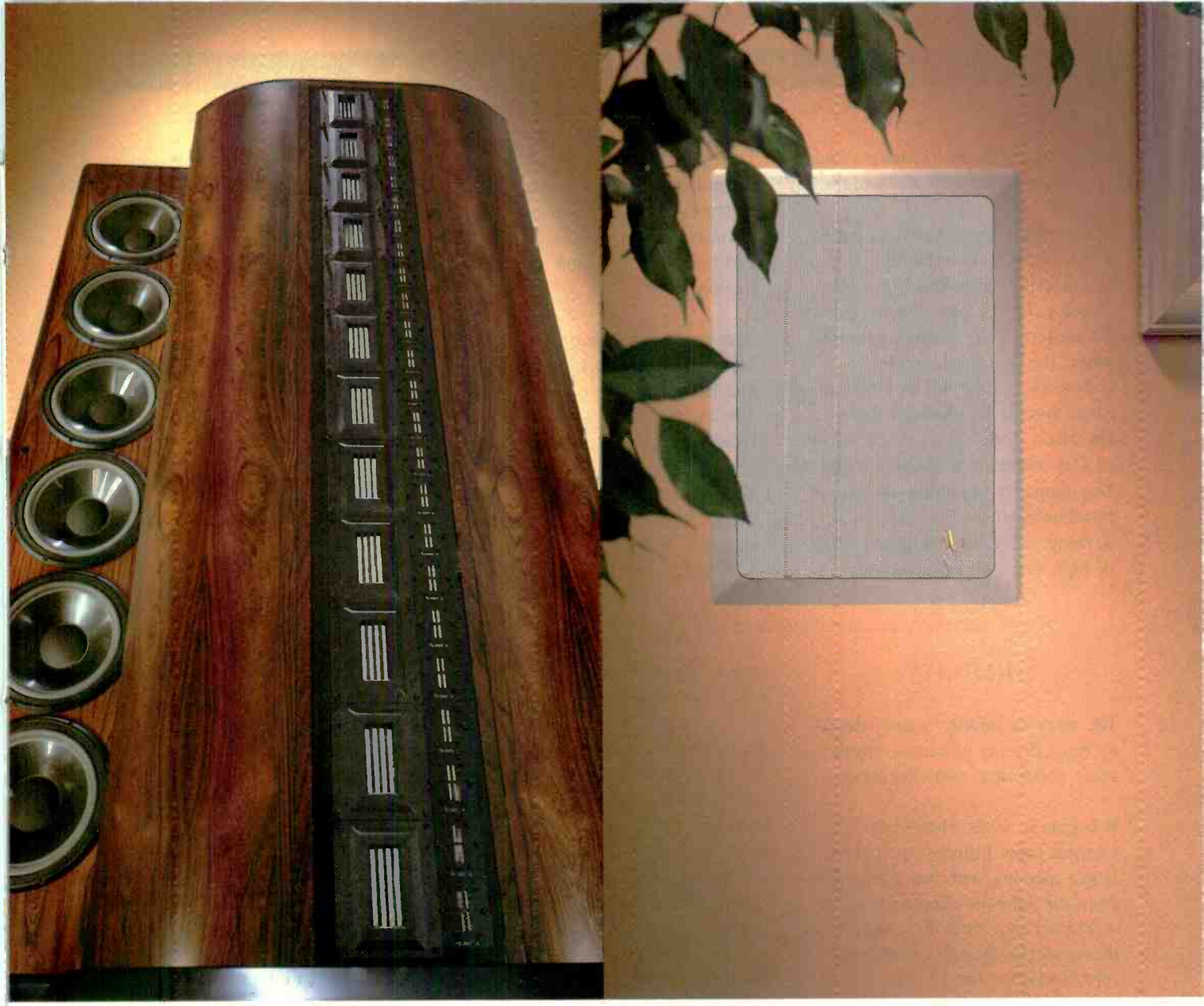
Building on the concept of full service manufacturing, AR brought forth a series of innovative and unique products, each of which set new standards and in many cases produced design elements and concepts still in use today.

For example, the XA turntable, premiered in 1963, gave the industry the three point floating suspension, low RPM motor, and damped tone arm concepts still found in many of the world's most exotic and expensive turntables. That unit set standards for wow and flutter, as well as signal to noise ratio and feedback immunity that were not to be exceeded for many years.

Throughout the 60's and 70's AR continued to be an innovator in the rapidly expanding worldwide audio industry. High current amplification, liquid cooling of drive units, and baffle treatments such as the Acoustic Blanket (TM) were all first seen in AR products.

As an integral part of IJI's plan to return AR to its historic position as an industry leader, the H.I. Series is available through specialist dealers and has gained enormous critical acclaim worldwide. The M1, the smallest system in the line, recently received the prestigious "Best Buy" award from Britain's *HiFi Choice Magazine*.

For 1992, AR continues to advance the art of audio reproduction even further with the introduction of two new lines. The "Classic" series of home loudspeakers are very high quality moving coil systems employing AR's SRA (Symmetrical Radiation Array). This drive unit/crossover module places a 1" soft dome tweeter between two vertically aligned mid/bass drivers to create a virtual point source. First shown to U.S. dealers in September 1992, the reaction has been excellent, with the sound



For music purists with an unlimited budget.

In the relentless pursuit of musical perfection, Infinity has created some of the world's best sounding speakers. Including one for the decidedly well-heeled: the 7½ foot, $60,000 Infinity Reference Standard V. Acclaimed internationally as the most sonically-accurate speaker ever made. (With unlimited space and budget you might choose the imposing sound – and imposing presence – of the IRS V.)

Now Infinity introduces another Reference Standard for people whose passion for music must be in harmony with their living space: the Environmental Reference Standard Series.

For music purists with limited space.

Infinity ERS environmental in-wall speakers use no floor or shelf space, and they can be painted to match or accent your room's decor. In short, they offer the best of both worlds – filling your rooms with spacious, extremely accurate stereo sound, but without imposing on your environment.

For a copy of Infinity's new ERS Series brochure and home theater planning guide, contact your authorized Infinity ERS dealer, or call (800) 765-5556. In Canada, call (416) 294-4833, H. Roy Gray, Ltd.

Infinity®
We get you back to what it's all about. Music.

© 1992 Infinity Systems, Inc. A Harman International Company.

being described as "seamless and transparent, but with real weight."

These new Classic speakers are the fruits of AR's re-organized Engineering Team under it's new director, David Day. David, known for designing the world's best FM tuner, the *Day Sequerra FM Reference*, joined AR in 1991 at the same time as IJI acquired the Davidson Roth Corp., manufacturers of Day Sequerra products. He and the Day Sequerra engineers are part of an alliance whose purpose is to develop AR's new "Limited" line of high-end audio components.

Day Sequerra, AR and Cello, Ltd., are collaborating to realize Mark Levinson's concept (he is the founder and President of Cello, Ltd.) of an "affordable reference quality system."

The system will encompass all aspects of audio, including cables and furniture. These new products, whether separate or combined, will redefine performance levels at their price points, a fact assured by the skill and integrity of the participants. These products will be hand made in the U.S.A. "Limited" refers to availability will be modest.

Arthur Blumenthal, Vice President and general manager of AR, noted that "by combining the skills and abilities of the three companies, we can produce a product family that will bring ultrahigh end performance at a very affordable price."

He added: "This will continue the tradition AR established from its inception—bringing the highest levels of American research, design and engineering expertise together to produce products that can equal or better the finest the world can offer." ☆

☆ ☆ ☆

INFINITY

The story of Infinity is one shaped by three driving passions—music, sonic perfection, and excellence.

It begins in 1969 when Cary Christie, now Infinity's president, began meeting with two partners from the aerospace industry on weekends to pursue their mutual dream of building the ideal audio reproduction system.

The group knew that the technology accessible in the products available simply could not give them the kind of accuracy, purity, and realism that they wanted. To find the path that could lead them to their dream, an R&D shop was set up in a garage at one of the group's home in Woodland Hills, CA, to begin the search for a state of the art speaker system using new scientific principles brought from their aerospace backgrounds.

Late that year the initial realization of the dream was produced, and a whole new concept in loudspeaker design was born. The Servo-Statik 1 was a true breakthrough, combining for the first time two electro-static elements (as satellites) with a dynamic servo controlled sub-woofer bass system.

With funding from outside investors, the partners put their concepts and their ideas to the ultimate test—they quit their full time jobs and moved their budding hi-fi company from the garage to a real factory building in nearby Chatsworth. Infinity was born.

However, the company quickly realized that good as it was, the debut product was simply out of reach for most serious music enthusiasts.

They turned their attention towards developing smaller and less costly systems but kept their focus on innovation, accuracy, and the application of aerospace technologies to the challenges of musical reproduction.

The goal was then and is now to produce no-compromise, leading-edge designs and then bring as much of that technology as practical to each and every product in the family.

The drive to bring to the consumer the best that American technology could produce allowed Infinity to achieve a number of firsts, propelled along by the enormous explosion of hi-fi sales in the mid 1970's as music became an integral part of the lifestyles of two generations.

During that period the company embarked on an ambitious research program which produced the world's first true digital power amp (a full decade before digital audio "arrived"), a unique all FET pre-amp, again years ahead of its time, and the world's first air bearing turntable.

The key developments from that program, however, were the signature EMIT(TM)

AR CLASSIC LOUDSPEAKERS

AR is recognized worldwide for its technological breakthroughs and contributions to the audio industry. However unlike most companies, AR does not employ technology for technology's sake, but only when it provides a noticeable, audible difference.

With the AR Classic Series you will hear the difference. They don't cast their own shadow over the music. Timbre and musical texture are intact. The image has height, width and depth. Dynamics appear to be limitless.

Listening will tell you far more than reading can. When you are considering and evaluating loudspeakers, bring along music you care about. Ask your dealer to play the AR Classics and hear the difference between the ordinary and the classic.

THE AR CLASSIC 26

Tapered cabinets minimize frontal area and diffraction

SRA, Symmetrical Radiation Array, provides a virtual point source

Acoustic suspension woofers are placed to control room interaction

All the Classics have bi-wiring capability

AR

Acoustic Research
330 Turnpike Street
Canton MA 02021
1 800 969 AR4U (2748)

© 1992 A division of International Jensen Inc.

(electromagnetic induction tweeter) and EMIM(TM) (electromagnetic induction midrange) drivers which allowed Infinity to establish reproduction and performance standards still being attempted by others.

These drivers combined for the first time the potential of the extremely low mass that Kapton diaphragms could provide with the power of rare earth Samarium Cobalt magnets.

This marriage of aerospace technologies to state of the art magnetic materials allowed spatial detail and a musical presence previously unobtainable.

Those drivers led directly to the company's flagship product, the IRS (Infinity Reference Standard), which in the no-compromise tradition not only broke ground across the reproduction frontier but has also served as the R&D platform for the technology now incorporated in less expensive products.

The ongoing R&D embodied in the IRS systems produced another group of advancements and industry firsts during the 1980's including the Watkins Dual Voice Coil system and the use of IMG (TM) (injection molded graphite) cones. These two proprietary breakthroughs combined to bring low frequency performance to a new level of realism.

As we enter the latter half of the 90's, and the full flowering of the digital audio age and explosion of audio/video entertainment systems, Infinity continues to bring its unique American blend of aerospace materials technology, no-compromise reproduction, and a quarter century long passion for sonic excellence and musical purity to bear on the needs of today's home entertainment consumers. ☆

BOZAK

One of the more innovative of America's loudspeaker pioneers was Rudy T. Bozak.

The company that bears his name took shape as a result of Rudy's commitment to the recreation of lifelike fidelity and the spatial perspective of live musical events. Bozak was responsible for engineering the first known 360° acoustic perspective and first stereophonic reproduction demonstrations to the general public, which took place at the 1939 New York World's Fair.

Rudy Bozak's unique approach was best demonstrated in the Lagoon Of Nations sound system, which was installed within a fountain and used a 27 inch loudspeaker with a 450 pound magnet structure whose overall frequency response was 28 Hz to 10 kHz +/− 4 dB—an astonishing achievement for the time.

After the successes at the World's fair, Bozak founded the R.T. Bozak Company in Buffalo, N.Y., and began manufacturing woofers, midranges, and tweeters of his own design, many of which utilized a proprietary coating of neoprene rubber compounds making them able to resist the effects of moisture and humidity—often a problem with designs of the time.

The business prospered, and in 1953 Bozak built a furniture factory to permit him to begin marketing completely assembled loudspeaker systems and equipment cabinets for the nascent hi-fi industry.

Bozak's designs were based on the infinite baffle principle, and his flagship model was the 18 cubic foot system Rudy called The Concert Grand.

Since Bozak was aware that many customers could not afford to purchase the system outright, he developed a pioneering modular approach that allowed the customers to begin with a modest system and add to it over time until they had built up a complete Concert Grand.

In the 1950's Bozak added to the loudspeaker line with the addition of amplifiers and electronic crossover systems to feed the needs of the growing audiophile community.

The two individuals who lead today's Norwich, Connecticut based Bozak Audio Laboratories bring their own heritage of experience to the daily process of guiding the company's future and maintaining the commitment to recreate the lifelike fidelity of live music events.

Howard Jacks, President and Chief Designer, has been a collaborator in the design and marketing of eight major U.S. loudspeaker brands, as well as the design, manufacturing, and supply of quality OEM loudspeaker components. Chairman of the Board David Luchs has been involved with the manufacturing of electronic component systems, complete loudspeaker systems, and high-quality furniture products on an OEM basis for more than 30 years.

"Definitive Technology Has Hit the Bull's Eye."

— Julian Hirsch, *Stereo Review*

Experience the Miracle of Bipolar Technology with Definitive's Revolutionary BP10 & 20!

"Truly Outstanding"
— Stereo Review

Experts agree that Definitive's revolutionary bipolar BP10 and BP20 are two of the world's finest speakers and are sonically superior to speakers selling for many times their remarkably affordable cost.

These advanced technology bipolar (front and rear radiating) systems combine lush spacious soundstaging, life-like depth-of-field, razor-sharp resolution and pinpoint 3-D imaging with powerful sub-woofer-like bass (to below 20 Hz), high efficiency, wide dynamic range and easy-to-position convenience for superb musical reproduction so real that it has been called, "a sonic miracle!"

The Ultimate Home Theatre
Combine the BP10s, BP20s or DR7s with our C1 ultra center channel and BP2 bipolar satellite/surround speakers for the ultimate in home theatre sound.

Visit your nearest Definitive dealer and experience the dramatic sonic superiority of these truly extraordinary loudspeakers. For More Information

Call 1-800-451-2248

Definitive Technology®

11105 Valley Heights Drive • Baltimore, MD 21117
(410) 363-7148

Enter No. 15 on Reader Service Card

The current products maintain the focus Rudy placed on linear, wide band response, highly accurate transient response characteristics, minimal harmonic and intermodulation distortion and coloration, and sufficient acoustic output to permit the reproduction of music at realistic live performance levels.

To accomplish this, each cone driver component is operated only within its linear piston range, thus avoiding the coloration due to irregularities and improper driver to driver transition. In the three top models multiple small drivers (a Bozak tradition) are used to achieve high acoustic output with a minimum of cone excursion as well as maximum control over cone motion.

One of the most distinctive aspects of the Bozak products is their cabinet design. Far more than a simple exercise in esthetics, the enclosures feature extremely thick front baffles (up to a massive 2 inches in the Grand). This provides the drivers with a highly stable and rigid platform from which to launch the acoustic wave front.

All but one system also employ the company's exclusive "Acoustic Insolation Enclosure," constructed from two different types of wood products to produce a non-parallel walled enclosed volume of air, inhibiting standing waves within the cabinet and permitting the drivers to produce maximum detail and clarity.

This enclosure is inserted into a furniture grade outer cabinet. The space between the two is then filled with foam in place of polyurethane, creating a highly braced, rigid, yet absorbent structure which drastically reduces acoustic re-radiation and the distortions it can produce.

Looking towards the future Howard Jacks noted that "the doctrine of pragmatic innovation and sonic reality that Rudy created will continue to be a core element in all our products. After all, our pursuit of acoustic reality is based on more than a half century of tradition." ☆

☆ ☆ ☆

LEGACY REEL TO REAL DESIGNS

During the late 1970's and early 1980's engineer Bill Dudleston, (BS, Engineering, Univ. of IL) found himself spending more and more time refining stereo recording techniques and playback systems.

Like many other American engineering professionals and experimenters of the time, he had great difficulty finding a loudspeaker system that could give him the kind of accuracy he felt was possible. Comparisons between the original sources and the reproduced material kept showing annoying faults in the speakers.

These frustrations were the beginning of Dudleston's personal voyage into the world of invention. Acknowledging his needs, he took the highly personal and uniquely American approach and put himself and his ideas on the line.

With his business partner, construction entrepreneur Jacob Albright, and the stunning sum of $2000, Dudleston, who had been a process engineer for a polymer manufacturer, left his current position as supervisor of a digital research lab and began what is today the Springfield, IL, headquartered Legacy Loudspeaker Systems division of Reel to Real Designs.

Spending the familiar nights and weekends tweaking, comparing, and most of all listening, what emerged was the Legacy-1, an elaborate four-way design he felt could achieve the performance results required. Some nine years later that system, now incorporating hundreds of hours of further refinement, is still being produced, but its brothers and sisters now number nearly a dozen.

Crediting the work of Roy Allison, D.B. Keele, and Olsen, Kellog & Rice as pushing him to follow the experimenter's path, Dudleston's interests in room acoustics (he is now busy exploring the potential uses of DSP for active control of loudspeaker performance and its potential in the area of psychoacoustics and the ear/brain interface) and the extensive time he has spent examining the way the room and the electrodynamic reproduction devices we call loudspeakers interact have led to a philosophy that emphasizes two key elements.

VANDERSTEEN AUDIO

The most expensive dynamic speakers in the world are multi-enclosure, minimum-baffle designs. So is every full-range Vandersteen speaker. One listen to the astonishing clarity and realism of Vandersteen loudspeakers will show you why "boxless" is definitely better.

Model 3

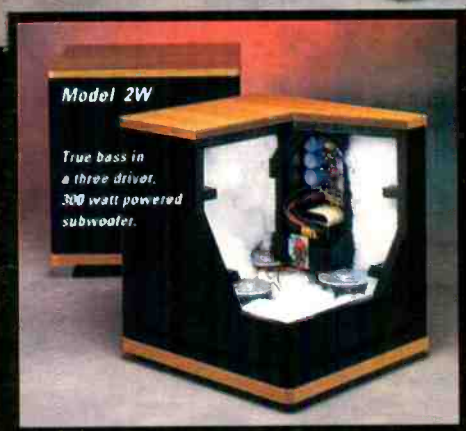
Ultimate realism in an advanced four driver, three-way loudspeaker with ultra-quality drive components, dual inputs for bi-wiring or bi-amping and a patented midrange that virtually eliminates internal reflections and the resultant distortion.

Model 2Ce

Superb performance in a legendary four driver, three-way loudspeaker with advanced drive components and dual inputs for bi-wiring or bi-amping.

Model 1B

Incredible value in a slim, elegant two-way loudspeaker with high-performance drive components.



Model 2W

True bass in a three driver, 300 watt powered subwoofer.

For more than 15 years, VANDERSTEEN AUDIO has built affordable loudspeakers true to both science and music. If you're looking for speakers that accurately reproduce the entire frequency range of music and recreate the full dimensions of the original performance, we can direct you to your nearest carefully selected Vandersteen Audio dealer.

VANDERSTEEN AUDIO
116 West Fourth St, Hanford, CA 93230
(209) 582-0324

DIMENSIONAL PURITY.®

Please write or call for a brochure and the name of your nearest dealer.

Enter No. 48 on Reader Service Card

Because, instead of acknowledging that we have a great deal of knowledge about how and where the buyer will use his system, designers often chose to measure and test in anechoic laboratory spaces which have, according to Dudleston, "little connection to reality, and are in fact a deep abyss into which good ideas disappear," he suggests that *first* we should acknowledge that loudspeakers will be operated in rooms and incorporate low frequency room gain into the operational performance of the system.

Second, keep midrange reflections to an absolute minimum since the ear's exceptional sensitivity in the 300 Hz to 3 kHz band make inaccuracies, and anomalies in this area are exceptionally detectable.

By incorporating the concept of increasing the piston area uniformly and progressively as the frequency drops, and avoiding any crossovers in or near the critical midrange region, the systems produced by Legacy offer the audiophile the opportunity to experience highly stable imaging coupled to low distortion, high dynamic range power distribution into the listening environment.

FOCUS (Field Optimized Convergent Source), the 165 lb. flagship of the company's loudspeaker line which incorporates more than 400 sq. inches of total piston area, and utilizes a unique driver array optimized to minimize the colorations caused by floor and ceiling reflections, is an example of this engineering philosophy.

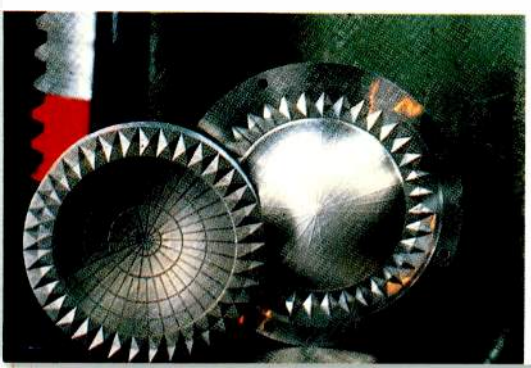
To achieve those goals in the FOCUS and the 11 other systems Legacy offers, the company designs its own low frequency units. In its unique 17-person craft workshop, which the company invites anyone interested to visit, exotic woods merge with injection molding, driver design and testing, system buildup, nulling, and final matching.

Building on the more than a century and a half of looking for a better way inherent in the American loudspeaker industry's traditions of innovation and refusal to accept the existing state of the art as the best that can be done, Legacy, in its own way, has brought to the marketplace ideas and concepts which have opened up further options for more research. ☆

JBL

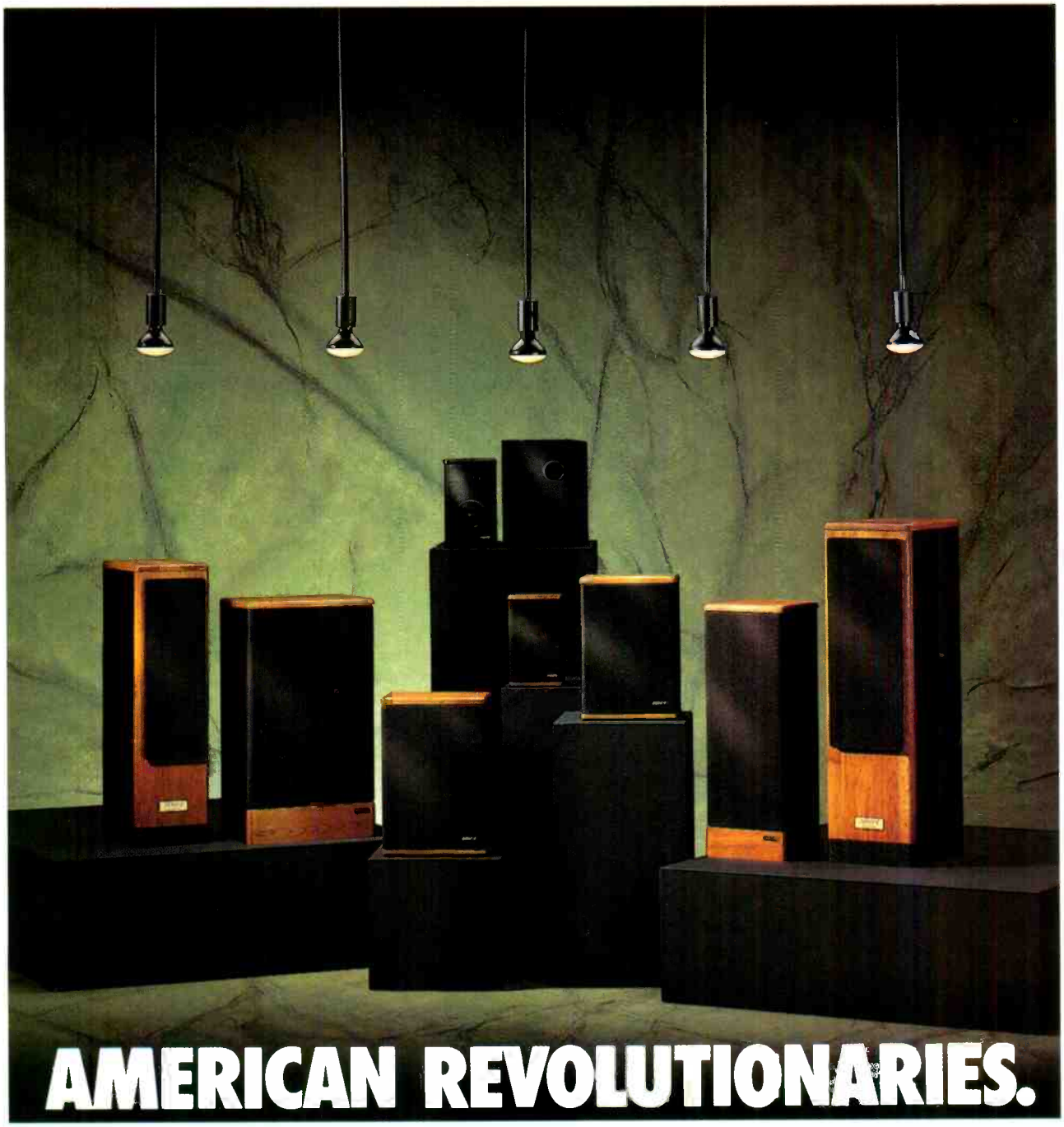
In January 1902, one of the men who was to forever change the face of the loudspeaker industry in America was born. James Bullough Lansing (born James Martini) was, over the course of his 47 years, to bring American audio industry a number of vital innovations, designs and manufacturing processes still in use.

The young Lansing showed a remarkable aptitude and interest in all things electrical and mechanical. That inquisitive bent and his drive for perfection and improvement (the signals from a radio transmitter he built at age 12 were so strong that they caused interference at the Great Lakes Naval Air station, a significant distance from his home) became critical building blocks of his passionate desire to make a better device and improve both the processes by which loudspeakers were made and the sound they produced.



His vision and willingness to take a different path were the elements which enabled Lansing to seek out and find the unique and innovative ideas he brought to the nascent loudspeaker manufacturing industry beginning in the 1920's. Having migrated to Los Angeles, he formed Lansing Manufacturing Company in 1927. By 1930 the company had more than 40 employees. Although Lansing's company produced products used to reproduce the first sound picture (The Jazz Singer, 1928), the explosive growth of motion picture sound gave the company its first real opportunity to provide the kind of ultrahigh quality "signature sound" products of Lansing's own design to professional users. In 1936, working from designs generated by film sound legends Douglas Shearer, John Hillard, and Robert Stephens, Lansing produced components for what became known as the Shearer horn system. That system won an Academy award for technical excellence.

In 1946 the company we know today as JBL, Inc. was formed as Lansing Sound. The work done by Lansing during the 40's and 50's on theater sound perfectly positioned the new company to become a key player in the developing professional sound industry as a supplier of studio monitors (becoming the benchmark for Capitol Records and EMI worldwide) and sound reinforcement components. The quality and strength of the Lansing designs was also what led Leo Fender to choose a modified version of a JBL cone transducer to provide the "sound" for his new electric guitar amplifiers.



You know, they played a big role in the Revolution. Rock-'n'-Roll Revolution, that is. When the Large Advent became the speaker of choice for an entire generation of rebels.

Today, that tradition is kept alive in speakers like the Heritage® tower. Its 8" Co-Active™ Woofers, 600 watts of peak power and handcrafted, pecan trim moved *Stereo Review* critic, Julian Hirsch to write, "...I hated to pack (it) up after tests were concluded."

Our award-winning Baby™ II is a true child of the Revolution. This little extremist has a 6.5" high excursion woofer with aluminum voice coil and a ½" polycarbonate ferrofluid-filled dome tweeter. 150 watts of peak power, too.

Just two of the reasons why *FORTUNE* Magazine rated Advent Speakers as one of the 100 products America makes best.

For American-made speakers with world-class sound, look to Advent. Call 1-800-477-3257 for more information and a dealer near you.

ADVENT

Sound as it was meant to be heard.

© 1992 Advent and Heritage are registered trademarks of International Jensen Inc.
In Canada, call SCL Products at 604-273-1095 (BC), 416-890-9298 (ONT).

DIGITAL READY

The company, which is now a part of Northridge, CA headquartered Harman International, continues the Lansing legacy of innovation. In addition to its leadership position within the professional sound reproduction field, JBL loudspeakers are designed for use at home and in the car. Matching finely crafted furniture to technologies first introduced to the industry by JBL has extended the company's leadership position to the home audio arena. Cast-frames and vented gap cooling are but two breakthrough technologies distinguishing the company's car audio offerings.

Today with more than 60 years of American innovation as a base, and using the same technologies that have made JBL the choice of 7 out of 10 recording studios, hundreds of the finest concert venues, live performance systems and THX-licensed movie theaters the world over, JBL brings to the listener precisely what the people who performed, recorded and mixed the performance heard—accurate, effortless, precise reproduction of the original source. ☆

☆ ☆ ☆

VANDERSTEEN AUDIO

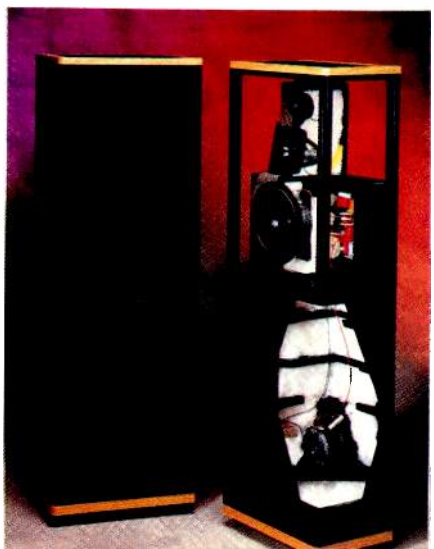
The time is the early 1970's. The place is the central San Joaquin Valley of California, near Fresno. Richard Vandersteen is very frustrated by the sound quality of the affordably priced loudspeakers he can find at the local hi-fi shops and dealers.

He believes he can produce something better. This belief is the beginning of what was to become Vandersteen Audio.

Working from his military electronics background and his extensive reading on the subject, Vandersteen designed and built a pair of loudspeakers for his own use. The friends and relatives that heard these first speakers liked them so much that Richard quickly found himself building pairs for them as well. Very soon he was spending almost all his time crafting, by hand, each pair of speakers. The process of improvement for Vandersteen followed a similar course to the one taken by many other innovative American loudspeaker entrepreneurs. Small improvement were made along the way, until in 1976 it all came together for Vandersteen in the product that turned him into a full time manufacturer—the revolutionary Model 2.

Using all that he had learned and adding in some new ideas about minimum baffle designs and proper driver alignment, Vandersteen produced the Model 2. The reaction from the growing circle of enthusiasts who owned one of Richard's systems encouraged him to show the design to a few of the local audio retailers. Their highly positive reaction and his belief in his designs convinced Vandersteen that it was time to put his concepts to the test.

In 1977 Vandersteen Audio was founded, based out of Richard's house. The garage was the factory, and the rest of the house became his lab, storage, and warehouse facilities. He built each pair of speakers himself using custom jigs to speed production, but within a few months the demand had exceeded his capabilities. It was time for a factory and a few employees to help produce the systems.



Now 15 years later, Vandersteen Audio has firmly established itself as a first line American manufacturer of high-end loudspeaker systems.

Richard was continuously looking for new ways to improve and enhance the systems he was building. This is what led him to become a pioneer in the application of computer based analysis to system design in the late 1970's. Using a Gen-Rad 2512 FFT analyzer to aid in his R&D program, he was also one of the first manufacturers to specifically address the shape and size of the baffle boards used to mount the drive units. By using a board only just large enough to hold the required driver(s), Vandersteen was able to significantly reduce both reflections from and diffraction caused by the baffle, as well as reducing the flexing and resonances often associated with larger baffle surface area approaches.

As a natural extension of his work on diffraction and reflection, Vandersteen and his company began a research project into the internal reflection characteristics of the drive units themselves.

The first product from this extensive project was U.S. patent number 5073948 granted to the first dynamic midrange cone driver to incorporate a reflection free zone behind the cone.

"... a wonderful loudspeaker that has no competition at its price point."

M.G.D., BOUND FOR SOUND

Focus

LEGACY
LOUDSPEAKER SYSTEMS
SINCE 1983

ACCEPTING SPEAKER TRADE-INS ON MAJOR BRANDS

distributed by Reel to Real Designs 3021 Sangamon Ave. Springfield, IL 62702
dealer and export inquiries invited 1-800-283-4644 Fax: 1-217-744-7269

Enter No. 31 on Reader Service Card

In a conventional midrange unit the energy from the back side of the cone immediately strikes the front of the magnet assembly and is reflected back through the cone into the listening area.

The research project enabled Vandersteen to find a unique way to minimize the frontal area of the magnet structure by utilizing a combination of advanced materials and proprietary construction techniques. The narrower profile presented by this design reduces internal reflections and the distortion they cause. This special driver is used in the company's Model 3 system.

To further aid in the ongoing process of improving the product, the company recently began a project in which it is applying minimalist techniques to produce a series of reference recordings to be used during the evaluation and listening test phases of speaker development. These recordings are now being marketed by the company on its own label.

The current product line encompasses the Model 1B, the Model 2Ce, and the flagship Model 3. In addition, the Model 2W powered subwoofer with a integral 300 W amplifier is available.

Only critically damped dual chamber metal dome tweeters, cast basket low frequency and mid frequency drivers, and transient perfect first order crossover networks are used in Vandersteen products. Every component used is tested prior to assembly and each finished system is compared by computer to a model reference unit under real world conditions.

Known for its exemplary workmanship, superior price to performance ratio, and highly reliable designs, Vandersteen Audio is continuing a decade and a half tradition of American loudspeaker innovation and advancements. ☆

DEFINITIVE TECHNOLOGY

Sometimes an individual gets the chance to follow his dream twice in a lifetime. In 1972, Sandy Gross and two of his friends and classmates at Johns Hopkins University formed what was to become one of the most successful and well-known American loudspeaker companies.

In 1988, after more than 15 years of innovation, and with a store of knowledge and experience regarding the pitfalls and practicalities of starting a company, Gross left to begin again.

This time he wanted to pursue, in true American dream fashion, a goal that had eluded him the first time—to produce a unique world class, high-end product with exceptional performance, incorporating as much of the available new construction techniques, materials technology, and design ideas as possible.

He felt that the progress that had been made in quantifying performance, analyzing the perceived sonic qualities of loudspeakers, and the availability of new cabinet construction options had not been fully utilized by any of the available products.

To explore this concept Gross began his journey down a familiar route—one whose sign says "I know there is a better way to do this."

To climb his personal mountain, Gross sought to define what he believed was missing from the marketplace. What he found was that there was an unfilled niche.

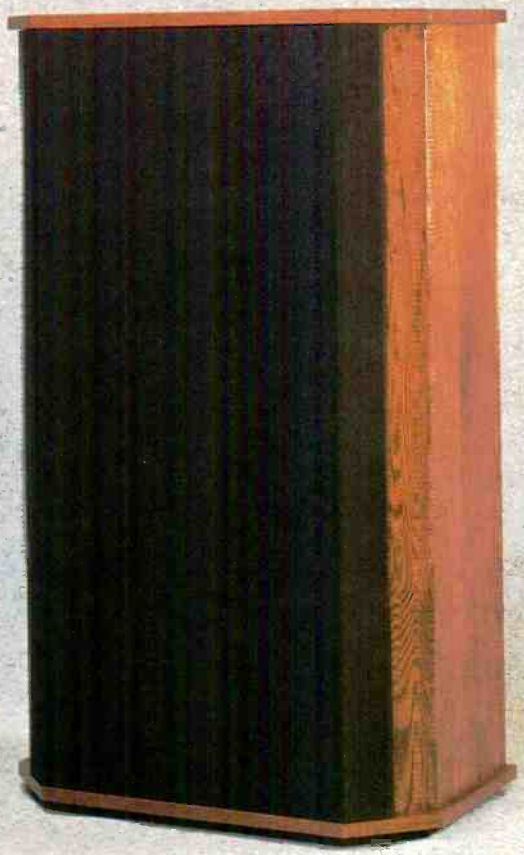
He saw an opportunity to provide high-end loudspeakers equally superb for music reproduction and home theater, which delivered the performance, technology and build quality of the most exotic and expensive systems, but offered affordable prices, utilizing lifestyle oriented designs that would blend into the space in which they were placed, and would seem to simply disappear when played.

Realizing that dipolar planar system designs provided the lifelike presence, accurate imaging, and sound stage depth they sought, but that their size, bass limitations, inefficiency, and room placement requirements often presented problems, Gross and his team set out to design bipolar towers with the efficiency, dynamic range, and extended bass response that the best conventional box systems offered.

Taking advantage of the newly available resources, the Definitive

Bozak

Like an Open Window,
They Give You All The Music.
Adding Nothing of Their Own...
Taking Nothing Away.



With Bozak...
it is the Music
that is Spectacular.

Bozak Audio Laboratories' sole commitment
is to the recreation of the life-like fidelity of original musical events.

For further information, please contact us directly.

Bozak Audio Laboratories 539 Norwich Avenue Taftville Ct. 06380 (203) 886-1510
FAX (203) 886-1413

Enter No. 6 on Reader Service Card

designers spent hundreds of hours with programmers using another American innovation, the super computer, to investigate the concepts surrounding the transmission line loading of low frequency drivers.

Their efforts produced a new and unique approach to the idea, the "computer synthesized transmission line" cabinet that was far less complex to build yet still produced the required effect.

Gross explains: "Without the ability of the super computer to model in extreme detail the loading characteristics of a transmission line, and the ability to investigate almost instantly any idea or option, we simply could not have designed the systems. Doing it the old way would have probably meant years of experimentation, then having to actually build each version to find out what the changes meant. With the computer this process takes just a few days."

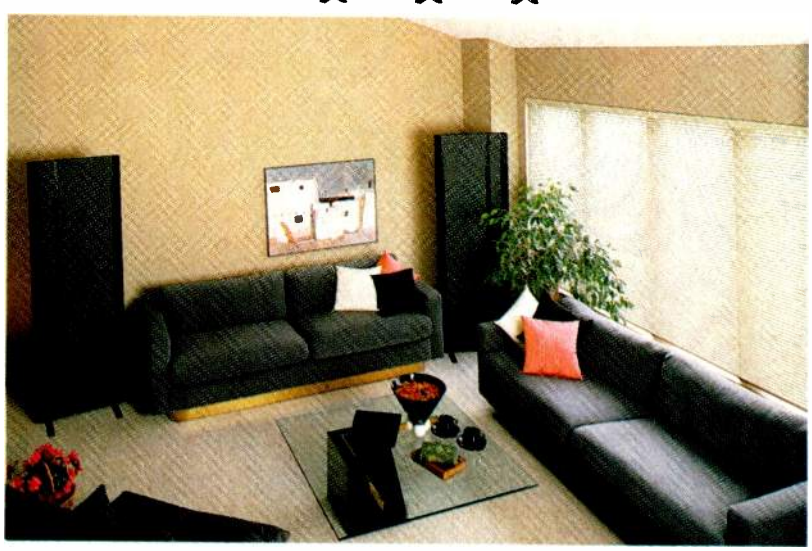
Coupled to the application of modeling and investigative techniques developed for the high tech American aerospace industry, Definitive Technology took advantage of a another proprietary American resource—the facilities of the National Research Council laboratories in Ottawa, Canada.

Working with a research partner and loudspeaker engineer Don Givogue, Gross brought the considerable resources available at NRC (considered to be the best facility of its kind in the world) to bear on the process of refining and quantifying the performance of the Definitive Technology systems.

Gross explained: "Although I built my first electrodynamic transducer based bipolar system in 1973, it was not until we began to measure and explore our prototypes at NRC that I was able to bring into focus all the ideas running around my head and see the results of the various options we had investigated.

This allowed the company to meet one of its key goals of bringing the performance of the ultrahigh end systems down to affordable, livable products that meet world class quality objectives.

He noted that "its easy to build high end loudspeakers when cost is not an objective," however, he added "to design a truly superior product offering high value as well as exceptional performance, which can be efficiently manufactured to a consistent quality standard takes more than a good idea. It takes experience, expertise, and very hard work." ☆



MAGNEPAN

For more than two centuries, experimenters and researchers have worked at the production of electrostatic transducers. Despite huge amounts of time, effort, and funding during the mid-1920's and onward until W.W.II, the restrictions imposed by available materials, amplifiers, and breakdown voltage limitations hindered the realization of the inherent potentials of planar drivers.

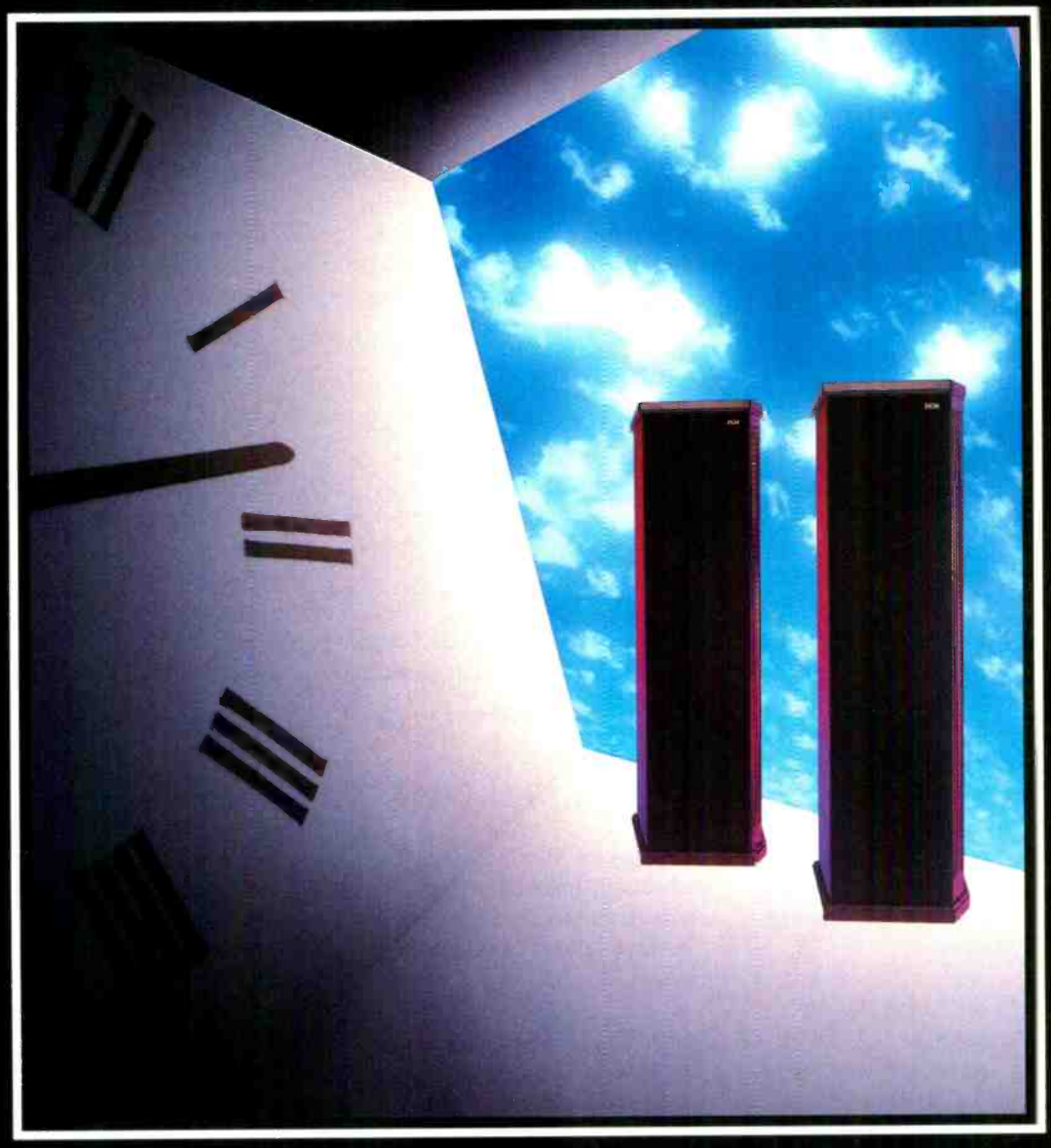
These limitations were all too clear to James Winey, Magnepan's founder whose confessed hi-fi addiction and a true love of music had led him to invest more than $2500 (1960's dollars) in building up the best music reproduction system he could assemble from available components. A pair of electrostatic loudspeakers were a part of that system.

However, Winey felt that those systems could still be improved, could be made even more accurate, and thus provide the listener with a more realistic sound field. Working alone, at night, and on weekends, he began to experiment with his own ideas on electrostatics, and ended up with a system that he described as "too flat and unstable."

Looking back on those days Winey recalled that a rubberized magnetic material from 3M was the trigger for the "idea" that became the first Magneplanar (electromagnetic panel) speaker.

Although the sound that emanated from that first working model, in the dead of night, was described by Winey as "puny," three years of additional tweaking, adjustments,

THE NEW TIMEWINDOW SEVEN: PERFORMANCE THAT PASSES THE TEST OF TIME.



In the 1970s, DCM introduced the original, critically-acclaimed TimeWindows.™ In the 1980s, the TimeWindow Three™ accompanied the birth of the digital era. Now, to meet the increased expectations of today's audio/video enthusiasts, DCM introduces the ultimate TimeWindow.™

The TimeWindow Seven™ combines the incredible imaging, clarity and accuracy of its predecessors with dramatic improvements in sensitivity, dynamic range and sound distribution. And it's enclosure design enhances the listening environment as much as the listening experience. To audition TimeWindow Seven™ speakers write to DCM, 670 Airport Blvd., Ann Arbor, Michigan 48108. Or call toll-free 1-800-878-TIME. The new TimeWindow Seven. It was just a matter of time.

DCM® Loudspeakers

Enter No. 14 on Reader Service Card

and modifications culminated in a stable working system that finally satisfied the precise reproduction goals Jim had set for the system.

Winey, driven by his internal knowledge that there was a better way to solve the known electrical problems with electrostatic drive systems, had created what is now generically called a planar-magnetic driver.

His pioneering breakthrough permitted direct coupling to the driving amplifier and because it used permanent magnets required no high voltage source for polarization.

That original system, completed in 1969, was the first working version of the type of planar magnetic driver still found in every system the White Bear Lake, MN based company produces. That prototype, which Winey showed to potential investors, friends, and dozens of audiophiles who he believed would be potential customers, was a full range system and was never actually converted into a production version.

With the help of Leland Vander Linden, a Pleasantville, IA businessman and friend, seed capital was raised, and the beginnings of what has become one of the audio industry's best known, longest lived technological innovators was in place.

Two more years filled with sweat, experimentation, further capitalization, and a hefty portion of plain old American ingenuity were to pass before the first salable units were produced in 1971.

The concepts behind the Quasi-Ribbon/Planar Magnetic driver, and the pure ribbon driver system introduced in 1982 for high frequency applications and now used in the company's three larger systems, have allowed Winey to address several fundamental quandaries facing loudspeaker designers.

One key element to the system's sonic performance is the extremely low mass mylar film and ribbon driver (approaching as close as current materials technology will allow the holy grail of loudspeaker design—the massless driver).

Only .001 thick, the ribbon, attached to the .0005 inch thick mylar diaphragm, permits the systems to respond essentially instantly to musical transients since there is no significant mass to put into motion.

The use of an open baffle design allows it to work in a symmetrical environment against the air pressure of the room producing a highly uniform pressure response, as well as a correspondingly even and regular phase plot.

This, coupled to the intrinsic energy conversion efficiency of the motor (since it does not have to bleed off energy to cover voice coil heat losses, magnetic-hysteresis losses, or eddy current losses), allows a highly uniform radiating structure to be produced.

Now, more than 20 years and 160,000 loudspeaker systems later, Magnepan's unique technologies are still giving audiophiles the world over the spacious and visual imaging coupled with the liner power response only the almost massless planar drivers can produce. ☆

MARTIN-LOGAN

The story of Martin-Logan is one of dedication, innovation, and commitment to the ideas that first, "it can be done" and second, "we can do it."

Martin-Logan began as a dream in musician, part time marketeer, weekend inventor and tinkerer Gayle Sanders' head.

Sanders was convinced that only electrostatic loudspeakers could bring to the listener music in it's purest and most transparent form.

He knew the history of the technology all too well, and was aware of the 200 years of attempts by dozens of others to make these systems stable, safe, and wide range enough to deliver the full musical spectrum. But Sanders remained positive that the problems could be solved, that there was a better way.

So, putting his money and his ideas on the line, Sanders in 1979 organized a small team to complete the 10 years of personal development work on an original user friendly design that did not destroy power amplifiers, did not arc, and delivered realistic volume levels.

...it looks like a ribbon

...it sounds like a ribbon

it's a quasi-ribbon

it's from Magnepan

•The taller Magneplanar® MG-1.5 at $1350 per pair, and the MG-.5 at $995 per pair, are for those wanting ribbon technology in a smaller, more affordable design.•Quasi Ribbon models at $690, $995, and $1350 per pair. •True Line Source ribbon models at $1950, $3000 per pair, and the fabulous new MG-20 at $8500 per pair.

Both speakers shown with custom transparent front grilles.

MAGNEPAN

1645 Ninth Street, White Bear Lake, MN 55110

Enter No. 24 on Reader Service Card

The first product didn't quite meet those goals however.

The flat electrostatic panel the team produced was audibly stunning to all who heard that first demonstration—but when in their enthusiasm they turned up the volume, sparks flew, smoke curled towards the ceiling, and a horrific lighting storm flashed across the aluminum panel.

That failure fully convinced Sanders that there were problems with the existing approaches which simply could not be mitigated sufficiently to make the products safe and reliable enough to be used in a home environment or stable enough to produce sufficient level to re-create the dynamics of live music accurately without either blowing up the driving amplifier or failing themselves. So he went looking for solutions from other industries.

He knew that new aerospace industry-developed polymer materials, better and more stable power supplies, and a host of other cutting edge ideas had not been applied to the electrostatic problem.

What emerged took advantage of state of the art conductive coatings, applied to a .0005 inch mylar diaphragm sandwiched between two perforated steel plates.

During one midnight testing and evaluation session, the unique curved shape that is a Martin-Logan trademark came forth. Seeking to emulate the dispersion of a sound wave front, the curvilinear shape that allows the company's system to achieve their remarkable dispersion and sound field spaciousness was suddenly obvious.

The ability to achieve a coherent wave front with high transient capability and near perfect phase coherency was now within reach.

This patented transducer configuration, which has earned the company 6 design awards from the Consumer Electronics Show, a remarkable achievement, produces the signature 30° pie wedge of sound energy with almost perfect dispersion.

The development process continued, and three years of intensive work with the firm that was developing the filtered windows for the space shuttle produced the patented vapor deposition system that creates the stable and optically clear diaphragm that supports the required 5000 V charge, yet was safe enough to operate in any home environment.

The work continued producing the completely insulated acoustically transparent stators that sandwich the diaphragm and the controlled resistive surface on the diaphragm.

All of that technology was incorporated into the Monolith, a full range hybrid ESL (electrostatic loudspeaker) that was introduced at the 1983 CES.

By 1989, the company had grown to the point where it made *Inc.* magazine's list of the 500 fastest growing privately held companies in America. The company made that prestigious list again in 1990, a rare honor. Currently, more than 50% of the company's sales of its line encompassing four hybrid electrostatic/dynamic systems, and one pure full range ESL system covering a wide price range, serving the needs of music lovers, and audiophiles the world over, are being done through export to more than 30 countries. ☆

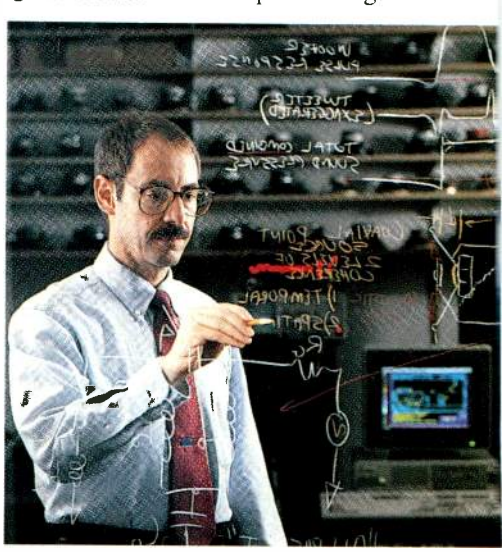
☆ ☆ ☆

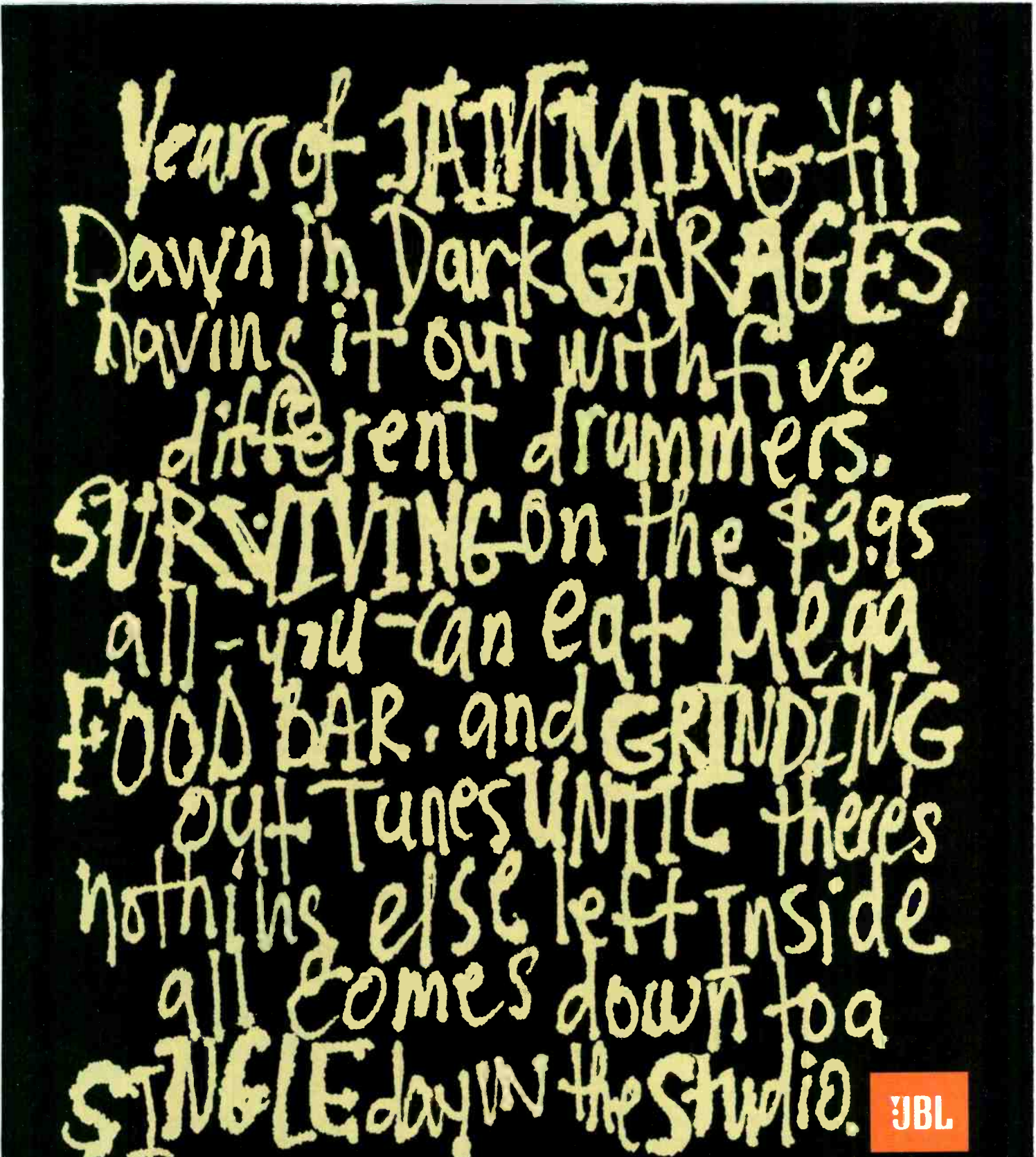
DCM

The mid-1970's were very prolific years in the American audio industry. That period saw the founding of many of today's well known names in consumer audio. Throughout these pages you will see a number of innovators and inventors who began their quest for better audio and the pursuit of their own dream, much like Steve Eberbach, (an aerospace engineer fascinated by loudspeaker design) Howard Krause (a engineering school student fascinated by loudspeakers) and Bob Watestripe (a top notch real estate salesman, who wanted to sell hi-fi).

Their pursuit of better audio made in America began with a casual conversation in an Ann Arbor, MI delicatessen. That chance meeting led to a trip to the Consumer Electronics Show, and shortly thereafter to the formation of the partnership that eventually became the DCM Corporation in 1974.

Like many others who had been hooked by hi-fi, Steve, Howard and Bob had a better idea—that the future of audio was in audiovisual style home entertainment. They knew that there was a need for cost effective, reasonably sized loudspeakers that could supply a spacious wide image yet maintain good localization and positioning.





PEOPLE WHO MAKE MUSIC TRUST JBL. (7 OUT OF 10 RECORDING STUDIOS USE AMERICAN MADE JBL EQUIPMENT.) PEOPLE WHO LISTEN TO MUSIC SHOULD, TOO.

JBL CONSUMER PRODUCTS • 240 CROSSWAYS PARK WEST, WOODBURY, NEW YORK 11797 • 1 800 336 4JBL A HARMAN INTERNATIONAL COMPANY

Enter No. 21 on Reader Service Card

Yet none of what they had heard fit this description.

After some false starts with a new power amplifier idea, and some serious learning curve experiences with the venture capital marketplace, they got some very sage advice from another entrepreneur: "Don't ever forget that the key to your company is your partnership, which is very strong."

The decision was made to postpone the amplifier project and focus on the loudspeaker vision that had first brought them together that night in the deli.

Steve was working with a local PA company (Fanfare) which was doing rock concerts. They had a shop where he could spend his spare time building up and trying out various loudspeaker designs. Howard was also experimenting with loudspeaker designs, trying to make something better than what he had purchased primarily because he could not afford the much higher cost of the superior products then on the market.

Steve and Howard combined their ideas and talents with Waterstripes' bottomless enthusiasm and sales ability, and following the advice they had received, they managed to survive.

Howard, who had left engineering school to work on the speaker project, then decided to return to business school. He commented, "I figured that either the company was going to be successful, in which case I would need the training, or it was NOT going to be sucessful, in which case I would need the training."

Bob and Steve continued to build speakers, three pairs at a time, tinkering and experimenting all the while. Steve recalled: "In those days we did our R&D testing with the people who came to the house to buy the systems."

The company continued to grow, and when a friend offered the use of a warehouse, and tools to use in the off hours, they jumped at the chance. Now they could make 100 units at a time, buying the more expensive components as required. 1977 saw expansion of DCM, with a working capitol loan from Ann Arbor Trust, and the move to a 1200 sq.ft. facility. 1978 saw the growth explode and a move to an 8000 sq. ft. facility. 1979 was even better and now in 1992 the 50+ employee company calls 15,000 square feet home. Three specific technologies are unique to the DCM systems.

These are ported transmission line enclosures, time equalized coaxial drivers and acoustic sound absorbing "lenses." They combine to provide high sensitivity, accurate phase response, and uniform distribution of the sound field.

The company's Time Window, Time Frame and CX series products continue to prove that innovation and dedication can provide a better sound.

This is all embodied in the latest version of the legendary Time Window series products, the flagship Time Window Seven. Combining all the renowned features first seen in the original products and updated through the succeeding series, this version makes dramatic steps in imaging, dynamic capabilities, and sensitivity.

The almost two decades since 1974 have seen continual growth for DCM, but more importantly, DCM has made significant progress toward the dream of bringing virtual reality into home entertainment. ☆

ADVENT

One of the oldest names in American audio is Jensen. In fact, the company that now bears Peter Jensen's name is the living legacy of the individual who essentially invented the modern loudspeaker, circa 1913.

Now known as International Jensen Inc., the company consists of the Acoustic Research, Advent, Day Sequerra, Jensen, Magnat, NHT, and Phase Linear brands. It has clearly positioned itself as an American technology leader and is continually adding to the legend Peter Jensen started almost 80 years ago.

Although many brilliant inventors moved forward from Jensen's original work, his engineering

breakthroughs truly built the stage upon which all that followed were to perform. The seed that Jensen planted essentially makes him the great grandfather of the loudspeaker industry as we know it today.

ALL CLEAR.

A rose is just a rose. And a speaker is just a speaker. Right? Get a grip.

These are Martin Logan Speakers. Unlike any others. Gone are the components of a traditional speaker. It looks like we put nothing behind the grill. That's our electrostatic driver, incorporating an incredibly advanced Vapor Deposited Membrane that you can see right through. With less mass than the air it's moving. Capable of cleanly reproducing the exquisite texture of a Stradavarious violin, yet able to unleash the awesome power of a Fender® bass.

New Aerius
$1,995.00 pr.

Martin Logan invented Curvilinear Electrostatic Technology. And we packed it all into a line of very remarkable loudspeaker designs. From the new Aerius starting at $1,995 a pair to the $60,000 Statement System.

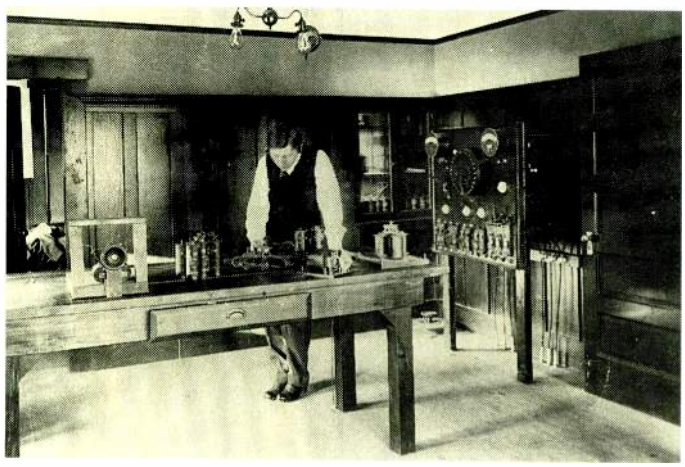
All this is something you'll have a difficult time seeing. But you will hear it. Clearly.

MARTIN·LOGAN, LTD.
THE ELECTROSTATIC TECHNOLOGY

913-749-0133
P.O. Box 707 Lawrence, Kansas 66044

From that seed came the company that was the first to make dedicated, high quality automotive speakers, the first to produce a Triaxial system and the first to develop a graphite cone.

Headquartered in Lincolnshire, IL, IJI has operations across America. R&D is located in nearby Schiller Park, IL, Acoustic Research in Canton, MA, NHT in Benicia, CA, and the General Magnetic operations are sited in Dallas, TX.



The plastic and metal stamping work, along with home loudspeaker assembly, takes place at the facilities in Punxsutawney, PA, final car product assembly in Lumberton, NC, and the company manufactures its woofer cones and voice coils in Clinton, NC.

Using its vertically integrated manufacturing capabilities, the company's 2000+ workers, using the PDQ (Products Demand Quality) team approach, prove every day that quality, American engineering, and home grown management can compete on a global scale. In fact, export sales to the Orient are continually expanding, as the quality and technical superiority of IJI products provide its worldwide customer base with first class, made in America loudspeaker systems.

One of the core divisions within the IJI family is ADVENT. Acquired by IJI in 1982, and now 25 years old, it was a part of the explosion in American loudspeaker development and technology centered in New England during the mid 1960's. By the 1970's one out of every six loudspeakers sold in the United States was an Advent.

Starting with the first model, called simply The Advent Loudspeaker, the line expanded to include two models, and the Smaller Advent joined its original parent, now dubbed the Large Advent. These products rapidly became the loudspeaker of choice for an entire generation of Americans, providing them with "Sound as it was meant to be heard."

After the acquisition, IJI relaunched the company with the "Baby" and over the last 7 years has expanded the family to include a range of products to serve the needs of audiophiles, including the special Limited Edition 25th Anniversary version of the original Large Advent, which graced more than a half million homes. Most recently, the company developed a full line of mobile audio products to bring the unique Advent sound to the automotive environment. These products continue the quarter century of design innovation that is the company's heritage by this year introducing Advent Mobile for the automotive environment, the first ICT (Inductive Coupling Technology) drive system in the U.S. where the high frequency reproduction element is inductively coupled to the woofer's voice coil, providing point source imaging in a very compact, low profile unit. The result is a speaker that is reliable and fits 90% of all car installations.

Today Advent continues to provide a whole new generation of users with excellent price to performance ratios as *Fortune* magazine noted when it rated Advent one of the 100 Best made American products.

In addition, a special award was presented to the now classic Jensen Triaxial 6x9 automotive loudspeaker system, first introduced in 1976, and still the standard after more than a decade and a half.

The future for IJI is focused on continuing the 80-year tradition of innovation. This effort is centered around a team of world-class acoustical, electrical, and mechanical engineers. The sole goal of this group is to move ahead by introducing new home, car, and lifestyle loudspeaker and electronics products.

The proud heritage of American innovation embodied in Advent is also found throughout International Jensen Inc. At the 1992 Summer Consumer Electronics Show, IJI received a record 6 Design and Innovation Awards. Advent home and car speakers, the unique Jensen BBE amplifier, Acoustic Research, and NHT offerings all earned awards.

☆ ☆ ☆

Audio

2

YAMAHA CDC-835 CD CHANGER

Manufacturer's Specifications
Frequency Response: 2 Hz to 20 kHz, ±0.3 dB.
THD + N: 0.0018% at 1 kHz.
S/N: 115 dB.
Dynamic Range: 100 dB.
Output Level: Line, 2.0 V; headphone, 200 mV.
Output Impedance: Line, 730 ohms; headphone, 150 ohms.

Power Requirements: 120 V a.c., 60 Hz, 20 watts.
Dimensions: 17⅛ in. W × 4¼ in. H × 15¼ in. D (43.5 cm × 10.8 cm × 38.7 cm).
Weight: 14 lbs., 5 oz. (6.5 kg).
Price: $549
Company Address: 6660 Orangethorpe Ave., Buena Park, Cal. 90620.
For literature, circle No. 91

A pair of five-disc CD changers recently introduced by Yamaha, the CDC-735 and CDC-835, incorporate a number of worthwhile and uncommon touches. The Model CDC-835, reviewed here, is the more expensive and feature-laden of the pair.

An unusual convenience is Yamaha's PlayXchange, which isolates the disc being played from the changer drawer. This eliminates vibration and permits up to four of the discs in the carousel tray to be removed and replaced while the fifth disc plays.

The D/A converter is Yamaha's S-Bit Plus, a single-bit system that uses Independent-Pulse Density Modulation (I-PDM) to generate separate, more accurate pulses for each channel. According to Yamaha's engineers, this converter improves low-level linearity, low-level signal purity, and high-frequency response clarity. The analog sections following the D/A operate in Class A, according to Yamaha.

The CDC-835 uses memory extensively. The player can store the table of contents (TOC) for all five discs at once instead of reading each disc's TOC as the disc is accessed; this

THD + N stays low even at maximum recorded level, indicating that the analog output stages have been properly designed.

speeds track selection, especially for programs that span several discs. A tape editing feature also functions with all five discs, so that a "favorite hits" tape can be easily assembled to fit the two sides of a cassette. A Program File memory can store program selections and order for up to 100 discs with up to 10 programmed selections from each. The same memory can store your chosen settings for the built-in digital equalizer. This equalizer, another unusual feature of the CDC-835, provides five settings ("Rock," "Vocal," "Jazz," "Classic," and "Flat"). Memorized settings for any disc will be activated whenever that disc is played.

Another unusual feature, Relay Play, permits two Yamaha changers to be connected together for uninterrupted 10-disc play. Other features include remotely controllable digital level control for headphone and line outputs, two-mode random play, four-mode repeat play, direct track access, five-disc direct access, music search and skip search, four-mode time display, three-mode display illumination, and a front-panel headphone jack. The CDC-835 is supplied with a 47-key remote control and is compatible with other Yamaha RS system components.

Control Layout

Only the most often used controls are normally visible on the front panel: "Power," "PlayXchange," "Open/Close," "Play/Pause," "Stop," "Disc Skip," five buttons for selecting discs or selecting and activating digital equalizer settings, the "Output Level" rocker, and the headphone jack. Less often used controls are accessed by opening a hide-away control panel that contains the required numeric buttons as well as other buttons used in programming. "Random" play, "Search," track "Skip," and "Repeat" buttons, as well as "Time" mode and display-illumination mode buttons, are also found on this subpanel.

The rear panel of the CDC-835 is equipped with a coaxial digital output jack, gold-plated analog line output jacks, and jacks and connectors used with Relay Play to allow two Yamaha players to work together. The remote control duplicates just about all of the front panel's controls. It also has an "Index" access button which enables you to start play from a given index point within a track (if index points are encoded on the disc) and permits you to move to any other desired index point. This is not done the usual way, which is by pressing the "Index" button each time you want to move to a higher index number. (In fact, pressing that button a second time will take you out of index mode.) Instead, you key in the index point you want by using the numeric buttons on the subpanel or the remote.

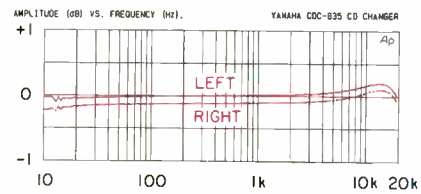


Fig. 1—Frequency response.

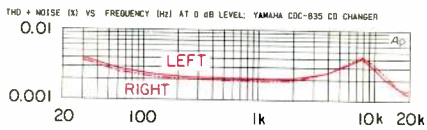


Fig. 2—THD + N vs. frequency as percent of maximum level.

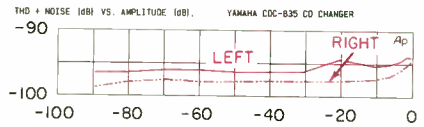


Fig. 3—THD + N vs. signal level.

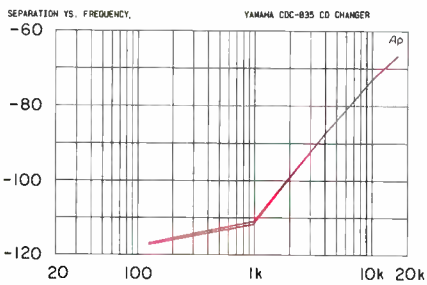


Fig. 4—Separation vs. frequency.

Measurements

Figure 1 shows the frequency response of the CDC-835. The published specification of ±0.3 dB to 20 kHz is easily met, but there is a difference in output levels between left and right channels. This difference amounts to approximately 0.15 dB.

Figure 2 is a plot of THD + N versus frequency for signals at maximum recorded level. My left-channel reading of 0.002% at 1 kHz (slightly lower in the right channel) does not quite meet the rated 0.0018%, but the difference is hardly worth worrying about. I was impressed by the fact that THD + N does not rise significantly at the higher treble frequencies, as is the case with many CD players I have tested.

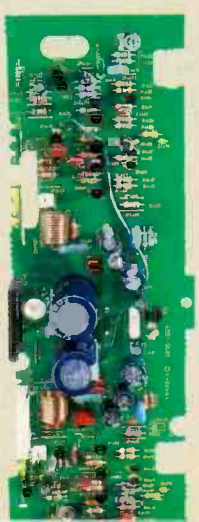
Figure 3 shows how THD + N varied with signal amplitude. Here, the right channel exhibits a slightly lower level of THD + N than does the left channel, but even the left-channel reading is some 96.5 dB below maximum recorded level over most of the range of amplitudes measured. This corresponds to a distortion percentage of 0.0015%. At maximum recorded level, the reading is about −95.0 dB, or 0.0018%, yielding close correlation with the result obtained in Fig. 2. The fact that this level of THD + N is maintained even at 0-dB recorded level indicates that the analog output stages are not reaching overload levels and are properly designed to handle the amplitudes involved.

To see how much of the THD + N figure was THD alone, I ran a spectrum analysis (not shown). It revealed mainly second and fourth harmonics, at around −100 and −108 dB, respectively. The spectral information allowed me to calculate a pure THD figure of 0.00108%. Additional spectrum analy-

THERE ARE 62 AUDIO/VIDEO RECEIVERS ON THE MARKET.* ONE OF THEM IS BUILT FOR REAL.

Real movie theater sound begins with a stack of powerful, articulate amplifiers. Harman Kardon's audio/video receiver starts with five discrete amplifiers, meticulously engineered into one precision-crafted

chassis. ■ Most important, the five amplifiers inside the AVR30 are pure Harman Kardon in design and build. Only superior-grade discrete parts are used in the main audio signal path – right down to the output terminals. The AVR30 is the ultimate expression of Harman Kardon's uncompromised 40-year commitment to performance over showmanship; to higher quality throughout instead of the all too familiar "bells and whistles." ■ Although not its intended purpose, the AVR30's 40 amp high-current rating provides capacity enough for a real theater sound system. A state-of-the-art digital sound and Dolby® Pro-Logic processing system controls and manages all this power. It's a system comparable to many separate surround units, each of which might cost as much as an entire ordinary A/V receiver. We suspect that this unique integration of high-end amplification and surround processing will make it difficult to settle for old standards of value. The AVR30 sets a new and important one. ■ Too many audio/video receivers are more difficult to use than full-size cinema sound systems. Some need 70 page owners' manuals. You can operate the AVR30 in any mode – right out of the box – without even opening the owners' guide. Still, reviewing that guide permits you to fully appreciate this receiver's remarkable repertoire. ■ To say that the AVR30 is unlike any other audio/video receiver is an understatement. Despite its unprecedented performance and engineering, some people will still be more impressed by the gadgetry and front-panel excess of other designs. But Harman Kardon didn't build its home theater receiver for a typical audience. We built it for you. In every sense, we built this one for real.



harman/kardon
THE AMERICAN REVOLUTION IN AUDIO AND VIDEO

H A Harman International Company

© 1992 Harman Kardon • 800-422-8027

Enter No. 20 on Reader Service Card

* *Audio* magazine's 35th Annual Equipment Directory; receivers with both surround circuitry and video inputs.

Measured performance of the Yamaha CDC-835 is equal to the better single-play units at a comparable or even higher price.

sis allowed me to compare quantization distortion for low-level dithered and undithered signals. For the dithered signal, only random noise was visible, but overall residual noise level was somewhat higher (peaking at −120 dB compared with peaks of −125 dB for the undithered signals). This is the worthwhile trade-off that dithering provides for low-level signal reproduction.

Although channel separation exceeds 110 dB at 1 kHz (Fig. 4), it decreases substantially at higher frequencies, measuring only about 66.5 dB at 16 kHz. From a practical point of view, this level of high-frequency separation is more than adequate, but I wonder why such a decrease occurred. Perhaps it was due to component and wiring layout, with the culprit being capacitive coupling between channels in the final analog stages or output cables.

Overall A-weighted S/N for the CDC-835 measured 114.74 dB for the left channel and 114.85 dB for the right channel. An unweighted spectrum analysis (not shown) of residual noise revealed very minor power-line hum peaks that reached no higher than a totally inaudible −119 dB at 120 Hz. Mostly, though, the noise was below about −130 dB up to 2 kHz, rising gently to about −115 dB at 20 kHz.

Low-level linearity of this changer is as good as any I have measured for even the costliest single-disc players. Yamaha's one-bit system of D/A conversion results in a deviation of less than 0.64 dB at −90 dB for undithered signals, as shown in Fig. 5. The same holds true for low-level linearity using dithered signals, also shown in Fig. 5. Here I noted even less deviation, all the way down to −100 dB. Both channels exhibit essentially the same minimal deviation from perfect linearity in these tests.

Further evidence of better than usual low-level linearity can be seen in the fade-to-noise test (Fig. 6), in which a signal gradually decreases in amplitude from −60 to −120 dB until it fades into the residual noise. Dithered signals were used, and once again, the deviation from perfect linearity is minimal. This test also serves to define EIA dynamic range, which, for this Yamaha changer, was approximately

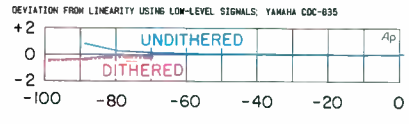


Fig. 5—Deviation from perfect linearity.

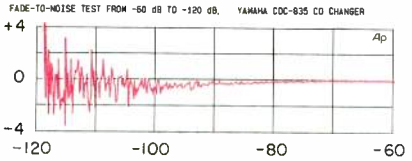


Fig. 6—Fade-to-noise test.

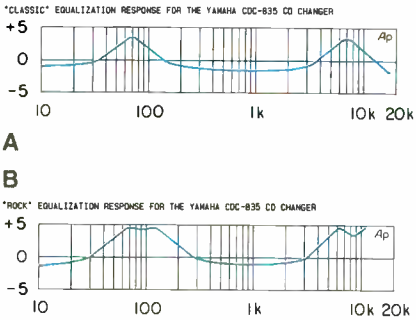


Fig. 7—Digital equalizer response in "Classic" setting (A) and "Rock" setting (B).

110 dB. Using the somewhat different EIAJ method of calculating dynamic range, I came up with a figure of 99.0 dB for the left channel and −100.2 dB for the right.

A remarkable aspect of the CDC-835 was its internal clock accuracy, which was as close to perfect as I could measure within the limits of my test equipment. Deviation from perfect timing accuracy was a negligible 0.003%.

Use and Listening Tests

The CDC-835 was extremely resistant to external vibration. With a disc playing, I pounded on both the top and the sides of the changer's cabinet, and at no time did I detect any evidence of mistracking or muting. On the other hand, using my Pierre Verany "defects" disc, I found that the changer was able to correct for missing data extending to 0.77 mm but that mistracking occurred when the length of missing data increased to 1.0 mm. Although this degree of error correction exceeds the minimum required by the CD standard, it is not up to the error-correction capabilities of some CD players I have tested.

With the CDC-835's digital equalizer at its "Flat" setting, I felt that the sound was somewhat deficient in brightness and mid-bass. However, when I switched to the "Classic" equalization mode, which adds mild boosts in both those areas (Fig. 7A), the balance seemed to improve. I noticed this on a recent release of Rachmaninoff's Symphony No. 2 (Telarc CD-80312) and a modern work, Paul Creston's Symphony No. 3 (Delos DE 3114). When listening to pop and rock, I found the music more dynamic and more emotionally exciting when I used the digital equalizer's "Rock" setting (Fig. 7B). As I might have expected, the "Vocal" setting (not shown) introduced a mid-range boost that tended to bring the singer's voice forward.

The CDC-835's convenience features are outstanding, and anyone who likes the idea of owning a multiple-disc CD player with extensive programmability would do well to consider this unit. I would rank its measured performance equal to the better single-play units selling for a comparable or even higher price. *Leonard Feldman*

Pioneer

Rule #23

All drivers are not created equal.

Rules

The speaker on the left is designed with Injection-Molded Polypropylene (IMPP™) cone technology. The speaker on the right is paper. The speaker on the left offers cleaner, richer bass. The one on the right doesn't. The one on the left can handle extraordinary amounts of power without distortion. The one on the right can't. The one on the left is from a full line of new high-performance component speakers from Pioneer.® The one on the right isn't. To find out more, call 1-800-421-1604, ext. 441

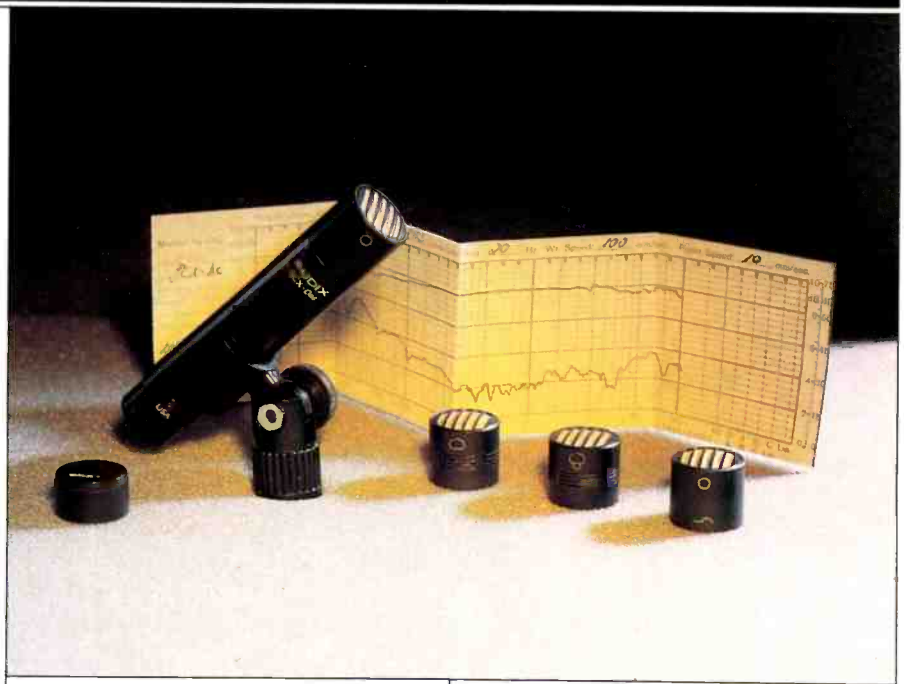
PIONEER
The Art of Entertainment

© 1992 Pioneer Electronics (USA) Inc., Long Beach, CA.

Enter No. 34 on Reader Service Card

3

AUDIX SCX-ONE STUDIO MIKE SYSTEM



Manufacturer's Specifications

Type: Condenser with interchangeable capsules.

Capsules: Omnidirectional (SCX-o), omnidirectional with added presence (SCX-op), cardioid (SCX-c), and hypercardioid (SCX-hc).

Frequency Response: SCX-o and SCX-op, 20 Hz to 20 kHz; SCX-c and SCX-hc, 40 Hz to 20 kHz.

Sensitivity (re: 1 V/μbar): SCX-o, −60 dB; SCX-op, −58 dB; SCX-c, −56 dB; SCX-hc, −56 dB.

Impedance: 200 ohms.

Equivalent Noise Level: 13 dBA re: 20 micropascals (μPa).

Maximum Sound Pressure Level (re: 20 μPa): SCX-o and SCX-op, 132 dB; SCX-c and SCX-hc, 130 dB; all figures 10 dB higher with optional 10-dB attenuator.

Power Source: Phantom, 9 to 52 V d.c.

Connections: Integral three-pin XLR male plug at base of preamp housing.

Dimensions: 4⅛ in. L × 13/16 in. dia. (10.5 cm × 2.1 cm).

Weight: 4 oz. (0.11 kg).

Prices: Preamp section, $500; capsules, $399 each; 10-dB pad, $100; shock mount, $199.95; windscreen and pop filter, $25.

Company Address: 19439 S.W. 90th Ct., Tualatin, Ore. 97062.

For literature, circle No. 92

The new SCX-One studio condenser microphone from Audix is distinctively short, which the manufacturer attributes to the use of surface-mount technology in the electronics. Audix has their own surface-mount facilities as well as proprietary coil-winding equipment. (Their consumer microphones, however, are imported from Japan.) I reviewed the Audix UD-200S cardioid dynamic microphone for the June 1987 issue and found it had good performance and appeared durable. Since 1988, I have been using Audix OM-1 dynamic mikes in my church auditorium; these microphones have survived relatively rough usage and still sound and look good.

The SCX-One and its interchangeable capsules have precision-machined housings and appear to be of high quality. The SCX-One is the first studio condenser offered by Audix and was so new that an instruction manual with detailed data on the unit was not available when I wrote this. The catalog sheet contained some errors and typos (which I've confirmed with the manufacturer); the specs listed at the beginning of this review are correct. The frequency response curves in the catalog sheet were too small to be of much use, but individually drawn strip charts were included with the microphone system.

In addition to the four capsules, a 10-dB attenuator was furnished, which fits in between the capsule and the preamp. This element is needed only when working with high sound levels, and it increases the maximum SPL from 130 or 132 dB to 140 or 142 dB. The windscreen, pop screen, and shock mount were not furnished. No cable was furnished, and I found that not all of the cables I had on hand with XLR-type three-pin connectors would fit the mike. This was because the microphone's precision machining did not allow for the size variation among different brands of connectors.

Measurements

Audix indicated that it would be best to use a source of phantom power with minimum series resistance so as to maintain the voltage at the mike close to 48 V d.c. For my tests, I used five 9-V batteries connected to the center tap of a high-quality 200:200-ohm isolation transformer. Since I used no resistor between the batteries and the center tap, and since fresh "9-V" batteries are actually a fraction of a volt over that value, I obtained approximately 47 V at the microphone. This arrangement had the advantage of isolating d.c. from my impedance-measuring circuit, which allowed me to ground one side of the mike output for the impedance test.

"There is an inherent quality of ruggedness, reliability, and sonic integrity that has always impressed me favorably when I have had the opportunity to test and listen to Soundcraftsmen products."

Leonard Feldman, **Audio**

SOUNDCRAFTSMEN UTILIZES ITS LEGENDARY CRAFTSMANSHIP AND RELIABILITY TO PRODUCE THE FINEST LINE OF AUDIO ELECTRONICS AVAILABLE.

MADE IN THE USA AND CRAFTED TO EXACTING TOLERANCES, SOUNDCRAFTSMEN ELECTRONICS ARE AMERICAN INGENUITY AT ITS HIGHEST LEVEL.

MODELS SHOWN ARE THE A400, P100, AND T100

MTX SOUNDCRAFTSMEN
Technical Assistance: 2200 S Ritchey, Santa Ana, Ca 92705,
Phone 714-556-6191
Sales Support: 555 W Lamm Rd, Freeport, IL 61032,
Phone 815-232-2000
© MTX, 1992
Quote reprinted with permission from Hachette Magazine, 1989
Enter No. 28 on Reader Service Card

The Audix SCX-One mike system has both excellent frequency response and uniform directional characteristics.

Normally, I present an impedance curve, but in this case, the magnitude varied so much with frequency that the isolation transformer introduced errors. After making corrections for the series resistance of the transformer, I estimated the impedance to be about 26 ohms at 1 kHz and above. Below 1 kHz, the impedance increased like a capacitor's, reaching about 1,100 ohms at 20 Hz. In order to avoid bass roll-off, the minimum load resistance on the mike should be about 3 kilohms.

I tested the SCX-One and its capsules using a 2-inch spherical laboratory sound source at distances from 6 to 24 inches. The first capsule tested was the omnidirectional SCX-o. Figure 1 shows that the response is smooth and flat, except that the peak at 8 kHz is about 2.5 dB higher than the response on the factory strip chart. This is an acceptable variation; in my opinion, a microphone of this size should have a peak of this magnitude in the frontal response so that diffraction does not cause the response to have excessive high-frequency roll-off. After translation to a 1-μbar (0.1-Pa) reference, the measured sensitivity was 6 dB higher than was shown on the factory test chart and 5 dB higher than shown on the spec sheet. Table I shows a comparison of three sets of sensitivity data for this and the other three capsules.

Normally, my data agrees with the manufacturer's within 1 or 2 dB. In this case, since my test values show less of a spread than Audix's factory test results do, there appears to be a problem in their testing but not in the microphones themselves. Despite what Audix's test charts show, the spread of values in the specifications and in my test results is acceptable. This is important to the user, because microphones with closely matched output levels are desirable for stereo recording and because uniform sensitivity implies uniformity in manufacture.

The frequency response with the SCX-op (omni with presence) capsule is shown in Fig. 2. If the 0° curve were smoothed a bit between 5 and 10 kHz, it would closely match the test curve supplied by the factory. Note that the 90° curve, compared to Fig. 1, indicates the response peaking in this capsule is about 7 dB at 7 kHz. This

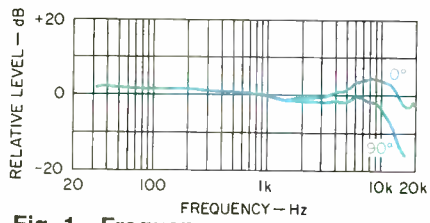


Fig. 1—Frequency response with SCX-o omni capsule (0 dB is −35 dBV/Pa).

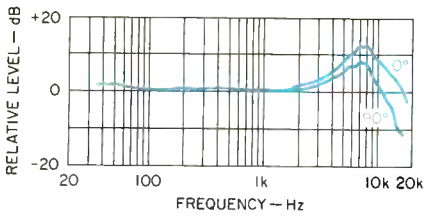


Fig. 2—Frequency response with SCX-op omni capsule with presence (0 dB is −38 dBV/Pa).

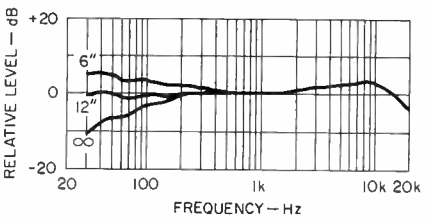


Fig. 3—Frequency response vs. source distance with SCX-c cardioid capsule (0 dB is −39 dBV/Pa).

Table I—Comparison of sensitivity figures at 1 kHz, in dB re: 1 V/μbar.

Capsule	Spec	Factory Test Chart	Reviewer Data
SCX-o	−60 dB	−61 dB	−55 dB
SCX-op	−58 dB	−63 dB	−58 dB
SCX-c	−56 dB	−56 dB	−59 dB
SCX-hc	−56 dB	−60 dB	−57 dB

degree of response equalization is comparable to popular vocal microphones, so the SCX-op capsule should be appropriate for vocal music and speech. Both omni capsules show linear bass response and will probably pick up subterranean bass. Omnis are the first choice for vocals, as they have no proximity effect (bass boost when used at close distances) and are less responsive to breath blast or "pop."

The response of the SCX-c cardioid capsule (Fig. 3) shows a slight rise towards 10 kHz, which is acceptable and perhaps desirable for many uses. The roll-off above 10 kHz is a bit too steep. The bass response is linear for sources 12 inches away but rolls off for point sources at an "infinite" distance (greater than 4 feet). Since the latter response is calculated for a free field, it is difficult to be certain if it is correct for sound pickup in rooms. Figure 4 indicates good cardioid directional responses for the SCX-c capsule. The individual factory test curve agreed fairly well with the above.

The data for the SCX-hc capsule (Fig. 5) indicates that exceptionally linear frequency response will probably be obtained for sources more than a few feet distant. Figure 6 shows good hypercardioid directional responses. Note that the "null" is at 135°, not 180° as in the cardioid. The factory test curves showed more linear response for the hypercardioid than for the other capsules, and my curves are in reasonable agreement with them.

To measure the noise of the microphone, I put it in a sound-attenuating box. The cardioid capsule was used for this test, as it was likely to pick up the least environmental noise at very low frequencies, and the mike was powered by a battery supply to avoid hum. The SCX-One has nearly 20 dB greater sensitivity than a dynamic mike, so noise from my instrument amplifier was not a factor.

The third-octave-band noise spectrum of the SCX-c (Fig. 7) decreases with frequency at a more or less linear rate. The A-weighted equivalent sound pressure level of the noise was calculated to be 25 dB. This was much higher than the manufacturer's rating of 13 dBA, so I tested a second sample and found it to have almost exactly the same noise level. Then, I put a Neu-

aragon amplifiers

the beast within the beauty

Each 4004 MKII contains two separate monoblock amplifiers enclosed in a single chassis. This beast produces 200 watts into 8 ohms, 400 watts into 4 ohms from each monoblock, and continues increasing power into lower impedances. The new 4004 MKII has advanced discrete high bias class A gain stages with auto bias control. From the epoxy sealed military grade resistors to the beta matched output transistors, the quality of the components in an Aragon are found only in the world's costliest electronics.

All this is then housed in a timeless sculpture of steel and aluminum, whose beauty has been exhibited in some of the nation's most prestigious museums. But the beauty is not just skin deep, the Aragons are there to exhibit the subtle musical differences between Stradavari, Guarneri and Amati violins.

Experience the beast within the beauty. Made in America and internationally acclaimed as the finest quality and value attainable.

MONDIAL DESIGNS LIMITED

2 Elm Street, Ardsley, New York 10502 • 914-693-8008

Enter No. 27 on Reader Service Card

Exceptional as my AKG mike is, I was pleased that I could hear no difference between tapes made with it and with the Audix.

mann KM-100 with cardioid capsule and the SCX into the test box. Playing a radio in the test room at low level and using the calibrated attenuator in my microphone amplifier, I determined that the equivalent noise SPL of the Audix was about 10 dB higher than that of the Neumann, a far more expensive mike with a rated noise level of 16 dBA. Therefore, I concluded that my measured noise level for the Audix mike was correct. However, noise from the SCX was not a problem during the listening tests.

The clipping level of the SCX-o omni was measured as 127 dB peak SPL, significantly lower than the rated 132 dB. Of course, inserting the 10-dB attenuator will increase the overload level to 137 dB.

Use and Listening Tests

After my tests, I obtained a second SCX microphone set, plus a power supply, so I'd have a stereo pair for recording. The power supply was made by ACO Pacific; Audix does not make or sell power supplies of its own. This switching supply used one 9-V battery to furnish 48 V d.c. to a pair of microphones; under load, however, the unit delivered only 29 V d.c. at the mikes, much less than my homemade battery supply did. The battery furnished with the supply died on the bench and was replaced with a fresh alkaline. Testing indicated that the audio outputs of the supply were balanced, with the midpoint grounded. This showed that the mike had an electronically balanced, transformerless circuit. I therefore derived the unbalanced signals for the recorder from one audio line only (pins 2 and 1 of the XLR-type connectors). This avoided shorting the other line (pin 3) to ground (pin 1), which might possibly damage chips in the power supply.

The recorder used was a Sony TCD-D3 DAT Walkman, so the entire recording setup needed no a.c. power. Because of the SCX-One's high output, I had to switch in the Sony's 20-dB mike input attenuator. This worked well until one channel of the Sony's mike preamp failed, probably due to a switch problem. The line inputs were still good, so the mikes were connected to these inputs with gain at maximum. Remarkably, the SCX mikes were able to drive the Sony to its 0-dB level during the taping.

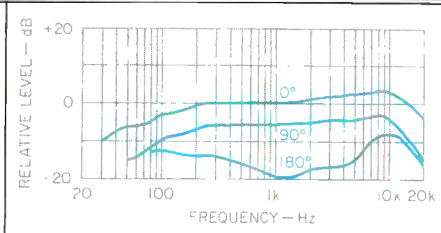


Fig. 4—Frequency response vs. angle, with SCX-c cardioid capsule.

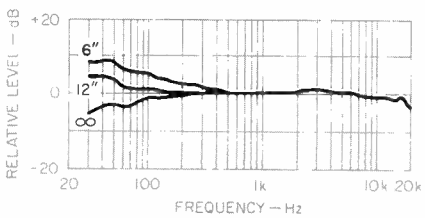


Fig. 5—Axial frequency response vs. source distance with SCX-hc hypercardioid capsule (0 dB is −37 dBV/Pa).

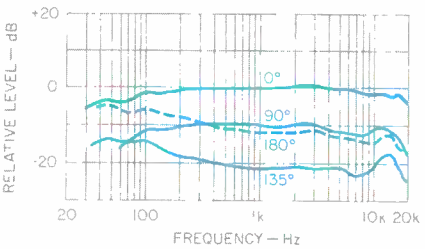


Fig. 6—Frequency response vs. angle with SCX-hc hypercardioid capsule.

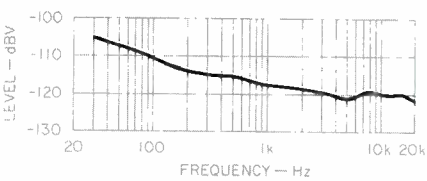


Fig. 7—Third-octave noise spectrum with SCX-c capsule.

My test recordings were made at a concert at the United Methodist Church in Haddonfield, N.J., a large sanctuary with 900 seats. I mounted the SCX-Ones on a 14-foot stand, used the hypercardioid capsules, and set up the mikes as a coincident pair with a 90° included angle. The Audix mikes were positioned about 2 feet below the permanently flown AKG C-422 stereo microphone. The latter was set as a coincident pair of figure-8 microphones at 90° (a Blumlein array). The AKG was connected via a Soundcraft 8 x 4 mixing console to a Sony DTC-75ES DAT recorder. The concert included a young persons' choir with soloists, handbells, organ, and piano. Nearly two hours of tape had been used by intermission. The DAT Walkman's battery, which is rated at two hours per charge, was flat by this time, and the battery in the microphone power supply was also weak.

I was unable to perform a strict A/B comparison between the AKG and Audix mikes, as the tape made with the AKG also included some sound from soloists' microphones at times, and I had to keep switching the AKG and Audix tapes in and out of the one DAT recorder I had available. Nonetheless, I am pleased that I heard no difference between the tapes, particularly since I consider the AKG to be an exceptional mike.

After the concert, I acquired a Toshiba DX-900 VCR with digital and VHS Hi-Fi sound. Because this unit can record both PCM and Hi-Fi sound simultaneously, with flat response from 20 Hz to 20 kHz on each, it is a valuable tool in comparing two pairs of microphones or in making surround sound recordings.

I used this VCR to make a backup master tape during an organ recording session in the Haddonfield church with Music Director and organist John Wilson. The large Austin pipe organ was recently rebuilt, and some electronic 32-foot stops had been added. I placed a pair of SCX-o omni units in the first row of the rear balcony, which is about 130 feet from the organ pipes. The mikes were spaced 7 inches apart, facing the organ, and powered by the audio console. The audio from

The Audix is comparable to more expensive studio mikes and is an ideal choice for live concert recordings.

the AKG mike was recorded by the Sony DAT Walkman and by the PCM tracks on the Toshiba VCR. The audio from the SCX mikes was recorded on the Hi-Fi tracks of the VCR as surround channels. The recordings were remarkably similar, save for an excess of very low bass on the SCX tracks, caused by room acoustics. I learned from this experiment that these omni mikes are capable of subterranean bass, as I had expected. I was not surprised that a good stereo recording could be made with slightly spaced omnidirectional microphones, as I had used this technique in reviewing the Brüel & Kjaer Studio Microphones (November 1984 issue).

After I obtained these good results, my colleague Carlton Read used the Audix omnis in recording a string quartet concert at the Presbyterian Church in Haddonfield. The acoustics of this large, 1,000-seat sanctuary had been recently improved. The mikes were spaced about 7 inches apart and were above, in front of, and facing the musicians. The recorder was a battery-operated Marantz cassette unit with Dolby B NR. The recording was technically about the best I've heard from this church. Background noise was not audible, and the stereo perspective was amazingly good. The instruments sounded very live, almost like a DAT recording.

Conclusions

The SCX-One microphone system has excellent frequency response and uniform directional characteristics, comparable to more expensive studio microphones. It is an ideal choice for making on-location concert recordings using a DAT or a PCM/Hi-Fi VCR. The noise levels may be too high for recording very quiet sources in quiet places but will probably not be noticed in typical concert recording venues.

I hope that by the time you read this review, Audix will have ironed out quality control in factory testing and provided a manual with properly written specifications. I also hope Audix can reduce the noise level and increase the peak SPL, but this may not be possible without increasing the cost. Still, these are small items, and overall this mike offers good performance at a reasonable price. *Jon R. Sank*

If you'd like to hear more about our colorful founder, drop us a line.

THIS OLD SAFE didn't fall on Jack Daniel, but it may as well have.

One morning in 1905, the safe wouldn't cooperate with its owner (he thought he knew the combination well). Mr. Jack lost his temper and kicked it hard enough to break his big toe. Infection took a lot of people in those days, and a few years later, it took Jack Newton Daniel. Faithful to his ways, we've never altered the whiskey that bears his name. Nor, we'll admit, ever found reason to mess with that old safe.

SMOOTH SIPPIN' TENNESSEE WHISKEY

Tennessee Whiskey • 40-43% alcohol by volume (80-86 proof) • Distilled and Bottled by Jack Daniel Distillery, Lem Motlow, Proprietor, Route 1, Lynchburg (Pop. 361), Tennessee 37352

Placed in the National Register of Historic Places by the United States Government.

4

JBL L7 SPEAKER

Manufacturer's Specifications

System Type: Four-way, tower-style vented box.

Drivers: 12-in. cone woofer, 8-in. cone mid-bass, 5-in. cone mid-range, and 1-in. titanium-dome tweeter.

Frequency Response: 30 Hz to 27 kHz, ±6 dB.

Sensitivity: 91 dB at 1 meter with 1 watt applied.

Crossover Frequencies: 180 Hz, 900 Hz, and 4 kHz.

Nominal Impedance: 6 ohms.

Recommended Amplifier Power: 35 to 450 watts per channel.

Dimensions: 45 15/16 in. H × 9⅝ in. W × 17⅝ in. D (116.7 cm × 24.4 cm × 44.8 cm), excluding base; base mounts flush with front and rear of cabinet, increases height by 1 in., and extends 2½ in. on either side.

Weight: 75 lbs. (34.1 kg) each.

Price: $975 each ($1,950 per pair), including base; available only in black ash.

Company Address: 240 Crossways Park West, Woodbury, N.Y. 11797; (800) 336-4525.

For literature, circle No. 93

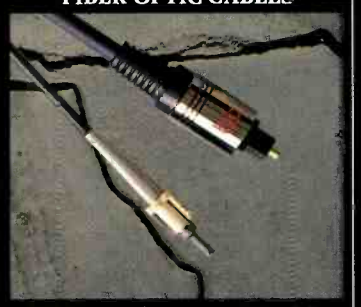
JBL's new L series consists of four models—the L1, L3, L5, and L7—which range from a small two-way 6-inch system to the L7 reviewed here, a floor-standing four-way 12-inch system. The L series is just below JBL's high-end XPL series of home loudspeakers.

The L designation in JBL's consumer line has long held an honorable position, going back to the early 1970s. In my JBL literature file (which is quite extensive, because I worked for the company's pro division for seven years beginning in the late '70s), I counted no fewer than 28 models with the venerable L prefix, running from the L15, to the very popular L100 "Century," and up to the mid/high-range horn-loaded L300.

The L7 is a true four-way, all direct-radiator loudspeaker and is only sold in mirror-image pairs. The bottom 2½ octaves are handled by a beefy long-throw 12-inch woofer mounted on the side of the cabinet and operating in a rear-ported box. The side-mounted woofer permits a relatively narrow cabinet just slightly wider than the 8-inch mid-bass driver. The mid-bass, mid-range, and tweeter drivers are in a vertical array on the top half of the cabinet, on a panel angled back about 9°. The cabinet's slanted top half minimizes internal standing waves because of the non-rectangular configu-

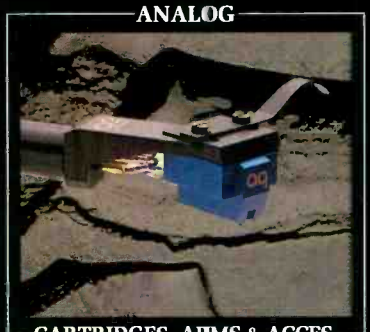
Push the envelope!

FIBER OPTIC CABLES



TOSLINK & ST STANDARD

ANALOG



CARTRIDGES, ARMS & ACCES.

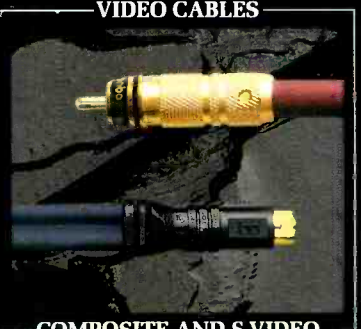
INTERCONNECT CABLES

SEVEN MODELS

In the world of high technology the term "envelope" is used to describe the performance limitations of the equipment. In the world of music and wonder, a diverse group of technically competent products from AudioQuest lets you expand the performance envelope of your audio or video system.

The common thread running through all the AQ products is that they offer the most improvement for the least money. No system is so poor or so perfect that using AudioQuest products won't make a wonderful improvement. The only proof is in the products themselves – please put us to the ultimate test – listen and look for yourself.

VIDEO CABLES



COMPOSITE AND S-VIDEO

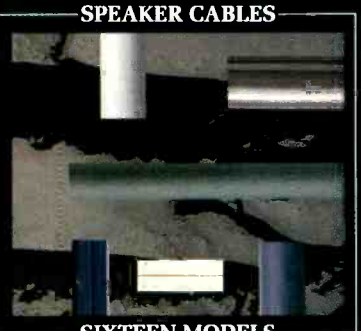
ULTRACONNECT

SORBOTHANE FEET

LP'S AND CD'S

GREAT MUSIC-GREAT SOUND

SPEAKER CABLES



SIXTEEN MODELS

RF STOPPERS

AC POWER CABLES

audioquest®

P.O. Box 3060 San Clemente, CA 92674 USA TEL (714) 498-2770 FAX (714) 498-5112
Distributed in Canada by Audio Products International, 3641 McNicoll Ave., Scarborough, Ontario M1X 1G5 Tel: 416-321-1800

Titanium's high ratio of stiffness to mass raises the resonance of the L7's tweeter dome far above the audible range.

ration. JBL states that the L7's narrow cabinet and vertical driver array contribute to uniform and wide sound dispersion, which results in improved stereo imaging.

The cabinet is quite solidly constructed from a combination of both high-density and medium-density fiberboards, and it is well supported by side-to-side and front-to-back braces. The extensive bracing strengthens the side walls and reduces vibration. Lockmiter corners increase the rigidity of the cabinet.

Subchambers are used for both mid-bass and midrange drivers. All absorption materials are fiberglass, and connections are made with 16-gauge stranded wire. The rear-mounted plastic port is 4 inches in diameter and 8 inches long. A grille made of black cloth stretched over a curved plastic frame occupies the upper third of the cabinet's front. A recessed cloth-covered grille also covers the side-mounted woofer. The L7s are only available in a finish of black ash wood. A supplied plastic base increases the width of the speaker by 5 inches for increased lateral stability. No means are provided for attachment of spikes.

The system contains a new family of cast-frame drivers designed specifically for assembly on JBL's automated manufacturing line. The low-frequency drivers utilize JBL's Symmetrical Field Geometry magnetic design to minimize low-frequency distortion. The woofer and mid-bass drivers each have vented pole-pieces; holes in the rear of their magnet assemblies circulate air for increased heat dissipation. The tweeter contains a dome and surround made from pure titanium. Titanium has a very high stiffness-to-mass ratio, which raises the dome's resonance far above the audible range, but is extremely difficult to work with. JBL forms the dome with ribs and uses a proprietary diamond pattern for the surround. Titanium's high strength and rigidity are used to great advantage in JBL's tweeters.

The crossover of the L7 is constructed on two separate p.c. boards, one devoted to the woofer and the other to the mid-bass, midrange and tweeter. The double-banana-jack input terminals are connected by straps which can be removed for bi-wire operation, permitting the woofer to be driven separately from the rest of the system.

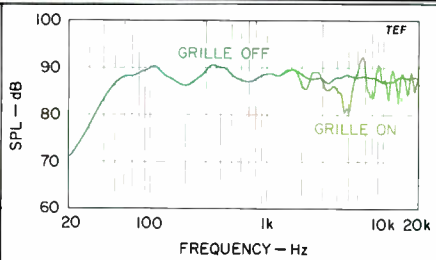


Fig. 1—Anechoic frequency response.

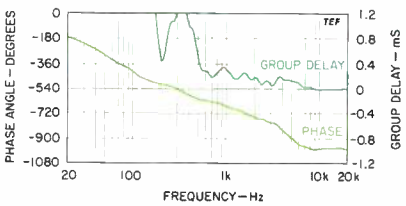


Fig. 2—Phase response and group delay.

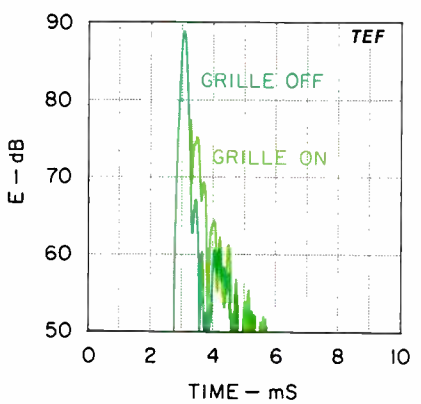


Fig. 3—Energy/time response.

The crossover is made up of 16 parts (not counting paralleled units): Four inductors, six capacitors, and six resistors. The crossover topology consists of a second-order low-pass section on the woofer, a first-order high-pass and a second-order low-pass section (forming a bandpass filter) on the mid-bass and midrange, and a second-order high-pass on the tweeter. All parts used in the crossover are of high quality, and all nonpolarized electrolytic capacitors are bypassed with low-value polypropylene units. The iron-core inductors in the woofer and mid-bass crossover legs are specified to have saturation currents higher than 4 amperes. JBL pays a lot of attention to the details, judging from the execution of the crossover, even to areas that consumers wouldn't normally see.

According to JBL's white paper describing the L series, the following performance characteristics were given high priority: Smooth on-axis response, smooth power response (i.e., smooth on- and off-axis response), accurate stereophonic imaging, and low distortion. The on-axis response should be smooth, because it defines the spectral balance of the sound that first arrives at the listener and so is of greatest subjective importance in judging timbre. Smooth power response is important because the room's sound and associated reverberation depend heavily on the off-axis response of the speaker and its power response. The total sound of a speaker depends not only on the direct sound reaching the listener but also on the later reflected sound. Assuming a properly designed listening room, a speaker with smooth on-axis and off-axis response will sound best. Accurate stereo imaging depends on absolute symmetry in your listening setup, on close right/left matching of the loudspeakers, and very uniform on- and off-axis horizontal response. Low distortion, particularly at high levels and low frequencies, is a requirement for realistic wide-range sound reproduction.

Measurements

Figure 1 shows the L7's on-axis anechoic frequency response. Measurements were taken at a distance of 2 meters from a point halfway between the midrange and tweeter and perpendicular to the front of the cabinet (not perpendicular to the tilted driver-mounting panel). A signal of 5.66 V rms was applied and the results referenced back to 1 meter. The response below 800 Hz was derived from 2-meter ground-plane measurements; the input was reduced to 2.83 V rms to compensate for the ground plane's 6-dB boost.

Overall, the response without the front grille fits a tight window of ±2.3 dB between 50 Hz and 20 kHz referenced to 1 kHz. Above 800 Hz, the

Effortless

"Theta's Generation III DS Pro does not merely sound better than other digital processors. It literally redefines what digital music can sound like.

With the Theta Generation III, we hear into the music as we have never heard from digital, its stunning and effortless transparency is reminiscent of the clarity we have heretofore encountered only from the world's very finest turntables..."

"The superiority of the Theta Generation III covers all sonic aspects, from transparency to clean purity to stereo imaging."

"...the Theta DS Pro Generation III can give you a total musical experience that you can't get anywhere else from digital."

—Peter Moncrieff
International Audio Review #64

Digital Done Right

Theta Digital Corporation

5330 Derry Ave., Suite R, Agoura Hills, CA 91301
(818) 597-9195 FAX (818) 597-1079

Enter No. 46 on Reader Service Card

DIGITAL
COMPACT CASSETTE
Made in the USA

ANALOG
COMPACT CASSETTE
1965

EVOLUT

REVOLUT

INTRODUCING THE WORLD'S FIRST DIGITAL

IONARY.

DIGITAL
COMPACT DISC
1982

TIONARY.

COMPACT CASSETTE RECORDER

Now enjoy the best of both worlds.

With the new Optimus® DCT-2000 you can record and play true digital audio on convenient Digital Compact Cassettes . . . *and* play your existing library of analog cassettes, too. Make perfect copies of your CDs—indistinguishable from originals—plus superb recordings from sources such as LPs and analog tapes.

The DCT-2000 incorporates the best in audio technology. 64-times oversampling. Fiber-optic, coaxial and analog inputs. Even a unique display that shows titles and performers' names on prerecorded DCC tapes. All the result of American—yes, American—craftsmanship.

Join the Revolution.

Radio Shack®
AMERICA'S TECHNOLOGY STORE℠

Enter No. 40 on Reader Service Card

JBL gave high priority to smooth on-axis response, smooth power response, accurate stereo imaging, and low distortion.

response fits an even tighter window of ±1.4 dB. Above 20 kHz (not shown), the response was flat to 22 kHz and then rolled off rapidly at higher frequencies. Notably, the response above 20 kHz did not exhibit any of the high-Q dome resonances commonly exhibited by most metal-dome tweeters. The roll-off above 20 kHz was quite smooth and well behaved.

The only conspicuous features of the response occur below 800 Hz, where the curve in Fig. 1 exhibits an undulating character with peaks at 105 and about 350 Hz and adjacent troughs. The trough at 200 Hz roughly coincides with the crossover between the woofer and the 8-inch mid-bass. Separate ground-plane measurements of the L7's output energized through the bi-wire inputs (with the bi-wire straps removed) revealed that, indeed, the output was low in this region.

The front grille causes some fairly severe interference effects in the on-axis response. I suggest leaving it off for serious listening; the speaker looks quite acceptable without it.

Above 100 Hz, the right and left systems matched within a fairly close ±1.3 dB. Close right/left matching is a prerequisite for stable lateral imaging.

Figure 2 shows the phase and group-delay responses of the L7, referenced to the tweeter's arrival time. The phase rotates a consequential 280° between 1 and 20 kHz due to a combination of crossover design and the offset between the acoustic centers of the midrange and tweeter. Between 800 Hz and 4 kHz, the group delay of the midrange averages about 0.2 mS, which indicates that acoustically its output lags the tweeter with an equivalent distance of about 2.7 inches. The dip in the group delay at 200 Hz coincides with a dip in the axial response at about the same frequency, indicating a possible minimum-phase aberration. If the response were equalized flat in this region, the group delay would also be much smoother.

The L7's energy/time response is shown in Fig. 3. The test parameters were chosen to accentuate the response from 1 to 10 kHz, which includes the highest crossover region. With the grille off, the main arrival, at 3 mS, is quite slender and is followed by only a single prominent delayed arrival

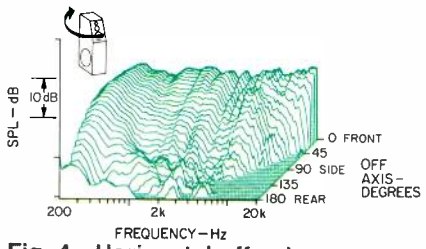


Fig. 4—Horizontal off-axis frequency responses.

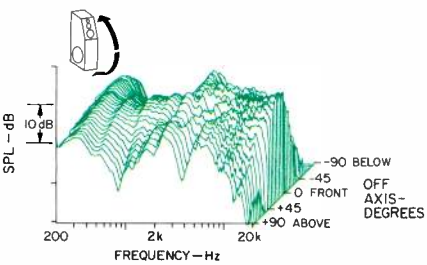


Fig. 5—Vertical off-axis frequency responses.

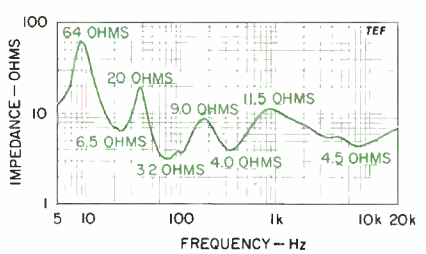


Fig. 6—Impedance.

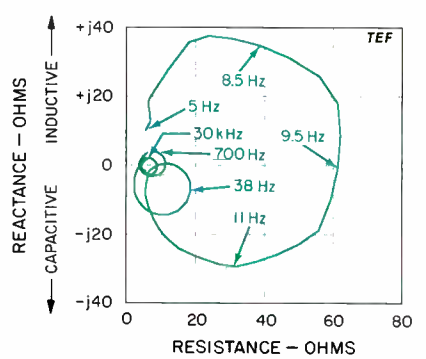


Fig. 7—Complex impedance.

about 23 dB down. With the grille, the main arrival is followed closely by three relatively high-level returns, the first only about 13 dB down from the main arrival.

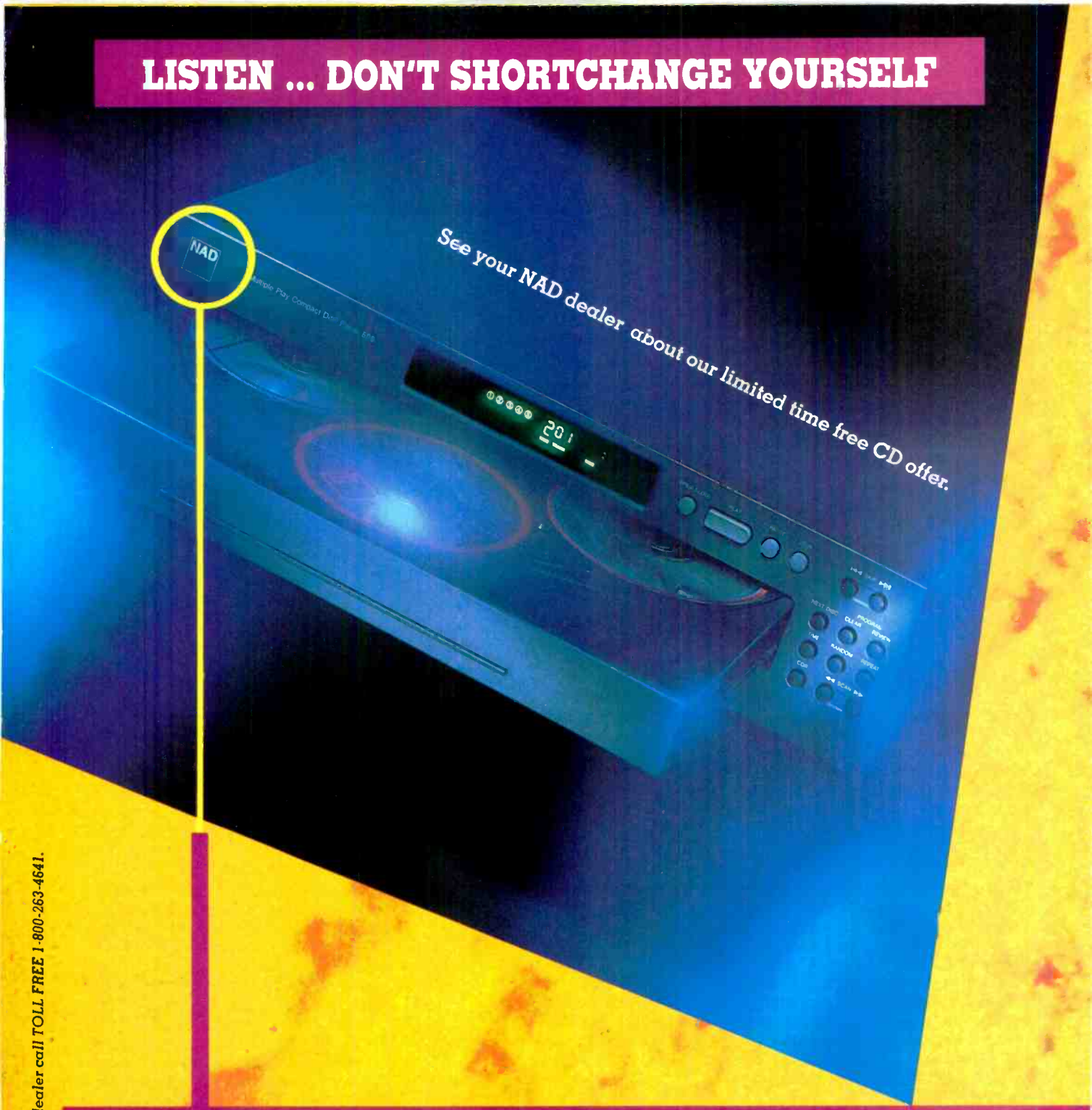
The horizontal off-axis responses of the L7 are displayed in Fig. 4; the bold curve at the rear is the on-axis response. Because the on-axis response is carried over quite faithfully into the off-axis curves, the L7's horizontal coverage should be judged first-rate. Although the system is slightly asymmetrical, with the midrange and tweeter offset on the front panel, the off-axis responses to either side were essentially the same.

Figure 5 shows the vertical off-axis curves. The bold curve in the center of the graph (front to rear) is directly on axis. Not clearly seen is the excellent flatness of the curves in the main listening window, from 5° below axis to 15° above it. Only the 10° and 15° below-axis response curves exhibit interference in the upper crossover range (3 to 5 kHz), where relatively narrow dips of 10 to 15 dB are evident. At extreme angles off the axis and above it (front of graph), dips in the frequency response can be clearly seen at both of the upper crossover regions, 900 Hz and 4 kHz.

When the system was subjected to a high-level, low-frequency sine-wave sweep, no significant cabinet resonances were evident. A sharp minimum in woofer excursion occurred at 29 Hz, which indicates the L7's vented-box tuning. Even at levels above 30 V rms (150 watts) at the 29-Hz box resonance, wind noise from the port was quite low and the port's sound output was very clean. The woofer handled a robust 18 V rms (54 watts into 6 ohms) at frequencies below 20 Hz without producing any bad noises, and it did not exhibit any dynamic offset effects. The maximum excursion of the woofer was a healthy ¾ inch, peak to peak, with a linear excursion of about ½ inch, peak to peak, and the driver overloaded gracefully.

The L7's impedance magnitude is shown in Fig. 6. A minimum impedance of 3.2 ohms occurs at 70 Hz and a maximum of 64 ohms at the subsonic frequency of 9 Hz. The maximum impedance in the passband is 20 ohms at 40 Hz. Because the curve has a

LISTEN ... DON'T SHORTCHANGE YOURSELF



Finally, it's here! The NAD 505 combines the convenience of a five disc carousel compact disc changer with the kind of performance that has won critical acclaim worldwide for single-disc NAD players. At NAD, the music is the most important feature. Come hear the difference.

NAD

YEARS of MUSIC

For your nearest NAD dealer call TOLL FREE 1-800-263-4641.

Enter No. 29 on Reader Service Card

The curves don't do justice to the excellent flatness of the response in the main listening window, from 5° below axis to 15° above it.

fairly high passband max/min variation of about 6.3:1, this speaker will be somewhat sensitive to cable resistance. Cable series resistance should therefore be limited to a maximum of about 0.044 ohm to keep cable-drop effects from causing response peaks and dips greater than 0.1 dB. For a standard run of about 10 feet, 14 gauge or larger wire should be used. Although smaller diameter wire, with higher series resistance, can be used, it will result in larger peak-to-dip response variations.

In Fig. 7 the complex impedance is plotted over the range from 5 Hz to 30 kHz with an expanded 80-ohm impedance scale. The large circle in the plot is the subsonic resonance of the lower vented-box impedance peak. The passband impedance phase (not shown) reached a maximum angle of +35° (inductive) at 550 Hz and a minimum angle of −71° (capacitive) at 48 Hz. The L7s will not be a problem for any high-quality amplifier, but don't parallel two L7s on one channel!

Figure 8 shows the 3-meter room curve with both raw and sixth-octave smoothed responses. The L7 was in the right-hand stereo position, aimed at the listening location; the test microphone was at ear height, at the listener's position on the sofa. The system was driven with a swept sine-wave signal of 2.83 V rms (1.33 watts into the rated 6-ohm load). The direct sound and 13 mS of the room's reverberation are included. Above 4 kHz, the smoothed curve is quite flat and extended. Some upper midrange emphasis between 1.5 and 2.5 kHz is noted. Excluding the two room-effect dips near 200 and 400 Hz, the curve fits an 8-dB window (±4 dB) from 100 Hz to 20 kHz.

Figures 9 and 10 show the single-frequency harmonic distortion versus power for the musical notes of E_1 (41.2 Hz) and A_2 (110 Hz). Distortion for the usual 440-Hz tone is not shown because the only distortion rising above the floor of my test gear consisted of about 0.2% third harmonic at full power. The power levels were computed using the L7's rated impedance of 6 ohms.

The E_1 (41.2-Hz) harmonic distortion data is shown in Fig. 9. At maximum power, the distortion only reaches

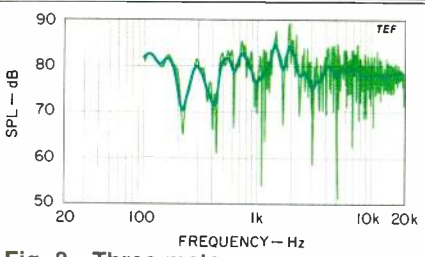


Fig. 8—Three-meter room response.

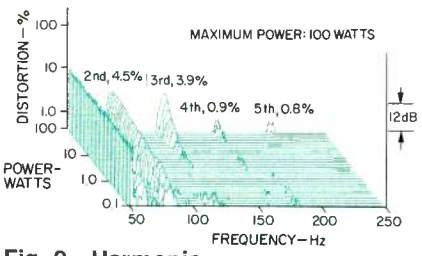


Fig. 9—Harmonic distortion products for E_1 (41.2 Hz).

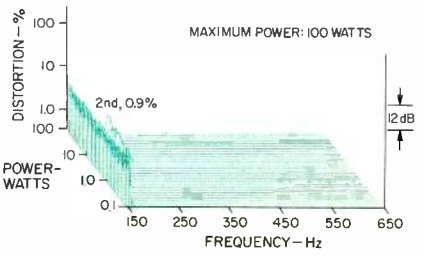


Fig. 10—Harmonic distortion products for A_2 (110 Hz).

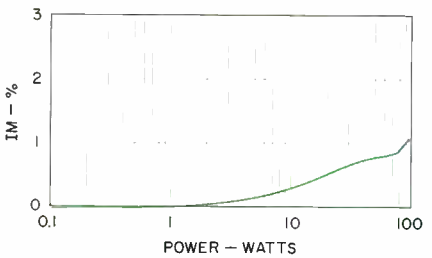


Fig. 11—IM for 440 Hz (A_4) and 41.2 Hz (E_1) mixed in equal proportion.

4.5% second and 3.9% third. Only small amounts of higher harmonics were evident. At 100 watts the L7 generates a fairly loud 104 dB SPL at 1 meter at 41.2 Hz.

The very low A_2 (110-Hz) distortion data is shown in Fig. 10. The second harmonic reaches only 0.9% at 100 watts; the higher harmonics were below the floor of my analyzer. At 110 Hz with a 100-watt input, the JBL generates a loud 108 dB SPL at 1 meter.

Figure 11 displays the IM distortion created by tones of 440 Hz (A_4) and 41.2 Hz (E_1) of equal input power. The IM rises only to the low level of about 1% at 100 watts. The four-way design of the L7, with a low crossover at about 200 Hz, separates the two IM test tones and sends one to the woofer and the other to the mid-bass driver, thus minimizing the distortion.

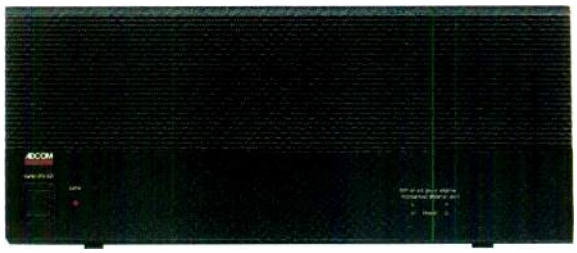
The L7's short-term peak-power input and output capabilities are shown in Fig. 12, and assume the rated 6-ohm impedance. The input power starts quite high, 230 watts at 20 Hz, but then fluctuates as frequency increases. Power-limitation dips occur at 60 Hz, 350 Hz, and 5.5 kHz. A maximum input of about 4.5 kW is reached between 800 Hz and 3 kHz and above 8 kHz.

In the vicinity of 60 Hz, the input power was limited to about 400 watts by a buzzing sound from the woofer. Both speakers exhibited the same effect. The power at 350 Hz was limited to about 900 watts; the output wave shape changed to a triangle, presumably due to crossover inductor saturation. Waveform distortion near 5.5 kHz limited the input power to about 1,000 watts. The flattening of the wave shape in this band may possibly have been due to tweeter excursion limitations in the bottom of its range.

The top curves in Fig. 12 show the peak sound levels the L7 can generate. The "room gain" of a typical listening room adds about 3 dB to the response at 80 Hz and 9 dB at 20 Hz.

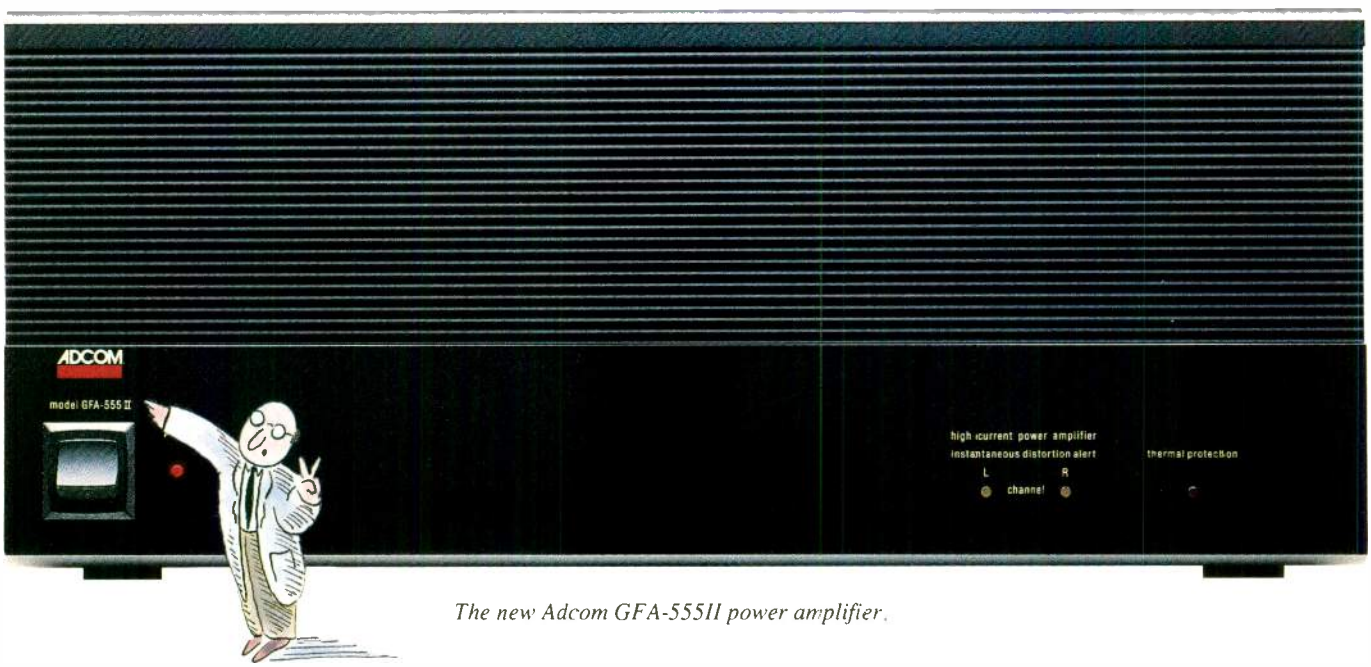
The peak acoustic output rises rapidly with frequency up to 150 Hz, hesitates, and then reaches a peak at 1.6 kHz near 125 dB SPL. At higher frequencies, the output curve mimics the input-power curve's dip at 5.5 kHz. With room gain, the output exceeds 110 dB above 26 Hz and 120 dB above 90 Hz, with only a slight fall

The Breakthrough.



The original Adcom GFA-555 power amplifier.

The New Breakthrough.



The new Adcom GFA-555II power amplifier.

Upon its introduction, the Adcom GFA-555 power amplifier was considered a breakthrough in audio technology. Rated superior to amplifiers costing two and three times as much, some critics had difficulty in naming a better component at any price.

Now, after years of using the GFA-555 as their model of superior performance and value, Adcom engineers announce another breakthrough. The new, upgraded GFA-555II, rated at 200 watts per channel*, offers greater stability, superior heat dissipation and less distortion. It is everything which made the GFA-555 "...one of the best selling amplifiers of all time,"** and more.

With the GFA-555II, Adcom begins a new generation of amplifiers, designed to set a new standard for performance at a reasonable price... giving more and more music lovers the opportunity of experiencing the thrill of sonic perfection without the shock of exorbitant costs.

Visit your Adcom dealer and listen to the new GFA-555II. Then ask its price. You'll hear how good this new breakthrough sounds.

**Power output watts/channel, continuous both channels driven into 8 ohms, 20 Hz - 20 kHz at less than 0.04% THD.*

***Stereophile*, October 1990.

ADCOM®
details you can hear

©1991 ADCOM

11 Elkins Road, East Brunswick, NJ 08816 U.S.A. (908) 390-1130
Distributed in Canada by PRO ACOUSTICS INC. Pointe Claire, Quebec H9R 4X5

Enter No. 2 on Reader Service Card

The JBL L7's sound was well balanced, somewhat up-front, with extended frequency response and excellent dynamics.

below 120 dB between 200 and 300 Hz. Even with the limitations in input power noted earlier, the L7's low-frequency output can keep up with that of the best speaker systems I have tested as well as with several subwoofers I know about. A stereo pair of L7s can reach even higher low-frequency levels with bass material that's common to both channels.

Use and Listening Tests

Although the L7s weigh 75 pounds apiece, they were fairly easy for me to move around. They can be "walked" easily by rocking the cabinet from side to side. Even without their bases attached, these systems are quite impervious to sideways tipping motions. The molded base attaches to the bottom of the enclosure with eight Phillips-head screws. Unfortunately, JBL did not provide guide holes to help with screw insertion and alignment of the base. I would have preferred bolts and Tee nuts rather than just wood screws that are simply driven into the cabinet's fiberboard bottom. As noted, no provision is made for spikes on the bottom of the enclosure.

The L7s are quite handsome in their basic black finish. The cosmetics and fit and finish of the cabinets are excellent; even the drivers look first-rate when removed from the cabinet. No trim rings are used around the drivers, because they look superb on their own.

Connection to the L7s is through a pair of quite accessible double-banana jacks on the bottom rear of the cabinet. As stated, bi-wire capabilty is supported by a set of removable straps that connect the two sets of jacks. The banana jacks unfortunately cannot handle large-diameter bare wire. On my review samples, the red banana terminals had a larger hole than the black terminals.

The owner's manual for JBL's L series of speakers was quite informative, providing much detail on system placement, hookup, and operation. The manual also included a four-page supplement specifically for the L7, which covered in detail such topics as placement, bi-wiring, and biamping. Even though the L7 is not in JBL's high-end line, the supplement tackles what are essentially high-end issues.

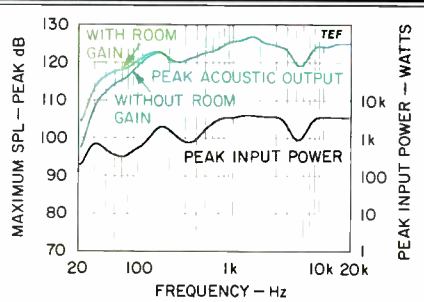


Fig. 12—Maximum peak input power and sound output.

Several bi-wire configurations are discussed, ranging from a single stereo amp setup to the use of four mono amps (which may include a mixture of tube amps for high frequencies and solid-state amps for the low frequencies!). For simplicity, however, I did most of my listening in the straight (non-bi-wire) configuration.

Listening was done using Straight Wire Maestro cables hooked to a Bryston 4B power amp and .4B preamp, driven by Onkyo and Rotel CD players. JBL recommends placing the L7s 3 feet away from both the side and rear walls and with the side-mounted woofers facing each other. I was not able to follow the recommendation for equidistant placement (and didn't want to, either!). Instead, I placed the speakers further from the rear wall than the side walls, with the woofers facing inward. The speakers were essentially aimed at my listening position, separated by 8 feet, and about 10 feet away.

The JBLs spent some extra time in my listening setup because of scheduling mix-ups, and I very much enjoyed the extra exposure to them. These speakers demonstrated a well-balanced, somewhat up-front sound with an extended frequency response and excellent dynamics. Their reproduction of high-frequency percussive sounds was extended and smooth, easily the equal of my reference B & W 801 Matrix 2 systems.

Reproduction of organ pedal notes played by Michael Murray on *A Recital of Works by Bach, Messiaen, Dupré, Widor, and Franck* (Telarc CD-80097) was quite extended and clean. I did notice some slight coloration in the middle and upper midrange that gave the pipe organ a somewhat up-front signature. This characteristic was also evident on other classical music and on jazz.

On difficult vocal, instrument, and percussion material—such as 16th-century Spanish compositions by Mateo Flecha el Viejo on *Las Ensaladas: Burlesques of the Spanish Renaissance* (Sony Classical SK 46699)—the L7s exhibited a well-integrated soundstage with particularly good stereo focus and clean vocal and transient reproduction.

The L7s' evenness of vertical coverage was not quite as good as that of my reference speakers on the stand-up/sit-down test with pink noise. Some midrange and upper midrange tonal changes were noted. The L7s' sensitivity was somewhat higher than that of my reference systems. On some third-octave band-limited low-frequency pink noise, the L7s' output at 25 Hz and above actually exceeded my reference speakers' capability. For the 20-Hz band, the L7s' fundamental output was not as great as my reference systems'. For the 20-, 25-, and 32-Hz bands, the wind noise from the JBL's vent was significantly less than from the B & W's, helped by the fact that the JBL's vent faces the rear.

On *The Mambo Kings* soundtrack album (Elektra 61240-2), the JBLs' high-level performance on the Latin-flavored big-band material with heavy percussion was excellent. The two vocal tracks of Linda Ronstadt were rendered very realistically, with natural dynamics. On rock kick drum, the L7s kicked quite well, compressing only slightly at very high levels.

At $1,950 per pair, the L7s offer a very good combination of attractive styling, a well balanced and fairly neutral sound, excellent dynamics, and extended frequency response—coupled with the legendary JBL name. Give them a listen! *D. B. Keele, Jr.*

Experience
FULL SPECTRUM SOUND!!!

Since 1977, Esoteric Audio has pioneered truly innovative cable designs. Our comprehensive research has culminated in our Tubular Geometry™ design. This unique construction eliminates strand interaction, minimizes skin effect, and dampens distributed resonances within the cable.

What does this mean in terms of musical sound quality? Simply put, the music will come through pure, clean, and totally palpable. Instruments and voices come to life with a precise and coherent 3-dimensional soundstage. In short, you will finally hear the music without cable induced distortions getting in the way.

But why take our word for it? Visit your local Esoteric Audio dealer and experience FULL SPECTRUM SOUND for yourself. The difference is incredible!

Mylar® and Teflon® are registered trademarks of E.I. Dupont Nemours & Co., Inc.

"When listening through my new Esoteric Audio interconnects, it was like hearing my recordings for the first time, again!"

the Art & Science of Connectology

ESOTERIC AUDIO USA

RR3 Box 262 Winder, Georgia 30680
Telephone: (404) 867-6300 Fax: (404) 867-2713

Enter No. 17 on Reader Service Card

PIONEER ELITE PD-65 CD PLAYER

Company Address: P.O. Box 1540, Long Beach, Cal. 90801.
For literature, circle No. 94

Sometimes it's hard to tell when the improvements touted by makers of CD players are real and when they are mere advertising ploys. Listening and bench tests assess the overall merits of a product—but without settling whether those merits are really due to the touted improvement. So I did something different by evaluating the Pioneer Elite PD-65 both with and without its claimed improvement.

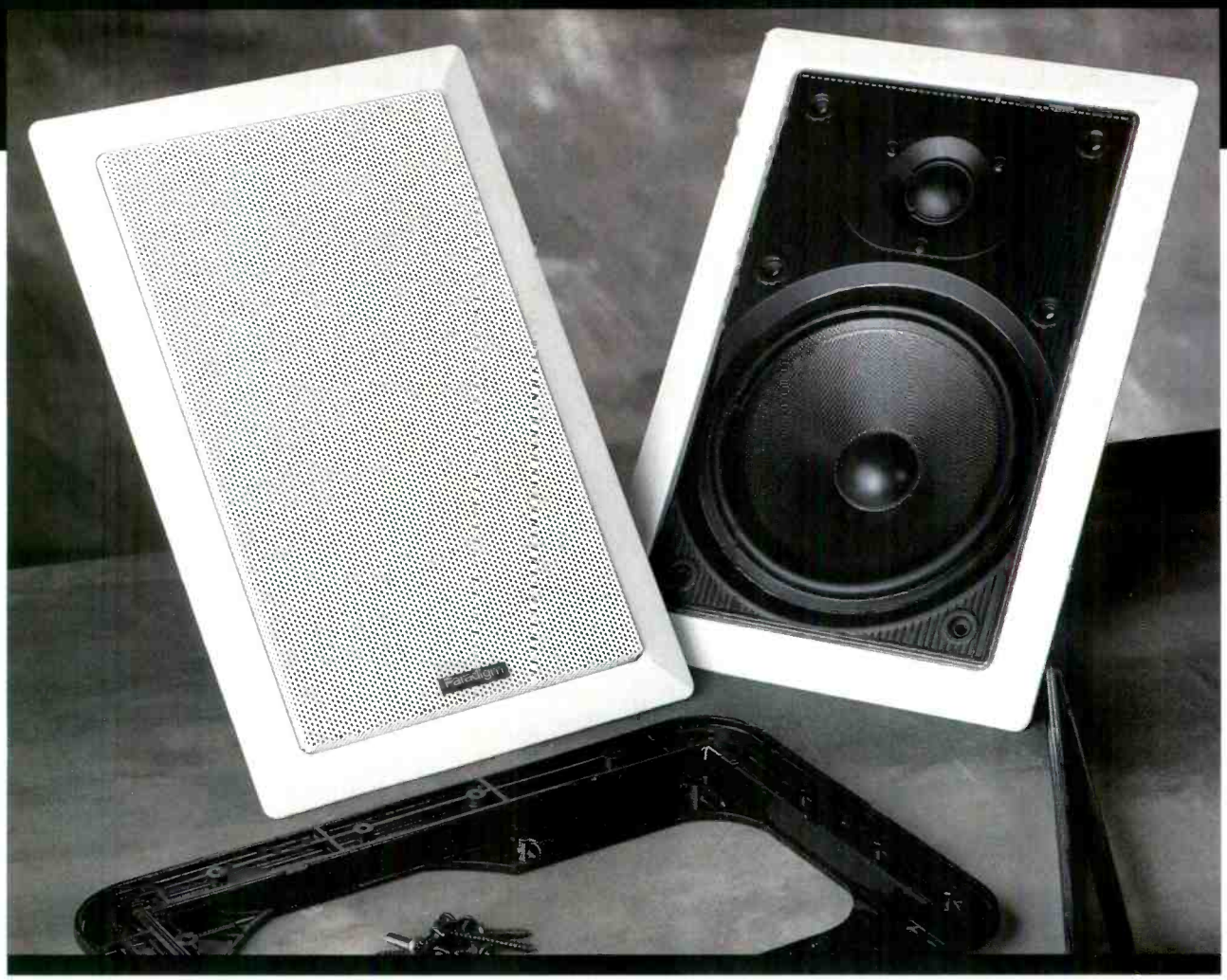
One of the major advances Pioneer claims for this player is its Legato Link digital filter system, used in both the $800 Model PD-65 and the $450 Model PD-52. What, exactly, is Legato Link? Let me quote from the manufacturer's press release:

> Pioneer's Legato Link conversion system improves CD sound quality by restoring high-frequency signals. Legato Link technology incorporates a proprietary integrated circuit to infer frequencies above 20 kHz, which have been eliminated in all CD recordings.
>
> During the standard CD recording process, the ultra-high frequencies are omitted from the digital-to-analog (D/A) conversion process, thus slightly altering reproduction of the original instrumentation. This conversion process recreates the lost sounds in existing CDs during digital signal processing.

In order to evaluate the merits of Legato Link, Pioneer sent us two samples of the PD-65, one of which had been modified by the substitution of a more conventional digital-filter IC. Normally, I'd have put both units on the test bench and done my listening later. This time, however, I thought it better to listen first, so that my judgments would not be influenced by any measured differences between the two units. I used selected musical tracks from my Pierre Verany test discs, including vocal selections, chamber music with flute solo, and contemporary music emphasizing percussion instruments. The differences between the two players were certainly subtle, but they were there! (Mind you, at my age I am lucky to hear pure tones of around 16 kHz, let alone tones above 20 kHz, as implied by the description of Legato Link. Nevertheless, I and others have long since proven that what one can hear as a pure sine-wave tone bears no relationship to what one hears when listening to complex musical material, rich in harmonics and overtones.)

Rather than sounding too bright (as I might have thought), the unit with Legato Link sounded more pleasant and less raspy than the unit lacking this feature, especially on the flute solo and the percussion examples. Once I had established that there was an audible difference—however subtle—I was anxious to see if I could correlate this difference with measurements on the test bench.

The Finest In-wall Speaker.



WHAT DOES IT TAKE to build the finest in-wall speaker? Quite simply, better design execution.

Better in-wall performance demands better materials. So, rather than flimsy plastic parts, we use a rigid aluminum diecasting that combines the main chassis, mid/bass driver chassis and tweeter faceplate into a single unit. Instead of inadequate mounting hardware made of plastic parts, metal clips etc., we use a rigid diecast-aluminum full-perimeter mounting flange. Add PARADIGM's renowned driver technology and seamless dividing networks, and the performance results are amazing! Articulate and transparent, these speakers simply reveal more of the musical and spacial reality of the live event.

EVEN MORE ASTONISHING IS THE PRICE! For the same or even less than conventional in-wall speakers, *you can own the best...* PARADIGM ARCHITECTURAL MONITOR SERIES speakers.

You won't find PARADIGM ARCHITECTURAL MONITOR SERIES speakers everywhere. A product this good requires the expertise of a qualified audio specialist. So, before you buy any in-wall speaker, visit your AUTHORIZED PARADIGM DEALER and listen to the finest of in-wall speakers.

FOR MORE INFORMATION CALL 1-800-553-4355 Ext. 41274 or write: AUDIOSTREAM, MPO Box 2410 Niagara Falls, NY 14302. In Canada: PARADIGM, 569 Fenmar Drive, Weston, ON M9L 2R6.

Sound&Vision *Critic's Choice Award*

For More Information

Call 1-800-451-2248

Paradigm®

Enter No. 32 on Reader Service Card

COPYRIGHT © PARADIGM/BAVAN

Although sonic differences between the Pioneer player with Legato Link and the one without it were subtle, they were definitely there.

Before discussing the test results, I should mention that the PD-65 boasts another unusual feature: A stable-platter design employing a heavy aluminum platter and a nonresonant mat to support the entire CD surface during rotation. As a result, it is necessary to load CDs with the *label side down*. The optical pickup assembly rides above the disc rather than below, where it is in most other CD players. Both samples had this mechanism, of course, so I cannot attribute any sonic differences between them to it.

My first surprise came when I measured the frequency response of both players. The unit with Legato Link exhibits a gentle *roll-off* beginning at around 10 kHz (Fig. 1A). The expanded vertical scale in the figure makes this roll-off look steep, but note that it only amounts to about 2 dB at 16 kHz. The unit lacking the Legato Link filter has essentially flat response; at 20 kHz it's −0.2 dB (Fig. 1B). Could the slight roll-off in the Legato Link unit account for its somewhat smoother, mellower sound? Wait, the plot thickens!

Next I measured THD + N as a function of frequency (Fig. 2). The Legato Link unit exhibits remarkably low THD + N at mid-frequencies (around 0.002%), but above 4 kHz, it rises steeply, reaching 0.1% at 10 kHz and approaching 10% at 20 kHz! As I thought about what Legato Link is supposed to do, this made perfect sense: When higher frequencies are present, the Legato Link circuit deliberately generates harmonics that are not present in the actual CD (Fig. 3). The test equipment interprets these harmonics as distortion components, which, in a sense, they are. However, the generation of out-of-band harmonics is exactly what is claimed for the Legato Link circuitry. Sure enough, the plot of the sample lacking Legato Link shows THD + N is a bit higher at low and mid-frequencies (around 0.003%)—probably attributable to production variation—but actually *decreases* as the high-frequency end of the plot is reached.

I tried to isolate harmonics from the residual noise by using the spectrum analysis function of my Audio Precision test equipment while playing an 8-kHz test tone. The plot (not shown) extended to 30 kHz with low-level harmonic components at 16 and 24 kHz, but for both machines, these harmonic components were so far below maximum recorded level that they were well below the threshold of human hearing. Furthermore, the amplitude of the out-of-band harmonic was essentially the same for both samples. However, the Legato Link spectrum showed a bit less noise, and the other showed a sudden drop of about 3 dB just above 21 kHz.

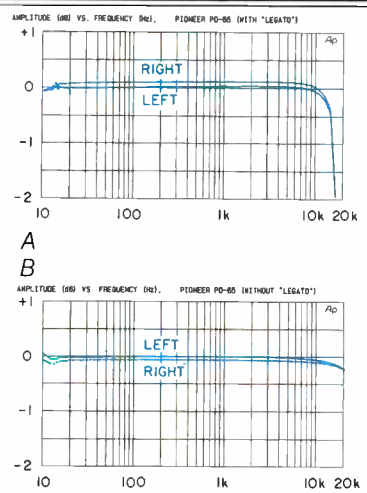


Fig. 1—Frequency response of PD-65 with Legato Link filter (A) and without Legato Link (B); see text.

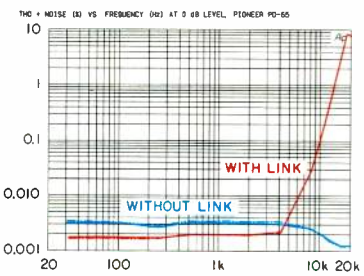


Fig. 2—THD + N vs. frequency.

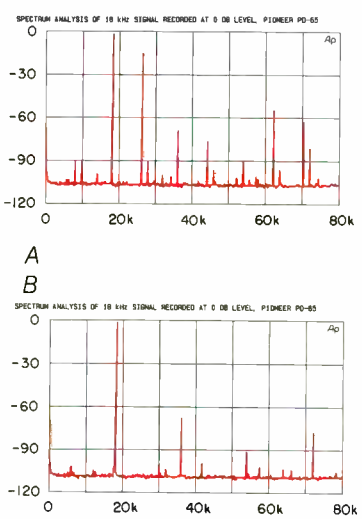


Fig. 3—Spectrum analysis of 18-kHz signal with Legato Link (A) and without it (B); see text.

Tests of deviation from perfect linearity (using undithered signals in the range from 0 to −90 dB and using low-level dithered signals in the range from −70 to −100 dB) offered no clues as to why I heard differences between the two units. Linearity was close to perfect for both players and for both types of tests; the deviation was less than 1 dB for the tests with an undithered signal and practically nil for the tests with a dithered, low-level signal.

When I conducted the fade-to-noise test, using dithered signals from −60 to −120 dB, the results confirmed the superb linearity of both machines, and the EIA dynamic range proved to be about the same for both samples (around 112 dB). I also checked out EIAJ dynamic range and found that the unit with Legato Link measured 98.8 and 98.4 dB for its two channels, while the unit without Legato Link measured 99.6 and 99.2 dB. Again, these differences are almost certainly attributable to production variations rather than to any influence of the Legato Link. This holds true for signal-to-noise ratios, which were around 113 dB for the Legato Link player and 114 dB for the player lacking the circuit.

Finally, in desperation, I decided to examine a 20-kHz waveform as reproduced by each machine. While I noted a bit of in-band aliasing that showed up as amplitude modulation of the 20-kHz sine wave, the appearance of the waveform was identical for both players. So the mystery remains. Admittedly, my listening tests were not conducted as double-blind tests, but I did play musical selections for other listeners, and they preferred the unit with the Legato Link as well. All of which again confirms the fact that static test-tone measurements don't always reveal how an audio product will sound!

Leonard Feldman

As real as you can get.

If you're tired of flavor-of-the-month preamp pretenders, maybe it's time to get real about an honest preamp in your music system. One that doesn't colorize the classics in your music collection, but lets them speak truthfully and neutrally.

A line preamp that has enough functions to give you practical, use-it-everyday control over your music system, yet enough inputs and outputs to be right at home in an audio-video setup.

And – let's not kid around – a high-end preamp that won't vaporize your bank account.

Meet the new LS3 line-level preamplifier from Audio Research. An all-new circuit design with optional balanced outputs. Honest, faithful reproduction. Sparkling dynamics. And the reputation and lasting value that has been the hallmark of this American manufacturer for over twenty years.

So, listen to the new LS3. It's about as real as you can get.

audio research

HIGH DEFINITION®

5740 Green Circle Drive, Minnetonka, Minnesota 55343-4424. Phone: 612-939-0600 FAX: 612-939-0604

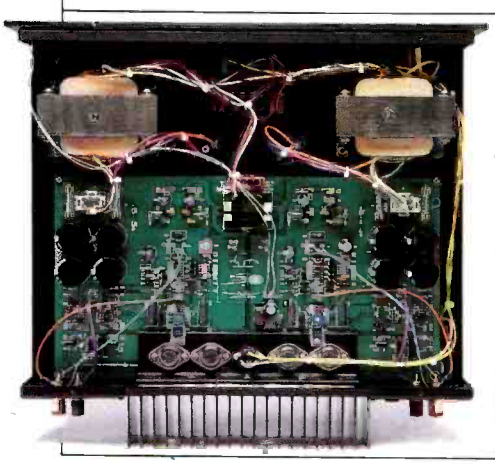
Enter No. 4 on Reader Service Card

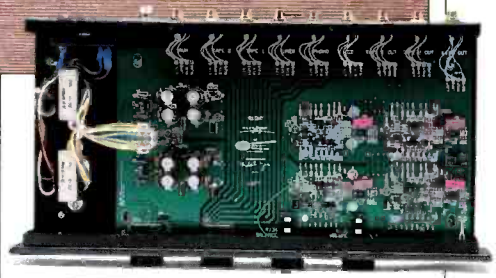
MOBILE FIDELITY SOUND LAB ULTRAMP PREAMP AND AMP

Company Address: 105 Morris St., Sebastopol, Cal. 95472.
For literature, circle No. 95

The UltrAmp Line Amplifier and UltrAmp Power Amplifier are part of a new series of components from Mobile Fidelity Sound Lab, long a source of top-quality recordings. The units are hand assembled in the U.S. and tested by designer Michael Yee. The UltrAmp product marketing is unusual; the equipment is being sold directly to the consumer by the manufacturer. Mobile Fidelity offers the buyer a 30-day, in-home audition, technical support through toll-free phone lines, and a comprehensive three-year warranty.

The UltrAmp line features fully discrete amplification circuitry (no integrated op-amps) and dual mono design with separate power transformers (not just separate windings) for each channel. Rather than trying to maximize the usual specs, Mobile Fidelity has taken a psychoacoustic approach to these designs, stating that their research shows that sonic differences between amps are mostly due to distortion components that fall below the noise floor. Feedback is limited to a moderate 30 dB or so; slew rate is 2.5 V/μS, which the company says is adequate because it is 10 times the maximum slew rate in music. Bandwidth is 2 Hz to 200 kHz.





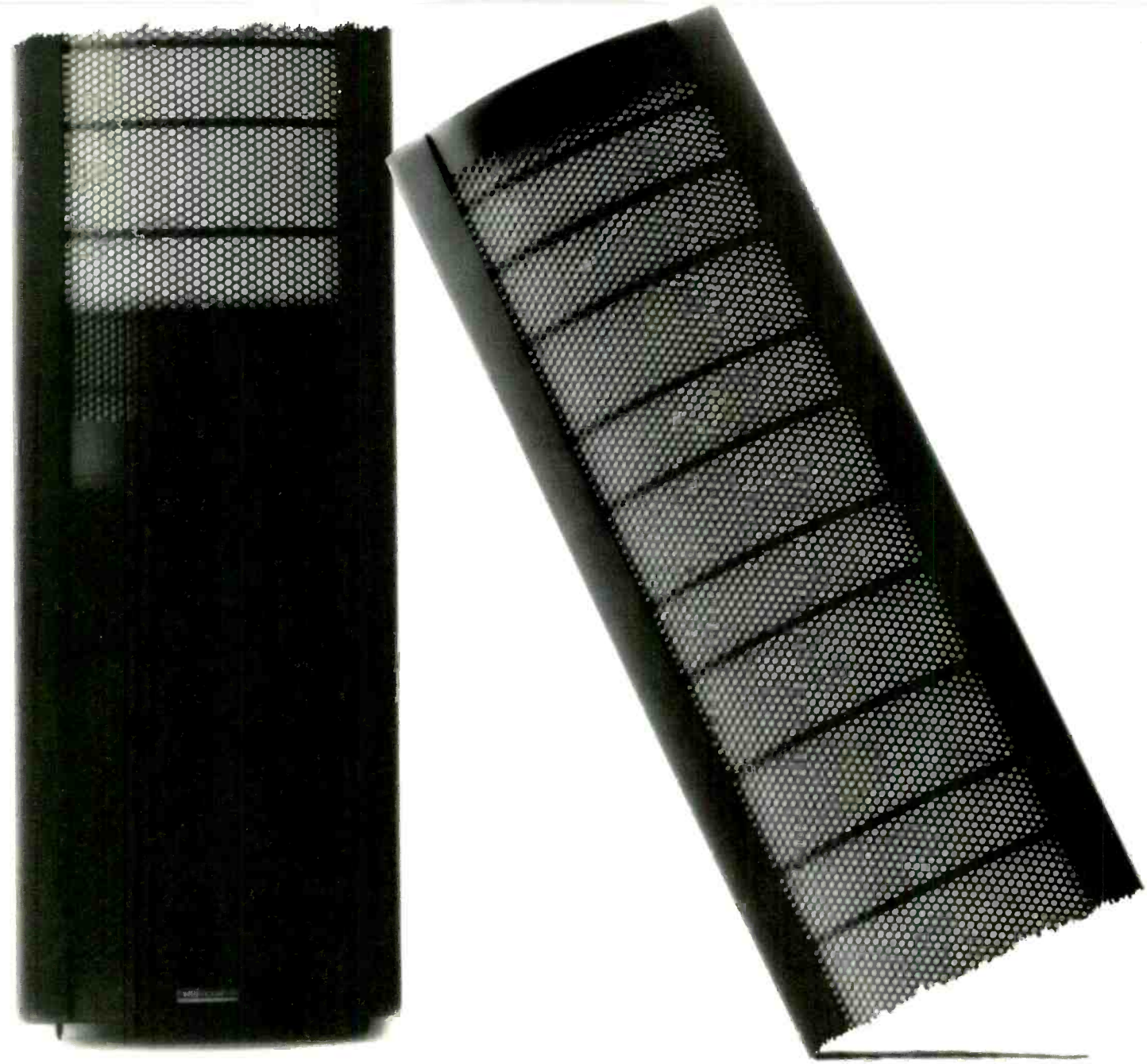
Direct marketing does offer some significant potential savings to the consumer, as dealers get a margin of about 30 to 50 points on high-end electronics. The UltrAmp Line Amplifier and Power Amplifier sell for $1,295 each. This is not an inconsiderable price, even by high-end standards. At this price point, there is a great deal of demanding competition from a wide range of high-end firms, including such well-established names as Adcom, B & K Components, Counterpoint, Forté Audio, Hafler, PS Audio, and VTL. And if you compare it to products priced as the UltrAmp line would be after a dealer markup, well over $1,500 each, the competition becomes even more demanding.

The UltrAmp preamplifier has relatively simple features: A selector for six line-level inputs, a combination muting and tape monitor switch with positions for two tape decks, and controls for volume and balance. It does, however, have sophisticated electronics. Each channel of this dual mono design has a separate line stage plus a separate buffer stage for tape outputs to ensure that interconnect cables and tape recorder inputs do not interact with the source. The preamp does not include a phono gain stage, but one is available from the manufacturer at extra cost.

The UltrAmp preamp has double regulation on the power supplies, separate ground planes for each channel, and a direct signal path without a.c. coupling capacitors; it uses conductive plastic potentiometers and silver-plated high-conductivity switches. Total harmonic distortion is rated at less than 0.02%, signal-to-noise ratio at 90 dB, and gain at 12 dB. The input impedance is 10 kilohms, and the output impedance is 100 ohms.

The UltrAmp Line Amplifier has a perfectly acceptable exterior style and finish, although I personally don't care for either the legibility or style of the blue lettering for the control functions. The unit does, however, have well-built input and output jacks and clean, well-laid-out circuit boards with high-quality components. The front panel is thick and exceptionally strong, and the power supply seems to be very well constructed.

I received two samples of the preamplifier. The earlier sample sounded far less clean than the second, the dot on its balance control was not aligned to show proper channel balance, and the volume control's lowest setting did



THE NEW AERIUS SPEAKER FROM MARTIN LOGAN LTD. SO MUCH TECHNOLOGY WE HAD TO CUT IT IN HALF TO FIT IT ON THIS PAGE

Sometimes it's not what you see, but what you don't see. That's true of the new Aerius Speaker from Martin Logan. What you do see is a speaker. Sleek. Elegant.

What you don't see are the components of a traditional speaker. After all, it looks like we put nothing behind the grill. What you're not seeing is our Electrostatic Driver that incorporates an incredibly advanced Vapor Deposited Membrane. You can see right through it. A design that allows for the soft subtleties of Brahms to come through crystalline and flawlessly. But just crank up some of your favorite rock & roll and get busy.

Martin Logan invented the Curvilinear Electrostatic Speaker. And we packed all this technology into a very intelligently sized package.

We may have had a difficult time putting all this on one page, but you'll have no problem sticking all of the music in your ear.

New Aerius
$1,995.00 pr.

MARTIN·LOGAN, LTD.
THE ELECTROSTATIC TECHNOLOGY

913-749-0133
P.O. Box 707 Lawrence, Kansas 66044

TIPS FOR MAIL ORDER PURCHASERS

It is impossible for us to verify all of the claims of advertisers, including product availability and existence of warranties. Therefore, the following information is provided for your protection.

1. Confirm price and merchandise information with the seller, including brand, model, color or finish, accessories and rebates included in the price.

2. Understand the seller's return and refund-policy, including the allowable return period and who pays the postage for returned merchandise.

3. Understand the product's warranty. Is there a manufacturer's warranty, and if so, is it from a U.S. or foreign manufacturer? Does the seller itself offer a warranty? In either case, what is covered by warranty, how long is the warranty period, where will the product be serviced, what do you have to do, and will the product be repaired or replaced? You may want to receive a copy of the written warranty before placing your order.

4. Keep a copy of all transactions, including cancelled checks, receipts and correspondence. For phone orders, make a note of the order including merchandise ordered, price, order date, expected delivery date and salesperson's name.

5. If the merchandise is not shipped within the promised time or if no time was promised, 30 days of receipt of the order, you generally have the right to cancel the order and get a refund.

6. Merchandise substitution without your express prior consent is not allowed.

7. If you have a problem with your order or the merchandise, write a letter to the seller with all the pertinent information and keep a copy.

8. If you are unable to obtain satisfaction from the seller, contact the consumer protection agency in the seller's state or your local U.S. Postal Service.

If, after following the above guidelines, you experience a problem with a mail order advertiser that you are unable to resolve, please let us know. Write to Nick Mataraззo, Publisher of Audio Magazine. Be sure to include copies of all correspondence.

The sophistication of the UltrAmp line amplifier lies in its circuitry, not its relatively simple features.

not produce total silence. The second unit not only had superior sound but a properly aligned balance control. It still, however, would not produce total silence with the volume control at its minimum position.

The second sample of the UltrAmp Line Amplifier provided an open, detailed, and dynamic sound. Overall frequency response and timbre were good, bass was very good, and the midrange and treble were detailed and extended. The soundstage was nicely detailed, with very good imaging and width, although depth and the ability to resolve layers of depth rated only good. Dynamics were very good, superior to those of a number of competing line-stage preamps.

In terms of overall performance, the UltrAmp Line Amplifier was certainly capable of good high-end performance. At the same time, it did not stand out from other products in its price class because it was less transparent and slightly less musically convincing in the upper octaves.

The UltrAmp Power Amplifier has an output power of 100 watts per channel into 8 ohms and 150 watts into 4 ohms, and a maximum current output of 20 amperes. Mobile Fidelity feels that conventionally designed speakers of 4 ohms or higher impedance never need current higher than 10 amperes. Total harmonic distortion is rated at less than 0.02%, signal-to-noise ratio is 90 dB, and gain is 30 dB.

Like the Line Amplifier, the UltrAmp Power Amplifier has a number of interesting technical features. The amplifier uses three power transformers. Two separate amplifiers are used for the high-current stage of each channel to improve imaging. A third transformer, which has a separate winding for each channel, drives the independently regulated power supplies for the gain stages. Mobile Fidelity feels that using three transformers to separate the high-current functions from the gain functions improves both imaging and apparent power level.

The circuit topology is unusual and does not require a decoupling network. For an amplifier to use feedback, one stage must be slower than the rest of the stages. In most amplifiers, this "slow stage" is the first stage, in order to improve measured speed. Mobile Fidelity claims that the measured improvement is obtained at the cost of stability with complex speaker loads. As a result, "fast" amplifiers then require decoupling networks that limit their ability to accurately drive speakers. Mobile Fidelity makes the UltrAmp's last gain stage the slow stage, so that the amplifier becomes more stable under a complex load and can deliver more electrical signal directly to the load.

All this care and effort translate into good sound quality. The UltrAmp Power Amplifier performed well with the Spendor BC-1, Thiel CS3.6, and Quad ESL-63 as well as with more conventional speaker loads. Bass, while not particularly dynamic, was well controlled and well defined. Midrange performance was well balanced, and transients were quick and well defined. Imaging was good to very good, as was depth. Soundstage width was moderate. The upper midrange was very clearly defined, although some competing products provide equal information in a more musical or transparent way. Treble performance was good.

Like the UltrAmp Line Amplifier, the UltrAmp Power Amplifier was capable of good high-end performance. At the same time, it too did not stand out from other products in its price class. Indeed, some competing products provide a more convincing overall illusion of musical reality. This is particularly true regarding the dynamics and energy of the bass and lower midrange and the sweetness and air of the upper midrange.

It is easily possible to build a good high-end system around the UltrAmp amp and preamp. Today's high-end and mid-fi electronics set a very high standard, however, and well-designed high-end electronics are available at prices as low as $300 for a preamp and $400 for an amp of nearly equal output as the UltrAmp. Any product line that emphasizes price, a special marketing approach, and outstanding value really ought to perform exceptionally well at its price point; I am not sure that the UltrAmps fully meet that test. UltrAmp is certainly a very promising new line, but it may well take some further evolution to surpass its competition. *Anthony H. Cordesman*

So Who Are We To Argue? Introducing The NEW Hafler Trans•nova

There is something "very right" about tube sound. Audiophiles know it, musicians know it, so who are we to argue? We don't. Jim Strickland, Hafler's chief engineer, has created "tubey" sounding solid state circuitry for Hafler's new Models 9300 and 9500 power amplifiers. A unique drive stage allows the lateral MOSFET output devices to be connected just like tubes! In fact, this new **trans•*nova*** circuitry is so unique, it's patented

As with the rest of the new Series 9000 line, the **trans•*nova*** amplifiers share the same elegant sonic quality, simplicity in design, modesty in price, reliability, and an unprecedented 7-year warranty!* We know you'll hear the distinction immediately. *Audition the new Models 9300 and 9500* **trans•*nova*** *amplifiers at your local Hafler dealer and hear incredible tube sound...* ***without the tubes.***

Model 9500

Hafler®

"THE AFFORDABLE HIGH END"

Hafler, A Division Of Rockford Corporation
Tempe, Arizona 85281 U.S.A. 1-800-366-1619
In USA, Fax (602) 894-1528
In Canada, Call Korbon Trading (416) 567-1920
In Europe, Fax (49) 421-487-877
In Pacific Asia, Fax (65) 339-0363

**7-Year warranty valid only in the USA*

Enter No. 19 on Reader Service Card

NUMERIC RADIO

Digital Radio Basics by Skip Pizzi. Intertec Publishing Corp., softcover, 152 pp., $30.00.

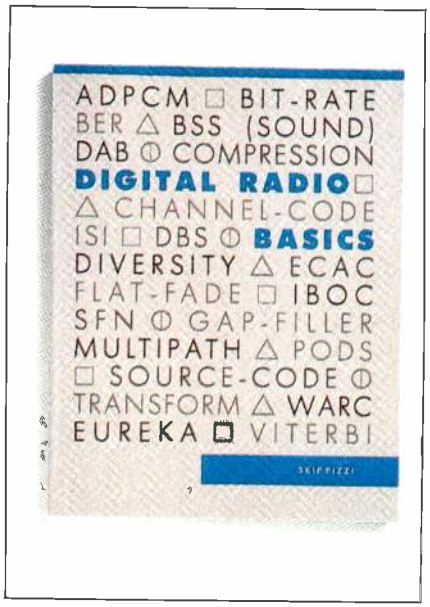
As Brad Dick, editor of *Broadcast Engineering* magazine, states in his preface to this remarkably up-to-date book, "It's not often that a technology leapfrogs an entire industry in new capability. Yet, that appears about to happen almost overnight with digital radio broadcasting (DRB)." Others in the industry are referring to this new technology as DAB (Digital Audio Broadcasting) or DAR (Digital Audio Radio). Regardless of what you call it, digital radio will be with us well before the end of this decade.

In his easy-to-read and well-organized book, Skip Pizzi first explains why digital radio is a "must." He then provides a clear primer on digital audio basics, covering such topics as bandwidth requirements, analog-to-digital conversion, binary coding, and digital signal modulation. After a brief discussion of digital radio broadcast history in Chapter 3, Pizzi leads us into the heart of the subject, data compression (or, as some prefer to call it, bit-rate reduction), in Chapter 4. The information contained in this chapter not only will clarify this subject as it relates to digital radio, but also will shed light on the data compression technologies being used in new recording formats such as the Digital Compact Cassette and the MiniDisc.

Pizzi manages to present a clear, unbiased picture of no fewer than eight proposed systems for digital radio broadcasting, categorizing them either as out-of-band formats (those that will require new spectrum allocations from the FCC) or as in-band systems (those that can use the existing broadcast spectrum in various ways).

Other chapters deal with such related topics as: Coding and error correction; the pros and cons of signal delivery by satellite, cable, and land-based broadcast stations, and the technical, economic, and political issues ahead. A useful glossary of terms is included, as is a list of names and addresses of the principal participants—system proponents as well as associations and committees involved in the digital radio selection process. Phone numbers and FAX numbers for each of these organizations are provided so those readers wishing more detailed information can go directly to the sources. At the end of each chapter, Pizzi provides a series of "endnotes" that either provide clarification for points made within the chapter or offer bibliographical references that will elaborate on points made by the author within the chapter.

One of the things that makes *Digital Radio Basics* such a joy to read is the lighthearted approach taken by the author. While the subject matter is, of course, treated with proper seriousness, each chapter is preceded by an insightful quote that sets the tone of the



chapter and provides the reader with ample food for thought. A couple of examples: At the beginning of the chapter "Digital Audio Basics," the author quotes Marshall Buck (an active AES governor), who said: "Wouldn't it have been nice if George Westinghouse had chosen 64 Hz as his power line frequency?" (If you don't get the significance of that remark, you will get it after reading the chapter that follows!) To ease the concerns of those who might find the chapter on data compression somewhat "compromising," Pizzi quotes philosopher Bertrand Russell, who said: "All science is dominated by the idea of approximation." And finally, before launching into a discussion of proposed formats, the author quotes a statement by William Osler: "In science, the credit goes to the man who convinces the world, not to whom the idea first occurs."

Among the most impressive aspects of this book is how amazingly up to date it is. The Electronic Industries Association has taken on the responsibility of establishing a single standard for digital radio broadcasting, at least in this country. Since that organization mandated that all system proponents submit descriptions of their system by mid-summer 1992, Pizzi was able to provide adequate description of all eight systems being proposed by the time his book was copyrighted and published in April 1992. Unlike many other technical books that are often obsolete (or at least somewhat behind the times) as soon as they are published, Pizzi's book is current on this important technology that is likely to change the couse of radio broadcasting in the very near future.

Skip Pizzi is eminently qualified to author a book such as this one. He is currently technical editor for *Broadcast Engineering* magazine, where he covers audio and radio matters of broadcast technology. Prior to joining the magazine, he spent 13 years at National Public Radio headquarters in Washington, D.C., serving in a number of different capacities, including that of technical training coordinator. Pizzi is also an active member of both the Audio Engineering Society and the Society of Broadcast Engineers and maintains a roster of consulting and training clients from around the country.

Leonard Feldman

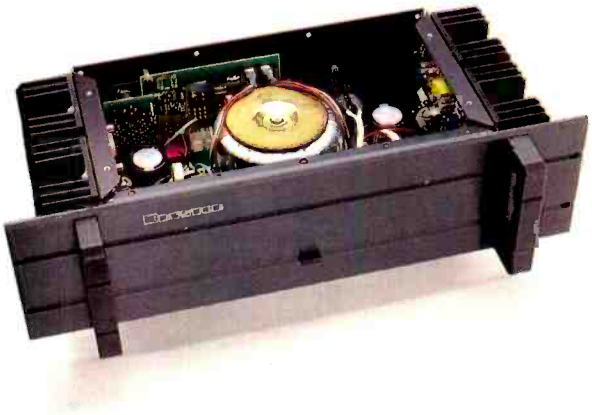
RDAT by John Watkinson. Focal Press, hardcover, 244 pp., $59.95.

Coding for Digital Recording by John Watkinson. Focal Press, softcover, 220 pp., $22.95.

Both *RDAT* and *Coding for Digital Recording* borrow heavily from John Watkinson's earlier book, *The Art of Digital Audio* (published in 1988 and reviewed in *Audio*'s January 1990 issue). The purpose of these new titles seems to be to make available in shorter form the specific topics each covers; both books offer some new material as well.

Substantial sections of *RDAT* are, word for word and figure for figure,

THE IDEAL AMPLIFIER FOR SUPERIOR SOUND SYSTEMS



Bryston's

3B NRB

Amplifier

Bryston's new 3B NRB amplifier is a companion piece to the 4B NRB and 7B NRB, with a similarly optimized interface between power supply and signal circuitry, and the same ultra-linear amplification as its larger counterparts. Its 120 watts per channel is a popular size for a wide range of music systems requiring the highest quality source of power. The 3B NRB uses Bryston's proprietary Quad-Complementary output section, which improves linearity to a new standard of accuracy, while virtually eliminating aggressive higher harmonic distortion products. From input to output, all the circuitry in the NRB series of amps has been optimized for the most musical amplification possible, with dual power supplies to provide precise and focused imaging. New, three-colour LEDs glow green for power-on, yellow for transient clipping, and red to indicate longer-term overload or any other departure from linearity, including shorted outputs, or strong out-of-band information, like RF or DC. Gold plated RCA and XLR input connectors allow unbalanced or balanced operation at the flick of a rear mounted switch. A ground lift switch separates system ground from audio ground to reduce annoying ground loops and system hum. Finally, switchable monaural operation is available if higher power requirements become necessary. Although the description of circuit innovations can indicate the research and commitment we bring to the design of the finest audio products, only in the listening does the result of that dedication become clear. Bryston's 3B NRB is capable of doing justice to the most refined sound system, with the subtlest details of the musical fabric revealed in their original form. We invite you to experience the musical accuracy, long term reliability and excellent value the Bryston 3B NRB represents.

BRYSTON

57 Westmore Dr., Rexdale, Ontario, Canada M9V 3Y6

Tel: (416) 746-1800 Fax: (416) 746-0308

Brystonvermont, RFD#4 Berlin, Montpelier, Vermont 05602

Tel: (802) 223-6159 Fax: (802) 229-2210

Enter No. 7 on Reader Service Card

20 YEAR WARRANTY - A GENERATION OF MUSIC

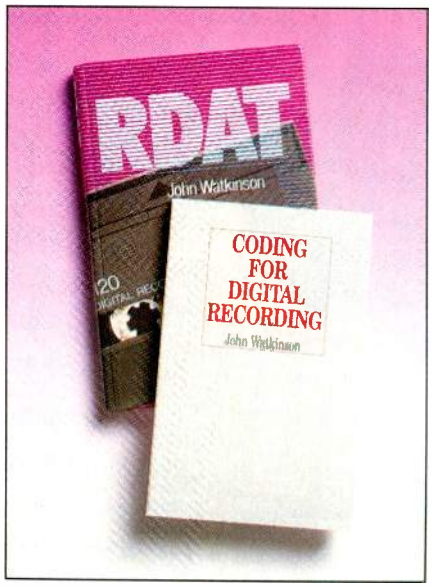
Watkinson's books borrow from his earlier volume *The Art of Digital Audio*, with some material intact, some rewritten, some new.

taken from *The Art of Digital Audio*. Chapter 1 is taken mainly from Chapter 8 of the earlier book. Chapter 2, "Conversion," is entirely from Chapter 2 of *The Art* and is outdated. My earlier review was quite critical of this material, and the comments stand. The techniques of analog-to-digital conversion used in modern digital recording and developed extensively over the past four years are almost ignored. This chapter is the weakest and most dated in the book, in my opinion.

Chapter 3, "Digital Audio Processing," is taken mainly from Chapter 3 of *The Art of Digital Audio*; Chapter 4, "Digital Recording," from Chapter 6, and Chapter 5, "Error Correction," mainly from Chapter 7. Two parts of Chapter 5, *Hamming distance* (Section 5.8, which now includes the Venn diagram) and *Introduction to error correction in RDAT* (Section 5.15), are largely rewritten. Section 5.15 gives a clearly written and specific application of complex error theory to the R-DAT signal-handling system. It is instructive to see the theory applied to a specific case. Additionally, Chapter 3 includes a section on the AES/EBU interconnect (taken, in turn, from Chapter 5 of the earlier book) that is very well done and appropriately placed. Understanding digital interconnects is vital if a digital system is to work well.

My rather extensive comments about *The Art of Digital Audio* apply to the corresponding chapters in this book as well. The first 147 pages of *RDAT* have text and figures principally in common with the earlier book but nicely rearranged to concentrate attention to those issues most applicable to understanding the R-DAT recording system. If the reader has not read the earlier book, these topics are an essential build-up to the chapters which follow.

Chapter 6 ("The RDAT Tape Transport"), Chapter 7 ("The RDAT Signal System"), and Chapter 8 ("RDAT as a Data Recorder") are wonderfully well written and as up to date as one could want. These 93 pages alone make *RDAT* a worthy addition to the bookshelf of anyone interested in digital recording. Watkinson is at his best form in the presentations in these three chapters. I found Chapter 6, on the mechanical transport and control sys-



tems of R-DAT, very interesting. The author includes here many details on the geometry of helical-scan recording, the mechanics of the transport, and the tracking system. His descriptions of the tape-handling motors, servo system, and alignment requirements are particularly well done. Of great interest to users of R-DAT will be the information on searching for program material and the editing of the material using digital techniques. This is definitely not a razor-blade type of operation (unless the editor of the tape wishes to cut his wrists).

The material on the R-DAT digital signal system (Chapter 7) includes details on formats, headers, interleaving, subcode structure, and time codes—specifics that any knowledgeable recording engineer should understand if the medium is to be used to its fullest. Indeed, this chapter is brimming with helpful information. The final chapter, which treats R-DAT as a data recorder rather than just an audio recorder, is a fine addition here. The author expands understanding of how closely digital audio and other forms of digital data handling and processing are related.

In the end, this book is a fine compilation of material from *The Art of Digital Audio* with extensive new material on R-DAT. It should be required reading for all those using R-DAT in any of its forms.

Coding for Digital Recording is almost completely a reprint from the original book but contains only information that is particular to the actual coding of digital information, with a number of applications presented in the final chapter.

The first four chapters are taken, with some selection and rearrangement, and essentially no new material, from chapters in *The Art of Digital Audio*. Chapter 5, at 80 pages, is also taken mainly from the earlier work. There are about a dozen pages extracted from another of Watkinson's books, *The Art of Digital Video*, and about a dozen pages of new material on CD-ROM and other optical media.

Chapter 1 is an introduction to the need for digital recording, and Chapter 2 briefly describes magnetic and optical recording schemes in popular use. These two chapters are both interesting and appropriate to the purpose of the book.

Chapters 3 and 4 are identical to Chapters 6 and 7 in *The Art of Digital Audio*. As indicated in my 1990 review, these chapters describe the heart of digital signal processing and are quite good. That is not to say that there are not some difficulties with the material presented. The writing is very compact, and some instances of major jumps in the train of thought are difficult to overcome. But as an overview and with the perspective of several years between these reviews, the new book holds up well.

In Chapter 4, "Error Correction," there is one substantially rewritten portion, Section 4.10, in which hamming distance is treated. The Venn diagram is discussed in some detail, and the back of the book has a large fold-out Venn diagram. This is a sort of coder's "centerfold," I suppose. The new material, four pages, is well written and interesting. Unfortunately, Venn did not get included in the index, an indication of a bit of haste in putting the book together.

Coding for Digital Recording is a good selection of material from the earlier book; at least 90% of it is extracted from *The Art of Digital Audio*. However, I would still suggest that you consider purchasing the earlier title. Although possibly twice the price, it is twice the book and all in all a far better choice for the sake of its completeness.

R. A. Greiner

DEEP BASS

SUBWOOFERS

MILLER & KREISEL SOUND CORPORATION

Push-Pull Dual Driver Powered Subwoofers

MX-100, MX-90, MX-80, & MX-70

10391 Jefferson Boulevard
Culver City, CA 90232
(213) 204-2854
In Canada: (604) 875-4475
Fax: (604) 872-1210

Musical Articulation. Detail. Elusive qualities of superior sonic reproduction that are *rarely* found in even the most expensive subwoofers.

Until now!

M&K's new MX subwoofers bring you these high-performance qualities—in a smaller cabinet and at a lower price.

In a cabinet the size of a bookshelf speaker, two new proprietary 12" subwoofer drivers produce the massive amounts of bass only expected from much larger cabinets. Better yet, M&K's Push-Pull design produces a much higher quality of bass by virtually eliminating even-order harmonic distortion.

MX-100, MX-90, MX-80 & MX-70

Four MX models, with internal amplifiers between 75 and 200 watts RMS, provide an ideal match for your system.

Building On Excellence

Seventeen years of M&K experience in Satellite-Subwoofer systems comes together *again* to create a new subwoofer performance standard. And with the 18" x 10" x 13.5" MX-70, M&K creates a new *compact* subwoofer standard.

The Ideal Choice

The unprecedented musical articulation and "ultra quick" sound of the MX subwoofers make them the perfect choice to complete any audio or audio/video system.

Enter No. 23 on Reader Service Card

MAGNIFICENT MAHLER

Mahler: Symphony No. 9 in D. Berlin Philharmonic, Leonard Bernstein.
Deutsche Grammophon 4353782, two CDs; DDD; 82:02.

Leonard Bernstein's death left uncompleted his cycle of the Mahler symphonies for Deutsche Grammophon. This necessitated a certain improvisation: Instead of realizing plans made for the Eighth, the label has released (on the two-CD set 4351022) Bernstein's 1975 performance of that great work at the Salzburg Festival with the Vienna Philharmonic and stellar soloists, plus the only completed movement from the 10th, the Adagio. If improvisation has also given us this unique recording of the Ninth, derived from two concerts during the 1979 Berlin Festival, then necessity in this instance has indeed become a virtue, and a very rare one.

A bit of stage-setting makes this extraordinary performance an even more affecting and poignant one. I still lived in Berlin at that time, and nothing conceivable would have prevented my attending the first of those concerts. For Bernstein himself, extramusical circumstances made the event extremely important for him. Tortuous, protracted negotiations delayed his debut with the Berlin Philharmonic for several years, but the Berlin Festival's director finally found a way to accommodate Bernstein's insistence on making the event a benefit for Amnesty International. Eyewitnesses reported that during rehearsals Bernstein only rarely stopped weeping; the fact that Hitler's former chancellery lay little more than a stone's throw away from the podium in the Philharmonie merely heightened the tensions of the moment.

One partisan *Philharmoniker* in particular regarded Bernstein as some sort of anti-Karajan, and almost defiantly sabotaged the interloper's first day of rehearsal. The next morning (after the mutineer called in sick and another player took over), Bernstein dared the rare step of appealing to the musicians for the reason they responded so inadequately to his conducting. His risk—a substantial one—paid off: From that point on, they played their hearts out for him, and this recording (taken over from RIAS, *Rundfunk im amerikanischen Sektor*) preserves the miraculous results. These pampered musicians, an exceedingly tough crew to impress, already knew all the world's greatest conductors. Even so, at the American ambassador's post-concert reception, when I ran into the Philharmonic's pianist Horst Göbel, his eyes aflame, he said, after a long pause for reflection: "I believe this was the most beautiful concert of my entire life."

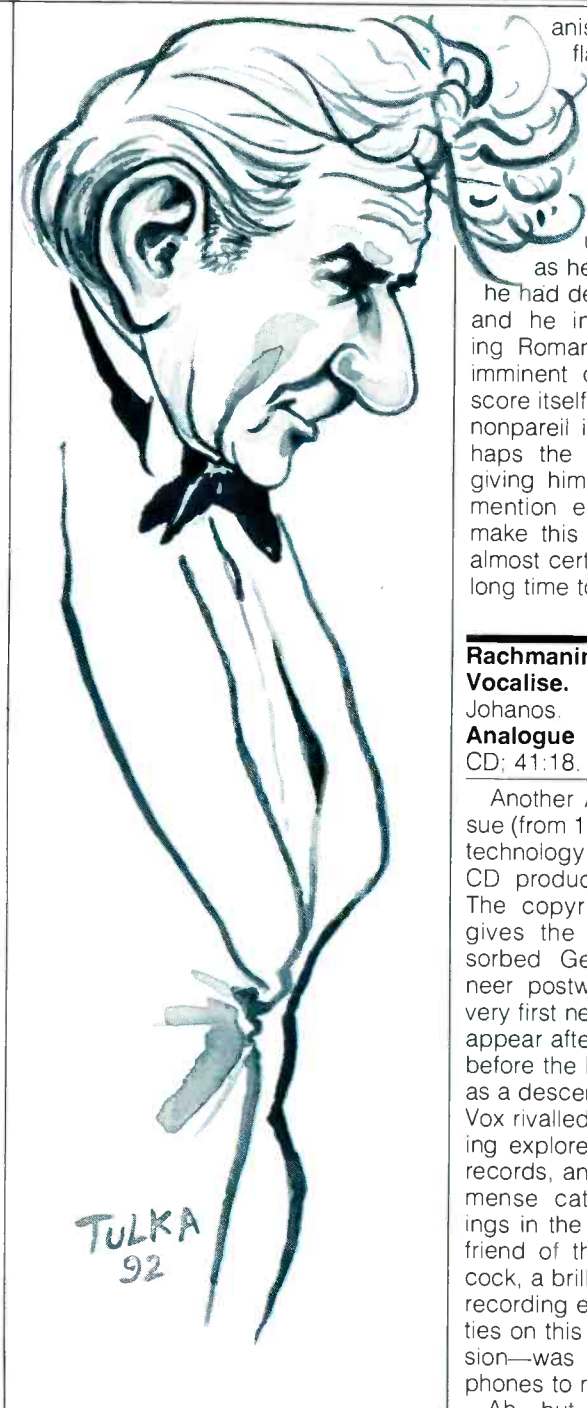


Illustration: Rick Tulka

Many listeners will find this performance almost unbearably moving. Mahler, as he composed the work, knew he had death staring him in the face, and he in fact wrote this wrenching Romantic masterpiece about his imminent demise. The overpowering score itself, combined with Bernstein's nonpareil interpretation of it and perhaps the world's greatest orchestra giving him and Mahler its all, not to mention exceptionally good sonics, make this Mahler Ninth one that will almost certainly set the standard for a long time to come. *Paul Moor*

Rachmaninoff: Symphonic Dances; Vocalise. Dallas Symphony, Donald Johanos.
Analogue Productions APCD 006, CD; 41:18.

Another Analogue Productions reissue (from 1967), complete with all-tube technology up to, of course, the final CD product. Interesting side points: The copyright, Moss Music Group, gives the original away—Moss absorbed George Mendelssohn's pioneer postwar label, Vox, one of the very first new American small outfits to appear after World War II, some years before the LP. (Yes—George M. rated as a descendant of *the* Mendelssohn!) Vox rivalled Vanguard as an enterprising explorer in new musical fields for records, and both labels amassed immense catalogs of original recordings in the heady days of the LP. My friend of those days, David B. Hancock, a brilliant pianist who was also a recording engineer, did the technicalities on this job. His hobby—or profession—was altering top-quality microphones to make them even topper.

Ah—but more! Yes, the CD is remarkably short, but it is very complete as a musical message. The Symphonic Dances were Rachmaninoff's last composition, written in this country in 1940 after his emigration here. He was in the New York area at the time, but moved to California to "be with his Russian

THE FOUR ALBUMS THAT MADE MUSIC HISTORY
BY DEFINING "AUDIOPHILE" FOR MILLIONS.
NOW IN A LIMITED EDITION COLLECTOR'S SET.

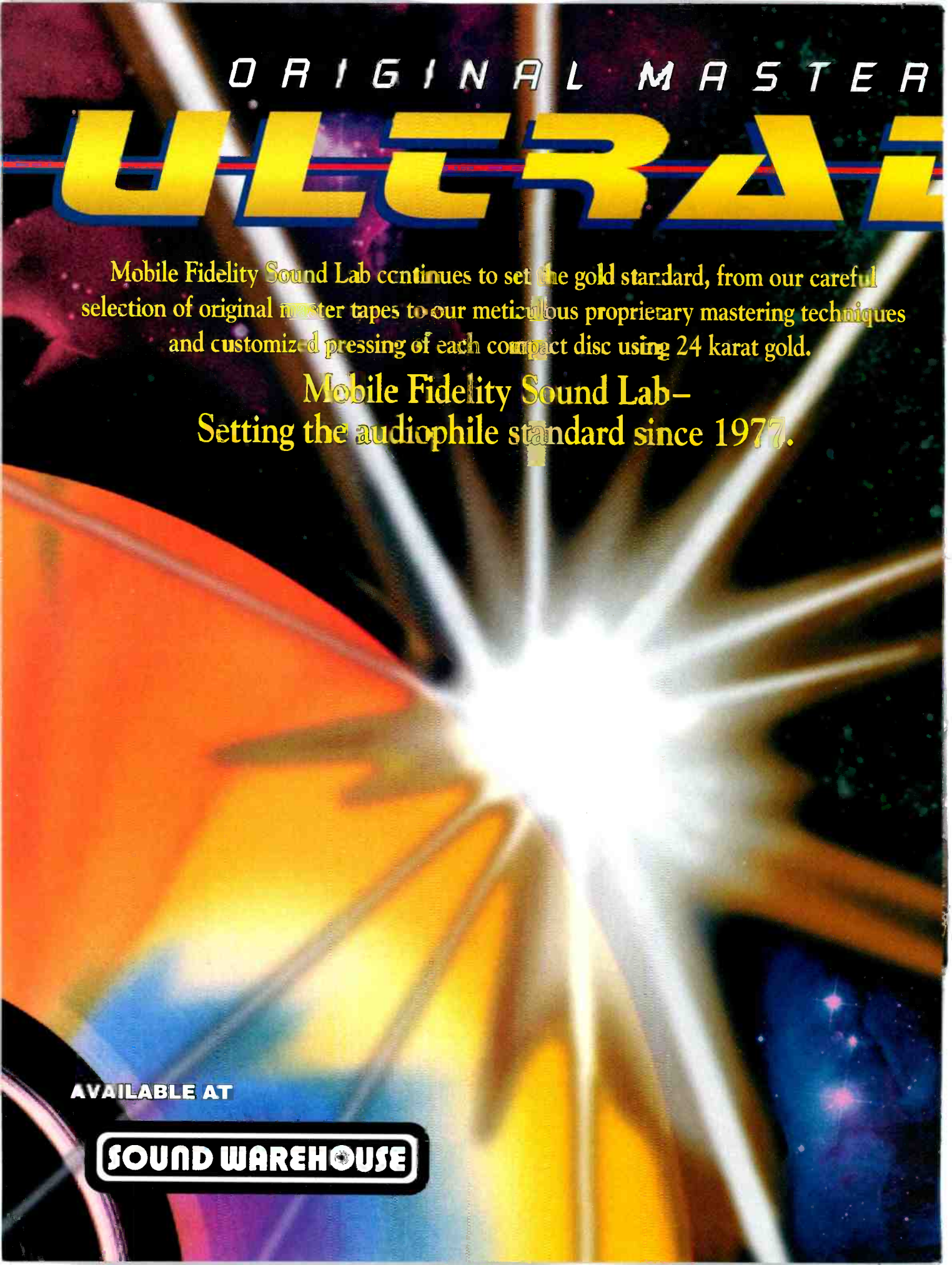
Fresh Aire

SEASONS

The perfect gift and a must-have collection for audio enthusiasts. SEASONS by Composer Chip Davis with Mannheim Steamroller brings you four CD recordings which redefined state-of-the-art and forever changed the listening expectations of millions. This classic set of Fresh Aire I, II, III & IV paints the four seasons in the "Mannheim Steamroller Style" that has won adoring fans worldwide. Available now at finer record stores.

AMERICAN GRAMAPHONE

Enter No. 3 on Reader Service Card


ORIGINAL MASTER
ULTRA
Mobile Fidelity Sound Lab continues to set the gold standard, from our careful selection of original master tapes to our meticulous proprietary mastering techniques and customized pressing of each compact disc using 24 karat gold.
Mobile Fidelity Sound Lab–
Setting the audiophile standard since 1977.
AVAILABLE AT
SOUND WAREHOUSE

RECORDING™

ULTRADISC II™

UDCD 555

UDCD 556

UDCD 557

UDCD 2-558

UDCD 559

UDCD 560

UDCD 561

UDCD 562

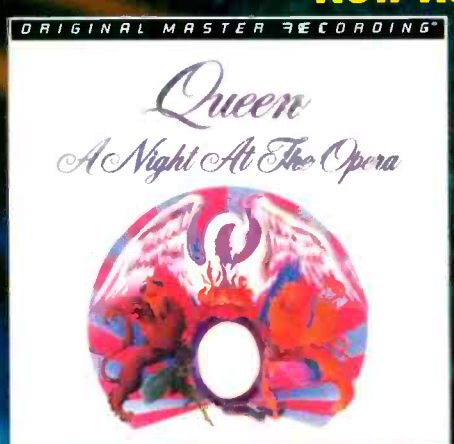
UDCD 563

UDCD 566

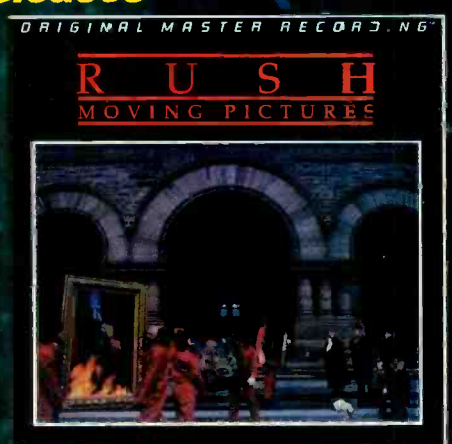
UDCD 567

UDCD 565

New Releases



UDCD 568



UDCD 589

mobile fidelity sound lab
a division of MFSL, Inc.

The Great American Audio Company™

ULTRADISC II™ is a new, improved ULTRADISC™ formulation.

For a free MFSL catalog, call 800-423-5759

Enter No. 26 on Reader Service Card

On *Horowitz the Poet*, the pianist had something much more important than demonic pyrotechnics on his mind: Pure music.

friends in the film industry." Maybe that's what killed him in 1943. It is a remarkable piece, this disguised short symphony in three oversized dance movements, and not in any way at all a feeble effort. It has every bit of the vast energy of the earlier works, as well as the usual sense of a-bit-too-much-and-too-long. The man was clearly at his full strength and undiminished in ability.

One of my music students at Finch College in New York at that time came to me breathlessly to say that Rachmaninoff lived in her apartment house and she saw him often going in and out. Didn't say where she lived. Maybe she lived in Huntington, Long Island, where all the books say *he* lived? Or did he have a part-time toehold in New York City? She would tell me she had seen him just that very morning. . . . Near as I ever got to the great man.

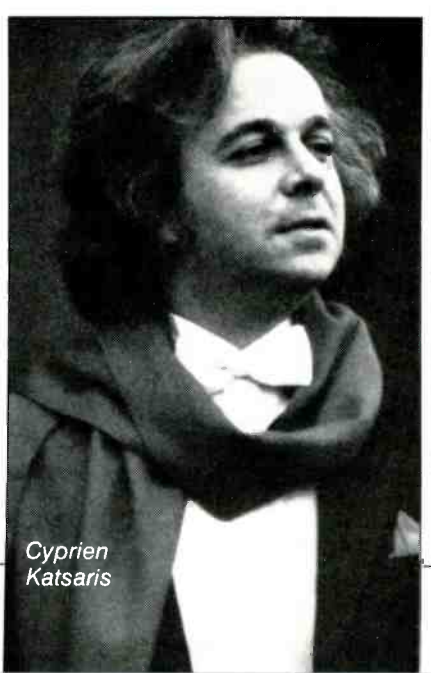
I think we may well revalue Rachmaninoff today, as a late Romantic who composed right through the Stravinskian neo-classic era, never departing a bit from the basic Romantic sound. Yet, as we can hear in this splendid performance of the Dances, he was able to absorb for the quick ear many of the real aspects of "modern" music, built into his own idiom. From where else the ever-increasing dissonance, the high-tension nervousness, the "jazz"-syncopated rhythms of the last movement? He was a lot more of his time than we thought.

The Dallas Symphony is fulsomely praised in the booklet in the usual PR terms. But here, *every word*, I can attest, is true. I could only wish some of the major orchestras today could play with the freedom, accuracy, and utterly musical ensemble of this 1967 Texas group under a splendidly aware conductor. Does it matter whether you have heard of him or not? I hadn't.

Edward Tatnall Canby

Schubert: Piano Sonata in B Flat, Op. posth.; Schumann: Scenes from Childhood, Op. 15. Vladimir Horowitz, piano.
Deutsche Grammophon 435025-2, CD; DDD; 56:07.

Those of us lucky enough to have heard Horowitz in person will almost certainly never hear his like again. Historically, Franz Liszt holds a hallowed place as the greatest piano virtuoso of all time, but one wonders, if Liszt could have made recordings, how his playing would stand up today to that of Horowitz, to mention only one name. Horowitz's musical and technical magic, at its best, bordered on the supernatural. How wonderful that these two performances—the Schubert in New York's RCA Studio in 1986 and the Schumann in a recital broadcast from the auditorium of Vienna's Musikverein in 1987—show the old warlock, even in his 80s, still a unique master with a style, a sound, and especially a unique articulation easily recognizable to the experienced ear. If these works include none of those demonic pyrotechnics that inevitably brought audiences leaping to their feet cheering, who cares? When he played these two performances, Horowitz had something infinitely more important on his mind: Pure music.


Cyprien Katsaris

Not for nothing has Deutsche Grammophon dubbed this disc *Horowitz the Poet*. This most stupendous pianistic technician of his era also had at his disposal a musicality that could turn something as simple as Schumann's hackneyed "Träumerei"—which he dearly loved, and often played as an encore—into a memorably limpid little gem. In this Schubert he chose a towering masterpiece, arguably the greatest of all Schubert's sonatas, which Horowitz plays with a heart-rending poignancy. Deutsche Grammophon's engineers have obviously exerted themselves to rise splendidly to this historic occasion.

Paul Moor

Brahms: Piano Concerto No. 2 in B Flat. Cyprien Katsaris, piano; Philharmonia Orchestra, Eliahu Inbal.
Teldec 2292-44936-2, CD; 50:43.

Three minutes of this familiar Brahms, which I had not heard for a long time, and it struck out clearly as "neo-Romantic"—the recent and renewed Romantic approach after the years of more rigid neo-classical. It's the same old Brahms, but somehow with a new rosiness in the cheek and a bit less formidable beard. Do we hear echoes of such as Schumann and even Tchaikovksy in this rendition? It's up to date, no question.

Neo-Romantic, of course, is now close to middle-aged. These are not kids, this pianist and this conductor. But they seem, at least to this long-time reviewer, to have much in common, not only early middle age and long hair, but a clearly *different* approach to the old conservative master. No longer is the old rigorous classic sound present, as in the seminal recordings of Bruno Walter; now all is relaxed and flowery, as though there were never a difference between Brahms and his musical antitheses of the 19th century, the "real" Romantics of the Wagner-Liszt school! That was a musical fight to the death, and I was brought up on its principles: Brahms, the academic conservative, Wagner, the Great Liberator. Gone! And probably rightly.

In practical terms, there are discrete differences that any Brahms listener

History Repeats Itself

History shows that in 1973 the Nakamichi 1000 forever changed the destiny of the audio cassette. Against all odds the world's first true 3-head cassette deck had transformed a medium designed for convenience into a serious audio recordist's dream-come-true

Now, the dream continues . . . Nakamichi's new line for 1993—consisting of four CD players, three cassette decks, three audio receivers and two audio/video receivers—incorporates Nakamichi's latest technologies and most refined build quality.

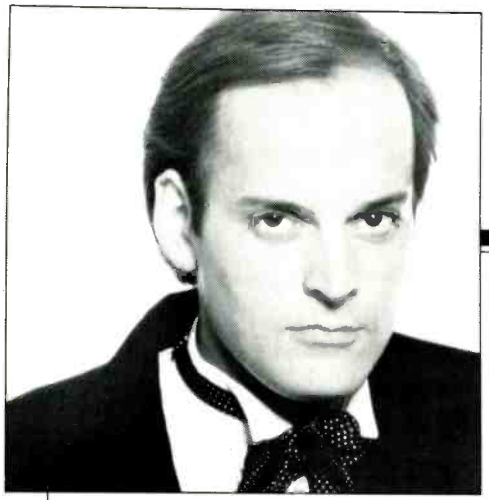
Developed through both extensive "live vs. reproduced" listening tests and laboratory measurements, the new Nakamichi line combines outstanding musical accuracy with the most advanced ergonomics and features. For example, the new A/V receivers employ advanced DSP circuitry for both ambience synthesis and Dolby® Pro Logic Surround decoding. By performing signal processing entirely in the digital domain, Nakamichi can create the most natural sounding effects . . . without noise or distortion.

The only aspect of the new Nakamichi line that you might find surprising is its remarkable affordability. Audition the new Nakamichi line today, and be a part of history in the making . . . again.

Nakamichi

Dolby and Pro Logic are trademarks of Dolby Laboratories Licensing Corporation.

Nakamichi America Corporation 19701 S. Vermont Avenue, Torrance, CA 90502 Phone: (310) 538-8150
Nakamichi Canada 276 South West Marine Drive, Vancouver, B.C. V5X 2R4 Phone: (604) 324-7535



When pianist Louis Lortie comes in on Schumann's A Minor Concerto, suddenly the composer himself looms as real as "3-D."

Photograph: Jean Blais Elle Quebec

can hear. Yes, Brahms did stress the overall structure of his work, always, sometimes even painfully, never wasting a note nor writing a purely inspirational tune just for the fun of it. Yet these things are *there*, even so, integrated into the ever larger structures he set down. Oddly, the neo-Romantics, as here, are mildly misguided in two directions. Yes, they play Brahms as full of sighs and ecstasy, from moment to moment, as I never remember it before. But curiously, they often miss the *real* high points of Romantic melody and dramatic contrast! This to an older ear is the characteristic of the neo-Romantic school of revivals. Go listen to the Brahms recordings of the 1950s and '60s for the significantly higher tension, the cleaner structure, the more truly *Romantic* performances that came out of the actual world of Brahms, not to say Wagner and Liszt, who were far more rigorous in their composing than our younger musicians suppose.

I enjoyed Inbal's free-wheeling orchestral accompaniment and wonder how he got it out of the Philharmonia, schooled in earlier Brahms for decades. Katsaris, the pianist, is dedicated and musical, makes many of the big musical points, and yet curiously does not seem to know how to project the grand shapes of the big Brahms melodies, nor the elfin staccato quality of some of the more pixie-like details—one of the high points in Brahms' piano writing. (Brahms played the first performance himself in 1881.) Yet, Brahms lives again, even so! What glorious continuity the art of recording has added to the art of music.

Edward Tatnall Canby

The Chopin Mazurkas, Vol. 1. Karen Kushner, piano.
Connoisseur Society, CD; 66:30.

It is a pleasure to have E. Alan Silver still around the New York recording scene—older audio people will remember his name from the early days. He was, I think, a definitive recordist in the move towards quality cassettes with his long-time Connoisseur Society, working from the start to the highest standards in both the recording and the transfer to home tape. Very early, Silver found himself inclined towards the piano, not only as a recording challenge but as a workable and reasonable medium for a small label, given musical taste and recording judgment.

Nobody has had a more productive experience in piano recording than Silver, both musically and technically, and you will hear the accumulated result in the superbly natural sound of this CD. It is limpid, with never a twang or buzz and notably a lack of mechanical noise, traits all too evident in many a piano recording. I have never heard it better.

It must be a pleasure, too, for Silver to exploit the CD, which is the greatest gift to piano recording in our history. A good ear will always notice the true pitch of a good piano CD, far beyond anything on cassette or LP.

I didn't even look at the pianist's name when this arrived, but I should have remembered that Silver has unerring good taste in picking really musical pianists who may not yet be in the million-dollar bracket and snapped up by the majors! This lady is a gentle and wonderfully polished musician, well schooled in the flexible (but so often maltreated) traditions of Chopin playing. Her New York teachers were good. *They* knew how! Not surprisingly, if I remember well, Silver had to do with their careers too, just as he now records New Yorker Karen Kushner.

Edward Tatnall Canby

Peter Tiboris

Schumann: Piano Concerto in A Minor; Chopin: Piano Concerto No. 2 in F Minor. Louis Lortie, piano; The Philharmonia, Neeme Järvi. **Chandos SK 48043.**

Louis Lortie, a youngish pianist new to me (there are hundreds), made me sit up with a start—Schumann come to life! The Philharmonia, that highly superior orchestra, is nothing much here—one senses just another job. But when Louis Lortie comes in, suddenly Schumann himself looms as real as "3-D." I was astonished, as one is so often astonished these days, at the impact, via CD, of relatively unknown musicians. Lortie is one of those people who simply *understands*, intuitively it seems, as though predestined to know. The man communicates, all-out.

Lortie's Chopin is only less impressive because the music is not as persuasive, because it's early Chopin and, when you come down to it, a somewhat inept attempt. The orchestra just plays chords, for the most part. Accompaniment. The piano doodles along, gracefully and melodically, but this doesn't compare with the best of Chopin. Can't blame Louis Lortie for this.

Edward Tatnall Canby

Beethoven: Symphony No. 9 in D Minor, Op. 125 (1895 Gustav Mahler Edition). Soloists; Janáček Opera Choir and the Brno Philharmonic, Peter Tiboris. **Bridge BCD 9033.**
Beethoven: Symphony No. 9 in D Minor, Op. 125 (1895 Gustav Mahler Edition). Soloists; Cincinnati College-Conservatory of Music Chorale-Motet and Chamber Choir; Cincinnati Philharmonia, Gerhard Samuel. **Centaur CRC 2107.**

Why in the world would a conductor of Gustav Mahler's monumental stature

Definitive Technology's Award Winning C1 Center/Main and BP2 Bipolar Satellite/Surround Speakers

Winners of the Prestigious Design and Engineering Award at the International Consumer Electronics Show.

For the ultimate in musical and home theatre performance.

Enthusiasts and world renowned experts acknowledge the dramatic sonic superiority of Definitive loudspeakers for both the superb reproduction of music and the dramatic special effects and dialogue of home theatre surround sound.

C1: World's Finest Center Channel Speaker

Optimum surround sound reproduction places heavy demands on the center channel speaker which in effect is the main speaker and handles 50% or more of the program material. It is no place to settle for second best. Definitive's C1 is the finest shielded, low profile, high resolution center channel/main speaker available. It uses superior state-of-the-art components and technology for extraordinary ultra high definition articulate clarity and 200 watt power handling.

The BP2's Bipolar Advantage

The BP2s are unique ultra compact high resolution bipolar (front and rear radiating) systems intended primarily for use on the rear/side surround channels of the finest home theatre systems. Experts agree that bipolars provide a perfectly diffuse sound source which is ideal for these applications. The use of BP2s results in a much more lifelike, dramatic all-enveloping listening experience than is possible with conventional speakers. In addition, because of their superb performance characteristics, the BP2s also make exceptional main channel speakers.

For More Information
Call 1-800-451-2248

Definitive Technology®
11105 Valley Heights Dr. • Baltimore, MD 21117 • (410) 363-7148

Enter No. 15 on Reader Service Card

When Mahler presumed to reorchestrate Beethoven's Ninth, he was constantly and solely concerned with the composer's wishes.

presume to reorchestrate one of the towering masterpieces of perhaps the greatest of all composers?

On the one hand, Mahler leaves the vocal parts and the original tempo indications unaltered; on the other, his version calls for additional timpani and four additional horns, introduces doublings between winds and strings, extends Beethoven's dynamic indications from *pp* and *ff* to *pppp* and *ffff*, and even introduces new countermelodic material! Mahler defended his audacities by claiming that, "Far from following any arbitrary purpose or course, but also without allowing [myself] to be led astray by 'tradition,' [I] was constantly and solely concerned with carrying out Beethoven's wishes in their minutest detail, and ensuring that nothing the master intended should be sacrificed or drowned out amid the general confusion of sound." Well, Beethoven's deafness had, of course, by that time become virtually total; also, later concert halls make those he composed for appear to be miniature.

Purists may rise up in wrath, but this curiosity does have its charms, albeit fewer than Mozart's delicious reworking of Handel's Messiah. These performances, neither a world-beater but both adequate, leave little to choose between. Centaur has made its recording at a puzzlingly low volume level, but both offer adequate fidelity.

Paul Moor

Strauss Waltzes. Vienna State Opera Orchestra, Jascha Horenstein. **Chesky CD 70.**

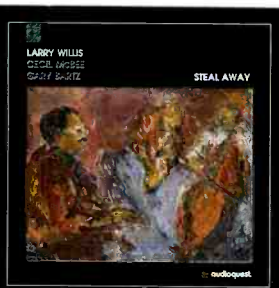
For at least a century, any professional musician operating in Vienna has been ready to play almost any Strauss (Johann Jr.) waltz in his sleep, and probably every other day as well. Here is the Viennese tradition as of a generation ago. Different? Yes. There is a certain tightness and efficiency that says 1962 emphatically. That was before the popular return of the Romantic way of doing things! "Make your point but don't exaggerate" was the then-current musical approach, and not even romantic Vienna could avoid doing it that way.

The curious thing is that this and other similar old recordings now compete virtually on a par with newer versions—and a new generation of musicians. It is a brand-new way of carrying on an old tradition, a sort of active feedback in the literal sound, to supplement the older "live" way of handing on music from one era to the next. Remarkable.

For my ear, the Chesky label does an excellent and unobtrusive job on transferring these top-quality analog recordings to the CD medium. This sort of transfer, to our great artistic advantage as well as audio's, is becoming routine in thousands of examples, though not always carried off as well.

Edward Tatnall Canby

MORE WORKS OF ART...



◀ LARRY WILLIS
STEAL AWAY
AQ 1009
also featuring Cecil McBee & Gary Bartz
Three giants of jazz turn in a per-formance of spirituals, blues and originals that is truly stunning. Past associations of these three include Miles Davis, Cannonball Adderly, Joe Henderson, Charles Lloyd and Phoraoh Sanders. Don't miss this one!

▲ BRUCE KATZ BAND
CRESCENT CRAWL
AQ 1012
"Amazing" is the only way to describe Bruce Katz's piano and Hammond B-3 organ playing. He has awesome technique along with that important "something extra" - soul. This Boston based group combines a forward looking jazz groove with what can only be called a turbo charged Booker T and the MG's sound. Features Bob Malach on tenor sax.

ROBERT LUCAS
BUILT FOR COMFORT
AQ 1011 ▶
Robert Lucas has received universal praise from the world-wide blues community for his first two releases on AudioQuest. "Built For Comfort" is a tasty combination of solo, duo and group offerings with backing musicians including Stephen Hodges (Tom Waits, James Harman) drums, and Freebo (Bonnie Raitt), tuba. "Built For Comfort" is Robert's best yet!

◀ MOKAVE VOL. 2
AQ 1007
GLEN MOORE, LARRY KARUSH, GLEN VELEZ
MOKAVE VOL.1
"***** ....an intense collaboration" said *DownBeat* in a rave review of Mokave Vol 1. Vol 2 features more from the masters of world music and improvisation. Those who have heard Vol. 1 already know. Mokave is earthy, funky, cerebral and a lot of fun!

◀ VICTOR LEWIS
FAMILY PORTRAIT
AQ 1010
also featuring JOHN STUBBLEFIELD, EDUARDO SIMON, CECIL MCBEE, DON ALIAS, JUMMA SANTOS
Victor Lewis is an extraordinarily talented drummer and composer who co-leads the acclaimed group Horizon with Bobby Watson. He has been the subject of recent feature stories in *DownBeat, The Wire, Modern Drummer and Newsweek*. "Family Portrait" features an all star cast of jazz luminaries and is a showcase for the composing talents of New York's most in demand drummer.

Also available from AudioQuest:
AQ1001 Robert Lucas-Usin Man Blues
AQ1002 Strunz and Farah
AQ1003 Tuxedo Cowboy
AQ1004 Robert Lucas-Luke and The Locomotives
AQ1005 Trio Galanterie
AQ1006 Mokave Vol. 1
AQ1008 Works of Art Sampler-Selected tracks from the first six AudioQuest releases

audioquest
State of the Art Music/State of the Art Sound
P.O. Box 3060
San Clemente, CA 92674 USA
(714) 498 2770

AVAILABLE AT ALL TOWER RECORDS | VIDEO LOCATIONS.
TO ORDER BY PHONE: TOWER RECORDS (800) 648-4844 OR ACOUSTIC SOUNDS (800) 525-1630

SOME THINGS ARE TIMELESS

My Foolish Heart
LIZ STORY

Pianist Liz Story takes a turn toward the world of popular romantic standards. *My Foolish Heart* features 14 intimate piano solos and piano/bass duets; timeless treasures from the catalogs of Duke Ellington, Rodgers & Hart, Jerome Kern and many others. Her sensitive exploration of these graceful classics evokes an enchanted mood that radiates with every song.

Stained Glass Memories
SCOTT COSSU

Following a three year absence from recording due to a near-fatal auto accident, Scott Cossu's return is marked by a momentous album on Windham Hill that clearly signals his prominence among contemporary instrumental artists. His latest work faithfully covers a variety of musical styles: Brazilian, Latin-inspired pieces, and chamber-oriented acoustic ballads.

Spider Dreams
TURTLE ISLAND STRING QUARTET

Suite for jazz string orchestra. From its inception, TISQ has pushed the envelope for string ensembles. On their latest CD, they expand their palette beyond the traditional quartet in both scale and content, bringing an improvisational, swing approach to a series of original compositions by group member David Balakrishnan. "Their voice is authentic and passionate." –Yo–Yo Ma

© 1992 Windham Hill Records

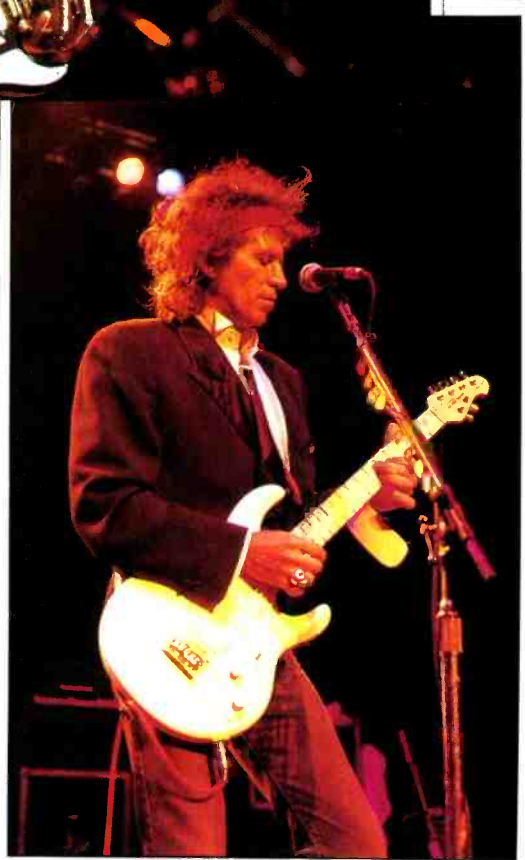
WOODY KICKS BUTT...KEITH KICKS BUCKET?

Slide on This: Ronnie Wood
Continuum 19210-2, CD; 59:23.
Sound: B Performance: B+

Main Offender: Keith Richards
Virgin V2-86499, CD; 49:37.
Sound: B+ Performance: B–

Ron Wood has been a Rolling Stone three times longer than Brian Jones or Mick Taylor—and has proven to be just as vital to the band's interplay. Next to Keith Richards, though, he's always seen as the upstart in their game of dodgeball guitar. But as a solo artist, Wood is now the tougher competitor.

Judging from its stylish DigiTrak package, one might expect Wood's *Slide on This* to be ultra slick, but the album is an agreeably dog-eared affair. Once past the opening track's drum machine, we're reassured by all-natural percussionists (among them Charlie Watts), and Wood fills holes with both terse slide guitar and his customary snippets of licks. Throughout, his Dylan-and-clove-spiced vocals jostle well with the smoky calls of Bernard Fowler, who also shares writing, arranging, and production credits. A few invigorating covers (including George Clinton's "Testify") supplement originals that range from the Philly soul of "Thinkin' " to some surprisingly fresh Stones-style numbers, especially "Like It" (with ferocious backing by Hothouse Flowers). Wood appears to relish his album's occasionally ragged sound, and if his goal is to reassert that rock keeps you young, then he's truly earned back the name "Ronnie."



On the first three tracks of *Main Offender*, Richards comes over like a kid as well. The voice seems rehabilitated, and the aggressive guitar is classic Keith. But the suspicion that this muscle carries little meat is borne out by the frail cuts that follow; sadly, by the time of "Runnin' Too Deep" and "Will but You Won't," the last thing we want to hear is another Stones chord. Elsewhere, nearly seven minutes are spent on thin reggae ("Words of Wonder"), and Steve Jordan bogs down the ballad 'Hate It When You Leave" with some unaccountably sluggish drumming. It would have been nice to hear this potentially affecting song on Richards looser, more involving *Talk Is Cheap*, where band and material were a lot less forced. *Ken Richardson*

Us: Peter Gabriel
Geffen GEFD 24473, CD; 57:49.
Sound: B Performance: A–

Peter Gabriel's *Us* picks up where *So* left off in 1986, with detours through the *Passion* soundtrack recording, the breakup of his marriage, a failed relationship with actress Rosanna Arquette, and therapy. It all emerges from the pan-global grooves of *Us*, possibly Gabriel's most personal album, and one where he looks inward rather than outward.

That's what informs the swampy beat of "Digging in the Dirt," the lead single and video. It's an emotional pendulum, swinging from verses tinged with angry violence ("Shut your mouth") to cries for help and understanding.

Gabriel mixes and matches cultures with willful abandon. "Come Talk to Me" has Scottish bagpipes, African drums, the Dmitri Pokrovsky Ensemble from Russia, and the Armenian doudouk. The doudouk is a serene double-reed instrument whose caressing tones echo Gabriel's own psychological journey. Gabriel makes all the cultures sound like they belong in the same village.

A few tracks follow too closely in the spirit of *So*'s "Sledgehammer" and "Big Time." "Kiss That Frog" is a tongue-in-cheek lark, while "Steam" recalls the jubilant rhythms of Martha and The Vandellas' "Dancing in the Street." But several songs are more

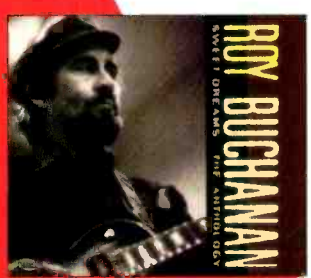
Photograph: ©Ken Settle

GET THE COLLECTION OF A LIFETIME WITHOUT A LIFETIME OF COLLECTING

ROD STEWART
"THE MERCURY ANTHOLOGY"

CHRONICLES
THE DELUXE ANTHOLOGY SERIES

THE ALLMAN BROTHERS BAND
"THE FILLMORE CONCERTS"



ROY BUCHANAN
"SWEET DREAMS: THE ANTHOLOGY"

MORE THAN TWO HOURS OF MUSIC IN EACH DELUXE 2-CD MINI-BOX. PLUS, CAREFULLY RESEARCHED BOOKLETS THAT CHRONICLE EACH ARTIST'S CAREER WITH DEFINITIVE NEW ESSAYS, AND A TREASURE OF INCREDIBLE PHOTOS!

FOR MORE INFORMATION WRITE TO:

CHRONICLES
825 EIGHTH AVENUE
20TH FLOOR
N.Y., N.Y. 10019

THE TROGGS
"ARCHEOLOGY (1966-1976)"

JOHN MAYALL
"LONDON BLUES (1964-1969)"

JOHN MAYALL
"ROOM TO MOVE (1969-1974)"

mercury
a PolyGram company

polydor

CHRONICLES

fontana

DERAM

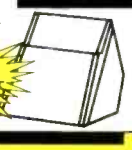
© 1992 PolyGram Records, Inc.

FACTORY AUTHORIZED

ROCK PARTNER

Bookshelf/floorstanding acoustic suspension 2-way loudspeaker system. Features 8" long-throw woofer and 1-3/4" liquid-cooled dome tweeter. The Rock Partner is equalized to boost bass output. Perfect for floor corner or shelf placement.

AR ACOUSTIC RESEARCH



Originally $300

LIMITED QUANTITIES

$129

CALL FOR HI - SERIES

DIGITAL PREAMP

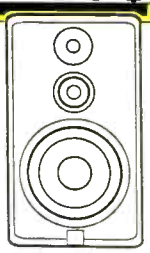
Remote controlled digital preamp features:
- 4 DA Super Linear converters
- 4X ovesampling digital filter
- Balanced output terminals (pre-out)
- MM/MC phono input
- A/V compatibility

Orig $1000 **$469**

CANTON

Karat 980

This top-of-the-line model of Canton Karat Series offers not only unparalleled sound neutrality over the entire frequency spectrum - it also provides the highest degree of bass dynamics. 3-Way bass reflex speaker system. Available in mohagany only



Orig $2000

$1179

CD INTERACTIVE

FREE $100 Software Offer

A totally new concept that finally puts complete control of your TV and audio system right in the palm of your hand! Fun! Excitement! Knowledge! CD-I has it all. Philips CD-I910 is the Imagination Machine that is a perfect gift for the whole family

Orig $799 **$499**

SOUND RETRIEVAL SYSTEM

ADD

3-D AUDIO EXCITEMENT

HUGHES™ AUDIO PRODUCTS

TO YOUR PRESENT TWO SPEAKER HI-FI OR HOME THEATER SYSTEM

- Restores dynamics, depth and incredible width to all of your sound.
- Adds spaciuos ambiance to mono, stereo, or surround type encoded material.
- Does not require extra amps or reaer speakers.
- Allows ycu to quickly upgrade you present investment
- No annoying sweet spot
- Helps make your loudspeakers disappear. Makes ordinary speakers sound extraordinary.
- Can operate in conjunction with surround type decoders.
- Exclusive mono to stereo synthesizer adds naturallife-like presence to mono recordings and old movies

FREE SHIPPING

NEW

RETRIEVER™ Orig $179 **$159**

FREE* BBE 3012

Sonic Maximizer For The Car
"The sound was immediately brighter, airier, and more sparkling, with added punch and snap to transients."
A $139 value

*With purchase of a BBE 1002 Sonic Maximizer • Offer valid only from Nov.10- Dec. 25, 1992 • Does not apply to previous purchases

BBE 1002 Sonic Maximizer

"New layers of detail were revealed...the soundstage was deeper and more three dimensional...proved to be totally addictive to the ears!" A real improvement!

Originally $239 **$189**

FREE*

One Pair of ADVENT Baby II Bookshelf speakers

*With purchase of Luxman System • Offer valid only from Nov.10- Dec. 25, 1992 • Does not apply to previous purchases

LUXMAN Design Series

Modest Size, Maximum Performance

A-007 - 40W/ch Integrated Amp
Digital direct (optical or coaxial)

T-007 - Digital Synthesized AM/FM Tuner
Built-in timer; 20 randomly selected presets

D-007 - Digital Exclusive CD Player
16 program selections

K-007 - Auto Reverse Double Cassette Deck
Dolby® B/C, HX Pro; Double-speed dubbing

5 YEAR LUXMAN WARRANTY

ORIGINALLY $2600 **$849**

Sound CITY

RETAIL STORE
Meadtown Shopping Center
Route 23 South
Kinnelon, NJ 07405

RETAIL STORE INFORMATION
Call 201•838•3444
Open 7 Days A Week
Mon - Fri 9-9 • Sat 9-6 • Sun 10-5

Factory Authorized for all brands we sell • Not responsible for typographical errors • Some pictures for illustration only • NO refunds on video equipment or car stereo products • 10 day defective exchange from date or receipt (Except on video products) • All returns must be made within 10 days of receipt of merchandise & are subject to a restocking fee • Products returned must be in original condition and packaging. Shipping & handling not refundable

1•800•542•SAVE

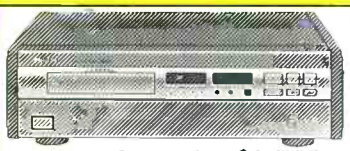
PHILIPS *DFA980*
Reference digital integrated amplifier features 100W/ch RMS into 4 ohms, grade "A" version dual D/A converter chip w/4X OS. Two stage remote volume control
ORIG $750 NOW ONLY **$399**

PHILIPS *DFA1000*
Reference digital integrated amplifier features 120W/ch RMS into 4 ohms, grade "A" version dual D/A converter chip w/4X OS. Two stage remote volume control
ORIG $2500 NOW ONLY **$995**

PHILIPS Cassette Decks LAST CALL

FCR50XBK
Auto reverse cassette deck with Dolby* B/C noise reduction; Dolby* HX Pro and fine bias control, quick music search, tape counter, auto music search & more
ORIG $400 NOW ONLY **$179**

FC315XBK
Dual stereo cassete deck features dual Azimuth adjustments, Dolby* B/C noise reduction, Dolby® HX Pro headroom extension, mic mixing function and more.
ORIG $300 NOW ONLY **$139**



ORIGINALLY $2000
NOW ON SALE
$1299

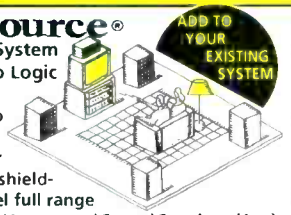
PHILIPS LHH500 *Last Call!*
REFERENCE SERIES CD PLAYER
- New Philips Bitstream Pulse Density Modulation 1-bit 256 times oversampling digital to analog conversion
- 4 DAC digital differential mode
- 700+ selection Favorite Track Selection lifetime memory programming
- 31 key full-function infared remote control transmitter
- Motorized, push-to-close disc tray
- Display Off feature cancels front panel display indication
- Automatic Music Scan for quick disc contents ovrview
- A-B playback or Delete Playback automatically repeats

Also Available LHH1000 Reference Series CD Players

HUGHES AUDIO PRODUCTS MODEL **AK-100**
Sound Retrieval System

"Perhaps the most effective stereo enhancement system, one that even simulates full surround sound."
Len Feldman Video Review March 1991
"The sound spread was so startling that I was certain additional speakers had been turned on-but they hadn't"
Len Feldman Audio April 1992
Holiday Special $249

AudioSource®
Home Theater System 4001 Dolby® Pro Logic System Featues:
- SS4 Dolby® Pro Logic Surround Sound Processor
- VS-One video shielded center channel full range speaker
- LS-Ten/A surround Sound Speakers (1 pr)



Make Your Receiver Into A Home Theater System
NOW ON SALE **$399**

Amp One Subwoofer Amp *170 watts bridged into mono*	$249
EQ10 Computerized EQ *Remote graphic EQ/spectrum analyzer*	$299
SS Three II Surround Processor *Pro Logic w/remote & built-in amps*	$349
AV3 Audio/Video Switcher *5 video/audio sources. Color corrector*	$159
VS One *Center channel shielded speaker*	Call
VS Two *Powered center channel speaker*	Call
LLC2 CD Cleaner *CD laser lens cleaner A must*	$24.95

LUXMAN
Compact Disc Player

DZ-92 REMOTE CD PLAYER
Features dual D/A converters • 4X oversampling digital filter • 3-beam laser • 20 selection programmed play • All metal chassis and housing • Multi-function remote control • STAR circuitry & more.
ORIG $280 NOW ONLY **$129**

5 YEARS
5 YEAR LUXMAN PARTS & LABOR WARRANTY

TELEPHONES

KX-T9000
900MHZ pocket sized folding wireless phone • 30 channel auto scanning • 2 interchangeable batteries • (10) 20 digit speed dial memory

NEW...CALL

KX-T3720 *Cordless* *Auto dialer, 10 ch access*	$99
KX-T3730 *Cordless* *Hands free speakerphone*	$119
KX-T3848 *Cordless* *7-day standby battery life*	NEW
KX-T3980 *Cordless* *2-line with LCD readout*	$169
KX-T4000 *Cordless* *2 interchangeable batteries*	$179
KX-T4350 *Cordless* *Answering system & cradle*	$169
KX-T3860 *Cordless* *Speaker with LCD readout*	NEW

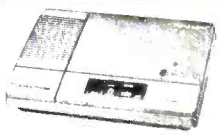
Panasonic
FAMILY DEALER
SELECTION • SERVICE • SATISFACTION

FAX MACHINES

KX-F50
Integrated telephone/fax/answering machine • tone remote system • 10 speed dial memory • Copier function • Fine mode for high resolution.
Orig $550 **$469**

KX-F60 *Telephone answering sys. w/fax*	$529
KX-F90 *Features auto paper cutter*	$599
KX-F110 *Features sequential broadcast*	LOW
KX-F5000 *Plain paper laser facsimile*	CALL
KX-F155 KX-F195 KX-F215 *White facsimile machines*	CALL

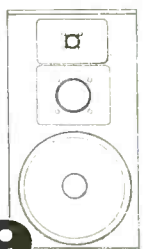
ANSWERING MACHINES



KX-T1000
Micro cassette answering machine with tone remote control and digital call counter
Orig $79 **$45**

KX-T1451 *Dual standard cassette*	$59
KX-T1461 *Voice/time/day stamp*	$69
KX-T1470 *Voice remote menu w/LCD*	$99
KX-T8000 *Digital answering machine*	NEW
KX-T1740 *2-line answering system*	$119
KX-T4400 *Dual micro cass w/cordless*	NEW
KX-T2100 KX-T2300 KX-T5000 *All new answering systems*	

a/d/s 3-Way In-Wall Speaker
750IL Oak Only
- 7" copolymer woofer, advanced 24dB/octave crossover
- Low-diffraction flush baffle and bi-wire capable
- 150 W power handling
- FR 42-20kHz



ORIG $1000 NOW ONLY **$539**

The Long Wait Is Over...
NOW AVAILABLE PHILIPS CDV-400

- S-video and coaxial digital output
- 42-button infared remote control
- Random play w/record edit
- 425 lines horizontal resolution
- 5-mode repeat play

FREE SHIPPING ORIG $599 **$479**

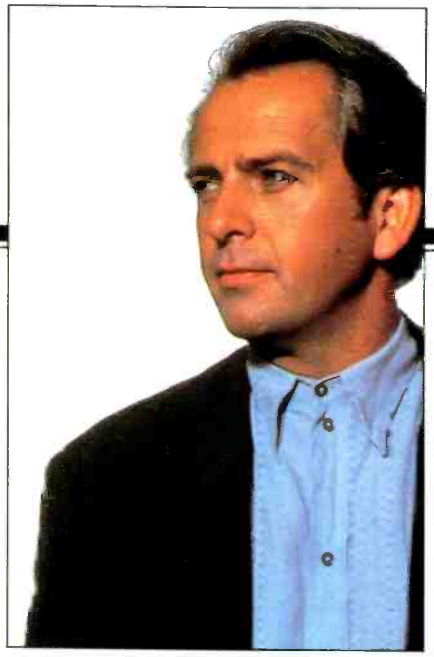
MAIL ORDER CALLS
To Order Toll Free Call:
1•800•542•7283
To Order By Fax Call:
1•201•838•9599
To Order By Mail:
Send Check, Cashiers Check or Money Order.

WE WELCOME
VISA · MasterCard · DISCOVER · AMERICAN EXPRESS
Mail Order Hours:
Monday thru Friday 9am - 9pm
Saturday 9am - 6pm • Sunday 11am - 4pm

CUSTOMER SERVICE
Please Have Your Invoice Number Ready:
1•201•838•1180
Customer Service Hours:
Monday thru Friday
10am - 5pm

Enter No. 44 on Reader Service Card

Pan-global Peter Gabriel emotionally confronts his inner turmoil on possibly his most personal album.



intimate, exploring the interface of sensuality and spirituality. You can hear it in the somber tones of the track "Washing of the Water," as well as in the African train rhythms underpinning Gabriel's tale of miscommunicated love on "Secret World" and the South African choral arrangements of "Blood of Eden," a song couched in the story of Adam and Eve.

Producer Daniel Lanois brings an open, textured atmosphere that complements Gabriel's internal turmoil. *Us* isn't the innovative leap of Gabriel's 1980s trilogy, but like those records it reveals more details, sonically and emotionally, with each listening.

John Diliberto

Burning Questions: Graham Parker. **Capitol CDP-7 99003 2.**

Graham Parker is getting predictable in his career: Sign with a new label, record your best album in years, then follow it up with a contractually obligated piece of self-indulgence. Fortunately, *Burning Questions* falls at the start of this cycle and is his best album since *The Mona Lisa's Sister*. Parker plays all the guitars and doesn't leave any gaping holes, but the instrumental hooks and trademark riffs are few and far between. He's backed by the rhythm section of Bruce Thomas and Pete Thomas, from Elvis Costello's former band, The Attractions; had Parker also enlisted Attractions pianist Steve Nieve, *Burning Questions* would have been a first cousin to Costello's *Armed Forces*. Yet these days, Parker's a lot closer to being Rod Stewart than a latter-day Costello, and he's desperately trying to maintain an angry pose. It's hard to think of anybody who could sing "I've seen the future of rock and it sucks" and not be embarrassed.

Jon & Sally Tiven

99.9° F: Suzanne Vega. **A&M 31454 0005 2.**

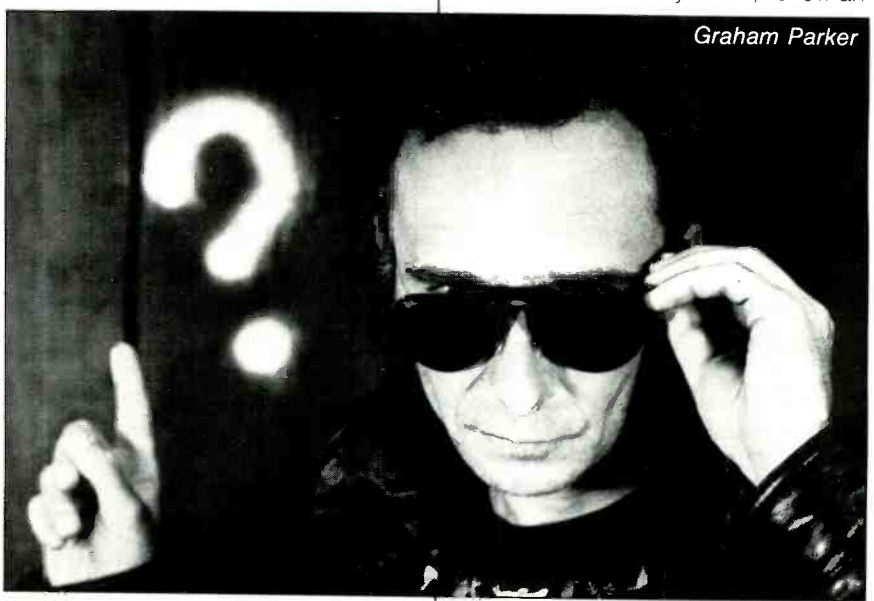
With her waifish ways, Suzanne Vega remains superb at writing about things lost to childhood as we grow older and lose that fine edge of joy. Yet *99.9° F* is too often joyless and plodding. The lovely and depressing poetry of "Blood Sings," the retro-psychedelic drone of "Fat Man and Dancing Girl," and the title cut itself, a sort of rap song on lithium, are woven and expressed without passion. Vega's songs aren't insubstantial—they're always about something—but it wouldn't hurt her to throw in some tempo changes and maybe a crescendo now and again.

Frank Lovece

Dry: P J Harvey. **Indigo 162-555 001-2.**

Hearing *Dry* for the first time recalls the virgin thrill of *Pretenders*, but the preciousness that would eventually swamp Chrissie Hynde is absent from England's Polly Jean Harvey. Her text and voice, especially in describing the stale mates of "Oh My Lover," show an age and a marksmanship far beyond her 22 years. Her music, for '90s power trio, revels in the chords of her own garageland guitar. Not since Sinéad O'Connor has a woman broken into alternative rock with such authority.

Ken Richardson



Graham Parker

Photograph: Jolie Parker

Suzanne Vega

Photograph: Nick Vaccaro

Tenement Angels: Scott Kempner. **Razor & Tie 2809.** (Available from Razor & Tie Music, 214 Sullivan St., Suite 5A, New York, N.Y. 10012.)

It's tough not to admire a guy who dedicates himself so seriously to rock 'n' roll while avoiding the subterfuge of the record business. Scott Kempner has finally gotten around to releasing his own album after years with The Dictators and The Del-Lords. Both bands were street-smart purveyors of no-B.S. rock, a vibe that Kempner retains while also acknowledging his

Photograph: David Schienmann ©Peter Gabriel, Ltd.

The world's smallest 12-band receiver.

WE SHIP NEXT DAY!

Includes digital clock, travel alarm, headphones, deluxe travel pouch, three "AA" batteries, and Grundig guide book. Measures approximately 3½" x 5⅝" x 1¼" and weighs a mere *14 ounces!*

The world is at your fingertips with...

The Grundig World Band Receiver

© 1992 MBI

Announcing a revolutionary breakthrough in world-band radios...from Grundig, the leader in German shortwave electronics. This miracle of miniaturization is not sold in U.S. stores or catalogs—only Willabee & Ward has it!

Tune in to events around the globe.

The RK-709 is the world's smallest 12-band receiver—AM, FM, FM Stereo (with headphones, included), and *all* 9 major shortwave bands. Small enough to fit into a pocket, briefcase, or purse, yet big on features. Telescoping antenna pulls signals from anywhere in the world. Listen to legendary BBC newscasts—the best in the world. Hear what Radio Moscow is saying about Yeltsin, or the American elections. Listen to the Voice of America for news from home when you travel abroad. Follow a crisis or breaking story wherever you are and no matter where it's happening: Baghdad, Barcelona or Beijing.

You don't have to pack a travel alarm, either.

You won't need it—this is better. The RK-709 wakes you with the radio or its ingenious "Humane Wake System"—the tone begins softly and gathers volume until you wake up! The digital alarm clock features a sleep timer that turns off the radio 10 to 60 minutes after you turn in!

Only $159! Payable in monthly installments.

The Grundig RK-709 is only $159 (plus $7.50 shipping/handling), payable in convenient monthly credit card installments. Includes deluxe carrying pouch, three "AA" batteries, and stereo headphones. One year warranty, 30 day money back guarantee. Order today.

Don't be confused by other 4, 5, 7, or 9 band radios. Grundig's RK-709 is today's best buy on a real 12 band receiver.

CALL TOLL-FREE: 1-800-367-4534 Ext. 623-358

Willabee & Ward
47 Richards Avenue
Norwalk, Conn. 06857

Satisfaction guaranteed.

CALL TOLL-FREE: 1-800-367-4534
Ext. 623-358

Please send me ____ Grundig RK-709 World Band Receiver(s). For each receiver, charge 4 installments of $41.63* to my credit card:

☐ MasterCard ☐ VISA
☐ Discover ☐ Am. Ex.

Credit Card # _____ Exp. Date _____

Name _____
PLEASE PRINT CLEARLY

Address _____

City/State/Zip _____

Signature _____
(All orders subject to acceptance.)

☐ I prefer not to pay by credit card and will pay by check. Enclosed is my check for $159* plus $7.50 shipping/handling, a total of $166.50 for each receiver.

*Any applicable sales tax will be billed with shipment.

Phone orders normally shipped next business day.
Higher shipping/handling outside U.S.

The Rembrandts paint obviously Beatle-esque portraits that go beyond their inspiration.

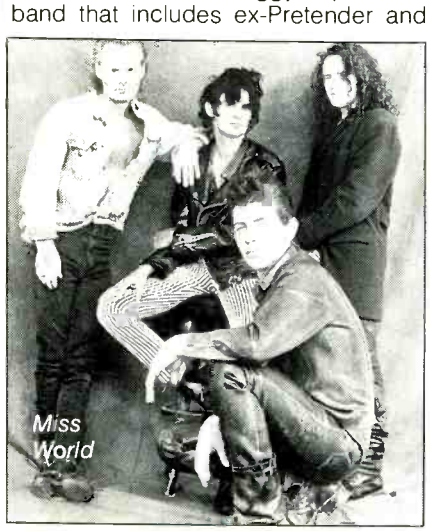
Photograph: ©Lee Stanford

roots. With backing from one of the best bands you've probably never heard of—The Skeletons from Springfield, Missouri—*Tenement Angels* has lots of Hammond organ, acoustics, and rich harmonies as well as loud guitars that go *kerrang*. Urbanites will relate to Kempner's stories of life in the big city. If you're also a Lower East Sider, however, this album will really hit home. *Michael Bieber*

Miss World. Anxious/Atlantic 7 82424-2.

Miss World is more or less the brainchild of Jonathan Perkins, a former member of Dave Stewart's Spiritual Cowboys as well as The Original Mirrors. Perkins is a clever lyricist, and he does a fine vocal impression of (alternately) Lou Reed and Iggy Pop. With a band that includes ex-Pretender and fellow Spiritual Cowboy alumnus Martin Chambers on drums, the fine guitarist Jimmy Taylor, and bassist Peter Noone (not the Hermit-keeper Herman), this debut is an unexpected pleasure. Although the approach is a bit mannered, Miss World manages to sound fresh despite the members' veteran status. Songs like "The First Female Serial Killer" and "Watch That Man Weep" leap out of the speakers with an urgency reminiscent of early Roxy Music. With the proper push, Miss World could become very popular, but at the least we should note that they're very good indeed.

Jon & Sally Tiven



Miss World

Untitled: The Rembrandts. **Atco 7 92200-2.**

On their second effort, Danny Wilde and Phil Solem, a.k.a. The Rembrandts, once again create sophisticated songs with neatly embellished arrangements. Playing most of the instruments themselves, including many multi-tracked acoustic and electric guitars, the two paint portraits in an obviously Beatle-esque pop pastiche that, like the best art, is highly inventive and able to stand on its own, going beyond its inspiration. *Michael Wright*

Sweet Old World: Lucinda Williams. **Chameleon 61351-2.**

With a plaintive quaver in her voice and a full-tilt emotional commitment, Lucinda Williams might be too much for some. But herein lies the difference between her own "ripped from life" performances and the "correct and successful" yet not so emotional covers of her songs by the likes of Patty Loveless and Mary-Chapin Carpenter. Be it uptempo for the joyous "Lines Around Your Eyes" and the bluesy "Hot Blood" or down-tempo for Nick Drake's "Which Will," *Sweet Old World* shows Lucinda to be a riveting writer and performer whose apparent simplicity is merely the entranceway to a rewarding artist of depth.

Michael Tearson

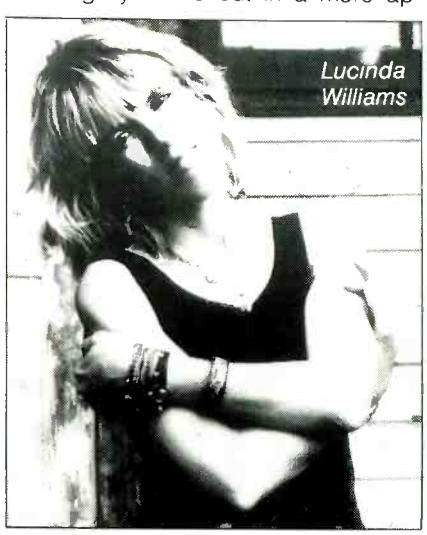
Cowboy Real: Tom Russell. **Philo PH 1146.** (Available from Rounder Records, One Camp Street, Cambridge, Mass. 02140.)

Cowboy Real is an acoustic album of cowboy ballads that bear an unerring ring of truth and sincerity. Here, Tom Russell is accompanied by guitarist Andrew Hardin, string bassist Hank Bones, and multi-instrumentalist Fats Kaplin. Old friend Ian Tyson duets on two cuts, the unforgettable corrida of the gamecock ("Gallo del Cielo") and a tale of love and life ("Navajo Rug"). Tom's admiration and understanding of cowboys and their lifestyle help make this a rich and honest album.

Michael Tearson

Blind: The Sundays. **DGC 24479.**

The Sundays' follow-up to their 1989 debut won't disappoint the band's fans. Stretching their luscious, acoustic guitar-driven sound to new aural lengths, they continue to spin confessional tales about love, obsession, and the fragility of life but in a more ap-



Lucinda Williams

The best investment you'll ever put into your sound system...

MASTER SOUND

Compact Discs

Classic albums that now sound better than ever before, thanks to Sony's revolutionary new 20-bit technology called "Super Bit Mapping."

In addition to reproducing music with unprecedented clarity and accuracy, each MasterSound disc comes with a 24-karat gold reflective surface, a special picture label, and deluxe packaging.

The experts are already raving:

"Super Bit Mapping is the best technique I've yet heard for digitally transferring 20-bit masters to 16-bit compact discs."
Bob Ludwig, renowned Mastering Engineer, June 1992

"This is a premium-quality sound from the CD medium, and I must confess I had thought CD's sonics were not to be improved upon... I will search them out and pay the extra dollars to have them, for they are that much better."
Gene Pitts, Editor, Audio Magazine August 1992

Now Available
Miles Davis "Kind Of Blue" CK 52861
Billy Joel "52nd Street" CK 52858
Aerosmith "Toys In The Attic" CK 52857
Dave Brubeck "Time Out" CK 52860
Bruce Springsteen "Born To Run" CK 52859
Bob Dylan "Blonde On Blonde" CK 53016
Boston "Boston" CK 52856
West Side Story, Broadway Cast CK 53152

For a technical paper on Sony's revolutionary "Super Bit Mapping" process, write to "SBM", Legacy Recordings, Radio City Station, P.O. Box 1526, New York City, NY 1010 -1526

MASTER SOUND LEGACY

"Legacy" and ■ Reg. U.S. Pat. & Tm. Off. Marca Registrada./© 1992 Sony Music Entertainment Inc./"MasterSound" and ● are trademarks of Sony Music Entertainment Inc./ "SBM/Super Bit Mapping" is a trademark of Sony.

YOU BETTER GRAB IT...

RECEIVERS

JVC RX705VTN
100W/channel remote Pro Logic Surround Sound Receiver
Orig. $500 NOW ONLY **$269**

JVC RX207VTN *40W/ch remote receiver* **$149**
Sherwood RV6010RS *Rated #1 receiver w/remote* **CALL**
Technics SAGX130 *70W/ch remote receiver* **$199**
Philips FR910PBK *40W/ch remote reciever* **$189**
Philips FR940PBK *100W/ch • Dolby* Pro Logic* **$399**
Sansui RZ9500 *Pro Logic • Award Winner* **$599**
Technic SAGX730 *125W/ch Pro Logic* **NEW**

SPEAKERS

Rock Solids

Indoor/outdoor speakers with brackets. Many Colors Available
FREE Shipping **$279**

Advent A1020 *In/outdoor speakers blk/wht* **$109**
Advent Graduate *2-way bookshelf w/8" woofers* **$199**
Advent A1052 *Limited Edition Anniversary* **CALL**
Altec Bias 550 *No Mistake Orig $12,000* **$7600**
AR M4 *Holographic imaging* **$399**
AR Partner 570 *Powered bookshelf speaker* **$289**
Celestion *Full Line Available* **CALL**
JBL Pro III Plus *3-way Satellite sub system* **$399**
JBL P20 *6.5" 2-way bookshelf speaker* **$229**
MB Quart 350 *2-Way floorstanding speaker* **$469**
Philips FB650XBK *50W 2-Way speaker w/7" woofers* **$169**
Pinnacle PN2+ *2-Way bookshelf speaker* **$99**
Yamaha NSA625 *2-Way bookshelf speakers* **$149**
Sonance SB30 *2-Way in/outdoor speakers* **$199**

All Speaker Prices Are Per Pair

NHT Authorized Dealer
Full Line Available

HEADPHONES

Sony MDRV6
Studio sound stereo headphones
Orig. $129 NOW ONLY **$67**

Sennheizer HD440 *Large diaphram digital ready* **$59**
AKG K270 *Parabolic • closed ear design* **$139**
Signet EP350 *Stereo headphones* **$37**
JVC HAD990 *Closed ear digital headphones* **$87**
Sony MDRIF310BK *Wireless stereo headphones* **$109**
Nady WH90 *Long range wireless* **$99**

PERSONAL AUDIO

Technics SLS505C
Portable/car compact disc player
Orig. $300 NOW ONLY **$199**

Panasonic RQV195 *Auto reverse cass tuner w/Dolby** **$69**
Sony WM2011 *Cass. walkman w/headphones* **$24**
Sony WMWX50 *Wireless cassette walkman* **$169**
Technics SLPXS900 *MASH 1-bit, 10 hrs of play* **CALL**
JVC XLP50J *Portable CD w/dual DAC,4X OS* **$129**
Sony D101 *Portable CD w/8X oversampling* **$159**
Sony Discman *D211, D311, D36, D515* **NEW**
Denon DCP150 *Portable CD layer* **CALL**

PORTABLE AUDIO

JVC RCB1
2-Band CD cassette portable system with clock/timer
Orig. $479 NOW ONLY **$289**

Sony CFD120 *Portable AM/FM/CD/cassette* **$189**
Sony CFD50 *Portable AM/FM/CD/cassette* **$125**
Sony CFD755 *3-piece AM/FM/CD/cassette* **$259**
Panasonic RXDT680 *3-piece AM/FM/cassette* **CALL**
JVC PCXT7 *Portable AM/FM/CD/cassette* **$369**
Panasonic RXDT707 *NEW portable AM/FM/CD/cass* **$369**

CD CHANGERS

JVC XLM405TN
6-disc magazine +single tray Total play of up to 7 discs
Orig. $299 NOW ONLY **$159**

Philips CDC925BK *5-Disc carousel with Bitstream* **$229**
Philips CDC935BK *5-Disc carousel w/digital out* **$269**
NAD 5170 Changer *Factory reconditioned 90 day warranty* **$399**
Technics SLPD827 *Remote 5-disc carousel* **$229**
JVC XLM505TN *6+1 changer with remote* **$199**
Sony CD Changers *Full Line Available*

TAPES

Scotch P6120 *8mm video tape - 10pk* **$41.90**
Scotch TC20EXG *20 min VHS-C tape - 10pk* **$34.90**
Scotch T120VHS *Full VHS video tape - 10pk* **$29.90**
Denon MGX100 *100 min metal tape - 10pk* **CALL**
Maxell XLIIS90 *High bias tape - 10pk* **$21.90**
TDK T120HDXPro *Pro quality VHS tape - 10pk* **$74.90**
JVC ST120 *S-VHS video tape - 10pk* **$84.90**

MINI SYSTEMS

JVC UX1
JVC's first micro system w/remote AM/FM tuner • CD Player • Cassette
Orig. $599 NOW ONLY **$369**

Denon DT400 *25W/ch stereo clock radio* **$199**
Hitachi FX7 *AM/FM dual cass,CD system* **$339**
JVC MX99 *Brand New System...HOT!* **NEW**
Panasonic SCCH55 *25W/ch mini system w/remote* **$479**
Sony FHB50CD *18W/ch mini system w/remote* **$399**
Denon Mini Systems *All Models Are On Display* **CALL**
Sony Mini Systems *MHC Series Availalbe* **NEW**
JVC Shelf Systems *MX44, MX55M, MX77M* **CALL**
Yamha YSTC11 *Top load CD w/dual cassette* **$569**
Optonica CDX17 *Remote system w/dual cassette* **$599**

CAR AUDIO

Panasonic CQDP38
Car CD player w/MASH 1-bit, 32X OS, removeable face , 22W x 4
Orig. $539 NOW ONLY **$349**

JVC KSRG7 *Auto reverse, detatchable face* **$227**
JVC XLMG700RF *10 disc changer w/controller* **CALL**
Clarion 5770CD *Removeable CD player* **$379**
Clarion SE7360 *5"x7" or 6"x8" speakers* **$79**
JBL Car Speakers *All Models Available* **CALL**
Phase Linear PLS1200 *12" subwoofer 4 or 8 ohm* **$199**
Phase Linear PLC2525 *5.25" component system* **$149**
Sony Car Audio *Full Line On Display*

VCRs

Panasonic PV2021
2-head VCR remote control cable ready, on screen programming
Orig. $249 NOW ONLY **$199**

Pnasonic PV4260 *Hi-Fi VHS w/S-VHS playabck* **$349**
Panasonic PV4201 *4-hd VHS w/S-VHS playback* **$249**
JVC HRD910U *4-head Hi-Fi VHS MTS* **$309**
JVC HRDX62 *Hi-Fi VHS w/digital tracking* **CALL**
JVC HRS4700U *S-VHS Hi-Fi VCR w/remote* **$499**
JVC HRS6800U *S-VHS Hi-Fi w/jog shuttle* **CALL**
Hitachi VTF462A *4-head Hi-Fi MTS VCR* **$399**
Hitachi VTM260A *Remote 4-hd w/on-screen* **$259**
Hitachi VTF430A *Hi-Fi rated #1 VCR* **$599**

TURNTABLES

Technics SL1200 *DJ's best turntable* **$399**
JVC ALA151BK *Auto direct drive turntable* **$79**
Denon DP7F *Direct drive turntable* **CALL**
Brand Name *Semi-automatic with cartridge* **$65**
Thorens TD180 *3-speed w/TP20 arm* **$299**

Sound CITY

RETAIL STORE
Meadtown Shopping Center
Route 23 South
Kinnelon, NJ 07405

RETAIL STORE INFORMATION
Call 201•838•3444
Open 7 Days A Week
Mon - Fri 9-9 • Sat 9-6 • Sun 10-5

Factory Authorized for all brands we sell • Not responsible for typographical errors • Some pictures for illustration only • NO refunds on video equipment or car stereo products • 10 day defective exchange from date or receipt (Except on video products) • All returns must be made within 10 days of receipt of merchandise & are subject to a restocking fee • Products returned must be in original condition and packaging. Shipping & handling not refundable

WHILE WE STILL GOT IT!

SUPER SAVERS - OUR BEST HOLIDAY SPECIALS EVER!

Sima SRWV2 *2-Way VHS rewinder*	$15.95	Terk AF9925 *Powered AM/FM antenna*	$89	Precision Power 2030M *30W/ch car amplifier*	$149	Sony SPP75 *10-channel cordless phone*	$89
Sima SRW8N *2-Way 8mm video rewinder*	$34.95	Brand Name DAT *Home DAT recorder*	$469	Pinnacle PN60 *6.5" 2-way bookshelf speaker*	$179	PS Audio Digital Link *18-Bit 8X digital processor*	$479
JVC JXS100 *Video selector switcher*	$89.95	a/d/s/ T2 *Digital tuner w/presets*	$239	Philips VR6705 *Top quality Hi-Fi MTS VCR*	$499	PS Audio 6.1 *Line level pre-amp*	$569
Sony TCD-D3 *DAT walkman player/recorder*	CALL	Philips VR6615 *4-Head VHS Hi-Fi VCR*	CALL	JVC AV31BM3 *31" color TV w/MTS*	$899	Scotche PDS1 *Car mounting bracket for CD's*	$29.95
Sole Control SC-2000 *Universal remote for 8 Audio/8 video*	$87	Panasonic PVM1321 *13" color TV with built-in VCR*	$469	Bazooka Bass Tubes *T62, T82, T102 & powered subs*	CALL	Soundcraftsman A200 *Home audio amplifier*	CALL
Gemstar VCR+ *VCR instant programmer*	$49.95	Hitachi VME23A *8mm, 64X Zoom camcorder*	$769	JVC UXA3 *Micro system with remote*	$349	Soundcraftsman Pro EQ44 *Third octave equalizer*	$399
Sony MDR-84 *Turbo headphones digital ready*	$37	Hafler DH330 *Digital FM tuner*	$159	Target BT1 *Tilt and swival speaker bracket*	$29.95	Sherwood XAT400Q *6-channel car amplifier*	CALL
Sony MDRIF510K *Wireless headphones*	$159	Kenwood KT880D *AM/FM digital tuner*	$159	Toshiba M222 *2-Head VHS VCR*	$199	Sherwood XA1240Q *4 x 50 watt car amplifier*	$199
JVC XLG3700 *Pull-out car CD/AM/FM receiver*	$299	Proton 440 *AM/FM digital tuner*	$169	a/d/s/ PSX10 *P-mount cartridge for turntables*	$19.95	Snooper D4000 *Triple superheterodyne radar*	$99
Kenwood ISM20 *Phone/answering machine*	$129	Advent A1022 *Mini passive ported subwoofer*	$129	Aiwa HST110 *Personal AM/FM cassette radio*	$39.95	Snooper Cycle *Radar detector for motorcycle*	$199
Jensen JFX125 *5.25" dual cone car speakers*	$29.95	Pinnacle PN SUB *Ported passive subwoofer*	$189	Camber 0.7t *2-Way 80W/ch speakeRs*	$139	Sony CCDF201 *8mm camcorder 6X zoom*	$549
JVC JXSV55 *Video editor console*	$449	Soundcraftsman *Control-13 17" pre-amplifier*	$249	Canon H800 *Hi-8 8mm camcorder*	$899	Sony ITD250 *2-Line desk-top phone*	$99
JVC JXT88 *Video titler w/charactor generator*	$349	Sole Control SC-1500 *Universal remote w/6 A/V*	$39	Brand Name Amp *110 watts per channel*	$269	Parsec Wavecatcher *Indoor AM/FM antenna*	$16.95
JBL GT962 *6"x9" 2-way car speakers*	$99	Philips CDV600 *Top-of-the-line laser disc player*	CALL	MEI DA7255 *250W/ch car amplifier*	$259	Memorex WM200 *In/outdoor 2-way speakers*	$89
Hitachi CT1394W *13" color TV with remote*	$209	Luxman G007 *Surround sound /equalizer*	$269	Mission 773M *Turntable cartridge*	$69	Monster Cable *Interlink & speaker wire avail*	CALL
Hitachi 31KX6B *31" MTS Color TV*	$899	SSI SSI3000 *Dolby® Pro Logic processor*	$199	Monster Cable CDS12R *Sound rings for CDs*	$13.95	Pinnacle PN50 *Centerchannel speaker*	$89
Yamaha NSA825 *2-Way floor standing speakers*	$249	Triad Satellite/Sub *System 6 • System 7*	CALL	Sony *SPA40, SPPA60*	CALL	Pinnacle PN8+ *2-Way bookshelf speaker*	$289
Advent A2000 *Model 350 New Vision Series*	$449	NAD MR13 *#1 Rated 13" TV w/S-video*	$389	Niles SPS1 *4-Pair speaker selector*	$79	Philips SBV1136 *10 ft S-VHS cable*	$14.95
Advent A2004 *Model 250 New Vision Series*	$349	Atlantic Technology 100 *Powered satellite/sub system*	CALL	Niles HDS6 *Hi-power 6 pair speaker selector*	$189	Sony ICFSW7600 *Short wave radio*	$219
Advent Heritage *Top-of-the-line speakers*	CALL	Terk FM8500 *Powered AM/FM antenna*	$29.95	Olympus S912 *Micro cassette recorder*	$49	Sony FD10A *Black & white handheld TV*	$89

SPECIAL PURCHASE

NAD FACTORY RECONDITIONED MERCHANDISE

QUANTITIES LIMITED

CALL FOR MODELS, WARRANTY AND PRICES

Atlantic Technology System 150

System 150HT Is A Complete Home Theater System That Combines All Of The Following Components:

152 PBM
"Power directed" bass module

151 LR
Main satellite speaker system

153 C
Center channel speaker

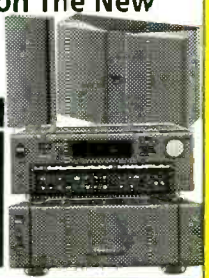
154 SR
Rear channel surround speakers

CALL FOR PRICE

EACH OF THE ABOVE CAN BE PURCHASED SEPARATLY

Come Audition The New Technics SC-TH200 System

LUCASFILM THX



SELECTION, PRICE & EXPERT ADVICE

• ADS • ADVENT • AR • AIWA • AKG • ATLANTIC TECHNOLOGY • AUDIO SOURCE • BAZOOKA • BBE • BELTRONICS • CANON • CARVER • CANTON • CLIFFORD • DENON • HAFLER • HITACHI • HUGHES • JVC • KENWOOD • LEXICON • LUXMAN • MINOLTA • MITSUBISHI • M&K • MONSTER CABLE • NAD • NHT • NILES • ONKYO • OPTONICA • ORION • PANASONIC • PHASE LINEAR • PHILIPS • PINNACLE • PROTON • PS AUDIO • ROCK SOLID • SENNHEISER • SHERWOOD • SOUNDCRAFTSMAN • SONANCE • SONY • SOUNDSTREAM • SSI • TECHNICS • TERK • THORENS • TOSHIBA • TRIAD • VELODYNE

ALTEC LANSING
JBL a/d/s/
CANTON
SONANCE
niles audio
NILES AUDIO CORPORATION

INWALL SPEAKERS
INFARED REPEATERS
VOLUME CONTROLS
SPEAKER SELECTORS
SPEAKER SWITCHERS

MAIL ORDER CALLS

To Order Toll Free Call:
1•800•542•7283
To Order By Fax Call:
1•201•838•9599
To Order By Mail:
Send Check, Cashiers Check or Money Order.

WE WELCOME

VISA · MasterCard · DISCOVER · AMERICAN EXPRESS

Mail Order Hours:
Monday thru Friday 9am - 9pm
Saturday 9am - 6pm • Sunday 11am - 4pm

CUSTOMER SERVICE

Please Have Your Invoice Number Ready:
1•201•838•1180
Customer Service Hours:
Monday thru Friday
10am - 5pm

Enter No. 45 on Reader Service Card

Paul Kelly writes lyrics with a simple eloquence, enhanced by appealing musical flourishes.

proachable way. With due respect to the band, vocalist and co-songwriter Harriet Wheeler is the magic ingredient that keeps The Sundays among the best in ethereal pop. Rounding out *Blind* is "Wild Horses," whose haunted spirit evokes the Rolling Stones original. *Toby Haber*

Comedy: Paul Kelly and The Messengers. **Doctor Dream DD 9265.** (Available from Doctor Dream Records, 841 West Collins Ave., Orange, Cal. 92667.)

Filling this hour-plus album with nearly 20 songs, Australia's Paul Kelly continues to match the reflective pop skills of Squeeze and Crowded House. It's a measure of his lyric-writing finesse that he can talk about sorrow ("Stories of Me") and revenge ("Brighter") with the simple eloquence of a wise teacher. He's also a fount of appealing musical flourishes, performed sympathetically by a band that never overreaches. After three fine albums on A&M, Kelly re-enters the U.S. courtesy of the folks at Doctor Dream, who should boast that they now have a small triumph on their hands. *Ken Richardson*

Disraeli Gears: Cream. **Mobile Fidelity UDCD 01-00562.**

The special thing about this gold Ultradisc of Cream's best album is that it includes both stereo and mono mixes of the entire album. Curiously, several of the mono fades, most notably on "Sunshine of Your Love" and "Tales of Brave Ulysses," are significantly longer. Engineer Tom Dowd's notes reveal that the whole album was completed in just 3½ days. *Michael Tearson*

Anam: Clannad. **Atlantic 82409-2.**

Clannad's new album, like its predecessors, carries Gaelic mysticism beyond the ends of the Earth. Indeed, three songs are in untranslated, indecipherable Gaelic, which is irksome. That aside, *Anam* is a beautiful, ethereal collection about faith and friendship in a *Wuthering Heights* mode. When the band members stray from that strength—as with "In Fortune's Hand," the closest thing to a conventional pop song here—they sound a bit like angst-ridden Archies. But mostly, even the Gaelic songs and two instrumentals are delicate and thoughtful, with a delicious underlying sense of menace. *Frank Lovece*

The Stiff Records Box Set: Various Artists. **Rhino R2 71062-4.**

This excellent four-CD box compiles 96 songs representing the irreverent label that unleashed Elvis Costello, Ian Dury, The Damned, Tracey Ullman, and many others into an otherwise unsuspecting world. Stiff's primary legacy is to acknowledge the fun at the core of rock 'n' roll—and fun is what this box is all about. Ian McCann's lengthy history of the label nicely complements the music. *Michael Tearson*

B&K PRO-10 SONATA & EX-442 SONATA

JUST THE MUSIC

"**The SONATA FAMILY UNITED** - When used together, the PRO-10 and EX-442 Sonata worked like a pair of world-class figure skaters: each complemented the other to benefit the overall performance. They really worked well in tandem.

On recordings of acoustic music, these components had the ability to differentiate clearly between an instrument's direct sound and the accompanying envelope of reflected and reverberant sound. In many cases, this gave me a clearer sense of what the recording acoustic was like. **Just the music.**"

Bob Bottman ***Sensible Sound,*** *Summer 1992*

Sonata PRO-10 Pre-Amplifier
MC/MM Capability
Gold Plated RCA Jacks
Wide Bandwidth
Line Drive Output
All Discrete Circuitry

Sonata EX-442 Dual Mono Amplifier
75 Amps Peak to Peak
Separate Power Supplies for Each Channel
Premium Connectors
DC Coupled Circuitry

B&K COMPONENTS, LTD.

1971 Abbott Road ▪ Buffalo, New York 14218-3241 ▪ USA
NY:716-822-8488 ▪ FAX: 716-822-8306 ▪ 1-800-543-5252

Enter No. 5 on Reader Service Card

GENRE™ *by Genesis.*™

The Affordable High-End.

The name Genesis has become synonymous with its unique cylindrical enclosure for one fundamental reason: *it results in superior sound.*

All enclosures that have "box-like" construction have "box-like" sound. Cylindrical enclosures solve that problem but are also quite costly to manufacture.

The Genesis Genre offers an ingenious yet affordable solution—a round chamber housed inside a rectangular time-aligned enclosure.

Genre also contains unique Genesis technologies including our circular ribbon tweeter, Kevlar/polypropylene injection molded woofer and computer-generated crossover network.

Genre is the result of the audio wizardry of Arnie Nudell and Paul McGowan who continue to innovate products addressed to the upper strata of high-end audio.

Suggested retail: $799.00/pair

Genesis

Evolution in Progress

953 So. Frontage Rd. West • Vail, CO 81657
(303) 476-3012
Enter No. 18 on Reader Service Card

BRANFORD'S BIG PAYBACK

Photograph: ©David Gahr

I Heard You Twice the First Time: Branford Marsalis
Columbia CK 46083, CD; 69:50.
Sound: A– Performance: B+

New York Stories: Various Artists
Blue Note CDP 7 98959 2, CD; 53:36.
Sound: A– Performance: A

I Heard You Twice the First Time is, by his own account, Branford Marsalis' long-overdue acknowledgment of the blues and its rich, long-standing legacy. Here, the *Tonight Show* bandleader demonstrates a new-found maturity, examining the interrelationship between blues and jazz as he tips his hat to men such as Robert Johnson, Leadbelly, and Charley Patton. On this journey, Marsalis first suggests, then reinforces, and finally celebrates the correlation between the two African-American art forms.

Aside from the cadre of contributors whom Marsalis routinely employs—Kenny Kirkland, Jeff Watts, Robert Hurst, and brothers Wynton and Delfeayo—it is the presence of blues and R&B artists that makes this date enticing. Along with somewhat predictable appearances by B.B. King and John Lee Hooker are contributions from Joe Louis Walker (who has one of the strongest voices around) and veteran belter Linda Hopkins.

In a similar spirit is a slightly tougher jazz-blues date, *New York Stories*. Appearing here is a startling aggregate of players—a roster any leader would kill for—who run through nine super-hip original compositions. The force behind this project is the magnificent and diverse guitarist Danny Gatton, who is joined on the front line by altoist Bobby Watson, young tenorist Joshua Redman (who seems to be nearly everywhere these days), and trumpeter Roy Hargrove. The rhythm section features Belgian pianist Franck Amsallem, bassist Charles Fambrough, and drummer Yuron Israel.

Steeped in the classic Blue Note albums of the late '50s and early '60s that were drenched in guitar and organ, this disc bowls you over with its rich textures, always varied terrain, and appropriate mood swings. Keenly crafted compositions are built on solos that range from searing to sensitive. Icing the cake are terrific arrangements featuring knockout hornlines. *New York Stories* is truly a present-day musical collage, one that entertains but also engages. *Jon W. Poses*

Danny Gatton

The Vibe: Roy Hargrove. **RCA/Novus 63132-2.**

Trumpeter Roy Hargrove's maturation as musician and leader is evident on *The Vibe*. Employing his working quintet, Hargrove and saxophonist Antonio Hart, pianist Marc Cary, bassist Rodney Whitaker, and drummer Greg Hutcherson make their way through 10 solid and rhythmically varied compositions. On several cuts, Hargrove beefs up his tight ensemble with reedmen

Roy Hargrove

Branford Marsalis and David "Fathead" Newman as well as trombonist Frank Lacy. Worthy of note is "Blues for Booty Green's," where Hargrove calls on organist Jack McDuff to provide the backdrop for a satisfying "down and dirty" episode.

Jon W. Poses

The Complete CBS Studio Recordings of Woody Shaw. Mosaic MD3-142.

This collection, the four albums recorded by the trumpeter during his tenure with CBS (1977 to 1981), shows how traditionalists like Woody Shaw made uncompromising art during a period in jazz when compromise

AUDIO ON-SALE AT THESE FINE STORES

AUDIO DEALER LISTING

ARIZONA

Phoenix
Sounds Like Music
2734 W. Bell Road - Suite 1306

CALIFORNIA

Los Angeles
Good News Etc.
2830 S. Robertson Drive

LA Audio Video Inc.
101 S. Western Ave.

San Diego
Stereo Design
9353 Clairmont Mesa Blvd.

COLORADO

Boulder
Listen Up Inc.
2034 Arapahoe Street

Colorado Springs
The Sound Stop
528 South Tejon

DELAWARE

Newark
Hale Corp.
70 E. Main Street

FLORIDA

Miami
Joe's News
1549 Sunset Drive

INDIANA

Portage
Who's Your Entertainment
P.O. Box 22

LOUISIANA

Baton Rouge
Art Colley's Audio Specialists
711 Jefferson Hwy

MARYLAND

Lutherville
Gramaphone Ltd.
10801 Tony Drive

MASSACHUSETTS

Northampton
Sound & Music Inc.
Millbank Place 351
Pleasant St.

Otis
Custom Audio Works
Route 8

MICHIGAN

Dearborn
Little Professor
22174 Michigan Ave.

Rochester
Rochester Book Center
1410 Walton Blvd.
Rochester Hills Plaza

NEW JERSEY

Morris Plains
J.S. Audio
643 Speedwell

Verona
Audio Connection
615 Bloomfield Ave.

NEW MEXICO

Albuquerque
Page One
11200 Montgomery NE

NEW YORK

Hicksville
Avtronics Ltd.
260 Old Country Road

Lake Grove
Audio Den Ltd.
Smith Haven Plaza
2021 Nesconset Hwy

Manhasset
Auto Performance Public
2 Shortdale Dr.

Merrick
Performance Audio Service
2064 Sunrise Highway

New York
Stereo Exchange
194 Mercer Street

Orchard Park
Stereo Chamber Inc.
Union & Orchard Pk. Rds

Walton
Audio Classics
US Post Office Bldg., P.O.B. 176

NORTH CAROLINA

Bollington
America Multimedia
P.O. Box 215 A

OHIO

Toledo
Leo's Book & Wine Shop
330 N. Superior Street

Warrensville Hts.
Hoffmans House of Stereo
23031 Emery Road

OKLAHOMA

Oklahoma City
Contemporary Sounds
10327 North May Ave.

TEXAS

Houston
Home Entertainment
5310 Kirby St.

WASHINGTON

Seattle
Definitive Audio
6017 Roosevelt Way N.E.

Olympia
Bull Dog News
116 E. 4th

MANITOBA

Winnipeg
Brian Reimer Audio
1053 C Street Mary's Road

Stereo Master Ltd.
1793 Portage Avenue

ONTARIO

Keewatin
R&S Video
613 Ottawa St.

Dealers interested in Audio should call 1-800-221-3148

Stanley Turrentine rekindles a fire between long-standing friends on *More Than a Mood*, a straight-ahead groove.

Photograph: Ching Ming

meant everything—press and radio exposure, let alone recording contracts. *Rosewood*, Shaw's 1977 CBS debut, remains an excellent large-ensemble album that does sound like a product of its time, yet no one—including label president Bruce Lundvall—was pressuring Shaw to adapt to the language of the day, fusion. *Rosewood* came from Woody's heart. Jump three albums and some four years later to *United*, which is as timeless and brilliant as any of his work on the Contemporary and Muse labels. It alone makes this box worth its price; some excellent essays by Michael Cuscuna and Carl Woidek enhance the set.

Michael Bieber

McCoy Tyner

Photograph: Gene Martin

The Turning Point: McCoy Tyner Big Band. **Birdology/PolyGram Jazz 513 163-2.**

What a difference a couple of decades make. The early '70s marked the period when McCoy Tyner recorded his first big-band effort, *Song of the New World*, an album charged with modal expansiveness and the African undercurrents dominating new jazz at the time.

In 1992, however, Tyner's running a post-bop big band, and *The Turning Point* is a turning back. In the wake of aggregations like Peter Apfelbaum and the Hieroglyphics Ensemble or the Carla Bley Big Band, Tyner risks sounding nostalgic. Slide Hampton's arrangement of "Angel Eyes" is one step removed from the mirrored globes of ballroom dancing. But despite the retrospective approach, there's some robust music here, not the least of which comes from Tyner's core trio of drummer Aaron Scott and bassist Avery Sharpe.

Always a broad, orchestral player, Tyner is well suited to the bombast of a big band, but hearing his skewed solo piano version of "In a Sentimental Mood," you realize that he's a big band unto himself.

John Diliberto

More Than a Mood: Stanley Turrentine. **Musicmasters 01612-65079-2.**

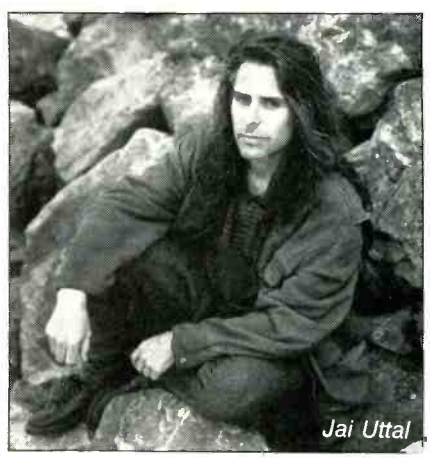
More Than a Mood is a classic, straight-ahead groove that rekindles some fire between long-standing friends. Stanley Turrentine plays with a kind of gentle-sounding steadiness, a bluesiness that delights. For a setting like this, you probably can't beat his rhythm section of pianist Cedar Walton, bassist Ron Carter, and Billy Higgins, who once again enthralls with his cymbal and snare work. Freddie Hubbard appears on two of the CD's eight selections.

Jon W. Poses

Monkey: Jai Uttal. **Triloka 7194-2.**

Trans-cultural fusions are becoming the norm, but few artists are working the territories with the experience or grace of Jai Uttal. *Monkey* blends Indian and Middle Eastern sounds, shined with synthesizers and samplers, and heated by jazz players from Peter Apfelbaum's Hieroglyphics Ensemble, of which Uttal is a member. With throbbing percussive rhythms—tablas, dumbeks, and percussion samples freely conversing with each other—Uttal's music moves freely from feedback guitar solos and saxophone backlines to melodies played on the dotar, an Indian stringed instrument. Although a handful of English vocal tracks make him sound like Michael McDonald with a sitar, Uttal is creating a fusion unimagined in the days of raga-rock.

John Diliberto



Jai Uttal

SONY

SONY AND BILLBOARD UNLEASH THE POWER OF MUSIC™

UP TO 3 FREE DECADE OF MUSIC CDS WITH PURCHASE OF ANY SONY CD PLAYER.

A decade ago Sony unleashed the power of music by introducing the world's first Compact Disc player. To commemorate this anniversary, Sony is offering, with the purchase of any Sony CD player, an exclusive collection of CD hits compiled directly from the Billboard charts. Visit your Authorized Sony Dealer or call 1-800-451-2248 (Access Code *41281) for a coupon with all the details on this offer, and let Sony CD Unleash the Power of Music for you.

For great music entertainment, watch for the Billboard Music Awards on Fox Television, December 9, 1992.

COMPACT DISC 10TH ANNIVERSARY

©1992 Sony Corporation of America. All rights reserved. Sony and Unleash the Power of Music are trademarks of Sony. Billboard is a registered trademark of BPI Communications. Offer valid between October 1, 1992 and January 31, 1993 only in the Continental U.S. and Alaska (excluding Hawaii). The 1-800-451-2248 telephone number will be active until January 31, 1992. The number of CDs you receive from the "Decade of Music" Collection depends on which Sony CD player you purchase.

The Brecker Brothers, updated for the '90s, blend MIDI instruments with hip-hop fronting and African-rhythm accents.

Return of The Brecker Brothers. GRP GRD-9684.

As stars of the fusion movement, trumpeter Randy Brecker and tenor sax virtuoso Michael Brecker carved their niche by combining studio-player chops with funk pretenses. Updated for the '90s, The Brecker Brothers apparently understand the current technological and pop music trends, blending MIDI instrumentation with hip-hop fronting and African-rhythm accents. Miles Davis tapped the exotic potentials of acid-jazz most satisfyingly by indulging his every sonic whim. The Breckers acknowledge this with specific Miles references, though they can't help but square off and polish up the eccentricities. Both Breckers and guests are best either showing off ("Above & Below," "Wakaria") or being outright silly ("That's All There Is to It"). This album will be one of the heaviest on jazz-lite radio. *Howard Mandel*

Pinetop's Boogie Woogie: Pinetop Perkins. **Antone's ANT 0020.**

Pinetop Perkins moves spiritedly through well-worn chestnuts by a veritable pantheon of bluesmen, from Roosevelt Sykes to B.B. King, while also including two of his own classics. Joining him are veteran sidemen/leaders James Cotton, Matt "Guitar" Murphy, Duke Robillard, Jimmy Rogers, and Hubert Sumlin, to name a few. Pinetop and company bring filigreed piano rolls, raspy harp, jazzy-smooth or funky guitars, and pumping rhythms. The only thing you need to provide here is a party. *Michael Wright*

The Tangos and Dances: David Chesky. **Chesky JD72.**

The Tangos and Dances finds pianist/producer David Chesky still immersed in Latin American music, with an emphasis on chorinhos, sambas, and tangos. Chesky's talent at the piano is complemented once again by Brazilian guitarist Romero Lubambo, who was vital to Chesky's previous project, *The New York Chorinhos*. Together, the players' wide range of expressiveness reminds one of Astor Piazzola's transformation of the tango from a dance into a concert music style. Piano and guitar are captured with rich and natural acoustics befitting this imaginative duo. *John Sunier*

DEALER SHOWCASE

CALIFORNIA

VISA MasterCard

More than
55,000 CDs ON-LINE

WORLD'S LARGEST ON-LINE AUDIO COMPACT DISC STORE

Discount Prices • Fast Delivery
Free Shipping for Orders of $100 or More

Modem: 408-730-9015
In Chicago: 312-751-2447
In New York: 212-532-4045
Up to 9600 bps 8-N-1

Finally Yours
CARMEN BRADFORD
$11.95
Sale ends December 31, 1992

AMAZING RECORDS

COMPACT DISC CONNECTION
1016 E. El Camino Real #322
Sunnyvale, California 94087
Tel.: 408-733-0801
Fax: 408-733-0850

CALIFORNIA

SYNERGY

Def: That phenomenon whereby the end result is greater than the sum of the parts: i.e. a home entertainment system created by The Systems Design Group, which is celebrating the grand opening of a new Beverly Hills location.

Purveyors of:
Alón • Adcom • Audioquest • Audiostatic • B&W • B&O • Carver • Celestion • Counterpoint • Definitive Technology • Denon • Fosgate • Grado • Klipsch • Lexicon • Linaeum • Marantz • McCormack • Mod Squad • M&K • NAD • Paradigm • Proton • Rock Solid • Rotel • Sci-Fi Tesla • Terk • Theta

Systems Design Group
(310) 370-8575
1310 Kingsdale Ave
Redondo Beach, CA 90278
261 N. Robertson Blvd.
Beverly Hills, CA 90211
(310) 205-0166
Mon-Fri 11am-7pm
Sat 11am-6pm

CALIFORNIA

"For The Magic Of Music."

Optimal Enchantment

Our customers are the discerning audiophiles of L.A. These are the DIE HARD MUSIC LOVERS who search everywhere before they buy. These are the most critical listeners, the least easily fooled, and the hardest to please. They seek UNEQUALLED MUSICALITY, which is why they buy here. Allow us to demonstrate our award winning sound & custom installations.

AUDIO RESEARCH - AUDIOQUEST - AUDIBLE ILLUSIONS - ACOUSTIC ENERGY - CAL - DYNACO - ORACLE - PSE - ROTEL - ROWLAND - SME - SOTA - SPICA - THETA - VPI - VERSA - VANDERSTEEN - & more

also : AUDIOPHILE RECORDINGS

For personal appointment call:
(310) 393-HIFI

CALIFORNIA

Before you invest your money, spend some time with us.

Call us for expert advice on custom home and theater sound systems at affordable prices. We offer fast, convenient shipping and provide unparalleled service after the sale.

REFERENCE AUDIO • VIDEO

310 517-1700 • FAX 310 517-1732
18214 DALTON AVENUE, DEPT A, GARDENA, CA 90248

AUTHORIZED DEALER FOR: AKG · ALÓN · ATLANTIC TECH · AUDIBLE ILLUSIONS · AUDIOQUEST · AUDIO ALCHEMY · AUDIO CONTROL · BEYER DYNAMIC · BOSE · CAL AUDIO LABS · CARVER · CELESTION · CLEARFIELD · COUNTERPOINT · CWD · DAHLQUIST · DCM · FOSGATE · GENESIS · GRADO SIGNATURE · HAFLER · HARMAN KARDON · HUGHES · INFINITY · JAMO · JBL · LEXICON · MAGNUM/DYNALAB · McCORMACK · MUSE · NAD · NESTOROVIC · NHT · NILES · OHM · ONKYO · PARASOUND · PHILIPS · PIONEER · POWER WEDGE · PROTON · PROAC · PS AUDIO · ROOMTUNE · REVOX · SONANCE · SONY · STAX · TARGET · TDK · THORENS · TICE · VELODYNE · VPI · AND MORE!

CALIFORNIA

THE DAT STORE

NEW IN STOCK: CD RECORDERS
DIRECTLY RECORDS AUDIO FROM ANY SOURCE ● FINAL RECORDED DISCS COMPATIBLE W/CONVENTIONAL CD'S

NEW IN STOCK: "SCOOPMAN" RECORDER
ULTRA-SMALL STAMP SIZE CASSETTE ● LONG BATTERY LIFE W/ A SINGLE "AA" BATTERY ● DIGITAL STEREO RECORDING

COMING IN OCTOBER: DCC
DIGITAL RECORD/PLAYBACK W/OUTSTANDING SOUND QUALITY ● PLAYBACK COMPATIBILITY ● QUICK TRACK ACCESS W/ADDRESS DATA ● TEXT INFORMATION DISPLAY

COMING IN NOVEMBER: MINIDISC
QUICK RANDOM ACCESS ● TOTAL DURABILITY ● SHOCK & VIBRATION RESISTANT PORTABILITY ● RECORDABLE DISCS ● SUPERB COMPACTNESS ● QUALITY SOUND

IN STOCK SINCE 1988: DAT RECORDERS
OVER 25 MAKES & MODELS ● SALES ● RENTALS ● REPAIRS DUPLICATIONS: DAT TO DAT & DAT TO CD ● 4MM DATA CARTRIDGE & BLANK DAT TAPE (3 HOUR AVAILABLE) ACCESSORIES & BLANK MEDIA FOR ALL RECORDERS

THE DAT STORE ● 2624 WILSHIRE BOULEVARD
SANTA MONICA ● CALIFORNIA ● 90403
WEEKDAYS:9-6/SATURDAYS:1-4/CLOSED SUNDAYS
FAX: 310-828-8757 ● 310 828-6487

Visit these specialty retailers for professional consultation

DEALER SHOWCASE

CONNECTICUT

Audiocom
high technology audio

AUDIO: Adcom, ADS, Beyer, Boston Acoustics, B&W, CWD, Celestion, Denon, Grado, Jamo, KEF, Niles, Lexicon, Luxman, Mcintosh, Nakamichi, Parasound, Revox, Rockustics, Velodyne

MOBILE AUDIO: ADS, Alpine, Blaupunkt, B&W, Boston Acoustics, KEF, Zapco, Z Box

VIDEO: CWD, Draper, Denon, JBL, Luxman, Pulsar, Stewart, Sharpvision, Sony, Sony Pro, Ultravision

- Audio/video systems from the industrys leaders
- Home video theaters/media rooms.
- Surround system specialists
- Multi-room remote control systems.
- Delivery, installation and in-home service.
- Our own on-premises service department.
- Custom mobile audio installation
- Serving our customers since 1968.

10-6 Monday-Saturday
2 rights off of exit #5 on US#95 in CT.

203 637-3621
177 Sound Beach Ave., Old Greenwich, CT 06870

FLORIDA

ONE OF THE SOUTH's LEADING HIGH END SALONS FOR 23 YEARS!

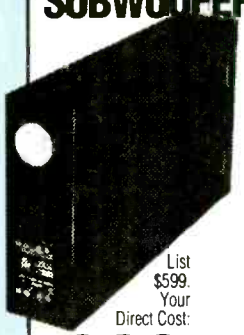
House of Stereo

Vimak Digital! ■ California Audio Labs Hot Delta Transport/Sigma D to A ■ Nobis Technologies Tube Electronics ■ Magneplanar's Incredible MG-20's ■ Aragon's New 18K, Palladium Class A Monoblocks, Aurum Preamp ■ Acurus ■ Quad ESL/Gradient Bipolar Sub ■ XLO ■ Totem Acoustics ■ Mark Levinson ■ PS Audio Ultralink/ Electronics ■ RoomTune ■ Proceed ■ Tara Labs ■ Audio Alchemy ■ Mirage ■ Ocos ■ Oracle ■ Tice.

(904) 642-6677
3505 Southside Blvd, Jax., FL 32216

FLORIDA

FACTORY DIRECT
HIGH END
SUBWOOFER SYSTEM



- Slim 17-1/4Hx30Wx6D
- Hand Crafted Enclosure. 65 lbs!
- 90Db Efficiency
- Response 34hz - 120hz
- 50 -200w per Channel
- High Gloss Laminate Finish
- 7 Year Warranty
- Dual Channel Passive Crossover

List $599.
Your Direct Cost:
$329 EA

SPEAKER WORLD

VISA MasterCard AMERICAN EXPRESS

Call 10-6 EST. Mon-Sat
1-800-359-0366

ILLINOIS

Reel to Real Designs

Authorized Dealer;
- CODA
- Counterpoint
- Cary
- Sumo
- Soundcraftsmen
- Thorens
- Parasound
- Fosgate
- Simply Physics
- Sumiko
- Quicksilver
- Room Tunes

New FOCUS Speaker

800-283-4644
call for literature

Visit our SPEAKER FACTORY SHOWROOM at 3021 Sangamon Ave., Springfield, IL 62702

INDIANA

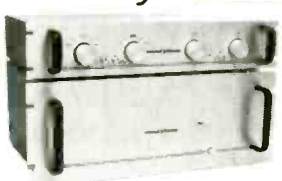
FREE
Catalog For Home & Auto

- J.V.C.
- JENSEN
- CRAIG

CALL OR WRITE
PIVCO
1801 N. GREEN RIVER RD
EVANSVILLE, IN 47715
1-812-479-3525 • C.S.T. 10-6

IOWA

hawkeyeaudio



- Apature
- Audioquest
- B&K
- Carver
- Conrad-Johnson
- Definitive Technology
- Infinity
- M&K
- Marantz
- Onkyo
- Ortofon
- Paradigm
- Polk Audio
- Sharpvision
- Sonographe
- Sony
- Spica
- Stax
- Thorens
- Yamaha

319-337-4878
401 S. Gilbert, Iowa City, IA 52240

MAINE

Acurus . . . Aragon . . . Audible Illusions . . . Audioquest . . . Audio Research . . . Bryston . . . Compact Discs . . . Creek . . . CWD . . . Denon . . . Grado . . . Jamo . . . Lexicon . . . Livewire . . . Magneplaner . . . Magnum Dynalab . . . Mark Levinson . . . Mission . . . NAD . . . Near . . . Prometheans . . . PSB . . . Pulsar . . . Revolver . . . Rotel . . . SME . . . Sota . . . Stax . . . Stewart . . . Sumiko . . . Sumo . . . Symdex . . . Thoren . . . VPI . . . And Much More!

Hi Fi Exchange
FORESIDE MALL • ROUTE ONE
FALMOUTH, ME 04105
(207) 781-2326

MASSACHUSETTS

The Best Values In Hi End Hi-Fi.

audio studio

Authorized sales and service for:

AR, Audible Illusions, Audioquest, B&K, Beyerdynamic, Cardas, Counterpoint, Dual, Hafler, KEF, KLH, Klyne, Maplenoll, Marantz, Mirage, Mission, Monster Cable, Morel, NAD, Nakamichi, Ortofon, Proton, QUAD, Renaissance Audio, Revox, Sennheiser, SME, Shure, Stax, Straight Wire, Thorens, Velodyne, VPI, and many more.

303 Newbury St., Boston, MA 02115
(617) 267-1001
FAX (617) 277-2415

414 Harvard St., Brookline, MA 02146
(617) 277-0111

INTERNATIONAL BUSINESS ACCEPTED

MINNESOTA

1 (800) 229-0644

RECORD PLAYER NEEDLES AND CARTRIDGES. World's Largest Selection and Lowest Price!!

up to 75% OFF cartridges

The needle doctor sells all major lines of **needles and cartridges.** Great variety! He stocks audio, video, phone accessories, record care, & headphones too.

M-Sat 10-7 Sun 12-5
419 14th Avenue SE
Minneapolis, MN 55414
(612) 378-0543 FAX: (612) 378-9024

Jerry Raskin's Needle Doctor

DEALER SHOWCASE

NEW JERSEY

Audio Connection

- Acoustic Energy
- AMC
- Audible Illusions
- B & K
- Counterpoint
- Creek
- Dynaco
- EAD
- Fried
- Kimber Kable
- Lectron
- Magnum Dynalab
- Melos
- Micro Mega
- Morch Arms
- Musical Fidelity
- Music Reference
- N.E.A.R.
- Parrasound
- Powerwedge
- Pro Ac
- PSB
- PSE
- Quicksilver
- Rega
- Rotel
- Spendor
- Spica
- Sumo
- Unity
- VAC
- VANDERSTEEN
- VPI

615 Bloomfield Avenue,
Verona, N.J. 07044

(201) 239-1799

TUBES & CABLES

NEW YORK

CAPITAL AUDIO/ELECTRONICS

AUTHORIZED DEALER FOR TOP BRANDS & CUSTOM HOME THEATER INSTALLATIONS

ADS
ADVENT
AUDIO SOURCE
BIC
BOSE
CANTON
CERWIN VEGA
CITATION
DAHLQUIST
EPI
FINE LINE
FROX
HAFLER
HARMAN KARDON
HARMAN VIDEO
JBL
LEXICON
MONSTER CABLE
NAD
NILES
ONKYO
PIONEER LASER KARAOKE
PSB
RUNCO
SSI
SHERWOOD
SOUNDSTREAM
SONANCE
SONY
TERK
TRIAD

member CEDIA

"At CAPITAL your investment is more than sound"

120 DUANE STREET NYC 10007
Telephone: (212) 608-3720
Fax: (212) 619-2918

NEW YORK

ALPHA STEREO

Quality Components, Professional Installation & Service

NAD

"We are known for the companies we keep"

Adcom, NAD, Rotel, Onkyo, Denon, Mission, B&W, Soundstream, Audioquest, Paradigm, Monster Cable, M&K, Ortofon, AKG, Stax, Polk Audio, Sharp Vision, Sony ES, Target, Atlantic Technologies, Audio Alchemy, Beyerdyamic

Northern NY's oldest & most renowned dealer.

345 Cornelia St., Plattsburgh, NY 12901

518-561-2822

Fax: 518-561-2961

Monday-Friday 10am-8pm, Saturday 10am-6pm
Mastercard, Visa, Discover, Amex

NEW JERSEY

SAVANT AUDIO

Providing the Ultimate In Products & Services

**Consultancy • Custom Systems
Acoustic Treatment • Installation
Home Theater • Retail • Worldwide**

Air Tangent • Allegro • Apex
Arcici • Athena • Air Tight
Audio Prism • AudioQuest
Audiostatic • Basis • Benz
Bitwise • Cardas • Chario • Chesky
Clarity Audio • Creek • CWD
Delos • Dorian • EAD
EKSC • Electron Kinetics
Eminent Technology • Ensemble
Epos • Essence • First Sound

Fosgate • Geman Acoustics
Harman Video • Harmonia Mundi
Kinergetics • Klyne • Last
Lectron • Magnan • Merrill
Mod Squad • Mogami • Morch
Nestorovic • Neutrik • Nimbus
Opus3 • Power Wedge
Presence Audio • Pro Ac
Proprius • QED • Rega
Reference Recordings • Roksan
RoomTune • Rotel • Sequerra
Sheffield Labs • Sims • Sumiko
Symphonic Line • Tara Labs
Target • Tice Audio • Wadia
Water Lily • WBT
and More

In New York & New Jersey
800-628-0627 609-799-9664

NEW YORK

GRADO audio-technica TWEEK

YOUR SEARCH IS OVER!

We specialize in hard to find phono cartridges and original replacement styli only!!

(800) 221-0906

CALL TOLL-FREE FOR FREE PRICE QUOTES AND VISA/MC ORDERS
N.Y. STATE (516) 599-1112

SEND SELF ADDRESSED STAMPED ENVELOPE FOR OUR FREE CATALOG.

VISA

LYLE CARTRIDGES
115 South Corona Avenue
Valley Stream, N.Y. 11582

Phones Open Mon-Sat 9 am-8 pm

TIPTOES LAST MONSTER CABLE Dynavector Bang&Olufsen PICKERING

ortofon SHURE STANTON

NEW YORK

- Acoustat
- Audio Alchemy
- B & K
- Canton
- Celestion
- Conrad Johnson
- Counterpoint
- Duntech
- Enlightened Audio
- Harmon Video
- Jadis
- KEF
- Lexicon
- Monitor Audio
- Motif
- NEAR
- NHT
- Pioneer Elite
- Runco
- Snell
- Sonographe
- Straightwire
- Synthesis
- Tice
- Velodyne
- VPI
- Wadia
- XLO
- & Much More

973 Northern Blvd., Great Neck, NY 11021
PHONE & FAX (516) 627-4456
THE DISCRIMINATING EAR

NEW YORK

60 Years in Business... We Must be Doing Something Right!

Apogee • Audio Quest • C.A.L. • Classe • Magnum • Monster Cable • B&W • NAD • Nakamichi • Straightwire • Sumo • Velodyne • Carver • Rotel • Signet • Genesis • Kinergetics • Target • B&O • Arcici • Fosgate • Lexicon • Listen Up • Sonographe • Sony ES • Tice • B&K • Thorens • Dahlquist

Consult a Quiet Expert

Square Deal

456 Waverly Ave., Patchogue, NY 11772

Local: **(516) 475-1857**
Others: **1 800 DEAL-441**

NEW YORK

Digitalville

High Definition Audio and Video Systems

Experience the magic of Digitalville complete home theatre systems, custom remote control systems, outdoor pool and patio speakers. Professional office systems. Conference rooms. All state of the art electronics and components Free in home or office Consultations and surveys. Detailed professional proposals

Digitalville
516-673-1133
129 Rte. 110, Huntington Sta., N.Y. 11746

DEALER SHOWCASE

NEW YORK

Esoteric Sound

....when music matters

Apex • Audio Alchemy • Audio Power
Chapman • Clearfield • Counterpoint
Enlightened Audio • Hartley • JBL-XPL
Kimber • Lexicon • Melos • Rotel
Jeff Rowland • Shahinian
Sumo • VAC • Wadia • XLO

Esoteric Sound Systems Ltd
Coventry Commons Rte. 347
Stony Brook, NY 11790
516 689-7444 Fax 516 689-7457

NEW YORK

AUDIO VIDEO, Inc. LODESTAR

•Authorized Dealers for•

ACURUS	DENON	ROOMTUNE
APATURE	ELITE	SANUS
ARAGON	EPOS	SHARPVISION
ARCICI	KEF	SME
AUDIOQUEST	MERDIAN	SONY
B & K	MONSTERCABLE	TANNOY
C.A.L.	NAKAMICHI	THORENS
CARDAS	PIONEER	TRIPPLITE
CELESTION	QUAD	TUBES by DESIGN
COUNTERPOINT	ROCKSOLID	V.A.C.
DEFINITIVE TECHNOLOGY	ROGERS	YAMAHA

Home Theater Specialists!

137-72 Northern Blvd., Flushing, N.Y. 11354
Tel:(718) 321-1500 • Fax:(718) 321-1078
MC • VISA • AMEX Accepted

OHIO

small town
BIG SOUND
for home & auto
YAMAHA
DENON
JVC
PHOENIX GOLD
KLIPSCH

O'Brien's
Photo Center & Sound Room
132 Putnam Street • Marietta, OH 45750
614-373-6737

PENNSYLVANIA

PHILADELPHIA AUDIOPHILES

Acoustic Energy	Jadis	PSB
Altis Audio	J.A. Michell	Rega Planar
Audible Illusions	Kimber Kable	Roksan
Audio Alchemy	Kinergetics	Rotel
Audiolab	Klyne	Sci-Fi
Audioquest	Koetsu	Snell
Avalon	Maplenoll	SOTA
Bitwise	Meridian	Soundcraftsmen
B&K Components	Micromega	Sound Lab
Cary	Mission/Cyrus	Stax
Celestion	MIT	Sumiko/SME
Classé	M&K Sound	Target
Counterpoint	Monitor Audio	Unity Audio
Duntech	Muse	VAC
Dynavector	NAD	VPI
Eminent Tech.	Oracle	Well Tempered
Ensemble	Parasound	Wheaton
Genesis	PS Audio	XLO Electric

DAVID LEWIS AUDIO
At Sound Service Company
8010 Bustleton Ave. Philadelphia, PA 19152
(215) 725-1177 Bank Cards Accepted

TENNESSEE

CAG CUMBERLAND AUDIO GROUP

REPRESENTING:
AUDIO QUEST · AUDIO RESEARCH · B&K AUDIO · B & W · BASIS · CALIFORNIA AUDIO LABS · CELESTION · CLASSE · CONRAD-JOHNSON · DAY SEQUERRA · GRAHAM · LINN · LYRA · MIT CABLE · MOD SQUAD · ORACLE · REGA · ROTEL · JEFF ROWLAND DESIGN GROUP · STAX · STRAIGHTWIRE · SUMIKO · TARGET · THETA DIGITAL · VANDERSTEEN · V.A.C. · WEL · TEMPERED · WILSON & MORE · CD's & LP's ·

CREDIT CARDS · DELIVERY · SET UP · MON-SAT 11-6

4119 HILLSBORO RD · NASHVILLE, TN 37215
(615) 297-4700

VERMONT

Vermont's Audio Leader!

SUMIKO
PARADIGM
A&R CAMBRIDGE
DENON • SUPERPHON • KLIPSCH
B&K • ADVENT • ADS • ROTEL
REGA • STRAIGHTWIRE • AUDIO CONTROL • AKG • SENNHEISER
CREEK • GRADO TARGET • GOLDRING
AUDIOLAB • SPICA • KIMBER • AIWA
MAGNUM • SHARP VISION • ACURUS
PINNACLE • DEFINITIVE TECHNOLOGY
ACOUSTIC RESEARCH • ARCICI
CHICAGO • HUGHES

INTELLIGENT AUDIO AT REASONABLE PRICES"
802-863-4372

city stereo
207 College St • Burlington, VT 05401

VERMONT

Here in Vermont, people demand value. We don't waste customers' money, and neither do these folks:

Adcom AudioQuest B&W Dual
Grado Hafler Luxman MIT
ModSquad MonsterCable Onkyo
Oracle Rotel Signet Sumiko
SME Tannoy Thorens Wharfedale

Five-year warranties on all new equipment
100% financing available
90 Days Same as Cash
Free installation in Connecticut River Valley & NYC

Scientific Stereo
800-456-4434
802-257-5855
128 Main St Brattleboro VT 05301

WEST VIRGINIA

THE BEST IN HOME GROWN AUDIO.

Hi-Fi Farm

FEATURING:
Philips, Quad, Alon, Scientific Fidelity, McCormack, OCM, Magnum, Lexicon, Snell, Woodside, Roksan, Spendor, B&K, Kimber, VMPS, Modsquad, Cardas, Harman Video, and many more.
Also featuring high end used equipment, fully guaranteed!

735 S. Kanawha, Beckley, WV, 25801
International Business Accepted on:
1-304-253-5450
Nationwide Toll Free:
1-800-752-4018
All major credit cards accepted.

WISCONSIN

The Sound Seller

For the Musical Difference
Authorized Dealer For:

Acoustat	NAD
Audio Control	Onkyo
M&K	Harmon Kardon
Nitty Gritty	Lexicon
Celestion	PROAC
Carver	Dahlquist
Kinergetics	Target
Monster Cable	Velodyne
Nakamichi	Grado
Niles	Atlantic Technology
Fried	Apature
Thorens	CWD
Proton	STAX
Component Guard	Sony

2808 Cahill Road
P.O. Box 224
Marinette, WI 54143
1-800-826-0520 (715) 735-9002

For advertising rates —please call 800-445-6066 (9am-5pm e.s.t.).

AUDIOPHILE LPs&CDs

Analogue Productions
Mobile Fidelity - Wilson
Reference Recording - Chesky
Sheffield Lab - Harmonia Mundi
Proprius - RCA Living Stereo - Klavier
Mercury Living Presence - plus many more
in and out of print recordings!

Catalog $3 in USA, $5 elsewhere - refundable

ACOUSTIC SOUNDS 1-800-525-1630
P.O. BOX 2043 • SALINA, KS 67402-2043
1-913-825-8609 • FAX: 1-913-825-0156
Visa
MasterCard

SPEAKER CATALOG

Parts Express is a full-line distributor of electronic parts and accessories, geared toward the consumer electronics industry, and the technical hobbyist. Stocking an extensive line of speaker drivers and accessories for home and car. Send for your **FREE** 148 page catalog today.

Parts Express
340 East First Street
Dayton, Ohio 45402
1-800-338-0531

ANNOUNCEMENTS

ACT AUDIO gives good sound!
A professionally designed listening room costs less than some CD's. Send SASE for details. ACT AUDIO, 619 Moon Clinton Rd., Coraopolis, PA 15108.

THE LNPA 150 MONOBLOCK POWER AMPLIFIER; clarity, immediacy, and accurate harmonic content never before heard in high end audio. Designed to please a musician's ears and built for longevity. "Some of the best solid state I have ever heard." Brian Cheney; VMPS Audio Products. R.E. DESIGNS, 510 Western Avenue, Lynn, MA 01904. (617) 592-7862. Available to audition at The Listening Studio, Boston, MA.

EUROPEAN TUBE ELECTRONICS: KLIMO, LECTRON, VERDIER and others; the MORCH tonearms from Denmark, the VERDIER turntables from France. Also outstanding classical/jazz CDs and LPs from six European countries (catalog $3.00). All items imported/distributed exclusively by **AUDIO ADVANCEMENTS,** POBox 100, Lincoln Park, NJ 07035. For info and dealer near you call: 201.633.1151!

LOW PRICES! We have a wide selection of audiophile products! FULL WARRANTY, plus extended warranties. PRICES TOO LOW TO PRINT! Sound Shop (206)692-8201.

ANNOUNCEMENTS

CASH for USED AUDIO & VIDEO EQUIP. BUYING and SELLING by PHONE. CALL for HIGHEST QUOTE. **(215) 886-1650.** The Stereo Trading Outlet, 320 Old York Road, Jenkintown, PA 19046.

AUDIO BY VAN ALSTINE HAS ALL NEW MODELS! Announcing our stunning new FET-VALVE, OMEGA TWO, and TRANSCENDENCE THREE DESIGNS. Our brand new big amplifier chassis features ultra-efficient extruded heatsinks and up to 50% more output mos-fets. We engineered brand new preamplifiers for all budgets (hybrid, tube, and solid state). Big preamps complete with tone controls and 9 sets of inputs for the most complex systems. Fabulous performing straight line preamps at true budget prices. Complete line-only preamps, headphone amps, stereo phase inverters, and more at prices under $300. Many available as complete kits for even greater savings and fun. All hand crafted in the USA. No cheap parts, no "made by machine" layouts. We design to be faithful to the spirit of the music. It's a listening revelation! Write or call for our illustrated catalog. Audio by Van Alstine, 2202 River Hills Drive, Burnsville, MN 55337. (612) 890-3517.

BIG DISCOUNTS! CALL US!!
BARGAIN PRICES ON CD PLAYERS, SPEAKERS, AND MANY MORE COMPONENTS! FAST SERVICE, FULL WARRANTY. SOUND SHOP (206)692-8201.

Hardbound AUDIO, annual bound volume editions, just like the ones in the Editor-in-Chief's office. Various years available in limited quantities, $40.00 each. Also available: Hardbound October Annual Equipment Directories. Years 1990, 1989, 1987, 1986, $15.00 each, and hardbound May Car Stereo Directories for years 1991, 1990, 1989 and 1985, $8.00 each. All prices include postage and handling. All orders postpaid. Check or money order only (no credit card orders) payable to AUDIO MAGAZINE. Send orders to AUDIO, 1633 Broadway, New York, N.Y. 10019. Attn: Michael Bieber, Or call 212/767-6301 for further information.

CA$H PAID FOR AUDIO & VIDEO EQUIPMENT. AUTHORIZED: **DENON**, HARMAN KARDON, MARANTZ, ROTEL, SUMO, ACURUS, ROGERS, CELESTION, ENERGY, SIGNET, ETC. **STEREO CLASSICS**, 75 CHURCH ST., NEW BRUNSWICK, NJ 08901. (908) 220-1144, FAX: (908) 220-1284.

AUDIOPHILE & SCHOLAR
UNIVERSITY AUDIO SHOP, MADISON, WI
Vandersteen, KEF, Snell, EPOS, JMLabs, Paradigm, NEAR, Pattern, B&K, Paragon, CODA, YBA, Boulder, SymphonicLine, Melos, Parasound, Micromega, Audio Alchemy, Rega, Roksan, Stax, Fosgate, Soundstream, JVC, Grado, PowerWedge, Audioquest, OCOS, & XLO. (608) 284-0001.

HOSANNA AUDIO: REVOX B286TP-$595. COUNTERPOINT SA100-$795. TANDBERG 3026A-$650. TANDBERG 3018A PREAMP-$850. NAKAMICHI PASII-$850. BELLES 400,450-OFFER. CITATION 25-$395. MUST MAN BE BORN AGAIN? JOHN3:1-18. (313)471-1223.

ATTN: QUAD OWNERS! FACTORY AUTHORIZED REPAIRS AND MODIFICATIONS ARE PERFORMED BY QS&D. WE HAVE ORIGINAL REPLACEMENT PARTS AVAILABLE ALONG WITH RECONDITIONED QUAD EQUIPMENT. IF YOU NEED ASSISTANCE PLEASE CONTACT QS&D AT 33 MCWHIRT LOOP #108, FREDERICKSBURG, VIRGINIA 22406. PHONE: 703-372-3711, FAX: 703-372-3713. MC/VISA.

AUDIO UNLIMITED in Colorado offers Acoustic Energy, Acrotec, AirTight, Audio Meca by Pierre Lurne, Audio Note, Benz-Micro, Bitwise, Chario, CODA, Dynavector, Ensemble, Golden Dragon, Ikeda, JM Labs, Lazarus, Magnum Dynalab, Musical Design, ORACLE, Muse, Roksan, Roomtunes, SOTA, Tice, Unity Audio, Wheaton Triplanar, & more... Call John Barnes at (303) 698-0138 or Fax (303) 922-0522. 2341 West Yale Ave., Englewood, CO 80110. VISA and MC accepted.

CD STORAGE+™

No. A300 (Shown in Solid Brown Oak)

Soricé Systems — Setting the Standards in Audio/Video Storage Systems

- Store 300 CD's in this Premium Solid Hardwood Cabinet.
- Impeccably crafted in your choice of Solid Oak, Walnut, Teak or Cherry.
- Fully adjustable Shelves store any combination of CD's, Videos and Cassettes — all in ONE cabinet.
- No-Slot design maximizes storage space, simplifies organizing & re-arranging your collection, accommodates single & multiple CD sets, allows for possible changes in the size of CD packaging.
- Adjustable Solid Brass Bookends keep Discs & Tapes upright and in place.
- Cabinets can be stacked, wall mounted or left free standing.
- Optional Clear or Smoked Glass Doors are available.
- Completely enclosed back provides dust protection.
- Compact size: 39½"H x 23½"W x 7½"D
- Shipped to you fully assembled.

SORICÉ
P.O. Box 747-A Nutley, NJ 07110
We accept Visa, MasterCard, American Express, Checks and Money Orders. All Models come with a 30 Day Money Back Guarantee and a Full One Year Warranty.

For Prices and Free Full Color Literature on our Complete Line of Audio/Video Storage Systems: Call Toll Free **1-800-432-8005** or FAX your name and address to **1-201-748-2592**

ANNOUNCEMENTS

---- LIMITED INTRO OFFER ----

Don't let the Depressed Economy get you down This Christmas, Lift-up your Spirits with a new BINAURAL HOLOGRAPHIC HEADPHONE ADAPTOR. LIMITED OFFER $14.95 POSTPAID, Exp. 2-22-93. Send S.A.S.E. For Full Info or Check or Money Order to: GT Enterprises, P.O. Box 62, Greenlawn, N.Y. 11740.

WESCOTT AUDIO - **Acoustat** Spectra mods, **XLO**, Discovery, **VAC**, Sumiko, Room Tune, Bitwise, **Ensemble**, Sonus Faber, **Muse**, Dynavector, **Power Wedge**, Benz-Micro, **Prodigy**, Edison Price, Eminent Technology, Vampire, **Power Flow**, BAE, **Music Meter**, Super Contact, & the superlative **EAD T-7000**, & **DSP-7000** transport & D/A converter. Call **SCOTT** 800-669-7574 Anytime, Anyday For Info. & Expert Consultation.

CD MAGIC makes CD Music come to life. Clean highs, fabulous detail, marvelous vocals, new musicality. **CD MAGIC stops CD skipping.** CD Magic sprays an invisible film onto CDs for major sound improvement. Will not harm or alter CDs. **CD MAGIC will improve 200 CDs** for audiophile playback. Send $14.95 for new CD MAGIC, postage paid. **Compact Dynamics Co.**, P.O. Box 32014-A, Euclid, Ohio 44132. CALL (216) 946-0438. FAX (216) 451-2510.

AUDIO CLASSICS

Buys-Sells-Trades-Repairs-Modifies.

Amplifiers: Accurus A250 $750, 2004II $1099; Audio Research D40 $795; Audire DM700 $699; B&K M200/Bal $1799; Berning EA2100 $2099; Cary Audio SLA70DLH $1069; Counterpoint SA100 $899, SA12 $825, SA220 $1995; Electrocompaniet Amp II $799; Jadis Defy 7 4575; Janis Interphase 1A $375; Krell KSA150 $3550, KSA250 $4900, MDA300 $7999; Lazarus H1A $899; McIntosh MC2120 $799, MC240 $1400, MC250 $499, MC2500 $2900, MC275 $2899, MC50 $599, MC75 $2495, MC754 $699, Motif MS100 $1825; Precision Fidelity M7A $399; PS Audio 200C $1199; Quad 306 $599, SAE A205 $399; Soloist OCM200 $1289, OCM500 $2099; Sonograph SA120 $599. **CD Players:** Adcom GCD575 $359; B&O CDX $249; CAL Aria $455, Icon $299; Discrete Technology FD2040 $199; Kinergetics KCD40 $1899; Krell CDDSP Custom $2533; McIntosh MCD7000 $749, MCD7007 $1499; NAD 5240 $249. **CD Processors:** Arcam Delta Black Box $299; Krell SBP32X $1999. **Crossovers:** Crown VFX2 $299. **Equalizers:** Audio Control C101 $325. **Headphones:** Stax ED1 $475, Lambda $399, Lambda Signature $1499, Sigma $379, SR80MX $299. **Integrated Amps:** MA5100 $350, MA6100 $449, MA6200 $1199. **Line Conditioners:** Tripp-Lite BC325 $399, LC1800 $249. **Preamps:** Amber FF17 $199; Apt Holman $200; Audiolab 8000C $349; B&K CS115 $269; Bedini BC800 $999; Carver C1 $299; Hafler SE100 $287; Jadis JPL $4995; Kinergetics KPA2 $999; Krell KBL $3200, KSL $1499, PAM5 $1125; Levinson 26 $3499; Marantz 7T $495; McIntosh C20 $349–799, C22 $1699, C26 $299, C27 $499, C28 $449, C29 $999, C31V $1200, C32 $899, C35 $1295, C504 $550; Motif MC9 $799; MTI 500 $399; Precision Fidelity C7AII $380, C8 $399; Reference Line 1000 $299; Soloist OCM55 $1129; VSP Straightwire II $499. **Processors:** Benchmark Acoustics ARU $299; Fosgate 101A $249; Lexicon CP1 $799, CP2 $799; Yamaha DSP1 $449. **Receivers:** Carver 2000 $999; Kyocera R461 $399; McIntosh MAC1700 $249, MAC4100 $999; MAC4280 $1558; Nakamichi TA3A $599; Scott 340 $299; **Record Cleaners:** VPI HW16.5 $375. **Speaker Switches:** Audio Control 15 $199. **Speakers:** Acoustic Energy AE1 $1589; Apogee Diva $6666, Major $2999, Minor $799; B&W 802 Matrix III $3483, 804 Matrix $1775; Dahlquist DQ20i $1145; Infinite Slope .6A $399; Infinity Kappa 5 $399; Janis WI $399; JBL 4408 $549; KEF 105/3 $2399, 107/2 $4195, C35 $285, C55 $399, C85 $599, Q60 $499, Q80 $499; Klipsch Quartet $649; Martin-Logan CLSIIa $2200; McIntosh ML1C $550; Phase Tech PC80 $375; Polk SDA1A $699; ProAc Mini Tower $1299; Quad ESL63 $1995; Ryan MCL3 $899; Snell KII $299; Tannoy K3838 $799; TDL Studio 1 $965, Studio 3 $995; Velodyne F1200 $995, ULD 15II $1195. **Tape Decks:** Sony PCMF1 $920. **Tonearms:** Dennesen ABLT1 $400; SME V $999; Syrinx PU4 $499. **Tuner Preamps:** McIntosh MX110 $399, MX112 $399, MX113 $449, MX117 $1199. **Tuners:** Carver TX11 $288; Creek T40 $399; Hafler DH330 $175, SE130 $289; Kenwood KT7001 $99; Magnum Dynalab Etude $1179, F205B17 $257, FT101AS19 $725, FT11S17 $399; McIntosh MR500 $699, MR510 $839, MR65B $299, MR7082 $1195, MR7083 $1299, MR71 $899, MR80 $1350; Sansui TUX701 $329; Tandberg TPT3001A $1295. **Turntables:** B&O 3300 $249; HW19IV $1499. **Video Disc Players:** NAD 5900 $599. **FREE Catalogue.** 8AM–5PM EST Mon–Fri., **AUDIO CLASSICS,** POB 176 AAA, Walton, NY 13856.

607-865-7200

FOR SALE

UPGRADE FOR LESS! ROGERS' AUDIO IS OFFERING BEST PRICES ON USED AUDIO COMPONENTS. BUY—SELL—TRADE. CALL (509) 966-4431.

WANTED MCINTOSH/DYNACO

WANTED: MCINTOSH, MARANTZ, DYNACO, ALTEC, JENSEN, FISHER, CITATION, JBL, ELECTROVOICE, CELLO, LEVINSON, AUDIO RESEARCH, CONRAD JOHNSON, WESTERN ELECTRIC, **TUBE**/SOLID STATE. (713)728-4343. FAX: (713)723-1301. MAURY CORB, 12325 ASHCROFT, HOUSTON, TEXAS 77035.

RACK AND CHASSIS BOXES for construction of electronic projects. Low cost; stocked for quick delivery. Call for free catalog. SESCOM, INC. 1-800-634-3457.

SAVE 40% ON HIGH-END home speakers, subwoofers, amplifiers. FREE CATALOG, 3021 Sangamon Avenue, Springfield, IL 62702.1-800-283-4644.

AA/STEREO TECH.

LOW PRICES/FAST DELIVERY! DENON, NAD, KEF, B&W, ADCOM, CARVER, NAKAMICHI, BOSTON, HAFLER, VPI, ADS, M&K, ROCK SOLID, ONKYO, B&K, DCM, SNELL, FRIED, VELODYNE, POLK, SPICA, COUNTERPOINT, AND MORE!
FULL WARRANTY!!
MOST ITEMS IN STOCK!!
414-836-2942
CALL US!!

CD OLDIES IMPORTS

ANNETTE FUNICELLO - Best Of (JPN)	$27.99
AMBROSIA - One Eighty (JAP)	$25.99
FRANKIE AVALON - The Fabulous (UK)	$18.99
OLIVIA NEWTON JOHN - Best (JPN)	$25.99
MAC & KATIE KISSOON Chirpy Chirpy Cheep Cheep (UK)	$18.99
MARIA MULDAUR - S/T Inc. Midnight At Oasis (JPN)	$24.99
ASSOCIATION - Greatest Hits (JPN)	$24.99
KOOL & THE GANG - Best Of (JPN)	$23.99
TONY ORLANDO & DAWN - Greatest Hits (JPN)	$27.99
SONNY & CHER - Collection (JPN)	$23.99
JAMES TAYLOR - Live in Rio (BRZL)	$21.99
MICHAEL MCDONALD - Best (G)	$24.99
DAVID CASSIDY - Best (JPN)	$24.99

We Specialize in Oldies, Greatest Hits & Classic Rock & Roll ONLY! (No metal, No weird stuff!) Call for FREE List
WE SHIP TODAY! ... ALL MAJOR CREDIT CARDS
Add $4.50 S/H per total order - NY Res. add Tax
CDMO, INC., Dept. AUD, 900 Rt. 110, Melville, NY 11747
Info: 516-385-2366 Orders Only: 1-800-FOR-CDMO

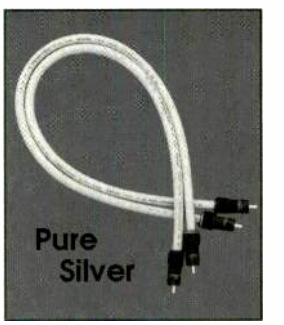
FOR SALE

ABARGAIN: STAX SIGN/LAMBDA $1,395; SIGN/SRM1-II $859, PRO/LAMBDA(#1) $459, SIGN/LAMBDA SRD/7 $599; GRACE F9ERUBY $199; F9E $125; FR1MK3F $169; ALL UNUSED (212) 966-1355.

CALL US LAST

WE WILL
BEAT ANY PRICE
PRINTED IN THIS MAGAZINE ON
HOME & CAR STEREO
The SOUND Approach
6067 Jericho Tpke., Commack, NY 11725
AUTHORIZED DEALERS **(800) 368-2344**

VAMPIRE WIRE™



...audible results with the finest in connecting components!

SOUND CONNECTIONS INTERNATIONAL, INC.
203 Flagship Dr., Lutz, FL 33549 PH (813) 948-2707

WE HAVE GONE FAR TO HAVE them HERE...

90
of EUROPE'S FINEST KITS

ETON Peerless scan-speak morel seas vifa DYNAUDIO AUDAX DAVIS Acoustics

The most ingenious designs from European speaker kit builders, now available here. Order our special **EUROPEAN KIT BROCHURE**, featuring **90** fully detailed drawings and specifications for only **$6**! Exclusively available from:

SOLEN Électronique Inc.
phone (514) 656 - 2759
fax (514) 443 - 4949
4470 Ave.Thibault
St.-Hubert, QC J3Y 7T9
Canada

Madisound Presents

Sledgling

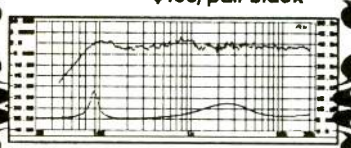
The Perfect Holiday Gift

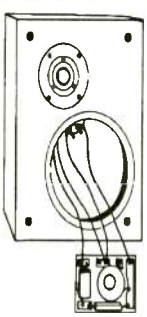
The Sledgling is the best little bookshelf speaker kit on the market today. The Sledgling speaker is small enough to fit unobtrusively in any den or be used as a rear channel speaker. We chose a high quality 6 ½" polypropylene woofer and a Vifa treated textile dome tweeter with ferrofluid for a very clean sound. We have utilized the best possible components in the crossover network with Sidewinder coils and Chateauroux Metallized Polypropylene capacitors on an epoxy circuit board.

The kit is designed to be as easy as possible to assemble. The cabinet is already finished. The holes for the drivers and the input cup are pre-cut; the crossover is preassembled, and the grill cloth is stretched on the frame. The assembly of this kit does require some soldering ability.

Specifications:

Impedance:	4 Ω or 8 Ω (Please specify)
Sensitivity:	90 db
Power Rating:	50 Watts
Freq. Range:	70 - 18000 HZ +/- 3db
Woofer:	6 ½ "
Tweeter:	¾" Dome
Crossover:	6/6 db w/ Sidewinder Coils and Polypropylene Capacitors
Cabinet:	Walnut Wood Veneer or, Black Lacquer 9"x12"x6"
Still Only	**$145/pair Walnut $135/pair Black**





Ordering Information: All speaker orders will be shipped promptly, if possible by UPS. COD requires a 25% prepayment, and personal checks must clear before shipment. Add 10% for shipping charges (Residents of Alaska, Canada and Hawaii, and those who require Blue Label air service, please add 25%). There is no fee for packaging or handling, and we will refund to the exact shipping charge. We accept Mastercharge or Visa

Madisound Speaker Components
8608 University Green
Box 44283
Madison, WI 53744-4283
Phone:(608)831-3433
Fax:(608)831-3771

FOR SALE

ADCOM, B&K, HAFLER and CD MODS
Since 1979, our reengineering has set the highest standards for performance and value! Inexpensive modifications to "all-out"—Toroids, huge filter caps, **Dual-Mono** conversions, outboard supplies. **MC-3T(Teflon®)** phono/line preamp board for Adcom, B&K and Hafler—simply stunning! **NEW! PA-1** driver boards for **HAFLER** amps—incredible! **SuperConnect IV** interconnect—the best or money back! We modify **PHILIPS, ROTEL, MAGNAVOX, MARANTZ** and **PIONEER** CDs. X-mas specials! Call for mailer today! MUSICAL CONCEPTS, 1832 BORMAN COURT, SUITE ONE, ST. LOUIS, MO 63146, (314) 275-4925.

SAN FRANCISCO AREA - IRRESISTABLY priced audiophile components/accessories. Shipped/delivered. World's best! By appointment only. 444 Eastwood, Petaluma CA 94954. (707) 765-1992.

AUDIO NEXUS = QUALITY

Featuring legendary **VANDERSTEEN** loudspeakers & **ROTEL** CD Players.

• Apogee • Audio Alchemy • Audioquest • B&K • Cary • Counterpoint • Dynaco • EAD • Esoteric • Forte • Fried • Kimber Silver • Magnum Dynalab • McCormack • Melos • PSB • Rotel • Jeff Rowland • Scientific Fidelity • SME • Sony ES • Sota • Stax • Vandersteen • VPI • Wadia. **SUMMIT, NJ (908) 277-0333.**

DYNACO ST70 UPGRADES: Gold EL34 Sockets, 1215 Microfarad on-board solid state B+, triode output, more. DoReTech Audio Services, Box 6054, South Hackensack, NJ 07606-4354. Phone/Fax: (201) 843-0488.

DYNACO AND HAFLER OWNERS! Audio by Van Alstine builds great new circuits for you. Not "modifications," but original engineering designs that eliminate transient distortion, have no on or off thumps, are durable and rugged, and sound closer to live than anything else. Complete do-it-yourself preamp (and Stereo 70 tube amp) rebuild kits from $195 including new PC cards and precision controls. New 300 volt/microsecond slew rate power mos-fet amplifier circuits installed in all Dyna and Hafler solid state amp chassis. We set new standards for transparency, definition, dynamic range, and liquidity. Recycle that solid Hafler or Dyna chassis and get better than new performance for a much lower cost. Write or call for our illustrated catalog. Audio by Van Alstine, 2202 River Hills Drive, Burnsville, MN 55337. (612) 890-3517.

★★★★★★ ACCESSORIES TO COMPONENTS ★★★★★★

Audio Outlet... where audiophiles call audiophiles for great selection, great services and great prices!

Sound Advice without the Price

AUDIO OUTLET Inc.

914-666-0550
24-HR. FAX 914-666-0544
Monday-Friday
10am-7pm ET

★★ P.O. Box 673 • Bedford Hills, NY 10507-0673 ★★

AUDIO CABLES & MORE

DON'T PAY EXORBITANT PRICES ! FOR TOP QUALITY !

We have years of experience in wire manufacturing and we have simulated the high priced brands. Equivalents as low as .35/foot. We demystify wire technology. Send for explanation literature and catalog that includes all our audio products or call our catalog request # 800 321 2108 24 hrs/day.

L A T INTERNATIONAL

Dept A 317 Provincetown Road
Cherry Hill NJ 08034

FOR SALE

WHO SAYS WE ONLY SELL CABLES??? CALL US. WE'LL SEND OUR COMPLETE LIST OF AFFORDABLE AUDIOPHILE PRODUCTS INCLUDING OUR CURRENT "SPECIALS LIST" WITH CLOSEOUTS LIKE: STRAIGHTWIRE LSI $39.95pr, TMI $69.95pr, AUDIOQUEST COBALT 50% OFF, ACOUSTAT SPECTRA 1100 $995.00pr, STAX LAMBDA SIGNATURE SYSTEM $1199.95. HCM AUDIO 1-800-222-3465, 1-916-345-1341, (FAX) 345-7269.

TARA LABS SPACE & TIME CABLE BLOWOUT! SAVINGS UP TO 60% ON SOME OF THE BEST INTERCONNECT AND SPEAKER CABLES AVAILABLE! DON'T MISS THIS OPPORTUNITY TO UPGRADE YOUR SYSTEM AT TREMENDOUS SAVINGS. SAVE ON QUANTUM II, QUANTUM III, QUANTUM REFERENCE, TEMPORAL CONTINUUM, PANDORA, ORIGINAL, ASTRAL BLUE AND MORE. MANY DIFFERENT LENGTHS. OVER 300 PAIRS OF NEW AND DEMO CABLES AVAILABLE. FULL MANUFACTURERS WARRANTY. CALL NOW FOR COMPLETE PRICE LIST. HCM AUDIO, (800) 222-3465, (916) 345-1341.

WE DISCOUNT! THEY DON'T!

WIDE SELECTION • LOW PRICES • FAST SERVICE• FULL WARRANTY • KNOWLEDGEABLE CONSULTANTS. **CALL US!** SOUND SHOP (206) 692-8201.

EXPERIENCED, FRIENDLY ADVICE! FREE SHIPPING! MIRAGE, PS, CWD, CARY, KINERGETICS, KEF, PHILIPS, AUDIOQUEST, FRIED, MONSTER, QUAD, SPICA, STRAIGHTWIRE, MORE!! READ BROTHERS, 593 KING, CHARLESTON, SOUTH CAROLINA 29403. (803) 723-7276.

DEALER DEMO SALE. Snell C IV $1099. JBL 4430 Bi Radial System $1850. Magnepan MG3A $1099. B&W 801 $1900. Klipsch Forte $699. Audio Alchemy DDE 1.0 $259. Thorens 320 II $550. Soundcraftsman Pro Power 8 $900. Mitsubishi LT 5V Turntable $199. Shure HTS 5300 Surround Processor $499. Audio Source SS1 Surround Processor $90. Reference Line Passive Preamp $199., & Miscellaneous Subwoofers. Sony 75ES DAT $499. Klipsch LaScala $999. SPICA Angelus $799. Velodyne UDL15 $799. NEW PARASOUND CLOSEOUT...HCA 500 Amp $199. 750 II Preamp $185. T/DQ 260 Tuner $150; OR ALL 3 FOR $449. 1-217-544-5252.

Cable TV Descramblers, Converters, Accessories. Name Brands. Lowest prices. Best service. Call CABLE READY COMPANY. (800) 234-1006 for FREE 16-page color catalog.

STEVE'S AUDIO ADVICE

Offering extra special pricing starting October on VMPS, McCormack, B&K, Quad, Philips, Alon, Rocksan, Woodside, Modsquad, also featuring Cardas, Kimber, and other great cable. Used equipment also available. Dial Toll Free 1-800-752-4018.

AUDIO SOLUTIONS is Atlanta's Hi-End source for Audio Research, McCormack, Theta, Vandersteen, CODA, Wire World, Acurus, Snell, Music Metre, Classe, Musical Design, Kimber Kable, B&K, Magnum Dynalab, Rotel, & VPI. 4880 Lawrenceville Highway. (404) 381-0778.

HI FI CLASSICS — USED HI END — HUGE SELECTION of components, cables, etc. Competent & helpful salespeople & the best prices around. WE BUY SELL & TRADE, INVENTORY LIST AVAILABLE. TEL: (718) 318-9618, FAX: (718) 318-9623.

DEMO SALE AT ARIEL...THE SPECIALIST IN COST EFFECTIVE HIGH-END: B&K, NEAR, Musical Design/Concepts, Straightwire & Many More. Authorized Dealer. Carmel, IN. Visa/MC. (317) 846-9766, 5-10PM.

AUDIO BEST: LA, ORANGE, SAN BERNADINO, CALIFORNIA. HOT COMPONENTS: NEAR 50ML, COUNTERPOINT, HAFLER, PS ULTRALINK; AUDIBLE ILLUSIONS; POWERWEDGE, ACOUSTAT; SPICA; VMPS; MAGNUM; FOSGATE; B&K, TARALAB, MUSIC REFERENCE, SOUNDLAB, CELESTION, MONSTER, STRAIGHTWIRE, MUSICAL CONCEPTS, (909) 861-5413, APPOINTMENT.

PAUL HEATH AUDIO

AUDIOSTATIC, ARONOV AUDIO, ARTEMIS, CROWN MACRO, B&K, CONRAD-JOHNSON, CODA, CARDAS, EMINENT TECHNOLOGY, ESSENCE, ENLIGHTENED AUDIO, PS AUDIO, UNITY, VIMAK, QUICKSILVER, LINAEUM, MERLIN, MUSIC METER, XLO, OCM, MUSICAL DESIGN. **217 ALEXANDER ST., ROCHESTER, NY 14607. (716) 262-4310.**

FOR SALE

FOR TWENTY YEARS WE HAVE BEEN THE SOURCE FOR ALL OF YOUR BLANK AUDIO/VIDEO TAPES AND ACCESSORIES, EVEN REEL-TO-REEL TAPES FOR STUDIOS, AT DISCOUNTED PRICES. CATALOG AVAILABLE. SOUNDD INVESTMENT CORPORATION, 3586 PIERCE DRIVE, CHAMBLEE, GA 30341. (800) 659-TAPE (8273). IN GA (404) 458-1679. FAX: (404) 458-0276.

ATTENTION AUDIOPHILES! See October '92 Audio, Pages 343 & 347. Unbiased, Expert Advice. Best Trades! Used/Demo List. **AUDIO CLASSICS ENTERPRISES.** Visa/MC/Disc. (405) 842-3033.

AUDIO DEN Authorized Sales and Service. ADCOM, ARAGON, ARCAM, B&K, CAL, CELESTION, CODA, CONRAD-JOHNSON, KLIPSCH, MAGNEPAN, MIRAGE, MIT, MONSTER CABLE, NAD, NAKAMICHI, NEAR, PARADIGM, ROGERS, SONOGRAPHE, SONUS FABER, SOTA, STAX, THETA DIGITAL, VELODYNE, YAMAHA. **AUDIO DEN**, 2021 Smith Haven Plaza, Lake Grove, NY 11755. **(516)360-1990.**

LAST CALL! ADC SS-525X 12-band autoequalizer: $249.95; dbx 224X-DS: $299.95; dbx 500XR: $369.95; AKG K-1000 earspeakers: $599.95 (all new, factory sealed cartons). Audio Marketing: (310) 839-2000.

HIGH-END 15%-40% DISCOUNT

WARRANTY • FAST SHIPPING • HONESTY: Acoustat • Adcom • a/d/s • Altec • Bang & Olufsen • Bose • Crown • Forte • Fosgate • Hafler • Infinity • JBL • JVC • KEF • Klipsch • Lexicon • Meridian • Nakamichi • Onkyo • Philips • Pioneer • Rane • Threshold • Velodyne. **SoundBox • (305) 262-4766.**

CARVER • LOWEST PRICES

20%-50% OFF FULL LINE • WARRANTY • FAST SHIPPING: **Amplifiers** • TFM-15 $315, TFM-25 $505, TFM-35 $550, TFM-45 $705, Silver Nine-t $875, TFM-75 Call. **CD** • SDA-490t $515, SDA-350 Carousel $265. **Preamplifiers** • CT-17 $605, CT-3 $335, CT-6 $445, C-19 $855. **Cassettes** • TD-1700 $395, TD-1400 $235, Amazing **Loudspeakers** • Platinum $2400, Silver $2000. **SoundBox • (305) 262-4766.**

AUDIO/VIDEO AUTHORIZED DEALER. Wholesale Prices. SONY, KENWOOD, BOSE, RCA, PHILIPS, ADVENT, JBL and More. FREE Catalog. (800) 423-VCRS. COLONEL VIDEO & AUDIO.

SPEAKER STANDS improve the sound of your speakers. 12" pedistal stands in ebony finish $24.95. Order now for Christmas! Send $1 for various heights & woodgrains to: Sterling Investments, 856 S. Aspen, Suite 21-S, Broken Arrow, OK 74012.

ADCOM GFA 535/GTP400 $450; AQ STERLING ORIGINAL 10' PR. $1100; GREEN 12' PR. $375; B&O OLDER RECEIVERS, TURNTABLES ETC. CALL; CJ PV-1 PREAMP $300; LEVINSON ML9 $1500, #27 CALL; LINN DMS $4500; LK-1/LK-280 CALL; MERIDIAN 208 CD $1400; MIT CALL; PIONEER CLD1070 VIDEODISC PLAYER $375; PINNACLE CALL; SONOGRAPHE SD1b CD $325; TANDBERG 3026 AMPLIFIER $675; THIEL CS3.5 CALL; VANDERSTEEN 3 $1900. CALL TERRY AT: (402) 391-3842.

CABLE TV DESCRAMBLERS! ABSOLUTELY THE LOWEST PRICES! ALL MAJOR BRANDS. NOBODY BEATS OUR PRICES! CABLE PRICE CLUB 1-800-377-9742.

ADCOM, ADS, AUDIO RESEARCH, BANG & OLUFSEN, B&W, CARVER, CELESTION, DENON, FOSGATE, HARMAN/KARDON, INFINITY, JBL, KEF, KLIPSCH, LEXICON, MIRAGE, NAKAMICHI, ONKYO, POLK, REVOX, TRIAD, VELODYNE, YAMAHA, AND MORE. MANUFACTURER'S WARRANTIES. LIVE ASSISTANCE WEEKDAYS. AUTOMATED PRICING 24 HOURS. AMERISOUND SALES, INC. (904) 262-4000.

BEDINI ELECTRONICS INC. OF IDAHO. All warranty and non-warranty work done. 25/25 45/45 100/100 All MKII series and BA-900 series Amplifiers Discontinued and Reconditioned Amplifiers and PreAmplifiers all models. Call or write for info, 7239 Valley Street, Dalton Gardens, IDAHO 83814. (208) 772-9207.

FOR SALE

PHILIPS DAC960 D/A CONVERTER/PREAMPS AT HALF PRICE! Coax & optical digital inputs, fixed & variable preamplified outputs drive power amps, balanced outputs, headphone amp. New with original Philips warranty. $475 + s/h. Phone (410) 828-9225 or write attention. HAMPTON CHILDRESS, BOX 36141, TOWSON, MD 21286-6141.

AAA—LOW PRICES—HIGH END EQUIPMENT!!! A/D/S/ • B&K • CARVER • CHICAGO STANDS • DCM • DENON • FRIED • GRADO • M&K • NAKAMICHI • ONKYO • PS AUDIO • SNELL • SUMIKO • THORENS • VELODYNE • VPI, and others. AUDIO ELITE, Menasha, WI.
414-725-4431 • SAVE $$$

DESIGN & INSTALL

YOUR OWN CUSTOM A/V or MULTIROOM SYSTEM with our informative catalogue of installation supplies. Complete Systems, Parts, Text, Diagrams, & Full Technical Support. — Catalogue $3.00. R Gladwin, P.O. Box, 221666. Carmel, CA 93922 or Call: 510-655-6653.

BEST $1,500 LOUDSPEAKERS!!! B&W • BANG & OLUFSEN • CROWN • NAKAMICHI • VMPS • DENON • TRIAD • ADCOM • CARVER • HARMAN/KARDON • POLK • MIRAGE • KEF + MORE + HONESTY. MANUFACTURERS WARRANTIES! TECH ELECTRONICS. (904) 376-8080.

CROWN RP-30 7-TUBE RACK-MOUNT RECORDER ELECTRONICS FOR SERIES 700/800/1000 PROFESSIONAL DECK. TWO, NEAR-NEW. SCARCE! MINIMUM OFFER $250/EACH. ALSO, FLEETWOOD TELEVISION, DYNAKIT & HEATH TUBE AMPLIFIERS. MAXWELL STRANGE, 11710 WAYNERIDGE COURT, FULTON, MD 20759.

DO IT YOURSELF SPEAKER REPAIRS
Foam speaker surround replacements from SAT will **save** you **hundreds of dollars. All sizes,** including AR ADVENT. BOSE JBL Surrounds adhesive, instructions $27.95 pair. Do It yourself with SAT

STEPP AUDIO TECHNOLOGIES
PO BOX 1088, FLAT ROCK, NC 28731
1-800-747-3692
VISA/MC

The World's First Inexpensive True Subwoofer: The *Hsu Research* HRSW10

Starting at $750 ***a pair*** plus shipping, these elegantly-finished cylindrical subwoofers provide tight, floor shaking ultra clean bass to below 20 Hz.

"14.3 Hz to 40 Hz"(+0, -3 dB) "the highest maximum output of all the systems" "generated truly awesome room-shaking bass..air pulsating around me" "provides extremely good value for the money, even counting the cost of a moderate sized amplifier, and still better value if you already have such an amp" - Don Keele, Nov 92 *Audio*.

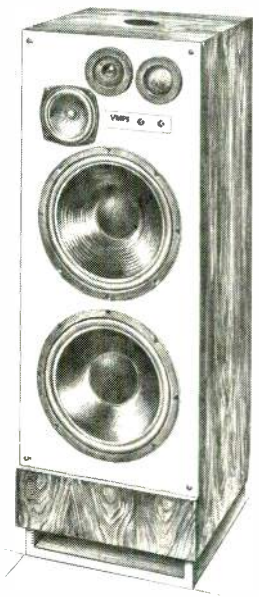
"the most effective subwoofer we have tested" "The skin-tingling and wall-vibrating sensation it imparted (even at moderate levels) was unmistakable" "a 'best buy'" "+/- 2 dB 11 to 70 Hz" - Julian Hirsch, Sep 92 *Stereo Review*.

Speaker Builder (3/92) found its distortion at 24 Hz to be an order of magnitude lower than the reviewer's reference with 4 instead of the 1 10-inch of the HRSW10.

Available factory-direct with a 30-day money-back guarantee from:

Hsu Research
20013 Rainbow Way
Cerritos CA 90701
1-800-554-0150 (Voice)
1-310-924-7550 (Voice/FAX)

LOWER LOUDSPEAKER DISTORTION



The VMPS Tower II, 43 x 15 x 16", 95#. $479/ea kit, $649/ea assem in gen. lt or dark oak

The VMPS Tower II is a low distortion, high output floor-standing speaker system offering unparalleled performance for price.

With its three 12" woofers (two active, one passive), butyl surround polycone mid, softdome tweeter and dual supertweeters (piezo or ribbon), the Tower II generates no more than 0.7% THD/1W drive down to 22Hz. High sensitivity (94dB/1W/1m) and high undistorted output levels (120+dB SPL/1m) ensure dynamic range and impact previously unavailable in its price range. **Audio Magazine** critic Anthony Cordesman comments: ". . . the Tower II is the only speaker even close to its cost that is capable of true deep and powerful bass response . . . It is an unquestionable Best Buy." (Jun 89)

Hear VMPS at the dealers below, or write for brochures and test reports on our full line including the **MiniTower IIa** ($369ea kit, $479ea assem), **Super Tower/R** ($749ea kit, $998ea assem), the all-out **Super Tower III** ($4700/pr kit, $5600/pr assem), our four highly acclaimed **Subwoofers** (**Smaller,** $259ea kit, $329ea assem; **Original,** $349ea kit, $429ea assem; **Larger,** $479ea kit, $599ea assem; **Dedicated,** $349ea kit, $429ea assem), the **QSO626 A/V Monitor** (269ea kit, $329ea assem), and the **QSO Series** bookshelf speakers starting at $159ea. Kits are supplied with assembled cabinets and prices include free shipping in 48 states.

VMPS AUDIO PRODUCTS

div. Itone Audio
3429 Morningside Dr. El Sobrante, CA 94803
(510) 222-4276 Fax: (510) 232-3837

Hear VMPS at: The Listening Studio, Boston; Sounds Incredible, Brookfield, Ct; Hamisch Norton NYC NY; Dynamic Sound, Washington DC; Hifi Farm, Beckley WV; Pace Audio, Decatur, Ga; American Audio, Greenville SC; Tech Electronics, Gainesville FL; Arthur Morgan, Lake Mary, FL; Sound Solutions, Carlisle PA; Sounds Deluxe, Clarendon Hills Il; Audio Specialists, South Bend In; Audio Connection, Terre Haute In; Ruth Industries, St. Louis Mo; Shadow Creek Ltd, Minneapolis Mn; Audio by Gil Morrison, Detroit Mi; Concert Sound, San Antonio Tx; Stereoworks, Houston Tx; Lookout Electronics, Longview Wa; Affordable Audio, Fresno, Ca; Exclusively Entertainment, Oceanside, Ca; Hal Broda, Escondido Ca; Christopher Hansen Ltd, Beverly Hills Ca; Audio Haven, Upland Ca; Sounds Unique, San Jose Ca; Private Line Home Entertainment, Stockton Ca; Golden Ear, Chico Ca; Itone Audio, El Sobrante Ca. The Sound Room, Vancouver BC Can.

THE $ENSIBLE SOUND

After 12 years of publishing still the only audiophile magazine to help you spend less and get more. Our current issue (#46) discusses the issues of tube amplification design which are never spoken of by those who report fashion instead of reality.

Subscriptions: $20.00/yr. – $36.00/2 yrs.
All available back issues (over 30) – $49.00
403 Darwin Dr, Snyder, NY 14226
1-800-292-5843

ACTIVE ELECTRONIC CROSSOVERS

MODEL 120 CABINET & NEW 120-R "RACK AND PANEL" DESIGNS

Made to order in Butterworth bi-amp, tri-amp, or quad-amp configurations with optional level controls, subsonic filters, or summers. Filters, regulated power supplies, equalizers, are also available.

New catalog and price sheet. Free!

DeCoursey Eng. Lab.
11828 Jefferson Bl., Culver City, CA 90230
PHONE (310) 397-9668

A Modern Classic

"The Musical Design D-140 deserves classic status!" "It doesn't sound like an amplifier, it just sounds like music!" "A true classic." Isn't it time you auditioned the D-140?

MUSICAL DESIGN
1832 Borman Ct., Suite 1, St. Louis, MO 63146. (314) 275-7162

FOR SALE

MCINTOSH Bought-Sold-Traded-Repaired. FREE Catalogue. See our ad at the beginning of the classifieds. **AUDIO CLASSICS,** POB 176MB, Walton, NY 13856. 607-865-7200. 8AM-5PM EST Mon.-Fri.

DEALER COST CLOSEOUT!! All B&W/Rotel product at cost. Also, Dahlquist M903, M905, M907, M909, DQ12, and The Cube loudspeakers for sale at dealer cost. Call for copy of dealer price list. Order Line: (800) 438-6040, Info: (704) 889-9223.

S.B.H. ENTERPRISES

1678 53rd St. Brooklyn, N.Y. 11204 Mon.-Fri. 8-7, Sun. 9-6
(800) 451-5851 NYC (718) 438-1027 FAX: (718) 438-4021

RADAR DETECTORS

BEL
990 179
966W 189
9665TW 239
9665TWR 239
956W 159
956R 179
936W 139

uniden
RD 5000 119
RD 6000 139

WHISTLER
3000 159 5000 199
880 154
1080 179
Spectrum 2 SE 134

HOME STEREOS

JVC
RECEIVERS
RX 207 TN 159
RX 307 TN 179
RX 507 TN 249
RX 707 TN 319
RX 807 TN 389

CD PLAYERS
XLR 304 TN 189
XLV 141 119
XLV 241 129
XLV 441 159 XLP 70 269

MINI COMPONENT
MX 44M 419 MX 55M 539
MX 77M 649 MX 90 779
UX A3 359 UX A5 419

SONY
FHB 50 CD 309
FHB 70 CD 479

CASSETTE DECKS
TDW 103 124
TDW 207 139
TDW 307 169
TDW 507 187
TDW 707 239
XLM 407 209
XLM 507 259
XLM 705 319

PORTABLES
PCX 300 229
PCX 2000 259
PCX 3100 169
PCX 5000 299
PCX 610 279
PCXT3 279
PCXT5 339

FISHER
PHD 8000 249
PHD 9000 299

CAR STEREOS

SONY
CDX 4040 229
CDX U8000 439
CDX A55 294
CDX U300 294
CDX U500 409
CDX 55RF 369
CDX U300RF 439
CDX 5180 299
XTC-900 169
XR6077 109
XR4357 149
XR5250 179
XR5450 219
XR5550 224
XR7130 219
XRU270 219
XRU330 259
XRU550 324
XRU770 439

BLAUPUNKT
Aspen CD81 341
Denver CD02 319
Washington SQR49 395
Miami CD42 319
Orlando CD02 299
Louisville CM41 249
Santa Fe DCM42 269
Cheyenne CM42 224
Daytona CR42 179
Malibu CR42 159
Boston SQR49 189
Newport SQR29 169
CDC M1 589
CDC M4 289
CS2210 SECURITY SYS 169

PIONEER
KEH M8200 329
KEH M7200 249
KEH M6200 239
KEH M5200 229
KEH 9898 219
KEH M7300QR 289
KEH 3200QR 189
KEH 2200QR 169
KEH 6969 174
KEH 4949 149
KEH M650 349
KEH M550 289
DEH M 980 419
DEH 880 374
DEH 780 319
DEH 680 299
DEH 580 269
DEH M77 489
DEH M66 379
GEH M200 199
KEXM900 CALL
KEXM850 439
KE 3700 189
KE 1700 159
CDX M33 349
CDX M35 345
CDX 4 255 CDX M30 289

Clarion
6300 CD 429 6200 CD 279
5390 CD 689 5870 CD 469
5670 CD 298 5631 CD 269
3970 RC 359 3770 RC 259
9772 194 9771 229
9731 179 9701 169
9670 189 9470 169
8703 179 A2000 629

PIONEER RECEIVERS
VSX 015 859
VSX 9015 719
VSX D701S 509
VSX D601S 429
VSX S115 384
VSX 501 335
VSX 451 295
VSX 401 269

CASSETTE DECKS
CTM 970R 339
CT WM 60R 299
CT M50R 259
CT W90R 345
CT W80R 259
CT W70R 234
CT W60R 209
CT W50R 179
CT W45R 160
CTW301 145
CTS410 259
CTS601R 319

CD PLAYERS
PD TM2 339
PD M901 294
PD M801 259
PD M701 219
PD M601 199
PD M501 179
PD S501 195
PD 701 145
PD 101 129

LASER PLAYERS
CLD S701 355
CLD M301 429
CLD M401 499
CLD DS01 589
CLD D701 789

We accept certified check, money orders and personal checks COD orders require deposit All products come with U.S. manufacturer warranty Distributor Authorized but not factory authorized Reloading fee 10% (still UPS shipping Please Add $7.50 Radar Detectors $10.50 Car Radio (Home Stereo call) for UPS shipping insurance and handling per unit Not responsible for typographical errors Fast delivery

FOR SALE

REEL-TO-REAL DESIGNS BRAND LEGACY I LOUDSPEAKER SYSTEM. OAK OIL FINISH WITH OPTIONAL REAR TWEETERS. CONDITION NEW. MIKE: (217) 347-5117.

THE GREAT RADIO SHOWS from the Past. Top Sound Quality & Selection. Reels or Cassettes. Catalog $1. Box 25066, Portland, OR 97225.

New **Sony** DTC-M100 SemiPro **DAT** Recorders $750 OBO, New **Hafler** XL600s, **Adcom** GTP500 preamp/tuner $335 OBO, 2 SoundCraftsman 200 Watt Power Amps, **Sony** CDP707ESD **CD** - Mint! $750 OBO, Kenwood 5300 Tuner $85, Thorens w/Rabco, 1 lot Club/Disco **Stage Lighting** equip. John (602) 553-8207.

LOUDSPEAKERS

ABSOLUTE SATISFACTION guaranteed. We sell more high end speaker kits than anyone in the U.S. Eleven kits from $119/pr. Free catalog. 1-800-346-9183. Audio Concepts, Inc., 901 So. 4th St., La Crosse, WI 54601.

BEST SELECTION & GUARANTY. 50 SPEAKERKITS for HOMES, SURROUND SOUND, CARS, PROS & SUB-WOOFERS. JBL, DYNAUDIO, POLYDAX, MOREL, SEAS, ELECTROVOICE & VIFA. NEW & USED ELECTRONICS; AWARD-WINNING CROSSOVERS, ANALYZERS. 64p. CATALOG, $2. GOLD SOUND, 4285 S. BROADWAY, ENGLEWOOD, CO 80110.

LOUDSPEAKER COMPONENTS-KITS. Dynaudio, Morel, Eclipse, Focal, Peerless, Eton, Vifa, more! Crossover parts--design books also. Catalog $2. Meniscus, 2575 28th St., SW, UNIT 2, Wyoming, MI 49509. (616) 534-9121.

CUSTOM ELECTRONIC CROSSOVERS, 6 to 36 dB/Oct. Also Snell, Magnepan versions. DB SYSTEMS, POB 460, RINDGE, NH 03461. (603) 899-5121.

VMPS factory assembled speakers. All models, low prices, shipped direct to you. Free price sheet. Arthur Morgan, 886 East Charing Cross CR., Lake Mary, FL 32746.

LOUDSPEAKER CABINETS — Large selection of high-quality Cabinets ready to finish in Oak, Walnut and solid color laminates. Grenier Cabinets, 5901 Jennings Road, Horseheads, NY 14845. (607) 594-3838.

A & S SPEAKERS imports the world's finest speaker components, crossovers, & kits: Dynaudio, Scan Speak, Ceratec, Focal, Morel, MB Electronics, Peerless, Polydax, SEAS, LPG, Eton & Versa-Tronics. We also ship VMPS systems & kits. Free literature. 3170 23rd Street, San Francisco, CA 94110. (415) 641-4573; Fax (415) 648-5306.

UPGRADE YOUR LOUDSPEAKERS WITH SUPERIOR HIGH FREQUENCY PERFORMANCE! VERY EASY/INEXPENSIVE TO CONSTRUCT WITH EASY TO FIND PARTS. EXCELLENT FOR "MUDDY- SOUNDING" HOME SYSTEMS, NIGHTCLUBS, ETC. MANY ADVANTAGES! SEND $5.95 FOR **FULL** PLANS. COMPLETE KIT INCLUDES TWEETERS & ELECTRONICS FOR 2 SPEAKERS: $59.95. PRODUCT RESEARCH COMPANY, 2481 STEPHANIE LANE, BINGHAMTON, NY 13903.

PYLE DRIVERS — 55 NEW woofer models. Also PIONEER OEM woofers, mids, tweeters & many others. BEST HOBBYIST PRICES. Dealer inquiries? MC/VISA. SRS, 318 South Wahsatch, Colorado Springs, CO 80903. (719) 475-2545.

LEGACY SIGNATURE II Speakers $1,400. ADS M-12/90 $600. McINTOSH 7000 CD Player Mint $500. Call (405) 254-3790.

NEAR - 50M IS THE MOST MUSICALLY ACCURATE LOUDSPEAKER REVIEWED BY THIS NEWSLETTER - BOUND FOR SOUND. Complete review from THE ABSOLUTE SOUND also. NEAR 207-353-7307.

BOZAK SPEAKER REPAIRS, using original manufacturer's machinery, specifications, techniques and dies. Quality workmanship. NEAR 207-353-7308.

Simply better technology from North Creek Music Systems - loudspeaker components and kits for the descriminating audiophile. Please call or write for a complimentary catalog. 500A Route 8, Speculator, NY 12164, (518) 548-3623.

GRILL CLOTH - VERY HIGH GRADE, ACOUSTICALLY TRANSPARENT KNIT GRILL CLOTH. AVAILABLE IN SIX COLORS. 1 YD. X 60" - $8.99. **SPEAKERWORLD 1-800-359-0366.**

BOSE, JBL REFOAMING QUALITY SERVICE ON ALL BRANDS SINCE 1977. CALL ABOUTOUR BOSE 901 UPGRADE/MOD., REFOAMING, REPLACEMENT PARTS, FAST SERVICE. **SPEAKERWORLD.** 813-544-3511. **800-359-0366.** MC-VISA-AMEX.

The Critics Had Their 30-Day, No-Risk, In-Home Audition.

Isn't It Time You Had Yours?

ICON
since 1989

"You'll fall in love with this speaker's clear sound. I feel that it can compete with several prestigious loudspeakers costing many times it's price." - Bruce Bartlett, High Performance Review , Summer 199-

"Close your eyes and you'd think you were listening to electrostatic speakers... I was constantly reminded of the Quad ESL-63, with its breathtaking transparency and impeccably true timbres through the middle and upper voices... The Parsecs are speakers for symphonic music; to the Sibelius Second they brought a naturalism and presence simply unmatched by any other design under consideration."
- Lawrence Johnson, CD Review, Nov. 1991

"The Lumen is the best under-$1000 speaker I have heard."
- Kenneth Duke, The Sensible Sound, No. 43, Summer 1991

"From it's clear, sweet, solid sound, we declare the Lumen a winner!"
- Music and Audiophile, January 1992

" For someone who is looking for a good speaker at under a grand, the Lumen would be my top recommendation right now."
- Karl Nehring, The Sensible Sound, No. 43, Summer 1991

"I urge you to rush and give the Lumen a listen. I think you will definitely fall in love with these American speakers!"
- Modern Audio, January 1992

For your own copy of our free 12-page color brochure and review reprints please call us toll-free at:

1 - 800 - 669 - 9662

Icon Acoustics, 13 Fortune Drive, Billerica, MA 01821

LOUDSPEAKERS

PATTERSON Audio Systems wishes you and your family all the joys and blessings of the holiday season!! **PATTERSON Audio Systems**, (313) 981-7220.

ROTTEN FOAM EDGES?

SIMPLY SPEAKERS does professional foam replacements any size/brand. 7 Year Warranty. We also sell foam surrounds for $22.95/pr. Computer designed kits & in wall speakers. MC/VISA/DISCOVER: 1-800-767-4041.

PROFESSIONAL FOAM REPLACEMENT!!! GUARANTEED WORK. FIVE YEAR WARRANTY. FAST TURNAROUND. ALL BRANDS - ALL SIZES. ADVENT A SPECIALTY. **NEVISONICS**, 601-A BAXTER AVE., LOUISVILLE, KY 40204. (502) 587-1848.

CROSSOVER NETWORKS, PASSIVE. CUSTOM, STANDARD, WHOLESALE PRICES. FREE BROCHURE, DESIGN ASSISTANCE. DEALERS WELCOME. FERGITRON ELECTRONICS, BOX 674, LEVITTOWN, NY 11756. (516) 735-2019.

SPEAKER RECONING; Refoaming Kits; Crossover Kits, & Mods By "Van Evers"; Grills Made To Specs; Diaphragms, Mids & Tweets; New Speaker Test Lab Using L.E.A.P.-L.M.S. THE SPEAKER EXCHANGE, 1242 E. Hillsborough Avenue, Tampa, Florida 33604. (813) 237-4800.

WE REPAIR SPEAKERS! Call for **FREE** Estimates. SPEAKER CLINIC. (404) 933-0101.

ADCOM, ADS, AUDIO RESEARCH, BANG & OLUFSEN, B&W, CARVER, CELESTION, DENON, FOSGATE, HARMAN/KARDON, INFINITY, JBL, KEF, KLIPSCH, LEXICON, MIRAGE, NAKAMICHI, ONKYO, POLK, REVOX, TRIAD, VELODYNE, YAMAHA, AND MORE. MANUFACTURER'S WARRANTIES. LIVE ASSISTANCE WEEKDAYS. AUTOMATED PRICING 24 HOURS. AMERISOUND SALES, INC. (904) 262-4000.

WANTED: WE ARE A RENOWNED LOUDSPEAKER REPAIR COMPANY SEEKING A RELIABLE SOURCE OF SPEAKER RECONING COMPONENTS. PHONE: (201) 993-5718, FAX: (201) 993-1177.

SOUNDAID MODIFICATION KIT for REALISTIC MINIMUS 7 & 77 SPEAKERS. "Wow! More bass, more depth, more listening fun." Peter M. Sorrentino, Valley Stream, New York. "The response of the bass driver is better...because there is less cone breakup." Audio/July 1992. "Dynamics were more, well, dynamic. Bass was smoother and deeper, treble was smoother, clearer and more defined...instruments were more cleanly seperated, compared to the presentation of the stock speaker." $ensible Sound Vol. 10 No. 39. Minimus 7 kit $27.90 + $2.90 shipping. NY State residents add app. sales tax. (Minimus 77 kit $29.50 + $2.90 shipping.) **SOUNDAID, PO BOX 30315, NEW YORK, NY 10011.**

Drivers: 8ea. **EVM15B II** 15" (new) $175 OBO, Altec **416A** 15" $165 OBO, 15" woofers from '30's/'40's "Voice-of-the-Theater"; Mint **Magneplanar MGIIIA** $1000 pr. John (602) 553-8207.

COMPACT DISCS

CASH PAID FOR AUDIOPHILE LP'S. MOBILE FIDELITY, NAUTILUS, CBS MASTERSOUND, SUPER DISC, SWEET THUNDER, JAPANESE PRESSINGS, RCA LIVING STEREO, MERCURY LIVING PRESENCE, ENGLISH DECCA'S AND EMI. MUST BE SEALED OR IN MINT CONDITION. CALL BOBBY AT (913) 823-7211.

LATIN MUSIC LOVERS. Your 1 stop source. CD's & videos from Latin Countries. JPR LATIN RECORDS, P.O. Box, 4155-B, Winter Park, FL 32793.

"CD STABILIZER" the only (motorized) electronic device that restores clarity, detail and overall sound quality back to the compact disc. No CD collection should be without this new technology. $29.95 ck/mo Visa/MC send to Bedini Electronics Inc., 7239 Valley St., Dalton Gardens, ID 83814 or (208) 772-9207, Fax (208) 772-5814.

BUSINESS OPPORTUNITIES

LET THE GOVERNMENT FINANCE your small business. Grants/loans to $500,000.00. Free recorded message: (707) 448-0270. (KF1)

CD PLAYERS

MUSICAL CONCEPTS = CD MUSICALITY

"Since 1979, Musical Concepts has been about satisfying musicality and transparency—not fancy faceplates, nor unsupportable hype!"—**ENIGMA V**, "The best CD value, outperforming $4000 transport/DACs", for only $649, **EPOCH V**, "More natural and musical than **any** transport/DAC combination—breakthrough openness and transparency!"—$995. All players use 384X oversampling! Try our **CDT II "Stable Platter"**—hear the difference transports make($649)! We modify **Rotel, Philips, Magnavox, Marantz, Pioneer**. Call for mailer today! MUSICAL CONCEPTS, 1832 Borman Court, Suite One, St. Louis, MO 63146. (314) 275-4925.

WANTED
TRADE-INS
FOR NEW

MARK

Bring us your tired old stereo for liberal trade-in towards new stereo.

When in Boston, please visit the world's smallest HiFi shop, featuring products by:

ALCHEMY	NAD
AUDIOQUEST	PARADIGM
BOSE	PHILIPS
HAFLER	PS AUDIO
HARMAN KARDON	SONY
LEXICON	STAX
MARANTZ	THORENS

SONY ES

Q Audio

95 Vassar Street
Cambridge, MA
02139

(617) 547 2727

STORE HOURS:
M-F 10-7
SAT 10-6

MC/VISA/DISC/AMEX

WHY RENT?
$AVE! $AVE!

CABLE TV DESCRAMBLERS

JERROLD • OAK • HAMLIN • ZENITH
PIONEER • SCIENTIFIC ATLANTA

READY-TO-SHIP!

6 MONTH WARRANTY!
ABSOLUTELY LOWEST
WHOLESALE /RETAIL PRICES!

MASTER CARD • VISA
AMEX • C.O.D.

FREE COLOR CATALOG!
1 (800) 950-9145

JP VIDEO

1470 OLD COUNTRY ROAD, SUITE 315-AR
PLAINVIEW, NY 11803 NO NY SALES

Premium Parts & Accessories

The largest selection of audiophile capacitors, resistors, connectors, chassis wires in North America. MIT MultiCaps, Wonder Caps-solder-wire, Solen cap, Rel-Cap: Vishay, Holco, Caddock, Resista resistors: MIT, Cardas, XLO, & silver chassis wires, custom cables & terminations: all types of audio connectors and adaptors: silver contact toggle, rotary switches & attenuator kits. Tubes, feet, damping sheets & compounds, tools and many accessories. Best prices & best service! Phone 415 669-7181 or fax 669-7558 for a catalog.
Michael Percy, Box 526, Inverness, CA 94937

AUDIOPHILE GRADE PARTS

For the last 4 years, SONIC FRONTIERS INC. has been offering audiophile hobbyists from around the world, the highest quality electronic parts for their audio electronic projects. We have continued to expand our line of parts and components to satisfy the needs of our demanding clientele. We are pleased to feature the following lines:

CAPACITORS:

MIT MultiCap - Film /Foil or Metallized.
World's best FILM CAPACITORS!

WONDER CAP - new Series "B", wonder wire leads.
REL- CAP - film/ foil polystyrene, axial leads.
WIMA - compact metallized and film/foil polypropylene, radial lead
SOLEN - metallized polypropylene, up to 200uf at 400VDC!
SIEMENS - metallized polypropylene from 51pf to .01uf at 630VDC

RESISTORS:

VISHAY - utilizing a proprietary *BULK FOIL* technology, these high precision resistors are the best available! We have a limited range of *VTA* series (axial lead, 0.5%) values in stock. Also,we are pleased to introduce the *S102K* series (radial lead, 0.25%) resistors which are available in any value up to 250K, in any quantity. In under 2 weeks!
HOLCO - 0.5% 50ppm metal film resistors, non-magnetic construction.We stock a comprehensive range of values in 1/4, 1/2 and 1 watt ratings.

ADDITIONAL PRODUCTS:

GOLD AERO - offering tested and selected tubes in 3 grades (Standard, Gold and Platinum) for the discriminating tubeophile 4 month warranty!; **RAM** TubeWorks, **CARDAS** RCA jacks, plugs, hookup wire and shielded cable; **WBT; TIFFANY, EDISON PRICE** Music Posts; **ALPS, BOURNS** Volume and Balance Controls, **NEUTRIK** XLR plugs, **GRAYHILL** rotary switches; **TEFLON** wire (many gauges and colours); **ANALOG DEVICES** AD827JN, AD847JN, **PEARL** Tube Coolers, Iso-Sockets, **CAE** (Curcio Audio Engineering) DANIEL PreAmp Kits (MKI and MKII) and DYNACO Rebuild Kits, **SONIC FRONTIERS** mono ladder attenuator kits (20K, 50K, 100K, 250K), best volume control available!; plus tube sockets, semiconductors, electrolytic capacitors etc .

SPECIALIZING IN INTERNATIONAL SHIPMENTS

DISCOUNTS UP TO 30% AVAILABLE!

Please **CALL, WRITE** or **FAX** for our *FREE* **1992 PRODUCT CATALOGUE!**

SONIC FRONTIERS
INCORPORATED

760 PACIFIC ROAD, UNIT #19, OAKVILLE, ONTARIO, CANADA L6L 6M5
TEL (416) 847-3245 **FAX (416) 847-5471**

PARTS AND ACCESSORIES

TOSLINK CABLES from A.T.A.E. have lower optical power loss and lower modal dispersion. We fabricate custom lengths of up to 20 meters (65.6 feet). Stock pricing: 5M $64.00, 10M $96.00. To order call A.T.A.E. FIBER OPTIC SYSTEMS DIVISION (408) 423-7179. M-F, 8 to 5 Pacific.

SILVER LIGHTNING INTERCONNECT! PURE SILVER. " WONDERFULLY NATURAL." Ultimate phono cable!! Excells anywhere! 100% money back. 1m $240/pr. Others, BALANCED: R. Bradley c/o BEAR LABS, PO Box 144, Hannacroix, NY 12087. (518) 756-9894.

PUBLICATIONS

MOVIESOUND NEWSLETTER. The state of film audio tracks in theaters and at home. $8/year (4-issues). Send $2 for two sample issues. P.O. Box 7304, Suite269A, No. Hollywood, CA 91603.

DIGITAL AUDIO WHITE PAPER: 25 years experience. Like having your own audio consultant. Covers all aspects of including purchase, setup, and insider information. $9.95 ppd. Visa/MC. 1-800-232-2191 (9-5 EST).

#1 IN AUDIO, VIDEO, DAT-TAPE. OVER 500 DIFF. 1-800-245-6000

MAXELL SONY FUJI OUR 17TH YEAR TDK

TAPE WORLD

DISC. VISA, MC NO EXTRA CHARGE

FAX 412-263-8298
M-F 8:00-5:00
412-263-8621
CO 245-6000

TAPE WORLD 220 SPRING ST BOX 361 BUTLER, PA 16003-0361
Call 1-800-USA-DENON for Denon Products

Can't afford the loudspeaker of your dreams?

We'll show you how to build it! From bookshelf to horns to electrostatics. Classic kits and new designs. A rich mix of how-to and theory. From the world's only magazine devoted to loudspeakers. Only $45 for two yrs. (12 issues). 1 yr. for $25 (6). U.S. $ only. Canada, add $6/yr. for postage. Other countries $40 1 yr. $70 2 yrs. air mailed.

SpeakerBuilder THE LOUDSPEAKER JOURNAL

Box 494, Dept. AU1, Peterborough, NH 03458

RECORDS

Rare Records Ltd.

We buy and sell
LP vinyl records
Over 100,000 titles in stock
139 West 72nd Street
New York, NY 10023
212 877-5020

LV/CD/RECORD COLLECTOR'S SUPPLIES. Jewel boxes, record jackets, sleeves, storage boxes, 78 sleeves, dividers, much more! Free brochure: CABCO PRODUCTS, ROOM 663, POB 8212, COLUMBUS, OH 43201. (614) 267-8468.

STANTON: 881MKIIS - $108PPD!, 500MKII78RPM - $38PPD! ● **KAB**: Brushes (Stylus - $3PPD, LP/45 - $11PPD, 78RPM - $17PPD), Gliding Platter + ™ - "Nitty-Grity Upgrade" - $15PPD. ● **Nitty-Gritty**: Purifier1&2 - $16PPD, Vac-Sweep(4) - $11PPD! ● **DeoxIT**: "Interconnect Restorer!" Solvent-free! - $22PPD. ● Free Catalog. ● Order today! CHK/MO: KAB Electro-Acoustics Box 2922A-12, Plainfield, N.J. 07062-0922. (908)754-1479.

USED LPs. AUDIOPHILE COLLECTIONS. MOSTLY CLASSICAL. $3.00 FOR LIST. 2,000+ TITLES. BOX 1766, VISTA, CA 92085.

HALF MILE VINYL. Affordable used LP's. Selected w/care. Cleaned & graded. All categories. Call f/information. SASE lists/wants: Box 98, East Wareham, MA 02538. (508) 295-2508.

AUDIOPHILE RECORDS

WORLD'S LARGEST SELECTION OF AUDIOPHILE LP'S AND CD'S! Mobile Fidelity, Sheffield, Reference, Chesky, Analogue Productions, Wilson, Klavier, Audioquest, Nautilus, OPUS 3, TBM, Proprius, Harmonia Mundi...many more current, rare and out of print. Catalogue $3 in U.S./$5 elsewhere. INFORMATION: (913) 825-8609. FAX: (913) 825-0156. ORDERS: 1-800-525-1630. ACOUSTIC SOUNDS, BOX 2043, SALINA, KANSAS 67402.

AUDIOPHILE RECORD WAREHOUSE! Out-0f-Print Direct-To-Disc, Halfspeed, Quiex II & Import Pressings. Great selection of In-Print Records & CD's. Quantity Discounts! Call for Free Catalog. Elusive Disc, 5346 N. Guilford Ave., Indianapolis, IN 46220. (317) 255-3446.

WANTED TO BUY

MARANTZ, MCINTOSH, HARTSFIELDS, W.E., PATRICIANS, TANNOY, KRELL, LEVINSON, ARC, ETC. Call LAST for absolutely highest collector prices on mint equipment. Act before market weakens. N.Y.S.I. (718) 377-7282, 2-6P.M., WEEKDAYS.

WANT — JBL Hartsfield, EV Patrician, Singles OK, McIntosh, Marantz & other tube equipment. Larry Dupon, 2638 W. Albion, Chicago, IL 60645. (312) 338-1042, evenings.

WANTED: WESTERN ELECTRIC, JBL, MARANTZ OLD EQUIPMENT. SUNLIGHT ENGINEERING COMPANY: 310-320-7020, 22130 SOUTH VERMONT AVENUE, #A, TORRANCE, CA 90502.

I BUY USED MID TO HIGH END EQUIPMENT. (303) 777-6064. LEAVE MESSAGE IF NOT IN.

HI-FI SUPPLIES--PAYS CASH FOR LEVINSON, ARC, C.J., KRELL, SPECTRAL, ROWLAND, THRESHOLD & OLD MARANTZ, MCINTOSH TUBE EQUIP. **(212) 219-3352,** 7 DAYS 10AM-6PM (NY).

COLLECTOR WILL TRAVEL, to **pick-up**: tube MARANTZ, McIntosh, **TANNOY** Speakers, **SEQUERRA** Tuner FN-1, KRELL, etc. **MONO**/Stereo. (718) 387-7316. NEW YORK.

Audio City Always Paying top for: Studer, Levinson, McIntosh, Marantz, CJ, ARC, Quad, Leak, Western Electric, Telefunken. Vintage Speaker systems, raw units by Tannoy, W.E., EV, JBL, Altec, Jensen. Audio tubes by Telefunken, Genalax, etc. P.O. Box 802, Northridge, CA 91328-0802. Tel: 818-701-5633. David Yo.

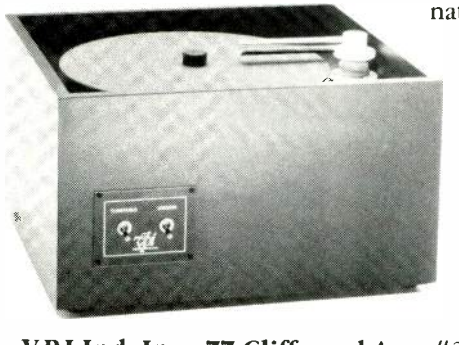
MARANTZ, REL, HADLEY, FAIRCHILD, WESTERN ELECTRIC, ETC., TUBE EQUIPMENT. ALSO, UNUSUAL HI-FI EQUIPMENT, OLD HI-FI BOOKS, MAGAZINES & CATALOGS. PAUL: (313) 737-0429.

AAAALWAYS PAYING TOP $$ FOR CLEAN, COLLECTABLE McINTOSH TUBE AND SOLID STATE, MARANTZ TUBE, WESTERN ELECTRIC, JBL-PARAGON, HARTSFIELDS, ETC. & ALNICO PARTS. EV PATRICIANS, GEORGIANS & MISC. PARTS. M. LEVINSON, KRELL, ARC, SPECTRAL ETC. CALL ME LAST ONLY WHEN YOU'RE READY TO SELL! JOHN: 1-800-628-0266.

vpi made in u.s.a.
HW-16.5
Record Cleaning Machine

Find out how good your analog records really are!

There is a wealth of information in the grooves of your analog records that is hidden from you. Let the HW-16.5 safely remove all this gunk that is clogging up your records, and be amazed at how quiet, detailed and natural-sounding records can be.



- Vacuum pickup tube assembly, automatically adjusts to the thickness of any record.
- 35 second cleaning cycle (wash/dry) per side
- 18 RPM, high-torque turntable motor for long life.
- Powerful suction (vacuum) ensures quick, deep cleaning—removes old residue
- Velvet coated record contacts
- Leaves a pristine, dry, static-free record

V.P.I Ind. Inc., 77 Cliffwood Ave. #3B, Cliffwood, N.J. 07721
Tel: 908-946-8606 Fax: 908-946-8578

WANTED TO BUY

TOP PAYING FOR MCINTOSH, MARANTZ TUBE AMP McIntosh Solid state, Western, JBL, Altec, Tannoy, EV, Jensen, Speakers & Horn, EMT Turntable, Ortofon Arm, Temma--(516) 942-1212, (516) 496-2973.

CAR STEREO

"STEREO WORLD" is your discount sound source with great deals on car and home stereo: Panasonic, JVC, Sony, PrecisionAudio Pioneer, Sherwood, Hi-Fonics, Blaupunkt, MTX, Pyle, Orion, Kenwood, Scosche EFX, Autotek, JBL-Car, Clarion and many others. We Carry alarms and a full line of installation kits. Please call or write for FREE catalog. FREE UPS in 48 states. Visa/MC; COD accepted. P.O. Box 596, Monroe, NY 10950. (914) 782-6044.

SERVICES

INDEPENDENT AUDIO CONSULTANT: Don't be taken advantage of by audio salesman, we can save you time and money. Guidance on all aspects, from purchase to inexpensive room acoustic treatments. Visa/MC. 1-800-232-2191 (9-5 EST).

Specialist, Tube Equipment Customization. Repair Services. Vintage military tubes & parts available. Service estimates for audio equipment, old or new. BWS Consulting, 5609 N. 23rd Street, Arlington, VA 22205. (703) 536-3910.

Audio Repairs and Restorations by Clif Ramsey, former Senior Service Technician at McIntosh. **Tuner Modifications** by Richard Modafferi, independent consultant to Audio Classics, inventor, and former Senior Engineer at McIntosh. Over 70 years combined experience. **AUDIO CLASSICS.** 8AM-5PM EST Mon.-Fri., POB 176SAR, Walton, NY 13856. 607-865-7200.

ACCUPHASE AUTHORIZED PARTS AND SERVICE. We repair and supply parts for all **ACCUPHASE** and **KENSONIC** Amplifiers, Tuners, Compact Disc Players, etc. Contact: ACCUTECH, 206 E. Star of India Lane, Carson, CA 90746. TEL. (310) 324-7406, FAX (310) 324-7422. Hours: 9am-4pm Pacific Time.

HELP WANTED

SOUND BY SINGER
HIGH END AUDIO/VIDEO SALES

Join the Best! Wanted: Ace Salespersons with extensive experience (two years plus) High End Audio and/or custom install (media rooms, incl. ceiling mt. projection, multi source/multi rm rem systems). Requirements: focused closer; organized; neat; articulate; reliable and persistent. Custom sales specific requirements: You must have designed, planned, written proposals for, laid out & supervised at least 6 jobs $15,000 plus. $600 per week. No b.s.-artists or hardsell low end types. Annual income 50,000-100,000 (draw against generous comm.) Med plan; Reloc Exp. Subsidized. **Please send resume to:** Bruce E. Brinker, 165 West 46th Street, Suite 1109, New York, N.Y. 10036.

SOUND BY SINGER
MASTER AUDIO/VIDEO INSTALLER

Extraordinary Career opportunity for organized motivated individual with can do attitude and hands on approach. Head up Service/Install Dept. N.Y.'s Top High End A/V store. Requirements: (1) Extensive Experience with survey, layout, draw plans, install and service of High End audio systems, media rooms, multi room/multi source remote control systems, including ceiling mount projectors (pre and post construction); (2) Trouble shoot repair all kinds of High End A/V components; (3) Terminate thick exotic cables; (4) Clean drivers license; Top salary, Med plan. Relocation Exp. Subsidized. **Please send resume to:** Bruce E. Brinker, 165 West 46th Street, Suite 1109, New York, N.Y. 10036.

MAIL ORDER

THE BEST DISC, TAPE & COMPONENT STORAGE SYSTEM IN AMERICA. Stackable, portable oak units hold all recording formats & Audio/Video components. FREE Mail-order Brochure (please mention Audio). Per Madsen Design: (415) 928-4509. P.O. Box 330101, San Francisco, CA 94133.

CUSTOM DESIGNS

FREEL AUDIO DESIGNS & MANUFACTURES THE HIGHEST QUALITY POWER AMPLIFIERS AT THE LOWEST PRICE! CALL/WRITE FOR FREE CATALOG. FREEL AUDIO, 195 IBIS DRIVE, MELBOURNE, FLORIDA 32951. (407) 676-5933.

AD INDEX

Firm (Reader Service No.)	Page
Acoustic Research	29-32, 83
Adcom (1, 2)	13, 123
Advent	89
American Gramaphone (3)	139
Audio Research (4)	129
AudioQuest	115, 146
B & K (5)	158
Benson & Hedges	7*
BMG	9 & 10
Bozak (6)	93
Brystonvermont (7)	135
Cambridge Soundworks (8, 9)	42, 43
Carver (10, 11)	23, 25
Celestion (12)	75
Clearfield by Counterpoint (13)	Cover IV
Columbia House	55
Courvoisier	Cover III
DCM (14)	95
Definitive Technology (15)	85, 145
Denon (16)	69
Esoteric Audio (17)	125
Genesis Technologies (18)	159
Hafler (19)	133
Harman Kardon (20)	105
Infinity Sysems Inc.	5, 81
Jack Daniels	113
JBL (21)	99
KEF (22)	20 & 21
Levinson	3
M & K Sound (23)	137
Magnepan (24)	97
Marlboro	7*
Martin-Logan	101, 131
MBI, Inc.	153
McIntosh (25)	19
Midwest Electronics	37
Mobile Fidelity (26)	140 & 141
Mondial (27)	111
MTX/Soundcraftsmen (28)	109
NAD (29)	121
Nakamichi	143
Olympus (30)	17
Panasonic (31)	41
Paradigm (32)	127
Parasound	44 & 45
Philips	76 & 77
Pioneer (33, 34)	34, 107
Polk (35, 36)	14 & 15, 70 & 71
Polygram Records	149
PSB Speakers (37)	35, 37, 39
Radio Shack (40)	118 & 119
Reel to Real (41)	91
Seagram's Glenlivet	27
Sennheiser (42)	18
Shure Brothers (43)	35
Sony	Cover II & 1, 163
Sony Music	155
Sound City (44, 45)	150 & 151, 156 & 157
Theta (46)	117
Vandersteen (47, 48)	12, 87
Windham Hill	147
Yamaha	36

Touch Tone Participant
*Regional Ad

NOW! The World's Greatest Christmas Music for Your Most Joyous Holiday Entertaining Ever!

A 4-CD set (4 cassettes if you prefer) Featuring the internationally renowned VIENNA BOYS CHOIR, LONDON SYMPHONY ORCHESTRA AND ROYAL COLLEGE OF MUSIC CHAMBER CHOIR AND BRASS ENSEMBLE — AND OTHERS!

Makes a great gift! Order additional sets for your list!

$19.98 (4 compact discs)
$13.98 (4 cassettes)

Includes all postage and handling charges. Allow 2-3 weeks for delivery.

Over 50 wonderful and varied Christmas delights in all: Nutcracker Suite... Jingle Bells... Silver Bells... eleven Messiah highlights, including Hallelujah Chorus... Ave Maria... We Three Kings... Hark! The Herald Angels Sing... O Come All Ye Faithful... O Holy Night... O Christmas Tree... Joy To The World... and many, many more!

A Music Gift To Be Treasured, From Sony Music Entertainment

To Order: Call 24 hrs. 1-800-257-3443 ext. 651 (have your Visa MasterCard or American Express card ready)

Or send a check or money order payable to: Sony Music Fulfillment, Dept. 1001-651, P.O. Box 4000 Carrollton, GA 30117

Please add applicable sales tax.

1992 ANN

SUBJECT INDEX

Addenda
Tuning In to Yesterday: Vintage Sets from the Golden Age of Broadcasting (Jan. 1992, 48), June, 4.
Equipment Profile: First Sound Reference II Passive Preamplifier (Jan. 1992, 98), June, 4.
Currents (data reduction, March 1992, 24), Aug., 4.

AM Reception
Forum: Aim High on AM, Ted Alexander, Nov., 22.

Anniversary of *Audio* Magazine
Behind the Scenes, Bert Whyte, May, 8.
Currents, John Eargle, May, 16.
Audio ETC, Edward Tatnall Canby, May, 19.
45 Years of Audio Magazine, Sept., 49.

Book Reviews
New Ears: A Guide to Education in Audio and the Recording Sciences, compiled and edited by Mark Drews, Jan., 110.
Auditory Scene Analysis: The Perceptual Organization of Sound by Albert S. Bregman, Jan., 110.
The Physics of Musical Instruments by Neville H. Fletcher and Thomas D. Rossing, Jan., 112.
Full Frequency Stereophonic Sound by Robert Moon and Michael Gray, May, 31.
Enhanced Sound: 22 Electronics Projects for the Audiophile by Richard J. Kaufman, July, 12.
The Down Home Guide to the Blues by Frank Scott and the staff of Down Home Music, July, 12.
Hearing: An Introduction to Psychological and Physiological Acoustics, Second Edition by Stanley A. Gelfand, July, 14.
The Roots of the Blues: An African Search by Samuel Charters, July, 15.
Acoustical Engineering by Harry F. Olson, Aug., 22.
The New Stereo Soundbook by F. Alton Everest and Ron Streicher, Nov., 14.
Bullock on Boxes by Robert M. Bullock III, assisted by Robert White, Nov., 14.
DAT: The Complete Guide to Digital Audio Tape by Delton T. Horn, Nov., 19.
Digital Radio Basics by Skip Pizzi, Dec., 134.
RDAT by John Watkinson, Dec., 134.
Coding for Digital Recording by John Watkinson, Dec., 134.

Cables & Wires
Forum (mutual inductance versus self-inductance), R. A. Greiner, Jan., 28.

Car Stereo
Ford Explorer: Slick but Super Simple (installation), Ivan Berger, May, 32.
Winter CES: Sweet Sounds, Ivan Berger, May, 34.
18th Annual Car Stereo Directory, May, 51.
Roadsigns (Philips DC777 car stereo with short wave), Ivan Berger, Dec., 40.

Construction Projects
Auricle: SoundAid Modification Kit for Realistic Minimus 7 Loudspeaker, July, 76.
With a Little Help from My Friends (improving speaker imaging with foam and felt), Richard J. Kaufman, Sept., 42.

Digital Compact Cassette (DCC)
The ABCs of DCC: Measurements & Mechanics, Leonard Feldman, Jan., 42.
A/B/Xing DCC, David L. Clark, April, 32.

Digital Technology
Currents (jitter and dither), John Eargle, Jan., 24.
The ABCs of DCC: Measurements & Mechanics, Leonard Feldman, Jan., 42.
Forum (SPARS code), Tom Jung, Feb., 21.
CD Packaging: A Boxing Free-for-All, Joe Wiesenfelder, Feb., 28.
Multi-Bit and One-Bit D/A Conversion, Leonard Feldman, Feb., 78.
Currents (data reduction), John Eargle, March, 24 (*Addendum*, Aug., 4).
CEDAR Noise Reduction: Getting the Grain Out, Beth C. Fishkind, March, 34.
A/B/Xing DCC, David L. Clark, April, 32.
Recordable CD: Promises & Problems, Michael B. Martin, *Part I*, June, 28; *Part II*, July, 36.
The Audio Interview: Heitaro Nakajima, David Ranada, July, 32.
The Audio Interview: Jack Pfeiffer, Susan Elliott, Nov., 44.
Currents (Kodak's Photo CD system), John Eargle, Dec., 38.
The Mechanics of Sony's MiniDisc: Beyond the Caddy, Leonard Feldman, Dec., 56.

Directories
Car Stereo Directory, May.
CD Changers, 51; In-Dash CD Players, 54; DAT Players, 58; Amps/Equalizers, 60; Radios/Tape Players, 78; Speakers, 86; Company Addresses, 137.
Annual Equipment Directory, Oct.
Introduction, 119; CD Players & D/A Converters, 122; Amplifiers, 142; Preamplifiers, 170; Tuners, 186; Receivers, 190; Turntables, 196; Tonearms, 198; Phono Cartridges, 200; Headphones, 204; Digital Recorders, 208; Analog Cassette

U A L INDEX

Decks, 210; Blank Cassettes, 214; Equalizers, 216; Ambience & Surround Sound Processors, 218; Signal Processors, 220; Crossovers, 222; Loudspeakers, 226; Company Addresses, 354.

Equipment Profiles

Acurus L10 Line Preamplifier, Sept., 66.
AKG K280 Earphones ("Auricle"), Jan., 106.
AKG K340 Earphones ("Auricle"), Nov., 106.
Altec Lansing PSW10 Subwoofer (*Thunder in the Listening Room: Subwoofer Shootout*), Nov., 34.
AR M1 Loudspeaker, Jan., 68.
Arcam Delta 110 Digital Preamplifier, June, 52.
Audix SCX-One Studio Microphone System, Dec., 108.
Beyerdynamic DT990 Pro Earphones ("Auricle"), April, 74.
B & K Components PRO-10MC Preamplifier, April, 56.
Bright Star Altair Loudspeaker, July, 60.
Bryston 4B NRB Amplifier, Aug., 42.
Canton Ergo 100 Loudspeaker, March, 62.
conrad-johnson Premier Seven-A Preamplifier and Evolution 2000 Amplifier, June, 88.
Crown Macro Reference Amplifier, June, 38.
Denon AVR-3000 A/V Receiver (*Roundup*), Dec., 46.
Dymek DR333 General Coverage Receiver, Sept., 84.
Dynaco QD-1 Series II Surround Sound Processor ("Auricle"), Sept., 96.
Dynaco Stereo 70 Series II Tube Amplifier, Nov., 64.
First Sound Reference II Passive Preamplifier, Jan., 98 (*Addendum*, June, 4).
Ford JBL Car Audio System, Aug., 48.
Grado Labs SR200 & Joseph Grado Signature HP-2 Earphones and HP-1ADC Earphone Amplifier ("Auricle"), Nov., 88.
Harman Kardon HD7600II CD Player, Feb., 76.
Hsu Research HRSW 10 Subwoofer (*Thunder in the Listening Room: Subwoofer Shootout*), Nov., 34.
Hughes AK-100 Sound Retrieval System Decoder, April, 48.
Infinity SSW-210 Subwoofer (*Thunder in the Listening Room: Subwoofer Shootout*), Nov., 34.
JBL L7 Loudspeaker, Dec., 114.
JVC RX-1050VTN A/V Receiver (*Roundup*), Dec., 46.
Kenwood KR-V9030 A/V Receiver (*Roundup*), Dec., 46.
Koss ESP/950 Earphones ("Auricle"), Nov., 96.
Maplenoll Signature Ariadne Turntable and Tonearm, July, 50.
Marantz CDR-1 Professional CD Recorder, March, 42.
McIntosh MC2600 Amplifier, Feb., 44.
Mobile Fidelity Sound Lab UltrAmp Preamplifier and Amplifier ("Auricle"), Dec., 130.
Naim Audio NAP 135 Mono Amplifier and NAC 72 Preamplifier, March, 74.
Nakamichi 1000mb CD Transport and 1000p Digital Processor, Jan., 56.
Nobis Cantabile Amplifier, Dec., 72.
Onkyo Integra TA-207 Cassette Deck, Sept., 72.
Onkyo TX-SV909PRO A/V Receiver (*Roundup*), Dec., 46.
Oracle Premiere MK IV Turntable and Oracle SME 345 Tonearm, April, 64.
Panasonic CQ-ID60 Car Stereo with ID Logic, May, 40.
Philips LHH500 CD Player, April, 42.
Philips DC777 Car Stereo with Short Wave, ("Roadsigns"), Dec., 40.
Pioneer VSX-D901S A/V Receiver (*Roundup*), Dec., 46.
Pioneer Elite PD-65 CD Player ("Auricle"), Dec. 126.
Proton AT-670 Tuner, March, 50.
PS Audio Digital Link II D/A Converter, July, 70.
Quart 490MCS Loudspeaker, Feb , 62.
Sansui RZ-9500AV A/V Receiver (*Roundup*), Dec., 46.
Sennheiser HD-540 Reference II Earphones ("Auricle"), June, 104.
Sitting Duck Listening Room Speaker-Placement Program ("Auricle"), Nov., 102.
Snell Type B Loudspeaker, Sept., 88.
Sony ES STR-GX99ES A/V Receiver (*Roundup*), Dec., 46.
SoundAid Modification Kit for Realistic Minimus 7 Loudspeaker ("Auricle"), July, 76.
Tannoy 615 Loudspeaker, Aug., 58.
TEAC Esoteric X-1 CD Player, Nov., 60.
Technics SA-GX910 A/V Receiver. July, 42.
Theta DSPro Prime D/A Converter ("Auricle"), Aug., 70.
Thiel CS2.2 Loudspeaker ("Auricle"), Aug., 68.
Vacuum Tube Logic (VTL) Straight-Line D/A Converter, Nov., 76.
van den Hul MM-1 Moving-Magnet Phono Cartridge and Well Tempered Record Player, Jan., 84.
Vandersteen 2Ci Loudspeaker, June, 71.
Velodyne F-1500 Subwoofer (*Thunder in the Listening Room: Subwoofer Shootout*), Nov., 34.
Vimak DS-2000 D/A Converter and Preamplifier, Nov., 54.
Well Tempered Record Player and van den Hul MM-1 Phono Cartridge, Jan., 84.
Win Research SM-10 Loudspeaker ("Auricle"), July, 80.
Yamaha CDC-835 CD Changer, Dec., 103.

Forum

Wires and cables, R. A. Greiner, Jan., 28.
SPARS code, Tom Jung, Feb., 21.
AIM High on AM, Ted Alexander, Nov., 22.

History

Tuning In to Yesterday: Vintage Sets from the Golden Age of Broadcasting (Atwater Kent Museum show), Jon R. Sank, Jan., 48 (*Addendum*, June, 4).
The Audio Interview: Henry Kloss, David Lander, Feb., 34.
Behind the Scenes (*Audio*'s 45th anniversary), Bert Whyte, May, 8.
Currents (*Audio*'s 45th anniversary), John Eargle, May, 16.
Audio ETC (*Audio*'s 45th anniversary), Edward Tatnall Canby, May, 19.
The Audio Interview: Heitaro Nakajima, David Ranada, July, 32.
The Audio Interview: Goddard Lieberson, Robert Long, Sept., 32.
45 Years of Audio Magazine, Sept., 49.
The Audio Interview: Jack Pfeiffer, Susan Elliott, Nov., 44.
The Audio Interview: Peter Asher, Ted Fox, Dec., 60.

Home Theater & Surround Sound

Home Theater: A Pro's Way, Wynne Smith, March, 28.
SRS: Surround Sound with Only Two Speakers (Hughes' Sound Retrieval System), Arnold I. Klayman, Aug., 32.
Currents (JBL Synthesis One THX system), John Eargle, Sept., 18.

1992 ANNUAL INDEX

A/V Receiver Roundup: Seven for Seven Seventy to Seventeen Ninety-Five (Denon AVR-3000, JVC RX-1050VTN, Kenwood KR-V9030, Onkyo TX-SV909PRO, Pioneer VSX-D901S, Sansui RZ-9500AV, and Sony ES STR-GX99ES), Leonard Feldman, Dec., 46.

Interviews
Henry Kloss, David Lander, Feb., 34.
George L. Augspurger, Wendy J. Duch, April, 36.
Heitaro Nakajima, David Ranada, July, 32.
Goddard Lieberson, Robert Long, Sept., 32.
Jack Pfeiffer, Susan Elliott, Nov., 44.
Peter Asher, Ted Fox, Dec., 60.

Listening & Listening Rooms
Currents (auralization and Lexicon Acoustic Reverberance Enhancement System), John Eargle, Feb., 18.
Home Theater: A Pro's Way, Wynne Smith, March, 28.
A/B/Xing DCC, David L. Clark, April, 32.
The Audio Interview: George L. Augspurger, Wendy J. Duch, April, 36.
SRS: Surround Sound with Only Two Speakers (Hughes' Sound Retrieval System), Arnold I. Klayman, Aug., 32.
Listening and Experience (listening panel for B & O), Villy Hansen and S. K. Pramanik, Aug., 38.

Loudspeakers
The Audio Interview: Henry Kloss, David Lander, Feb., 34.
A New Type of Speaker: A Sphere of Sound (Museatex Audio's Melior Point Source speakers), Moray Campbell and Scott Robinson, June, 34.
Currents (JBL Synthesis One THX system), John Eargle, Sept., 18.
With a Little Help from My Friends (improving speaker imaging with foam and felt), Richard J. Kaufman, Sept., 42.
Thunder in the Listening Room: Subwoofer Shootout (Altec Lansing PSW10, Hsu Research HRSW 10, Infinity SSW-210, and Velodyne F-1500), D. B. Keele, Jr., Nov., 34.

MiniDisc (MD)
The Mechanics of Sony's MiniDisc: Beyond the Caddy, Leonard Feldman, Dec., 56.

Noise Reduction
CEDAR Noise Reduction: Getting the Grain Out, Beth C. Fishkind, March, 34.

Obituaries
Arthur A. Janszen, Jan., 8.
B. V. Pisha, Feb., 6.

Photo CD
Currents (Kodak's Photo CD system), John Eargle, Dec., 38.

Pro Recording
The Audio Interview: Goddard Lieberson, Robert Long, Sept., 32.
The Audio Interview: Jack Pfeiffer, Susan Elliott, Nov., 44.
The Audio Interview: Peter Asher, Ted Fox, Dec., 60.

AUTHOR INDEX

Alexander, Ted, *Forum: Aim High on AM*, Nov., 22.
Berger, Ivan, *Ford Explorer: Slick but Super Simple*, May, 32; *Winter CES: Sweet Sounds*, May, 34; *Roadsigns* (Philips DC777 car stereo), Dec., 40.
Campbell, Moray and Scott Robinson, *A New Type of Speaker: A Sphere of Sound*, June, 34.
Canby, Edward Tatnall, *Audio ETC* (*Audio*'s 45th anniversary), May, 19.
Clark, David L., *A/B/Xing DCC*, April, 32.
Duch, Wendy J., *The Audio Interview: George L. Augspurger*, April, 36.
Eargle, John, *Currents* (jitter and dither), Jan., 24; *Currents* (auralization and Lexicon Acoustic Reverberance Enhancement System), Feb., 18; *Currents* (data reduction), March, 24 and *Addendum*, Aug., 4; *Currents* (*Audio*'s 45th anniversary), May, 16; *Currents* (JBL Synthesis One THX system), Sept., 18; *Currents* (Kodak's Photo CD system), Dec., 38.
Elliott, Susan, *The Audio Interview: Jack Pfeiffer*, Nov., 44.
Feldman, Leonard, *The ABCs of DCC: Measurements & Mechanics*, Jan., 42; *Multi-Bit and One-Bit D/A Conversion*, Feb., 78; *A/V Receiver Roundup: Seven for Seven Seventy to Seventeen Ninety-Five*, Dec., 46; *The Mechanics of Sony's MiniDisc: Beyond the Caddy*, Dec., 56.
Fishkind, Beth C., *CEDAR Noise Reduction: Getting the Grain Out*, March, 34.
Fox, Ted, *The Audio Interview: Peter Asher*, Dec., 60.
Greiner, R. A., *Forum* (wires and cables), Jan., 28.
Hansen, Villy and S. K. Pramanik, *Listening and Experience*, Aug., 38.
Jung, Tom, *Forum* (SPARS code), Feb., 21.
Kaufman, Richard J., *With a Little Help from My Friends*, Sept., 42.
Keele, D. B., Jr., *Thunder in the Listening Room: Subwoofer Shootout*, Nov., 34.
Klayman, Arnold I., *Hughes SRS: Surround Sound with Only Two Speakers*, Aug., 32.
Lander, David, *The Audio Interview: Henry Kloss*, Feb., 34.
Long, Robert, *The Audio Interview: Goddard Lieberson*, Sept., 32.
Martin, Michael B., *Recordable CD: Promises & Problems, Part I*, June, 28; *Part II*, July, 36.
Pramanik, S. K. and Villy Hansen, *Listening and Experience*, Aug., 38.
Ranada, David, *The Audio Interview: Heitaro Nakajima*, July, 32.
Robinson, Scott and Moray Campbell, *A New Type of Speaker: A Sphere of Sound*, June, 34.
Sank, Jon R., *Tuning In to Yesterday: Vintage Sets from the Golden Age of Broadcasting*, Jan., 48 (*Addendum*, June, 4).
Smith, Wynne, *Home Theater: A Pro's Way*, March, 28.
Whyte, Bert, *Coda: B. V. Pisha*, Feb., 6; *Behind the Scenes* (*Audio*'s 45th anniversary), May, 8.
Wiesenfelder, Joe, *CD Packaging: A Boxing Free-for-All*, Feb., 28.

WHAT MAKES A HOLIDAY

A MEMORY

To send a gift of Courvoisier, where legal, call 1-800-238-4373.

Courvoisier Cognac 40% Alc./Vol. Hiram Walker & Sons, Inc., Farmington Hills, MI © 1992

Hearing is Believing.

"Rooms with good sound included Clearfield...The impressive and reasonably priced Metropolitans were driven by Counterpoint's gorgeous new monoblocks." -Robert Harley, **Stereophile**, April '92, Vol 15, No. 4.

"The pride of this new line is an imposing, beautifully crafted tower dubbed the Metropolitan ($6000/pair) in Walnut, Light Oak, Black Oak, or Cherry. After listening a few minutes I asked designer Albert Von Schwekert if he was a musician. He beamed and said, "Yes, a pianist." Indeed, his speakers are finely tuned instruments." —Lawrence B. Johnson, **CD Review**, March '92.

"...The sound had an airy, detached-from-the-speakers quality that's rare in speakers of their size, bass response, and dynamic capability." --Robert Deutsch, **Stereophile**, Vol. 15, No. 4.

The Clearfield Metropolitans were selected for the CES Design and Engineering Exhibition as **most innovative new product, 1992.**

On the Clearfield Continentals ($3000/pair);
"The Continental has a way of sonically disappearing into the room - of disassociating its physical self from the recorded event to where, if the eyes are closed, only the music remains. Its presentation and the vividness of its imagery is tactile to a degree that I am tempted to say that "seeing is believing." —Martin G. DeWulf, **Bound for Sound**, No. 6a/92.

Model shown: Metropolitan

The introduction of the new Clearfield line caused quite a stir at CES. To hear why, may we suggest you call the number below to receive literature and information on the nearest Clearfield dealer to you.

CLEARFIELD BY COUNTERPOINT

1 (800) 275-2743

Enter No. 13 on Reader Service Card