

# Audio

NOVEMBER 1991 • US \$2.95 • UK £1.95 • CAN \$3.50

**SCENES**  
MUSIC  
BY CABLE

## **SOUND FOR CINEMA**

ACOUSTIC WAVE CANNON  
FROM BOSE

**PSB  
STRATUS GOLD**  
THE 10,000-WATT  
SPEAKER!!!

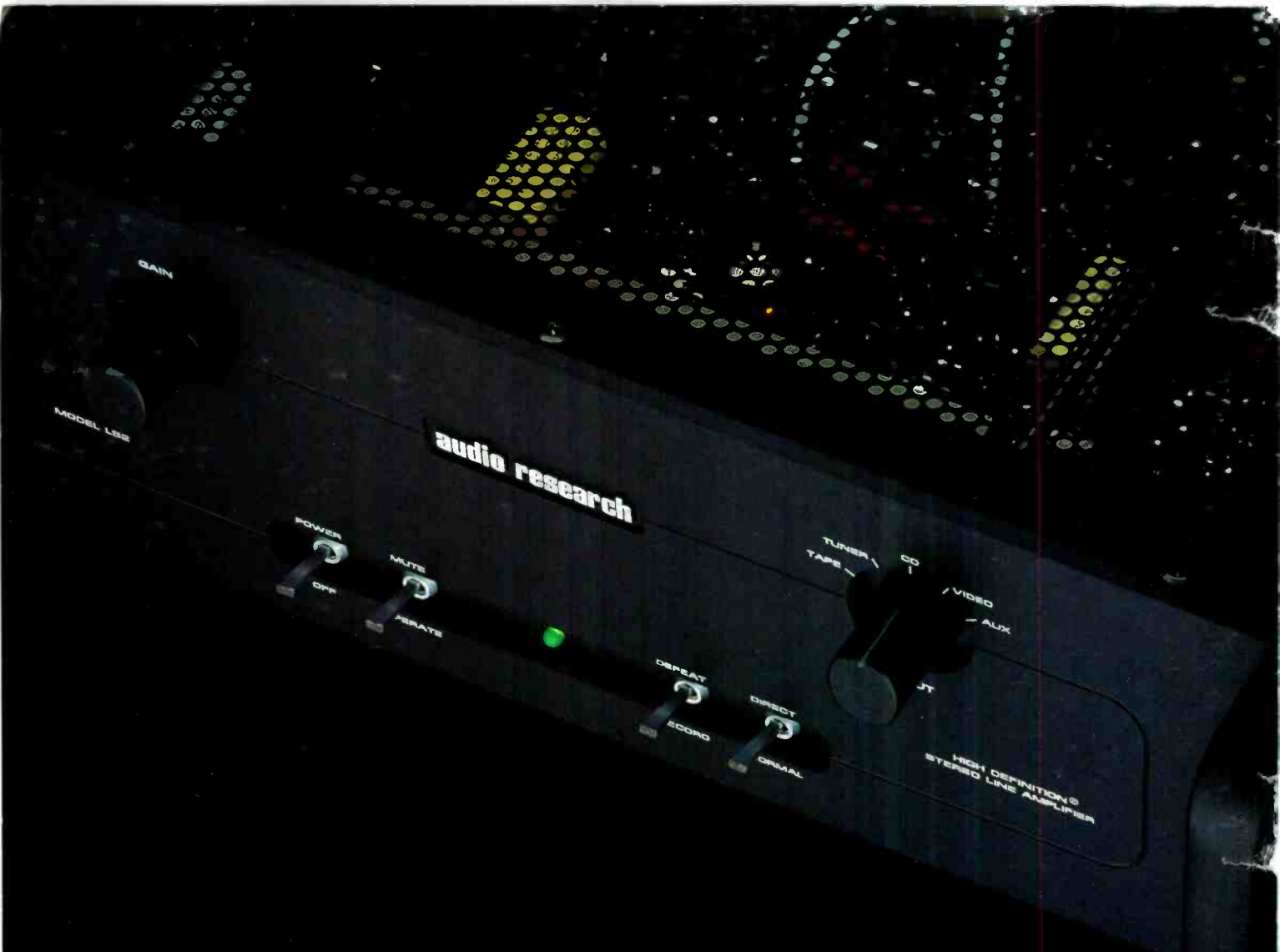
## **TESTED**

**FORTÉ**  
**MODEL 4 AMP**  
A GEM

FEB 93  
MR F B MAXWELL JR  
7736 FRANCES DR  
ALEXANDRIA VA 22306-2817  
#MF11

#BXBHBYY\*\*\*\*\*5-DIGIT 22306  
#MXW7736F095 5#710272 06





# What could be simpler?

The control functions you use every day.  
Enough inputs to handle all your favorite sources.  
High-performance XLR and single-ended outputs.  
New circuitry which redefines lucidity and neutrality.  
And, a surprisingly affordable price: \$2495, suggested retail.

Simple, isn't it? From the company that's been bringing high-end audio down to earth for more than twenty years.

**audio research**  
HIGH DEFINITION®

6801 Shingle Creek Parkway / Minneapolis, Minnesota 55430 / Phone: 612-566-7570 FAX: 612-566-3402

Enter No. 4 on Reader Service Card



**LOOKS LIKE  
NO OTHER...**

**SOUNDS LIKE  
NO OTHER...**

**SOUNDS LIKE  
NOTHING  
AT ALL.**

**THE BEST IN  
THE WORLD.**



**Interconnects and  
Speaker Cables.  
Made in USA**

**XLO Electric Company, Inc.  
9164 Hidden Farm Road  
Rancho Cucamonga  
California, 91730  
Phone (714) 466-0382**

# Audio

NOVEMBER 1991

VOL. 75, NO. 11



*Bose Acoustic Wave Cannon, page 30*



*PSB Speakers, page 46*

## FEATURES

<b>SOUND FOR CINEMA: BOSE ACOUSTIC WAVE CANNON</b> .....	William R. Short .....	30
<b>IMPEDANCE, CABLES &amp; TREBLE LOSS</b> .....	Herman Burstein .....	42

## EQUIPMENT PROFILES

<b>PSB STRATUS GOLD SPEAKER</b> .....	D. B. Keele, Jr. ....	46
<b>LUXMAN F-114 SURROUND SOUND PROCESSOR/AMPLIFIER</b> .....	Leonard Feldman .....	60
<b>MAS DCC-1 DIGITAL CONTROL CENTER</b> .....	Bascom H. King .....	70
<b>AURICLE: FORTE AUDIO MODEL 4 POWER AMP</b> .....	Anthony H. Cordesman .....	84

## MUSIC REVIEWS

<b>CLASSICAL RECORDINGS</b> .....	88
<b>ROCK/POP RECORDINGS</b> .....	98
<b>JAZZ &amp; BLUES</b> .....	106

## DEPARTMENTS

<b>SIGNALS &amp; NOISE</b> .....	4	
<b>CODA: NORMAN H. CROWHURST</b> .....	Edward T. Dell, Jr. ....	9
<b>AUDIOCLINIC</b> .....	Joseph Giovanelli .....	10
<b>TAPE GUIDE</b> .....	Herman Burstein .....	11
<b>BEHIND THE SCENES</b> .....	Bert Whyte .....	14
<b>AUDIO ETC</b> .....	Edward Tatnall Canby .....	20

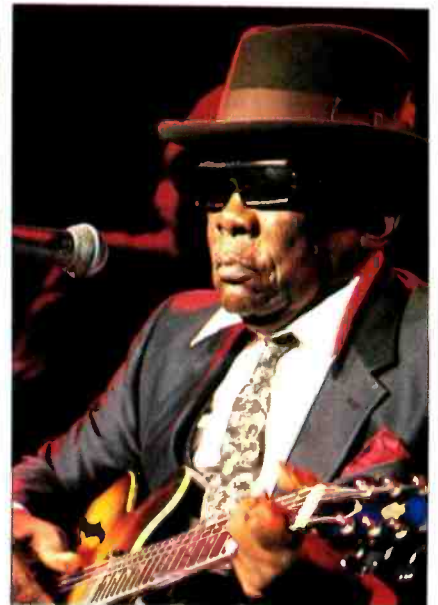
The Cover Equipment: PSB Stratus Gold speaker  
The Cover Photographer: Dan Wagner

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.

MPA

The  
Audit  
Bureau



*John Lee Hooker, page 106*

# I M P R O V I N G    T H E    B E S T

**B**eginning with the first Mark Levinson® products, we defined quality in audio, using superior components and craftsmanship to heighten the experience of music in the home. Twenty years later we not only continue this tradition, but enhance it with state-of-the-art engineering and manufacturing, so that today's Mark Levinson audio equipment is a world-wide reference standard. The N° 23.5 Dual Monaural Power Amplifier is one example of this evolution.

An improved version of the widely acclaimed N° 23 amplifier, the N° 23.5 is not the sort of update that merely takes advantage of newer and better parts, or that corrects flaws in the original design. Rather, it incorporates substantial improvements in four areas: self-referencing voltage reference in the power supply regulator amplifier, a new active balanced input stage, an enhanced

current mirror, and differential cascode bootstrapping. If you don't understand this technical jargon, consider that it took a team of engineers using advanced computer-aided design tools over a year to perfect the N° 23.5 and bring it into production. Such sophisticated engineering requires tools and skills seldom found at high-end audio manufacturers, and demands a quest for perfection that is at odds with supplying the mass market.

The sonic improvements are as easy to hear as the electronic theory behind them can be difficult to grasp: greater dynamic contrasts and clarity of fine details and harmonic structure yield a new level of musical excitement. The results are available for your evaluation at your nearest Mark Levinson dealer. Audition the N° 23.5 for yourself, and learn why Mark Levinson products remain your best investment in home music reproduction.



N° 23.5

mark  
levinson

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 A. Carriero  
Associate Managing Editor: Douglas Hyde  
Directory Editor: Ker Richardson  
Assistant Editor: Joe Wiesenfelder  
Assistant Editor/Music: Michael Bieber

Associate Editors: E. T. Canby, B. Whyte, B. V. Pisha  
Senior Editors: L. Feldman, D. B. Keele, Jr., D. 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, H. G. La Torre, E. M. Long,  
F. Lovece, J. W. Poses, J. R. Sank, D. Spoto,  
M. Tearson, J. & S. Tiven, M. Wright

Business Services Director: Greg Roperti  
Production Director: David Rose  
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

**ADVERTISING**

Group Ad Director:  
Charles L. P. Watson (212) 767-6038  
Group Sales Mgr., East:  
R. Scott Constantine (212) 767-6346  
Regional Mgr.:  
Christine B. Forhez (212) 767-6025  
Regional Mgr.: Carol Berman (212) 767-6292  
Midwest Region: Patis Group  
Arnold S. Hoffman (708) 679-1100  
Jeffrey M. Plaster (708) 679-1100  
Group Sales Mgr., West:  
Bob Meth (213) 739-5130  
Regional Mgr.: Paula Mayeri (213) 739-5130  
Network A/D: P. Beckenbach (212) 767-6223



Chairman and CEO: Daniel Filipacchi  
Exec. V.P./Editorial Director: Jean-Louis Gignire  
Exec. V.P./Publishing, COO: David J. Pecker  
Sr. V.P./Dir. Corp. Mktg.: Paul DuCharme  
Sr. V.P./Dir. Cross-Media Sales: Gerald S. Wroe  
V.P., General Counsel: Catherine Flickinger  
V.P., Circulation: Leon Rosenfield  
V.P., Mfg. & Distribution: Anthony R. Romano  
V.P., Magazine Development: Marcia Sachar  
V.P., Special Mktg.: Bette Rockmore  
V.P., Research: Susan Smollens  
V.P., Controller: John Miley  
V.P., Treasurer: John O'Connor  
V.P., Corp. Comm.: Jolie Cross Doyle

**AUDIO**, November 1991, Volume 75, Number 11.  
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. \$21.94 for one year, \$39.94 for two years, \$53.94 for three years; other countries, add \$6.00 per year.  
**AUDIO**® is a registered trademark of Hachette Magazines, Inc. ©1991, 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.

**Won't Get Fooled Again**

Dear Editor:

I just got as far as the ad from Lirpa Laboratories (April) and had to write to you. Very clever! I'm sure that, had you included a reader service number, your undercover people at Lirpa-april Labs might even have sold some of those marvelous toys.

Dr. Craig Merrell  
Dallas, Tex.

**A Decade of Service**

Dear Editor:

I am the owner of a Rega turntable. Over the past 10 years, I have dealt with Rega Research in England several times. Their customer service department is courteous and informative; their service department is efficient, and easy to deal with. This is a company that not only stands behind their product but goes out of their way to ensure customer satisfaction.

Tom Chadwell  
Tustin, Cal.

*Editor's Note:* Rega turntables are presently handled in the United States by Music for Others, 113 West Lockwood, St. Louis, Mo. 63119.

**Speaking on Tweaking**

Dear Editor:

I particularly enjoyed Bert Whyte's essay, "The Urge to Tweak," in the April issue. I'm sure there are many audio enthusiasts who feel, as I do, that the tweak phenomenon has gotten out of hand. Here is the situation as I see it: As Whyte observes, tweaking and related pastimes (such as a preoccupation with outmoded technologies) are the creation of an audio subculture that many years ago split off from a mainstream they considered overly concerned with scientific objectivity and therefore "dull." At the outset, many people (including myself) found their articles and equipment reviews useful. But I believe this resulted more from their free indulgence in brand-name comparisons (a practice the mainstream has consistently shied away from) than from any profound observations arising out of their highly touted subjective evaluation approach. Whatever the case, with the passing years, and the steady improvement of audio technology, this subculture now finds

itself in the position of being forced to "hear" aural differences that often no longer exist or are simply artifacts of their listening techniques. Thus, to sustain their "philosophy," they have created a fantasy world of preposterous contraptions, sonic will-o'-the-wisps, and pseudoscientific baloney that is unfair to true audiophiles and honest equipment manufacturers alike.

It is true, as Bert Whyte pointed out, that participating in this controversy is part of the fun of being an enthusiast. On the other hand, for me the fun stops at wasting money on useless products or, worse yet, those that cause damage. I think it is high time for more "dull technologists" to follow Whyte's lead and speak out on the tweak issue.

Stanley L. Freeny  
Morristown, N.J.

**Keeping an Open Market**

Dear Editor:


In the January "Signals & Noise" column, R. H. Coddington complained, in essence, that the hi-fi market has too many speaker manufacturers and models and that this supports inefficient producers and keeps prices high. His position, I guess, is that less choice is more efficient.

I would like to project this scenario: The federal government appoints a Speaker Czar; all speaker companies are eliminated, except one (the Czar's wife's cousin, no doubt); all foreign speaker addicts face jail; maximizing profits for the speaker monopoly is enhanced by discontinuing all R & D, reducing quality control, banning advertisements, killing warranties, cutting back distribution, eliminating product literature, and raising prices.

Have I omitted some items? Don't worry, no government monopoly would. Just keep in mind that no competition means no need to improve a product. Does this nightmare sound familiar?

Mr. Coddington should understand that free markets force lower prices and higher quality goods into the market. Competition fuels the marketplace. Inefficient speaker companies that produce products at uncompetitive prices and quality can't sell against products that offer more for less cost. No sales mean no profits, leading to

*Continued on page 8*

Beyond the  
straight and  
narrow path. 



PEUGEOT  
Beyond the obvious.™

1991 Peugeot 405 models are intelligently priced between \$15,490 and \$22,175. MSRP. Excludes tax, title, options, registration and destination charges. Subject to availability.

There's an abundance of performance cars in the middle of the road. So to find one that's truly distinctive, you'll need to look in a less obvious place.

There you'll discover the Peugeot 405 Mi16. A performance sedan that, unlike the common variety, doesn't offer a mere list of features, but rather a superior balance of dynamic characteristics.

This remarkable integration of 16-valve power, superior handling, and smooth, supple ride is something the Mi16 owes to Peugeot's long and renowned racing experience. Four straight Paris-Dakar victories and two straight World Rally Championships are also a tribute to Peugeot's exceptional durability.

So if you're looking for a performance sedan with unusually impressive qualifications, stray from the beaten path and examine the Mi16. For your nearest dealer call 1-800-447-4700.

ES

# Presenting The Distinctive Acoustics Of Seven Different Environments In One Distinctive CD Carousel Changer.







Why accept a machine that can only change your discs, when you can own one that will also change your acoustic environment? Introducing the CDP-C87ES, a 5-disc carousel changer with Digital Signal Processing (DSP). Thanks to DSP equalization and DSP reverb, this remarkable CD Changer can actually replicate the acoustic environment appropriate for just about any music. So you can hear Haydn in a Hall, a chorale in a Church, and a Stratocaster\* in a Stadium. Which gives even the most familiar CD's a newfound richness of ambience and texture.

And once you choose the right environment for a CD, store it in the CDP-C87ES Custom File™ memory. The changer will then automatically recall your programmed environment every time you play that disc.

Sony engineers can count among their distinguished inventions the CD carousel, the CD player, even the CD itself. It's no surprise then, that the C87ES and its fellow DSP changers, the C77ES and C67ES also

incorporate an advanced complementary HDLC™ converter system. It overcomes low-level non-linearity —the number one sonic shortcoming in CD players.\* So the sound of these changers is not only rich, it's refined.

Sony ES matches this technological enlightenment with an enlightened three-year limited warranty on parts and labor. See your authorized ES dealer for details. To find that dealer, call 201-930-7156 during East Coast business hours. And discover that in music at least, you really can improve the environment.

**Buy either the Sony CDP-C87ES, C77ES, or C67ES between August 1 and October 31, 1991 and Sony will give you a boxed set of four glorious CD's to play on it.** It's the Digital Masterpiece Collection, featuring the very best music from American Gramophone, GRP, Telarc, and Windham Hill. This offer is only available from your authorized ES dealer, who can provide you with all the details.



**SONY.**  
THE LEADER IN DIGITAL AUDIO\*

# 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.

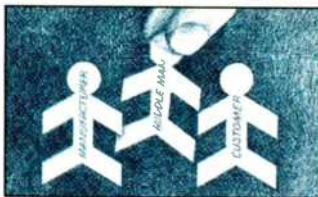
Our helpful, knowledgeable audio experts (not clerks) are on duty for advice, hook-up information or orders, 8AM-midnight, *every* day, including holidays. They don't know the meaning of the phrase "hard sell." A customer wrote "The quality of your product is matched by your attitude towards your customers."

## 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.



Keep in mind that no competition means no need to improve a product.

Continued from page 4

nonexistence. Brands that develop sales and profits succeed. The consumer dictates the ultimate fate of products.

As to Mr. Coddington's lament about not being able to afford a high-end speaker system: Where is it carved in stone that high-end means only high price? Let this gentleman find a knowledgeable, honest high-end dealer . . . they abound. This retailer will lead him to a good selection of speakers at price points Mr. Coddington can afford.

Competition between many reputable dealers and high-end products assures us all of wide selection, resulting in hi-fi bliss.

Ken Nelson  
Stereophile, Worldwide  
Yonkers, N.Y.

## Headphone Referenced

Dear Editor:

I thoroughly enjoyed Edward M. Long's articles on headphone measurements (April) and was delighted to read his comment that "The only other earphones I would presently consider for use as references are the Etymotic Research ER-1M, which are, at least at present, not available as a production item. They are an in-the-ear type and the most accurate of any I have ever heard."

I am happy to report that a production version of these earphones, the ER-4, is now available. It is an all-in-the-ear type with the same diffuse-field-equalized frequency response as the ER-1M but with a slightly higher undistorted output.

By providing some 20 to 30 dB isolation from outside noise, such earphones permit enjoyment of the total dynamic range of recent recordings without requiring ear-shattering reproduction levels to overcome masking by the background noise levels of typical listening environments. They might also avoid the need for the "offset, dual-plate, double-stud 2 x 4-inch partition with two layers of 1/2-inch gypsum" to eliminate furnace noise, as described by Walter G. Jung in his "Signals & Noise" letter appearing in that same issue.

Mead C. Killion, Ph.D.  
President, Etymotic Research  
Elk Grove Village, Ill.

## CAMBRIDGE SOUNDWORKS

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

154 California St., Suite 104NOV, 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.

Enter No. 9 on Reader Service Card

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



**Norman H. Crowhurst**

Well-known electronics writer Norman H. Crowhurst died at age 77 on March 7, 1991 after a brief illness. He was born November 3, 1913 in South-end-on-Sea, England. He earned degrees at Streatham Hill College, Goldsmith's College, and at S.E. London Technical College, where he was later a senior lecturer. Crowhurst began his career at Johnson & Phillips, Ltd. In 1935, he became Chief Engineer at Tannoy, Ltd., where he remained for the next 10 years.

Crowhurst was best known to electronics buffs, and especially audiophiles during the 1950s and 1960s, as perhaps the most prolific author on audio theory and construction. He developed many unique answers to different problems, such as a stereo power amplifier which sported only one pair of output tubes but two transformers. He had an unusually clear writing style and an exceptional ability to explain difficult theoretical concepts in terms that beginners could easily understand. He had a remarkable number of admirers among his readers, who credited him with being the first author to stimulate their appreciation for audio and electronics.

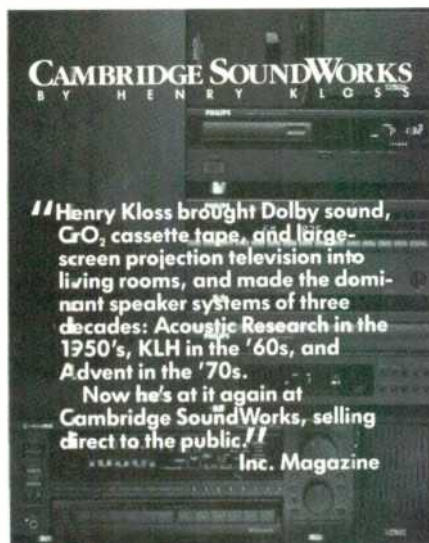
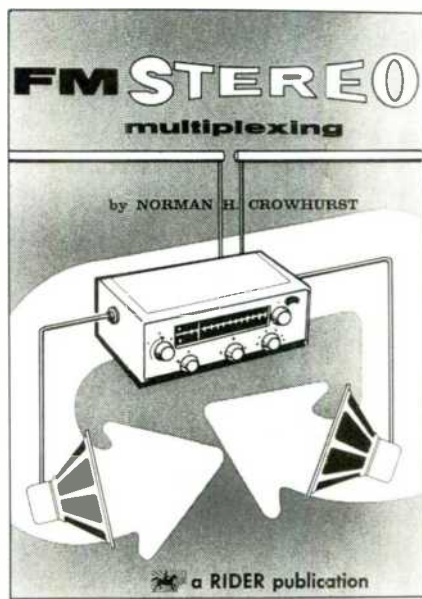
Norman Crowhurst was certainly one of the most widely read authors in the audio field, having contributed to 32 commercial publications and many professional journals. He once claimed to have written over 2,000 articles and papers and some 50 books. He held a number of patents.

Crowhurst was honored with a Fellowship by the Audio Engineering Society in 1959. An associate member of the British IEE, he was a senior member of the British Sound Recording Association and a member of the AES, SMPTE, IEEE, ASA, National Council of Teachers of Mathematics, and Professional Engineers of Oregon.

Crowhurst and his wife emigrated to the United States in 1953. They became naturalized citizens of the U.S. on November 17, 1960. He worked as an editor at several British and U.S. publishing houses, both on staff and as a consultant, and for two years he worked at Fairchild Recording Equipment Co.

In mid-October of 1990, the bicycle Crowhurst was riding was struck by a passing car, in his adopted home of Dallas, Oregon. Medical examination revealed little or no obvious damage, but he failed to recover completely. He became ill in late February and was bedridden for a great part of each day. His death came suddenly from heart failure on March 7, 1991.

*Edward T. Dell, Jr.*



# FREE Audio Catalog

At Cambridge SoundWorks we manufacture speakers and music systems designed by Henry Kloss (founder of AR, KLH & Advent), and we sell them from our factory in Newton, Mass. We also sell selected audio components from brands like Philips, Pioneer and Denon. Because we sell factory-direct, you can save hundreds of dollars on components and systems. We sell nothing but "the good stuff." Our knowledgeable audio experts will help you make the right choices, without being pushy. And you can call toll-free for advice or "hook-up help" 365 days a year—even holidays. This is the simplest way to get the right deal on stereo components...and there's virtually no risk.

- Call toll-free for factory-direct savings.
- Save hundreds on components and systems from Cambridge SoundWorks, Philips, Pioneer, Denon 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.

**1-800-AKA-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 104NOV, 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.

## Wrong Cable Connector Causes Mono

In your answer to Steve Metz's question about monophonic sound with videocassette recorders in the January issue, you missed a very likely cause of the lack of stereo from the reader's VCR.

Some stereo TV sets have switches in their audio inputs to eliminate the need for a "Y" connector when connecting a single cable from a monophonic VCR. Manufacturers of VCRs are aware of the TV inputs and use compatible plugs. One of my co-workers had a similar problem after substituting some audio cables. The center pin of these plugs was not long enough to open the switch that bridges the left and the right channels of the TV set when the second input is left open. If a VCR is hooked to an audio system via such a TV, as appears to be the case in Metz's system, the VCR signal passed on to the audio system will be mono, with both channels bridged to-

gether. Some TV sets may have external stereo/mono switches that could cause the same problem.


Make sure you have the right cable connectors, and make sure that the switches on the TV are set to the position which permits stereo to be received by your audio system.—Dennis L. Green, Detroit, Mich.

## Scratched CDs

Q. My CD player is designed in such a way that it pulls the disc in when it is manually inserted halfway into the slot. I have noticed that my CDs are getting small, barely noticeable scratches—apparently from my player. The discs still play properly. Any insight or advice you can give on this subject will be appreciated.—Margaret Samardak, Orchard Park, N.Y.

A. I have received letters from owners of other CD players about scratches that occur as a result of the discs being pulled in by the mechanisms. I have to think that there are

rough surfaces that come into contact with the discs as they move in and out.

If the player is new, have it serviced under warranty. If the warranty has run out, maybe you will want to open the player and check into the problem yourself. Hopefully, you will see the complete path taken by the discs as they enter and are later ejected. Unfortunately, this is not always easy to do. You should expect to see guides that eventually place the disc on its spindle. One of these guides probably has some rough edges. A light touch with a fine file will smooth these edges just enough to avoid scratching the CD. Whatever you do, only remove enough material to prevent scratching the discs. Removing too much material could result in poor guiding or worse scratching of the CD. 

If you have a problem or question about audio, write to Mr. Joseph Giovarelli at AUDIO Magazine, 1633 Broadway, New York, N.Y. 10019. All letters are answered. Please enclose a stamped, self-addressed envelope.

## Strike Up A Deal With Sony.

# Buy any Sony home or car CD player...



# SONY

### Wow and Flutter Limits

**Q.** If a tape deck has a wow and flutter specification of, say, 0.06% wtd. rms, and if a tape is recorded and played back on this deck, what would be the wow and flutter? Would it be the same 0.06%, or  $\sqrt{2} \times 0.06\%$ , or some other figure? Is it additive? When does it become objectionable?—Leonard Ross, Los Angeles, Cal.

**A.** Wow and flutter can be additive or subtractive. When additive, the maximum level, using your example, would be  $\sqrt{2} \times 0.06\%$ . The point at which W & F becomes discernible, and therefore objectionable—tending to impart a grainy or coarse character to the program material—varies from one person to another and depends on the nature of the sound source; it is more perceivable on a single sustained note. At one time it was considered that it should not exceed 0.25%. Today, about 0.1% is considered the safe limit, or perhaps as low as 0.05%. Some decks do get below 0.05%.

### Head Materials

**Q.** While shopping recently for a new cassette deck, I was overwhelmed by the variety of materials that are used in tape heads. Could you please describe the advantages and disadvantages of ferrite, permalloy, sendust, cobalt amorphous, glass, etc.?—Jeff Jacobsen, Austell, Ga.

**A.** Your question demands an extensive answer that goes beyond the limitations of this column. Therefore, only a few general comments follow.

Each of the head materials you describe has its advantages and disadvantages. For example, ferrite has the advantage of resistance to wear and therefore of long life. But this is not always a preferred material for recording when its distortion characteristics are considered.

Within each type of material, there are variations of quality, according to manufacturer or according to which of several grades is used. This mitigates against my giving a statement as to

which type is best for a given purpose (recording, playback, erasure).

The price of a deck tends to reflect the quality of the heads employed. It is not uncommon to find that a given deck uses different head materials for the several heads, each chosen for optimum performance.

### New Shell

**Q.** I've noticed some mechanical vibration picked up by the playback head when playing older prerecorded cassettes. Is there any way I can cure this? Is it practical to remount the tapes in new shells?—Gerald Pasternack, Colts Neck, N.J.

**A.** If you are not all thumbs, you can transfer a tape to a new shell. If your audio dealer doesn't carry it, try Radio Shack (Cat. No. 44-626, \$1.19). **A**

**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. Please enclose a stamped, self-addressed envelope.**

and get 3 great CD titles.

**FREE**  
(\$2.00 shipping & handling)

**\$30.00  
VALUE**

Get the great performance of a Sony and your choice of three CD's free when you purchase a Sony home or car CD player between Oct. 1, 1991 and Jan. 31, 1992. Choose any 3 of these CD's.

Michael Bolton	Michael Bolton	38537	Peter Tosh	Legalize It	34253
Heart	Little Queen	34799	Luther Vandross	Never Too Much	37451
The Byrds	Greatest Hits	09516	Glorio Estefan	Eyes of Innocence	39622
Bruce Springsteen	Wild, Innocent		Sade	Stranger Than Paradise	44710
	E. Street Shuffle	32432	Aerosmith	Gems	44487
Julia Iglesias	Julia	38640	James Taylor	JT	34811
Johnny Mathis	Johnny's Greatest Hits	34667	Sarah Vaughan	Brazilian Romance	42519
Simon & Garfunkel	Sounds of Silence	09269	Jaco Pastorius	Jaco Pastorius	33949
Neil Diamond	Heartlight	38359	Bob James	Touchdown	35594
Dizzy Osbourne	No Rest for the Wicked	44245	Ston Getz	The Best of Two Worlds	33703
Quincy Riley	Mantra Health	38443	Placida Domingo	Perhaps Love	37243
Ted Nugent	Midnight Love	33692	Branford Marsalis	Romance For Saxophone	42122
Marvin Gaye	Midnight Love	38197	Leonard Bernstein	Childrens Classics	46712
Isley Brothers	Greatest Hits, Vol. 1	39240	Leonard Bernstein	Favorite Overtures	46713

To receive your CD's, mail this coupon postmarked no later than 2/29/92 along with the original bar code (with the model number on it) from the carton of your Sony CD player, a copy of your dated sales receipt and a check or money order (no cash) for \$2.00 (payable to Sony Corp.) for shipping & handling to: Sony 3-CD OFFER, P.O. Box 1147, Terre Haute, Indiana 47811.

Clearly print your 3 selection numbers below:

\_\_\_\_\_ ( )  
(optional choice if one of your preferred titles is unavailable)

Name \_\_\_\_\_

Male \_\_\_\_\_ Female \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Model # \_\_\_\_\_ Serial Number \_\_\_\_\_

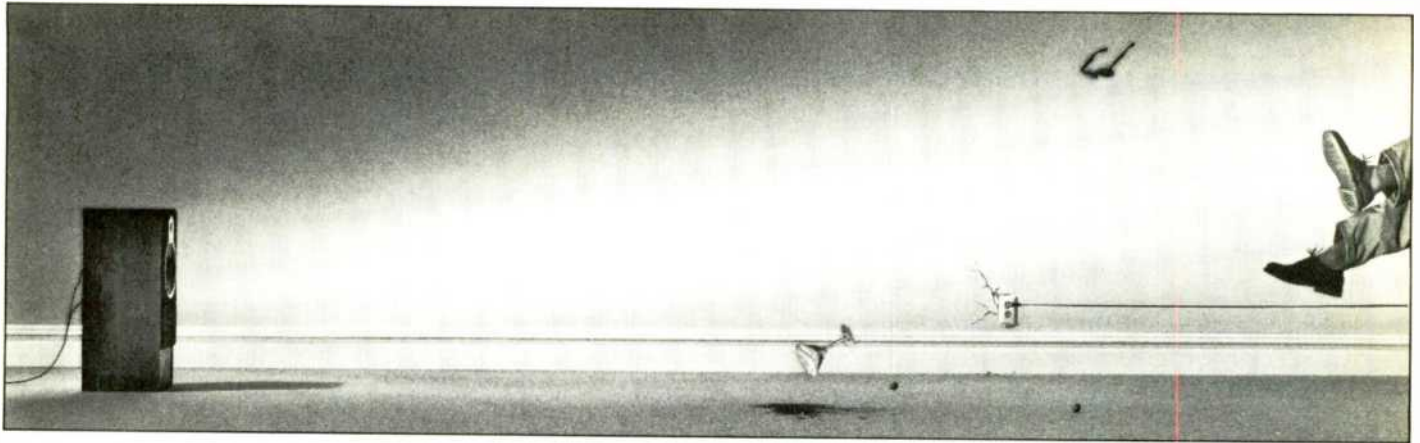
Date purchased \_\_\_\_\_ Tel# \_\_\_\_\_

Offer good only on Sony home or car CD players—those model numbers beginning with CDP, CDP-C, CDP-X, CDP-X, WH-C, LBT, CDX, CDX-A, and XES-C. Model numbers beginning with D, D-180K, MDP and CFD are not considered home or car CD players and are not eligible. Sony reserves the right to substitute compact discs based on supply or availability. Limit one \$30 Value Package per qualifying Sony CD Player purchased. Offer valid only in the Continental U.S. (Includes Alaska, excludes Hawaii). Void where prohibited by law. Misuse of offer will void coupon. Please allow 4-8 weeks for delivery.

©1991 Sony Corporation of America. All rights reserved. Sony is a trademark of Sony.

0005

# THE SCIENCE BEHIND MAX



© 1991 Maxell Corporation of America

Maxell XLII-S achieves new highs in Maximum Output Levels, offers wider dynamic range, along with significant reductions in AC Bias Noise and Modulation Noise. This is an all-new Maxell audiotape formulation capable of blowing you away like never before.

We started from scratch, creating

Musically, this would make the violinists in a symphony orchestra sound as though they were strolling around the stage instead of sitting still. You don't want gypsy violinists wandering through your symphony.

The standard magnetic coating



*A powerful reason for trying Maxell XLII-S.*

on nearly all audiotapes today consists of gamma ferric oxide particles.

But standard wasn't what we were shooting for when we developed XLII-S. Instead, we harnessed a higher energy magnetic particle we call Black Magnetite. It has 13% greater magnetic power and is a major contributor to the outstanding MOL of this new tape.

Another is the superior dispersion technique we employ in placing the Black Magnetite particles onto the tape.

*Smooth Side. Rough Side.  
Maxell dual-surface base-film reduces tape jitter.*

XLII-S from the base-film up. In fact, the base-film is unlike anyone else's and our patent on it is pending.

We call it "dual-surface base-film." One side is smooth, the other rough. The smooth side provides the sound and the rough side provides a stable, non-sticky ride through the tape deck's transport mechanism with the least possible tape jitter.

Excessive tape jitter causes phase deviation which results in echo "shading"



# MAXELL'S BLOW-AWAY SOUND.

During manufacture, some tapes are run through a magnetic field and the magnetic particles adhere to the film in a willy-nilly, helter-skelter pattern—similar to the arrangement you'd find on the end of a magnet if you dunked it into a bowl of metal filings.

At Maxell, we use a unique and complex process called "multi-orientation." Simply stated, it allows us to place smaller, Black Magnetite particles onto the tape in greater density, in near perfect alignment. The result is a smoother, more uniform coating which produces less AC Bias Noise.

Finally, there's a newly engineered cassette shell that doesn't merely house the tape. It *contributes* to the tape's outstanding performance.

Through the use of a new composite material—a blend of ceramic and polymer resins—we created a *high resonance-damping cassette shell*. More rigid and weightier than standard

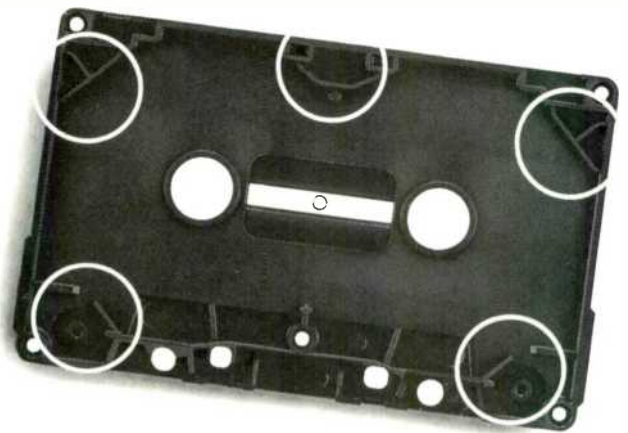
cassettes, it reduces modulation noise and helps maintain phase accuracy. Also, by making the window smaller, we were able to improve the cassette's overall structural integrity, building in five support points instead of the standard three.

All in all, we think you'll find that Maxell XLII-S is the finest High Bias audio cassette available today.

Make it your first choice for program material that demands the highest standards of performance. Buying anything less is like knowingly setting out to take your music to the min.

IEC Tape Specifications		
Tape Selector Position		IEC II High (Cr/Ob)
Unit		XLII-S 100
Physical Properties		
Backing Material		Dual Surface Tensitized Polyester Base Film
Tape Width	mm	3.81
Coating Thickness	µm	4.5
Total Thickness	µm	11.0
Yield Strength	N	5.5
Breaking Strength	N	10.5
Magnetic Properties		
Magnetic Material		Black Magnetite
Coercivity	kA/m (Oer)	50(720)
Retentivity	mT(G)	190(1900)
Squareness		0.90
Electro-acoustic Properties		
Optimum Bias		dB +1.0
Sensitivity	315 Hz	dB +0.5
	6,300 Hz	dB +1.5
	12,500 Hz	dB +3.0
	16,000 Hz	dB +4.5
Output Uniformity at 315 Hz		dB 0.3
Output Uniformity at 6 kHz		VU 0.4
Dynamic Range		dB 65.5
NDR (Maximum)		dB 57.5
Output Level		dB +6.0
AC Bias Noise		dB -56.5
Erasing Effect		dB 70
Print-Through		dB 51
<small>All features and specifications are subject to change without notice. (Specifications are measured with reference to IEC Type II Reference Tape U90-400 in accordance with established IEC procedures.)</small>		

The XLII-S Performance Story.

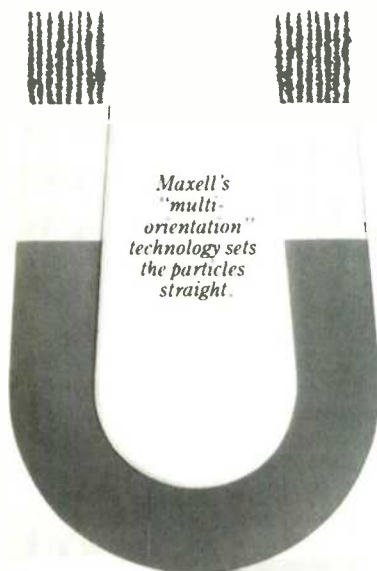


XLII-S vibration-damping cassette shell has five support points for increased rigidity and durability.



## TAKE YOUR MUSIC TO THE MAX.

Enter No. 18 on Reader Service Card



Maxell's "multi-orientation" technology sets the particles straight.

BERT WHYTE

## A, B, C, DMX

**B**y general reckoning, 1950 was the year that marked the beginning of the hi-fi era and of the audio industry as a distinct entity. The "hi-fi nut" of that time was trying to reproduce music with the highest sound quality from the long-playing 33 $\frac{1}{3}$ -rpm vinyl record and from FM broadcasts.

In those days, all audio equipment operated with vacuum tubes, and the sound was totally monophonic. It must also be remembered that the magnetic tape masters from which the LP discs were cut were recorded without any noise reduction. The first use of Dolby noise reduction was by Decca (London Records) in 1966. Thus, the signal-to-noise ratio of LP discs was such that audible tape hiss, along with all the surface noise artifacts, was an omnipresent annoyance.

Although such factors as microphone choice and quality, and engineering skills, had a direct bearing on FM broadcasting, it was generally considered that FM was the best source for high-fidelity music signals. In those heady days of FM broadcasting, it was possible to tune in live concerts by the New York Philharmonic. Earlier, Major Edwin Armstrong, the father of FM, had personally paid to run 15-kHz equalized phone lines from the National Symphony Orchestra concerts, in Washington, D.C., to his 800-foot-high transmitter tower atop the Palisades on the Hudson River in New Jersey. The music would then be transmitted to the local New York/New Jersey metropolitan area with a signal-to-noise ratio approaching 70 dB!

Audiophiles who wanted to record these wide-range FM broadcasts had to use the relatively primitive Brush Soundmirror or Pentron tape machines, and ironically, even the higher quality Magnecorders had S/N ratios no better than 50 to 55 dB!

In 1953, Armstrong was developing FM stereo multiplexing, and I worked with him, making special stereo tape recordings in Carnegie Hall and furnishing him with stereo recordings of the Chicago, Minneapolis, and Detroit orchestras as well as stereo recordings of the Benny Goodman, Woody Herman, and Stan Kenton bands. Armstrong had a very simplistic, "purist" (if highly impractical) attitude to FM stereo



broadcasting: There was a left channel and a right channel. Monophonic compatibility was only a minor consideration! Luckily, the multiplex system we use today is a sum-and-difference system that does not short-change those who listen to FM monophonically. (Colleague Len Feldman and I have each long since chronicled Murray Crosby's system, which not only used the sum-and-difference method but would have given us 16 dB better S/N than today's system.)

In any case, even with its less-than-optimum multiplex system, stereo FM was (and is) a major source of music for millions of people. After all, not everyone can afford an extensive library of LPs, audio cassettes, or CDs.

However, addressing FM stereo broadcasting strictly from the standpoint of classical music and the sonic fidelity of the signals, today's FM listeners have fallen on parlous times indeed. According to the 1991 edition of *Audio's Annual Equipment Directory*, there are 104 FM tuners on the market, ranging in price from \$120 to \$12,800! A great many audiophiles own FM tuners, and many of them listen to classical music on either a casual or a dedicated basis. I haven't had an FM tuner in my system for over 15 years, and in checking with other audiophiles, I found that they also have not used FM

tuners for quite a few years. Our reasons for this indifference to classical music on FM is the universal lack of live concert broadcasts (due to union rules, concerts are taped and then broadcast) and poor fidelity of transmission, including severe compression. Far higher fidelity of sound is available to us from CDs and other recorded sources.

Nonetheless, the many people who do still listen to classical music on FM have been and are increasingly being subjected to the most appalling conditions in respect to the technical shortcomings (i.e., gross distortion and high signal compressor) of many FM broadcasts. Worse yet are the programming practices for classical music broadcasts on FM stations throughout the country.

Small town or big city, FM stations broadcasting classical music have a new format that supposedly is the result of computer-based demographic studies of the 24- to 55-year-old age group. The rah-rah pundits in advertising agencies and purported media experts tell the broadcasters that their target audience in this group "lives life in the fast lane" and its cultural pretensions in respect to classical music must be satisfied in special ways that save their valuable time. The music must be served to them in palatable,

Illustration: Mark Maicho



# Unexpected.

Nakamichi 1000mb



Not even the Nakamichi engineers who created the 1000 mb expected it to sound so good. Not that it was a *total* surprise. After all, Nakamichi's extensive research had already proven conclusively that vibration—all kinds of vibration, but especially the airborne variety—is bad news for CD reproduction. But when all of the sophisticated countermeasures collectively known as the Nakamichi *Acoustic Isolation™* system were harnessed to combat vibration in the 1000mb CD transport, even its creators were impressed. Then again, Nakamichi products bearing the "1000" model designation have always managed to drop a few jaws. Ask to hear it through the Nakamichi 1000p Digital Audio Processor fitted with the new DA-111p D/A converter upgrade. And expect the unexpected.

• Acoustic Isolation™ system • MusicBank™ system • Digital outputs only (coaxial and optical) • Full-function wireless remote control

Acoustic Isolation and MusicBank are trademarks of Nakamichi Corporation

## Nakamichi

Nakamichi America Corporation

19701 South Vermont Avenue Torrance, CA 90502 (800) 421-2313 In California: (800) 223-1521 Nakamichi Canada: (800) 663-6358

# FREE Stereo Catalog

In 100+ pages, you'll see the latest in home and car stereos, video and telephones. Crutchfield's one-of-a-kind catalog brings you quality brands like Sony, Pioneer, Kenwood, Advent, Bose, AR, and many others—all at discount prices.

You'll see each component in detailed color and get Crutchfield's exclusive comparison charts of specs and features. Our technical staff and writers highlight the unique benefits of every product, so you can choose the model you like best.

Call or send this coupon now for your free catalog

## 800-336-5566

8am - Midnight (Eastern time)  
7 days a week

Name \_\_\_\_\_

Address \_\_\_\_\_ Apt. # \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Optional - Are you in the market for:

PC/Office products  Security products

# CRUTCHFIELD

1 Crutchfield Park, Dept. AU, Charlottesville, VA 22906

"Shure's most recent version of its top model, the V15 Type V-MR... strikes this listener as perhaps the most musical-sounding phono cartridge ever made."

Hans Fantel  
*The New York Times*



## SHURE®

For product literature, call 1-800-25-SHURE  
(In Illinois, 1-708-866-2553)

Enter No. 31 on Reader Service Card

# Crystal Strings



From the skilled craftsmen of Hofbauer in Germany comes this beautiful crystal violin. Made of highly polished lead crystal with over 24% PbO it measures approximately 7" in length. A great collectible item for any audiophile.  
CM003 \$59.95

\$6.95 S&H and applicable sales tax to American Promotions, Inc., P.O. Box 700, Dept. No. 65-11D11, Emerson, NJ 07630

TOLL FREE 800-533-8161 Ext. 11D11

Luckily, the multiplex system used today is a sum-and-difference system that does not shortchange listeners to monophonic FM.

easily digested slices. Everything must be upbeat, and profundity must be scrupulously avoided. Thus, we have such incredible dictums from FM broadcasters as not playing the second (slow) movements of concertos, because the slow movements are too draggy, not lively enough, are too introspective, or perhaps have negative connotations.

Again, for much the same reasons, the broadcasters do not play any organ music. This is a particular no-no, being far too funereal and depressing. Most solo vocal recitals are taboo, and, of course, most operas are out or, at best, are broadcast in the wee hours of the morning. Symphonic music must not be too ponderous, and the broadcasters are fond of presenting shorter movements, rather than complete symphonies, as this conveniently allows the placement of commercials at frequent intervals. If you think I am exaggerating this, there was a lengthy article in *The New York Times* some months ago, in which the incredulous reporter enumerated all this new "hip" classical music programming and expressed his outrage.

I spoke to the program director of a major classical FM station who freely indulges in these practices and confesses quite candidly that such programming is the "new reality," that their demographic slice has no time for "involvement." He then crassly informed me that this new format "makes money," while the "old fud formula" does not. I find this argument rather hard to swallow.

Perhaps I am an old mossback, and not "with it" in respect to this abuse of the FM medium. But I am more dismayed about the lack of sensitivity to, and lack of respect for, great music, both on the part of the FM broadcasters and their shallow listeners.

Bemoaning the point doesn't help this situation. There are still many people who would appreciate listening to classical music unsullied by technical shortcomings or compromised presentations. Take heart, because I have just recently found not merely an alternative to classical music via FM, but a very sophisticated, exciting new concept in music presentation: Digital Music Express (DMX). This service is programmed, marketed, and distributed

The Black Crowes:  
Shake Your  
Moneymaker 52142



The Doors/Original Soundtrack 54289

Madonna:  
The Immaculate  
Collection  
54164



Chris Isaak: Heart  
Shaped World 73735

Wilson Phillips  
00726



# Get 8 COMPACT DISCS FOR THE PRICE OF 1 also available on cassettes

WITH NOTHING MORE TO BUY EVER!

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

Traveling Wilburys, Vol. 3  
(Warner Bros.) 24817

Trixter  
(Mechanic/MCA) 61594

Daryl Hall & John  
Oates: Change Of  
Season (Arista) 00543

David Lee Roth:  
A Little Ain't Enough  
(Warner Bros.) 10551

Black Box: Dreamland  
(RCA) 84063

Prince: Graffiti Bridge  
(Paisley Park) 34107

Def Leppard:  
Pyromania  
(Mercury) 70402

George Benson/Count  
Basie Orchestra:  
Big Boss Band  
(Warner Bros.) 13519

Quincy Jones:  
Back On The Block  
(Warner Bros.) 64116

Deee-Lite: World Clique  
(Elektra) 52050

Nell Young: Rugged  
Glory (Reprise) 34621

Kentucky Headhunters:  
Pickin' On Nashville  
(Mercury) 24740

Anita Baker:  
Compositions  
(Elektra) 00921

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

Chick Corea Akoustic  
Band: Alive  
(GRP) 10721

Bob Marley: Legend  
(Island) 53521

H-Five  
(Jive) 10542

The Bonnie Raitt  
Collection  
(Warner Bros.) 00569

Suzanne Ciani:  
Planiissimo  
(Private Music) 11047 \*

Technotronic: Pump Up  
The Jam-The Album  
(SBK) 34781

Hank Williams, Jr.:  
America (The Way I See  
It) (Warner Bros.) 20612

Van Halen  
(Warner Bros.) 14620

The Cars: Greatest Hits  
(Elektra) 53702

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

Jeff Lynne:  
Armchair Theatre  
(Reprise) 00803

Dirty Dancing/  
Original Soundtrack  
(RCA) 82522

Pat Benatar: Best Shots  
(Chrysalis) 44319

ZZ Top: Afterburner  
(Warner Bros.) 64042

Skid Row  
(Atlantic) 01038

ZZ Top: Recycler  
(Warner Bros.) 73969

Rick Astley: Free  
(RCA) 53656

Bell Biv DeVoe: Poison  
(MCA) 00547

Jane's Addiction:  
Ritual de Habitual  
(Warner Bros.) 10020

Aerosmith: Pump  
(Geffen) 63678

Reba McEntire: Rumor  
Has It (MCA) 44609

Tony! Toni! Toné!: The  
Revival (Polydor) 00565

Best Of Robert Palmer:  
Addictions  
(Island) 10819

Damn Yankees  
(Warner Bros.) 14852

Keith Sweat: I'll Give All  
My Love To You  
(Elektra) 51603

Too Short: Short  
Dog's In The House  
(Jive) 54304

Greatest Gospel Hits  
(Malaco) 44366

Edie Brickell: Ghost Of  
A Dog (Geffen) 73923

Eric Clapton:  
Journeyman  
(Warner Bros.) 53940

Carly Simon: Have You  
Seen Me Lately?  
(Arista) 20912

The Glenn Miller  
Orchestra: In The  
Digital Mood  
(GRP) 43293

James Taylor: Greatest  
Hits (Reprise) 23790

Raffi : Evergreen  
Everblue (MCA) 10492

Lionel Richie:  
The Composer  
(Motown) 24700

Lenny Kravitz: Mama  
Said (Virgin) 10041

Solti: Tchaikovsky,  
1812 Overture  
(London) 25179 \*

Clint Black: Killin' Time  
(RCA) 01112

En Vogue: Born To  
Sing (Atlantic) 14187

Paula Abdul: Shut Up  
And Dance (The Dance  
Mixes) (Virgin) 80326

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

Talking Heads:  
Stop Making Sense  
(Sire) 24560

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

Lisa Stansfield:  
Affection (Arista) 34198

The Robert Cray Band:  
Midnight Stroll  
(Mercury) 73659

America: History  
(Greatest Hits)  
(Warner Bros.) 23757

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

Another Bad Creation:  
Coolin' At The Play-  
ground (Motown) 10456

Kathy Mattea: A  
Collection Of Hits  
(Mercury) 10791

Yanni: Reflections  
Of Passion  
(Private Music) 24223

Nelson: After The Rain  
(DGC) 74079

Motley Crüe: Dr. Feelgood  
(Elektra) 33928

Fleetwood Mac :  
Behind The Mask  
(Warner Bros.) 43756

Crusaders: Heal The  
Wounds (GRP) 34744 \*

AC/DC: Back In Black  
(Atlantic) 15772

Scorpions: Crazy World  
(Mercury) 14795

Paul Simon: Graceland  
(Warner Bros.) 72315

U2: Rattle And Hum  
(Island) 00596

Grateful Dead: Built To  
Last (Arista) 72230

Patsy Cline: 12 Greatest  
Hits (MCA) 53849

Gipsy Kings: Allegría  
(Elektra) 11178

Vince Gill:  
Pocket Full Of Gold  
(MCA) 73599

Clint Black: Put  
Yourself In My Shoes  
(RCA) 24690

Guy!...The Future  
(MCA) 14875

Steve Winwood:  
Refugees Of The Heart  
(Virgin) 54232

Styx: Edge Of The  
Century (A&M) 74498

Deep Purple: Slaves &  
Masters (RCA) 11145

Linda Ronstadt: Cry  
Like A Reinsword:  
Howl Like The Wind  
(Elektra) 52221

Stevie N: Love And  
Emotion (RCA) 00539

Atlantic Records: Hit  
Singles (1958-77)  
(Atlantic) 10514

The Cole Porter  
Songbook: Night And  
Day (Verve) 10613

Keith Whitley: Greatest  
Hits (RCA) 10728

The Jeff Healey Band:  
Hell To Pay  
(Arista) 00544

Robert Plant:  
Manic Nirvana  
(Es Paranza) 54122

Big Daddy Kane: A  
Taste Of Chocolate  
(Cold Chillin') 01095

King's X: Faith, Hope  
Love By King's X  
(Atlantic) 74229

Spyro Gyra: Fast  
Forward (GRP) 00829

Pet Benatar:  
True Loves  
(Chrysalis) 44663

AC/DC:  
The Razors Edge  
(Atlantic) 33379

Roger McGuinn:  
Back From Rio  
(Arista) 81997

White Lion: Mane  
Attraction (Atlantic) 54209

Debbie Gibson:  
Anything Is Possible  
(Atlantic) 24815

Extreme: Pornograffiti  
(A&M) 43557

Faith No More: The Real  
Thing (Reprise) 65719

Catching Up With  
Depeche Mode  
(Sire) 00560

Kenny G: Live  
(Arista) 64505

Randy Travis:  
Heroes And Friends  
(Warner Bros.) 74597

Contraband  
(Impact/MCA) 32031

Bon Jovi: New Jersey  
(Mercury) 00516

Big Band Bash  
(Compose) 10458

Twin Peaks/TV  
Soundtrack  
(Warner Bros.) 63540

Hank Williams, Jr.:  
Pure Hank  
(Warner/Curb) 60351

Jeffrey Osborne: Only  
Human (Arista) 00545

Vanilla Ice: To The  
Extreme (SBK) 24689

Chicago: Twenty 1  
(Reprise) 10533

Billy Idol: Charmed Life  
(Chrysalis) 62264

Peter Gabriel: So  
(Geffen) 14764

Johnny Gill  
(Motown) 00738

Tom Petty: Full Moon  
Fever (MCA) 35911

Staship: Greatest Hits  
(RCA) 90207

Monie Love: Down To  
Earth (Reprise) 44752

Tesla: The Great  
Radio Controversy  
(Geffen) 00839

Alabama: Pass It On  
Down (RCA) 00531

Tears For Fears:  
The Seeds Of Love  
(Fontana) 33653

Paul Simon: Graceland  
(Warner Bros.) 72315

The B-52's: Cosmic  
Thing (Reprise) 14742

Guns N' Roses:  
Appetite For Destruc-  
tion (Geffen) 70348

Take 6: So Much 2 Say  
(Reprise) 53580

Alannah Myles  
(Atlantic) 30045

The Cure:  
Kiss Me, Kiss Me,  
Kiss Me  
(Elektra) 42404

Bulletboys: Freakshow  
(Warner Bros.) 34757

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

Depeche Mode: Violator  
(Sire) 73408

Scorpions: Crazy World  
(Mercury) 14795

U2: Rattle And Hum  
(Island) 00596

Traveling Wilburys, Vol. 1  
(Warner Bros.) 00711

Bobby Brown:  
Dance! ...Ya Know It  
(MCA) 73660

Charlie Parker:  
Original  
Recordings  
(Jive) 01044

Dwight Yoakam: If  
There Was A Way  
(Reprise) 64310

Bruce Hornsby & The  
Range: A Night On The  
Town (RCA) 63689

Boogie Down  
Productions: Live  
Hardcore Worldwide  
(Jive) 44584

Lita Ford: Silletto  
(RCA) 63893

Jasmine Guy  
(Warner Bros.): 54384

Lita Ford: Lita  
(RCA) 24793

Jimmy Buffett: Greatest  
Hit(s) (MCA) 42157

Tracy Chapman  
(Elektra) 53582

**Compact Disc Club**

### START SAVING NOW—MAIL TODAY!

Mail to: BMG Compact Disc Club P.O. Box 91412/Indianapolis, IN 46291

YES, please accept my membership in the BMG Compact Disc Club and send my first four CDs (check box below for cassettes) 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 which I can choose 3 more CDs FREE! That's 8 CDs for the price of one ... with nothing more to buy, ever! (A shipping/handling charge is added to each shipment.)



**INSTANT  
50%-OFF  
BONUS DISCOUNTS!**

**It's the BMG  
difference!**

You earn INSTANT 50%-OFF BONUS DISCOUNTS every time you buy a CD at regular Club price. In a nutshell ... buy 1, 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!

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

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

- 1  EASY LISTENING  
Betty Midler  
Barry Manilow
- 2  COUNTRY  
Clint Black  
Reba McEntire
- 3  HARD ROCK  
ZZ Top  
Aerosmith
- 4  POP/SOFT ROCK  
Madonna  
Elton John
- 5  CLASSICAL  
Luciano Pavarotti  
Vladimir Horowitz
- 6  JAZZ  
Kenny G  
George Benson
- 7  HEAVY METAL  
AC/DC  
Slaughter

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

Address Apt.  
City State Zip

Telephone ( ) Area code

Signature  
We reserve the right to request additional information or reject any application limited to new members, continental USA only. One membership per family. Local taxes, if any, will be added.

<sup>(2)</sup> Cassette members will be serviced by the BMG Music Service; current Music Service members are not eligible.

\* Selections marked (\*) not available on Cassette

I PREFER CASSETTES!<sup>(2)</sup>  
(You may choose cassettes with the same 10-day, no-obligation privilege. Full membership details will follow.)

ALTH AS

Londonbeat:  
In The Blood 44569



**R.E.M.**  
OUT OF TIME

R.E.M.: Out Of Time 24762

Vinnie James:  
All-American Boy  
63237



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

Buy just **1** smash hit in one year's time

Then get **3** CDs of your choice, FREE<sup>(1)</sup>

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

**Nothing more to buy...EVER!**



Jesus Jones:  
Doubt 44654

# Get 8 COMPACT DISCS FOR THE PRICE OF 1

WITH NOTHING MORE TO BUY EVER!

also available on cassettes

Bette Midler: Some People's Lives (Atlantic) 53566

Jon Bon Jovi: Blaze Of Glory (Mercury) 44490

Kik Tracee: No Rules (RCA) 10719

Horowitz At Home (DG) 25211

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

Yellowjackets: Greenhouse (GRP) 10475

The Lynch Mob: Wicked Sensation (Elektra) 11076

Carmen McRae: Sarah Dedicated To You (Novus) 34511

Bad Company: Holy Water (Atlantic) 24784

Van Halen: OU812 (Warner Bros.) 50913

Fleetwood Mac: Greatest Hits (Warner Bros.) 00796

INXS: X (Atlantic) 64378

Steelheart (MCA) 44528

B.B. King: Live At The Apollo (GRP) 24735

Winger: In The Heart Of The Young (Atlantic) 00570

Diane Schuur: Pure Schuur (GRP) 10824

The Go-Gos: Greatest Hits (I.R.S.) 50315

Soul II Soul: Vol. II 1990-A New Decade (Virgin) 00567

Huey Lewis & The News: Sports (Chrysalis) 44448

Roy Hargrove: Public Eye (Novus) 54579

Mr. Big: Lean Into It (Atlantic) 24821

Rush: 2112 (Mercury) 33716

Led Zeppelin II (Atlantic) 03692

Cinderella: Heartbreak Station (Mercury) 73694

Ralph Tresvant: Live (MCA) 14889

Madonna: I'm Breathless (Sire) 00572

James Galway: Greatest Hits (RCA) 73233

Alan Jackson: Here In The Real World (Arista) 53833

Enuff Z'Nuff: Strength (Atlantic) 14864

Bing Crosby's Greatest Hits (MCA) 04709

Ratt: Detonator (Atlantic) 63335

AC/DC: Back In Black (Atlantic) 13772

Taylor Dayne: Can't Fight Fate (Arista) 01114

John Williams/Boston Pops In Space (Philips) 05392

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

Slaughter: Stick It Live (Chrysalis) 20666

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

The Escape Club: Dollars And Sex (Arista) 54291

Kronos Quartet: Black Angels (Elektra) 62287

Joni Mitchell: Night Ride Home (DGC) 10731

Bobby Bland: Midnight Run (Malaco) 44333

Grateful Dead: Built To Last (Arista) 72230

ZZ Top: Eliminator (Warner Bros.) 34129

The Judds: Love Can Build A Bridge (RCA) 24549

U2: The Joshua Tree (Island) 53501

Teddy Pendergrass: Truly Blessed (Elektra) 14879

Marcus Roberts: Alone With Three Giants (Novus) 54397

Barry Manilow: Live On Broadway (Arista) 24805

The Cure: Mixed Up (Elektra) 74190

Judy Garland: Best Of The Decade Years, Vol. 1 (MCA) 10-97

Kitaro: Ko-Iki (Geffen) 43758

Earl Klugh: Midnight In San Juan (Warner Bros.) 73722

Roy Orbison: A Black And White Night (Virgin) 64-95

The Best Of Dolly Parton (RCA) 51583

**CLASSIC ROCKERS**

Jefferson Starship: Gold (RCA) 64132

Led Zeppelin IV (Runes) (Atlantic) 12014

Chicago: Greatest Hits 1982-89 (Reprise) 63363

Fleetwood Mac: Rumours (Warner Bros.) 24025

Styx: 14 Classics (A&M) 14822

The Mamas & The Papas: 16 Of Their Greatest Hits (MCA) 80183

Crosby, Stills, Nash & Young: Greatest Hits (Atlantic) 30230

Chuck Berry: The Great 28 (Chess) 64137

George Harrison: Best Of Dark Horse, 1976-89 (Dark Horse) 80307

Best Of Eric Clapton: Time Pieces (Polydor) 23385

Best Of Bad Company: 10 From 6 (Atlantic) 60321

All The Best Of The Lovin' Spoonful (Buddah) 10012

Eagles: Greatest Hits, Vol.1 (Asylum) 23481

The Best Of Steely Dan: Decade (MCA) 54135

Elvis Presley: 18 No. 1 Hits (RCA) 72190

Eagles: Hotel California (Asylum) 30030

Best Of The Doobie Brothers (Warner Bros.) 43738

Lynyrd Skynyrd's Innyrds (MCA) 01150

Supertramp: Classics (14 Greatest Hits) (A&M) 04891

Buffalo Springfield: Retrospective (ATCO) 00844

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

1950's Rock & Roll Revival (Buddah) 11179

Iron Butterfly: In-A-Gadda-Da-Vida (ATCO) 44356

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

## ON THE CUTTING EDGE

Elvis Costello: Spike (Warner Bros.) 00841

Pixies: Bossa Nova (4AD/Elektra) 53773

The Cure: Ostin-Integration (Elektra) 01109

The Sundays: Reading, Writing And Arithmetic (DGC) 63175

The Alarm: Standards (I.R.S.) 24765

Morrissey: Kill Uncle (Reprise/Sire) 20588

Concrete Blonde: Bloodletting (I.R.S.) 84212

R.E.M.: Eponymous (I.R.S.) 00701

Pump Up The Volume/Sdtk. (MCA) 44606

10,000 Maniacs: Hope Chest (Elektra) 44340

Replacements: All Shook Down (Warner Bros.) 83585

Dread Zeppelin: Un-Led-Ed (I.R.S.) 63594

Erasure: The Innocents (Sire) 01009

Waterboys: Room To Roam (Chrysalis) 74255

Lou Reed: New York (Warner Bros.) 01058

Morrissey: Bona Drag (Sire) 00578

World Party: Goodbye Jumbo (Chrysalis) 33536

The Stone Roses (Silvertone) 53921

The Christians: Colour (Island) 81645

Pixies: Doolittle (4AD/Elektra) 01108

R.E.M.: Green (Warner Bros.) 00715

Bob Mould: Black Sheets Of Rain (Virgin) 53750

Cowboy Junkies: The Trinity Session (RCA) 01043

Best Of The Velvet Underground (Verve) 62303

**START WITH 4 COMPACT DISCS NOW!**

Yes, start with any 4 compact discs shown here. You need buy just 1 more hit at regular Club prices (usually \$14.98-\$15.98), and take up to one full year to do it. Then choose 3 more CDs FREE. That's 8 CDs for the price of 1... with nothing more to buy... ever! (A shipping/handling charge is added to each shipment.)

**HOW THE CLUB OPERATES**

You select from hundreds of exciting CDs described in the Club's magazine which is mailed to you approximately every three weeks (19 times a year). Each issue highlights a Featured Selection in your preferred music category, plus alternate selections. If you'd like the Featured Selection, do nothing. It will be sent to you automatically. If you'd prefer an alternate selection, or none at all, just return the card enclosed with each issue of your magazine by the date specified on the card. You will have at least 10 days to decide or you may return your Featured Selection at our expense. Cancel your membership at any time after completing your enrollment agreement simply by writing to us, or remain and take advantage of bonus savings.

**FREE 10-DAY TRIAL**

Listen to your 4 introductory selections for a full 10 days. If not satisfied, return them with no further obligation. You send no money now, so complete the postage-paid card and mail it today.

<sup>(1)</sup> A shipping/handling charge is added to each shipment.  
©1991 BMG Compact Disc Club, 6550 E. 30th St., Indianapolis, IN 46219-1194. TRADEMARKS USED IN THE ADVERT ARE THE PROPERTY OF VARIOUS TRADEMARK OWNERS.

**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

**NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES**



An alternative to classical music via FM, DMX is an exciting concept in music presentation.

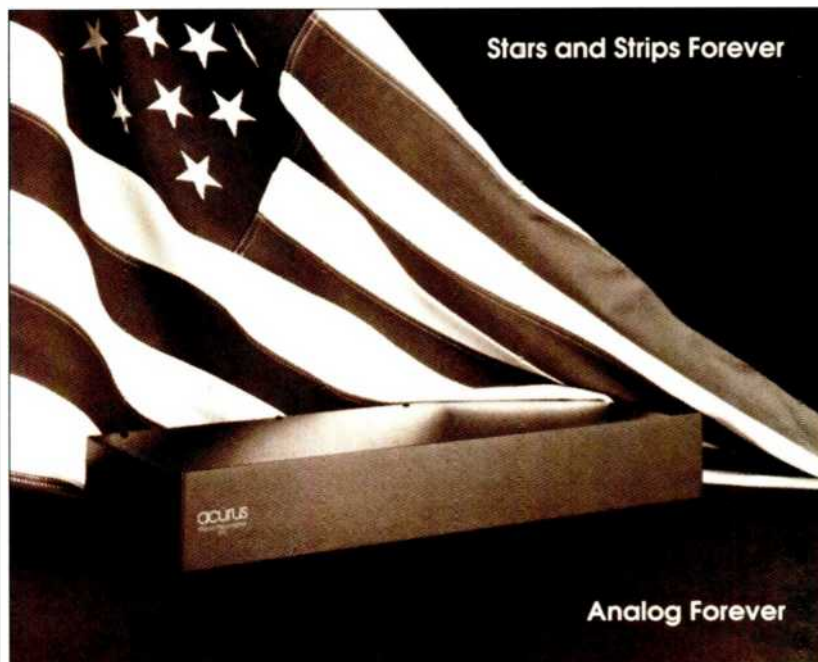
by International Cablecastings Technologies (ICT) with Scientific Atlanta, a company known for its satellite and cable TV activities, contributing on the technological side.

ICT maintains a vast CD library which is continuously updated and covers all types of music from classical to heavy metal and everything in between. Special CD playback equipment in the DMX library outputs the standard Sony/Philips 16-bit/44.1-kHz digital signal, which Scientific Atlanta uplinks to the Satcom F-4 satellite, parked in a geostationary position 22,300 miles above the earth. The satellite then downlinks the digital signal to a cable TV operator. The cable TV company sends the signal, still in the digital domain, over the cable lines that also carry its video programs to their subscriber. The subscriber is furnished with a digital tuner/decoder. This unit outputs the CD signal through a one-bit D/A converter and then to an analog output for connection to the customer's stereo system. Or the digital signal is output through a coaxial port for connection to the subscriber's own outboard D/A converter. The DMX decoder provides 30 separate music channels, individually selectable via remote control. Among these channels, classical music is offered in symphonic, chamber and opera modes. There are channels for a half-dozen rock/pop formats, easy listening, big bands, jazz, country, gospel, etc. An optional remote control has a scrolling LCD display that furnishes the title of the album, title of the song or selection, and artist name. This service operates 24 hours a day and has a very low repetition rate. Another feature of the DMX service and decoder is that the cable TV operator, at his own discretion, can provide digital simulcasts of soundtracks from virtually any video channel—HBO, Cinemax, Disney, MTV, etc., as well as special events.

This DMX system is not off in the future, like such things as Digital Audio Broadcasting (DAB) or Direct Satellite Broadcasting. Actually, the DMX service has been available for some time and is currently available in some 20 markets with over half a million subscribers, to be gradually expanded to over 20 million through cable companies in the U.S. The local cable compa-

nies charge approximately \$8 to \$9.95 per month for the DMX service and furnishes the subscriber with the DMX digital tuner/decoder. Apparently, in my area, the cable company is about to offer the DMX service. (This is a fairly progressive company in that they have proposed rewiring their system

with fiber optic cable and should be entirely shifted to the fiber optics by 1993.) When the DMX service is available to me, I plan to use it. While I have a great many Compact Discs, most of them classical, once in a while it would be nice to listen to some jazz, swing, or big band music! **A**



## acurus Accuracy From the U.S.

Advanced Technology in the Service of Musical Tradition

### The Acurus P10 Phono Preampfier

The musicality of better analog recordings is undisputed. The Acurus P10 was created to preserve *and* advance the quality of these cherished recordings. The P10 may be connected to the auxiliary input of *any* preamplifier. Its selectable gain and loading allows it to be properly interfaced with any moving magnet or moving coil cartridge.

As you would expect of Acurus, only 1% metal film resistors, polypropylene capacitors and matched transistors are in the class A circuit. The price of the P10 will surprise you, because there are no integrated circuits used to cut costs, thereby making the Acurus fully discrete...Because discretion is the better part of value.

**MONDIAL DESIGNS LIMITED**  
2 Elm Street, Ardsley NY 10502 • 914-693-8008

Enter No 22 on Reader Service Card

## TRUE BLUE BINAURAL



Let us now take the quotation marks off "binaural" as used in my recent explorations into a memorable era of audio history, the early '50s. "Binaural" then was no more than an early and joyously misguided name for the brand-new two-channel sound that we now call stereo.

It has been a royal snafu of terminology ever since! Back at that time both loudspeaker two-channel reproduction and two-channel reproduction through 'phones were indiscriminately called "binaural." Now it's the other way around. Today we call everything stereo whether it's speakers or 'phones. It is stereo, of course, 99.9% of the time, that is, recording intended for loudspeakers. Only a very mild resurgence of real binaural recordings, specifically designed for headphone listening, is the present exception.

But to further confuse things, we have widely discovered that loudspeaker stereo sounds very good through 'phones, whether that was the idea or no! Almost as many people now listen to stereo through 'phones as through speakers, what with all the pocket-size portables around. Our present stereo serves nicely for both of these purposes.

Is there any room, then, for what is best called true binaural, as a *separate listening experience* from recordings made specifically for 'phones? Will we ever get the differences straight: The very different recording techniques, a fundamentally different sort of "programming"? A real question, which deserves a spate of background. Will people ever untangle 'phone stereo and 'phone binaural from each other? I wonder.

Blame the indefatigable PR folks, if you will, for a lot of this genial mix-up. These people are not famous for scientific precision. Nor do consumers care very much for what might seem to them to be hair-splitting. Stereo is a nice, comfortable word so let's call everything stereo. And so we do! After all, even a boom box with speakers a foot apart is a stereo.

But there are always clear heads around and in surprising places. I know of no more concise account of the difference between loudspeaker stereo and headphone binaural than a short paragraph printed more than 30 years ago with the very first RCA Victor stereophonic tape release, reel-to-reel. It was ECS 1, and alternatively ECSD 1 for staggered or offset heads (Magne-

cord), *Also sprach Zarathustra* by Richard Strauss with the Chicago Symphony and Fritz Reiner:

Stereophonic recording differs from binaural (a term sometimes incorrectly applied to stereophonic records) in that the microphone placements are selected for loudspeaker [sic] reproduction. Binaural properly applies to a two-channel system designed for headphone reproduction. It thus requires the use of two channels fed by microphones spaced about 7 inches apart (normal ear separation).

There you have it. And note that there is no mention of an intervening "dummy" head. From an entertainment point of view, a product for listening, that is absolutely right, the way I see it. Binaural recording is not necessarily literal, any more than stereo for loudspeakers. Headless binaural is really quite reasonable.

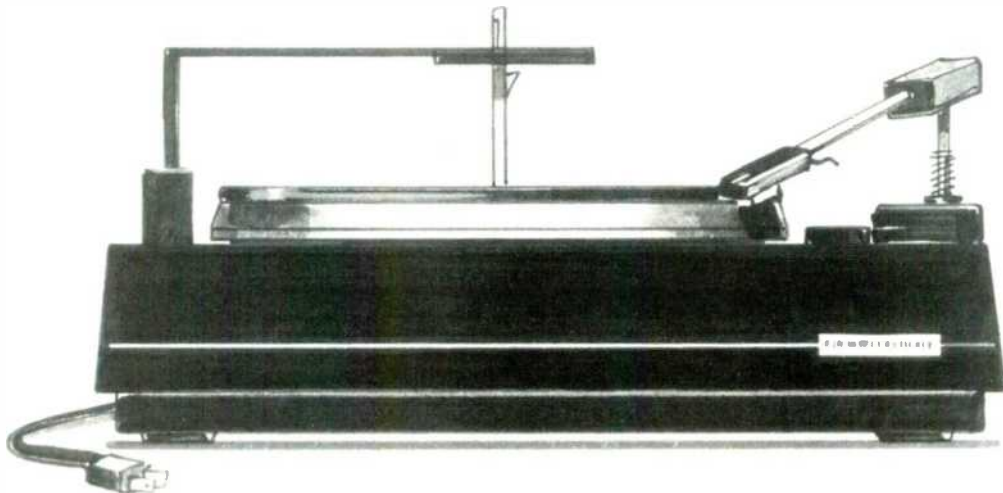
Out of the same RCA account, take a look at this admirable description of the impact of stereo for loudspeakers. Remember, this was one of the very first available stereo recordings:

Stereophonic recording and reproduction results in a spatial, "3-D" effect, tends to localize the instruments of the orchestra, and thus produces a higher degree of realism than can be obtained with a single-channel system.

So much in so few words! I particularly like "a higher degree of realism," which is soberly accurate. In spite of bushels of claims during at least 80 years of this century, no released recording has ever been *literal* by any intention. Not even today's so-called "live" recordings (they couldn't very well record if they were dead, wrote an exasperated correspondent to me recently), made indeed at concert performances and rehearsals but more often than not at a number of them edited together.

Not literalism but *realism* is our aim in any of our media, as RCA says. An *impression* of reality, of presence and immediacy, produced by the arts and artifices of recording technique! We are literal, as of the living original, only in the purity of the signal. Not anywhere else.

# ~~\$~~150 Reward. Dead or Alive.



Your old record or CD player can put you \$150 closer to the Luxman DC-114, arguably the world's finest CD changer.



The Luxman DC-114 is the ultimate upgrade

for your CD listening pleasure. If you're really serious about the quality of audio reproduction in your home, you won't settle for anything less.

Here's why we can call the DC-114 fully-featured, fully-programmable CD changer "the ultimate" without blushing:

- Duo-Beta circuitry.
- STAR circuit topology.
- Voltage-driven amplification.
- Two 18-bit, 8x Oversampling D/A converters.
- Handtrimmed MSB potentiometers for improved linearity.
- High-precision transport.
- Fully compatible with all Alpine CD changers for the car.

- Six disc magazine plus single play drawer.
- 5-year parts and labor warranty.

## The \$150 Trade-Up Special.

Take any record player or CD player to a participating Luxman dealer and get a \$150 credit toward the purchase of the state-of-the-art Luxman DC-114 compact disc changer from the manufacturer's suggested retail price of \$800. Think

of how many CDs you can buy with the \$150 you save. And you'll hear

them the way they were meant to be heard – with the purity and clarity of Luxman sound reproduction.

For your nearest participating Luxman dealer, call 1-213-326-8000, extension 214.

Offer good through January 31, 1992.



Luxman DC-114 Shuttle  
"CD Changer"

# LUXMAN

A Division of Alpine Electronics of America, Inc.

**1000**  
**WATT**

**Automotive Competition Series**



**INTERCOOLED**



# The 2<sup>nd</sup> best thing that ever happened in the back seat of your car.

WE WANTED TO SHOW YOU A FULL-BLOWN SHOT OF OUR  
1000 WATT WOOFER, THE JBL 1800GTi. BUT WE CAN'T.

THIS PAGE IS TOO SMALL. WHICH BRINGS US TO PLAN B.

YOU KNOW THE 18-INCH WOOFER YOU SEE AT CON-  
CERTS? THE ONE WITH THE COSMIC BOTTOM END?

THAT'S THE 1800'S DADDY. WE SWIPED THE IDEA  
FROM OUR STAGE STACK AND PUT IT IN A CAR.

SOUNDS AWESOME. WHY SHOULDN'T IT? JBL HAS

SPENT FORTY YEARS IN THE STUDIO PERFECTING

THE SAME TITANIUM TRANSDUCERS, SAME RICH

BASS, SAME STUDIO MONITOR SOUND YOU HEAR

IN OUR GRAND TOURING AUTOMOTIVE SERIES.

2 AND 3-WAY SYSTEMS. SEPARATE HIGH, MID

*The JBL  
1800 GTi  
shown here  
actual size.*

AND LOW-FREQUENCY TRANSDUCERS.

MATCHED COMPONENT SYSTEMS.

FULL-FREQUENCY SPEAKERS. THIRTY-TWO DROP-IN

PIECES. SO IF YOU'D LIKE TO UPGRADE TO SOMETHING

REALLY HOT, TEST DRIVE THE WHOLE JBL LINE. (IF YOU'D JUST

LIKE TO GET TO FIRST BASS, PICK UP THE 1800GTi.)



**H** A HARMAN INTERNATIONAL COMPANY 240 CROSSWAYS PARK WEST WOODBURY  
NEW YORK 11797 8500 BALBOA BOULEVARD NORTHridge CALIFORNIA 91329

Enter No. 15 on Reader Service Card

# In choosing a CD player, you can play the numbers...

1 beam or 3 beam / Mash. one bit, 16 bits, 18 bits or 20 bits / 2 times oversampling at 88.2kHz or 4 times oversampling at 176.4kHz. 1 beam or 3 beam / Mash. one bit, 16 bits...

## ...or play the music.



Recently more and more CD players have been promoted by a kind of numbers game, as if by some magic combination one CD player can be made to sound better than another. The vast majority of these CD players still fail to address the most important subtleties that reproduce the natural real sound of live music.

Adcom on the other hand continues to impress the audio critics with the superior musicality of its GCD-575 CD player. To reach this objective, "...the GCD-575 was designed and built with extraordinary attention to detail."\*

We ask that you let your ears be the judge of which CD player meticulously reproduces the integrity of the original performance. The CD

player that plays the numbers? Or our critically acclaimed Adcom GCD-575 which plays the music.

Please visit your Adcom dealer for a demonstration of this remarkable product. Or write us for our brochure. You will discover why it pays to play the music, not the numbers.

*\*Stereo Review, 12/89.*

# ADCOM<sup>®</sup>

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, Quebec H9R 4X5

©1991 ADCOM

**Oddly, the nearest we have come to literal recording was embodied in the old acoustic system.**

Oddly, the nearest we have ever come to literal recording for the great public was embodied in the old acoustic system, an enormous commercial success for long years. The voice of a Caruso was taken down, insofar as the acoustic horn could do it, in a total sonic vacuum akin to that of an anechoic chamber, just the voice, no acoustic trimmings. Discounted, of course, are both the extraneous noise and distortion and the very limited frequency range. You will find a lot about this in the recent and admirable two-part article in *Audio* on the restoration of older recordings (June, July 1991).

An acoustic "surround" sound was not possible but, curiously, even when it became so with the advent of the microphone and electronic amplification, we continued to record in a sonic semi-vacuum well into the early '30s. The *realism* we could achieve with added room sound was only gradually understood, as microphone techniques were developed in practice.

One other and very different sort of literal recording occurred much later with the spate of "live versus recorded" demonstrations put on at various hi-fi shows and press sessions, supposedly to prove that our hi-fi was perfect, i.e. literal. But these were not ever commercial recordings. They were specially made, deliberately *without spatial surround* in Caruso fashion, for a very strange effect. The musicians played either in an anechoic chamber

(a terrible chore for the players!) or, as in Edgar Villchur's first AR demos, in the middle of a large open meadow on a windless day. Definitely literal. All you heard was the actual music, entirely spaceless. (If you have been inside an anechoic chamber, you'll know the almost scary effect of disorientation when the spatial sense is missing.)

What? You don't understand? For a convincing and *literal* "live versus recorded" demonstration, the reproduced sound must take on the spatial qualities of the room in which both it and the comparative live musicians perform. No normal recording, made with "built-in" space, can ever resemble the living performance. There is always the double liveness, that of the recording and that of the playback acoustic, to make the recording "sound like a recording."

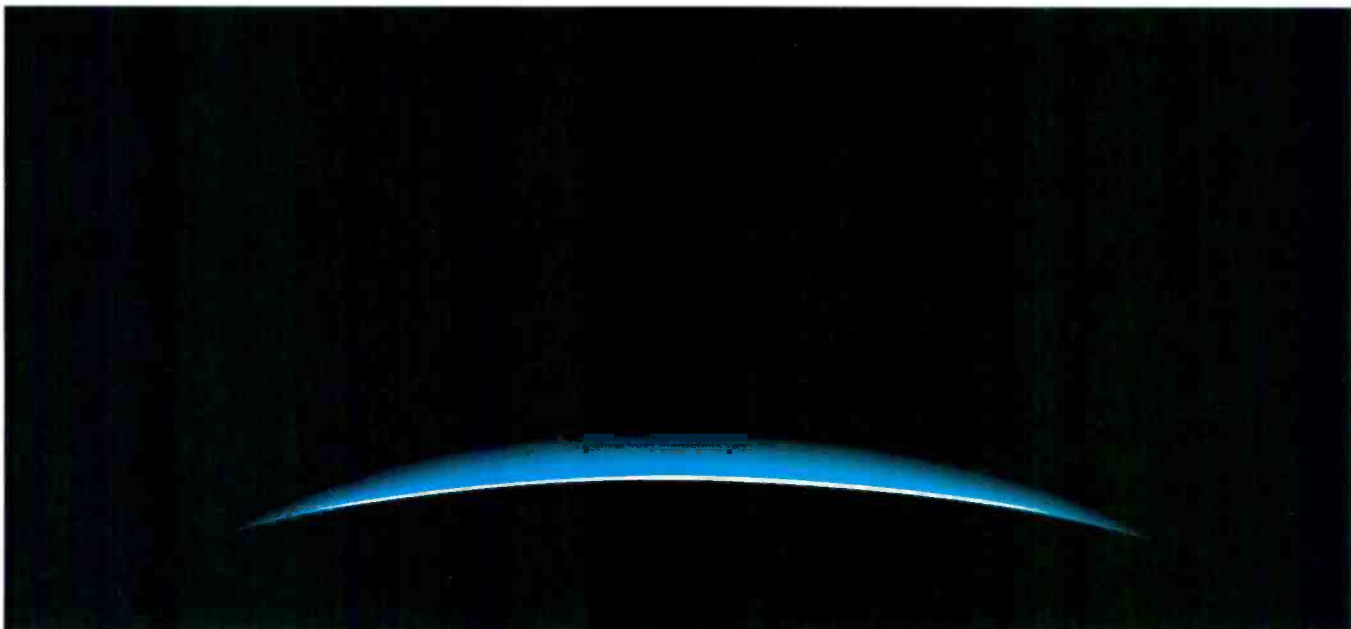
The Villchur comparisons proved the point. I was present at the outdoor recording (spraying noisy insects), and I attended the formal "live versus recorded" demos. When the canny musicians, a string quartet, "faked" one passage, bowing their instruments silently while the recording produced the music, I was completely taken in, though I thought I knew the cues. And when the players put down their instruments and stretched their muscles as the music went right on playing, there were oohs and ahs. It worked! We had dispensed with realism, for the moment, in favor of a truly literal reproduction. Interesting

but wholly impractical for general use. To those who got the message, this was a great moment of truth.

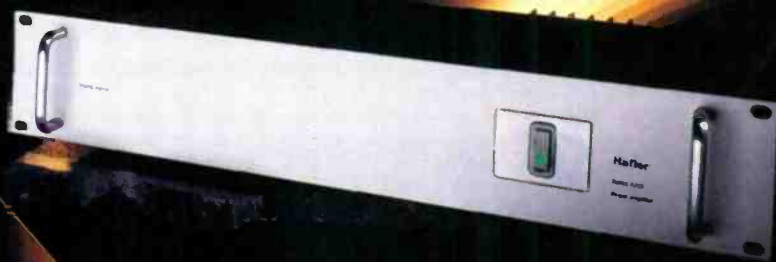
Does all this apply to binaural sound, specially recorded for headphones? Isn't that supposed to be a more literal approximation of real hearing experience? Be wary! Yes, in some respects, binaural can be startlingly literal. But still it is a realistic reproduction, not a literal reproduction.

As you may see, I am working ever so carefully towards the details of this binaural experience via the background picture, for it is all too easy to catch one's self in just another trap of literalness. Yes, there has been a lot of talk, experiment, and R & D in the binaural era of late, after years of semi-somnolence. And a major background survey has been offered in the recent and thorough technical articles printed in *Audio*. To these I can add nothing in the technical way, unless a bit of proportion and practicality. "What's in it for me?" That's the old question, though it can be put more delicately, I admit. Is all this incredibly complex and expensive scientific research likely to produce a viable true-binaural product, distinct from stereo? And is the "gear" that is being developed, not exactly low in cost, of a sort that can be used by those who want this kind of recording for their own interest?

We do seem to be working towards something, whatever it may be. A surprising number of big corporations



# CREATION OF A NEW GENERATION



## Hafler®

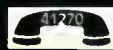
*"THE AFFORDABLE HIGH END"*

Hafler's passion for audio excellence unleashed the power of a **new** dimension of audio products. **The Series 9000.**

The uncompromising pursuit to maximize sonic performance has resulted in a line of audio products that rival the world's best hi-fidelity components - at very modest prices. The synergy that emerged from the combination of leading audio experts, and the highest quality circuitry (like the patented trans-nova circuitry) has empowered Hafler to offer a **new 7 year warranty.** Experience the Hafler difference. Call today for the dealer nearest you.

Hafler, a division of Rockford Corporation, Tempe, Arizona 85281 U.S.A. (602) 967-3565 In Canada, call Karbon Trading (416) 567-1920 In Europe, FAX (31) 1726-17864 In Pacific Asia (65) 335-0363

For More Information



Call 1-800-451-2248

Enter No. 14 on Reader Service Card

Some big corporations have set up expensive science labs that delve into intricate aspects of binaural hearing.

have set up expensive binaural R & D on the scale of a professional science lab, delving into the innermost intricacies of binaural hearing. But to what end?

There are really three separate groups involved in this. All of them have their one-track minds, intent on their own priorities. Are they ours? First, naturally, come the profit boys, looking for a nice simple new product that will pay, preferably in volume. Oddly, they are not much in evidence. Instead, the big binaural PR we get is dominated by the second group, the big-time research operations, ever more complex. Just read our articles and you will see what I mean. This may be PR of a sort but it's on a very high level of abstruseness—for PR, anyhow. This is strange, but perhaps canny. One is led to think that binaural has to be expensive, very expensive, if it is to be, er, hi-fi. Perhaps that is the message and the belief too. We say the same concerning speakers and amps. High-end gear is very much of a reality today and not exactly unprofitable. Binaural R & D would seem to be aiming at a market and distribution, both consumer and professional, that is not unlike other gear already familiar to us. Good but expensive! Okay, if it does not try to be too *literal*. There is decidedly that danger.

Take the dummy binaural head. You can sense the telltale literal approach that it implies. Do we all need such

heads between our mikes? They cost a lot. We are given the feeling that they are absolutely necessary. Are they? That is, for a satisfactory realism, not necessarily literal. Who needs to be literal? Who needs heads? At risk of my life I have to say it! Is the binaural dummy head like the well-known Emperor's clothes?


I have worked with four heads, counting my own (an excellent dummy—and free). I have also worked with two mikes and NO head between. These heads somehow move me to irresistible humor. I returned one with big eyebrows and false hair attached to the German staff in New York, much to the horror of the entire personnel. JVC's head of some years ago, foam-type, had a sculptured look and inset spaces for 'phones that included built-in mikes, a very useful idea, like the three-head (magnetic) tape recorder. That head still stands in my living room, complete with a big, black charcoal mustache, bushy eyebrows, and a gaucho hat on top. Sorry, but I just can't help it.

Seriously, I have made many dozens of binaural recordings with no head at all between the mikes and have always found them effective, in fact not really very different from those made with dummy heads. It's a matter of aesthetic priority, how important the differences are for the listener.

There are indeed curious distortions in the binaural space, within those

headphones. The biggest is the lack of front. Everything is heard to the sides, overhead, inside the 'phones, out back, but things that were in fact out front simply are not there where they belong. The dummy head, and a lot of special shaping of "ears" for the mikes, of canals and textures and much, much more, may indeed get some of that sound in front, where it ought to be. I have yet to hear it. Even big corporate research can do wishful thinking.

The third group, after the profit boys and the research labs, has been involved in personal binaural recording ever since it was possible, beginning some 40 years ago (when I began). These are the binaural lone wolves. Or semi-lone wolves. Small-time independents, often recording like myself for the sheer pleasure of it, sometimes even producing published binuaral material. I hate to say so but theirs are the best—perceptive recordings by people who listen for themselves and learn how to get the most for the least. I'll have a good deal more to say on this score at another time, with the kind indulgence of the leaders of the big binaural operations.

Meanwhile, try it out for yourself. It's really quite easy with any little handful of stereo recording machinery and two mikes 7 inches apart. Or even pinned to your hat. Play back ONLY through headphones, not loudspeakers. That's true binaural. 

# Tools of the trade. Remastered.



Enter No. 20 on Reader Service Card

## Listening in the 90's

Today people have become more and more space conscious. Many apartment dwellers don't want to give up valuable floor space for large speaker systems. Others who are planning a surround sound or home theatre system simply don't have the room for more speakers in their listening rooms or hesitate to commit the floor or wall space to a good sounding pair of speakers.

Until now, serious music lovers have had little, if anything, to choose from that would produce a large, bigger-than-life sound in a small, compact size. Systems that fit one's space requirements have been woefully disappointing in sound quality.

### The RM 3000 Three Piece System

Polk's engineers had determined long ago that there were indeed certain technical advantages in

sonic performance.

The small satellites can be located on shelves, mounted on a wall or placed on their own floor stands. They are very attractive and yet small enough to be hidden from view if desired.

The RM 3000 subwoofer is also small enough to sit behind your furniture and can be used on its side to fit into tight spaces. And since it is beautifully finished, it can be used as a piece of furniture.

### The Legendary Sound of Polk

In the tradition of Polk Audio, Matthew Polk and his team of engineers were determined to make the RM 3000 sound better than any other speaker of its type.

Initial reactions have been filled with superlatives including Julian Hirsch of

*Stereo Review* magazine who says, "...they sound excellent...spectral balance was excellent—smooth and seamless."



*The RM 3000's satellites measure 7"H x 4 1/4"W x 5 3/8"D and are available in black matrix, gloss black piano or paintable white. The subwoofer is 12 1/2"H x 20"W x 12 1/2"D and is available with black wood grain sides and a black, mar-resistant top.*

## Sound as big as life from speakers

small speaker systems. Both high and mid frequencies could be faithfully reproduced with superior transient response and dispersion characteristics, and the convenient, more flexible placement of small enclosures within the listening area could create an ideal sound stage. Unfortunately, reproducing the life-like, full body of the lower frequencies could not be achieved in a truly compact enclosure.

Polk's RM 3000 replaces the traditional pair of speakers with three elements, two compact midrange/tweeter satellites and one low frequency subwoofer system. This configuration makes it easy to properly and inconspicuously place the system within your listening room while offering superior

Behind these accolades is an impressive technical story.

### The Technical Side

The big sound of the RM 3000 is due, in part, to the unique arrangement of the tweeter and midrange elements. This "time aligned system" delivers the high and mid frequencies at precisely the same instant. The result is a clear, lifelike and expansive presentation.

The cabinet materials selected for the satellites are over four times as dense as typical enclosures. The black matrix finish is a non-resonant polymer aggregate (FOUNTAINHEAD®). The gloss black piano and paintable white finishes are rigid ABS



Polk's RM 3000 Two Piece Speaker System  
*fits into today's home decor.*

## small enough to live with.

surrounding a mineral filled polypropylene inner cabinet. Polk engineers have all but eliminated any "singing" or resonating of the satellite enclosure. You hear the effortless, free sound of a much larger system.

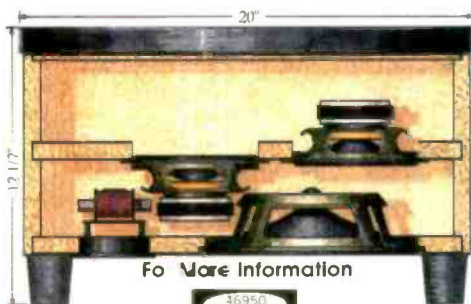
Most subwoofer systems look alike on the outside, but the Polk is worlds apart on the inside. Utilizing twin 6 1/2" drivers coupled to a 10 inch sub-bass

radiator, the bass is tight and well defined. There is no tuned port to create "whistling" or "boominess" of the bass frequencies.

### You Have To Hear It To Believe It

You really won't believe how good the RM 3000 sounds until you hear it. We invite you to your nearest authorized Polk dealer for a demonstration. You'll hear sound as big as life...from a speaker you can live with.

You'll hear the next generation of loudspeakers.



For More Information

Call 1-800-992-2520

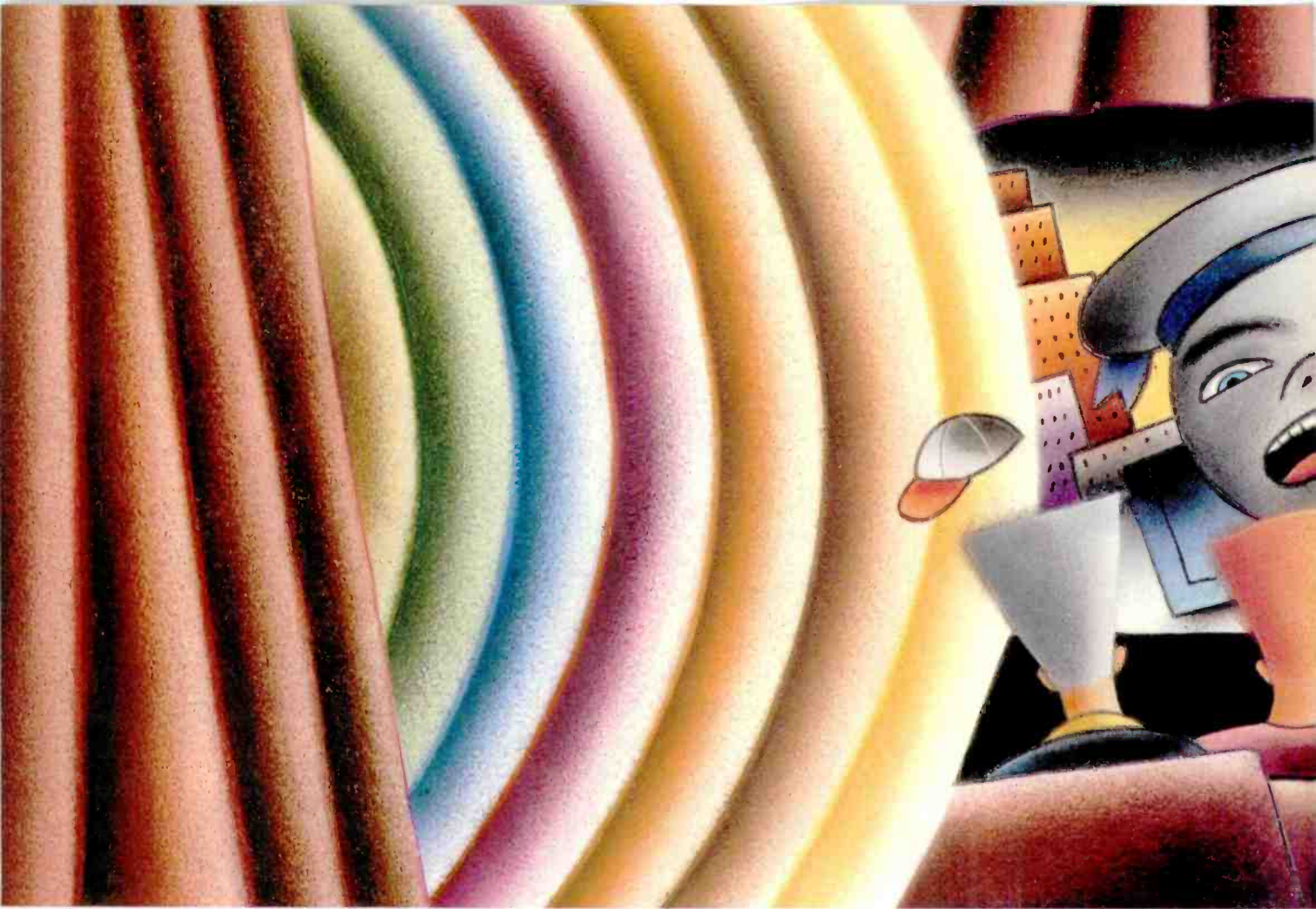
*For deep, well defined bass, Polk uses twin drivers coupled to a sub-bass radiator. Normally, one subwoofer system is used for both channels. For those desiring even greater low frequency performance, a second subwoofer can be added, one fed by the left channel, the other by the right channel.*

# polkaudio

The Speaker Specialist®

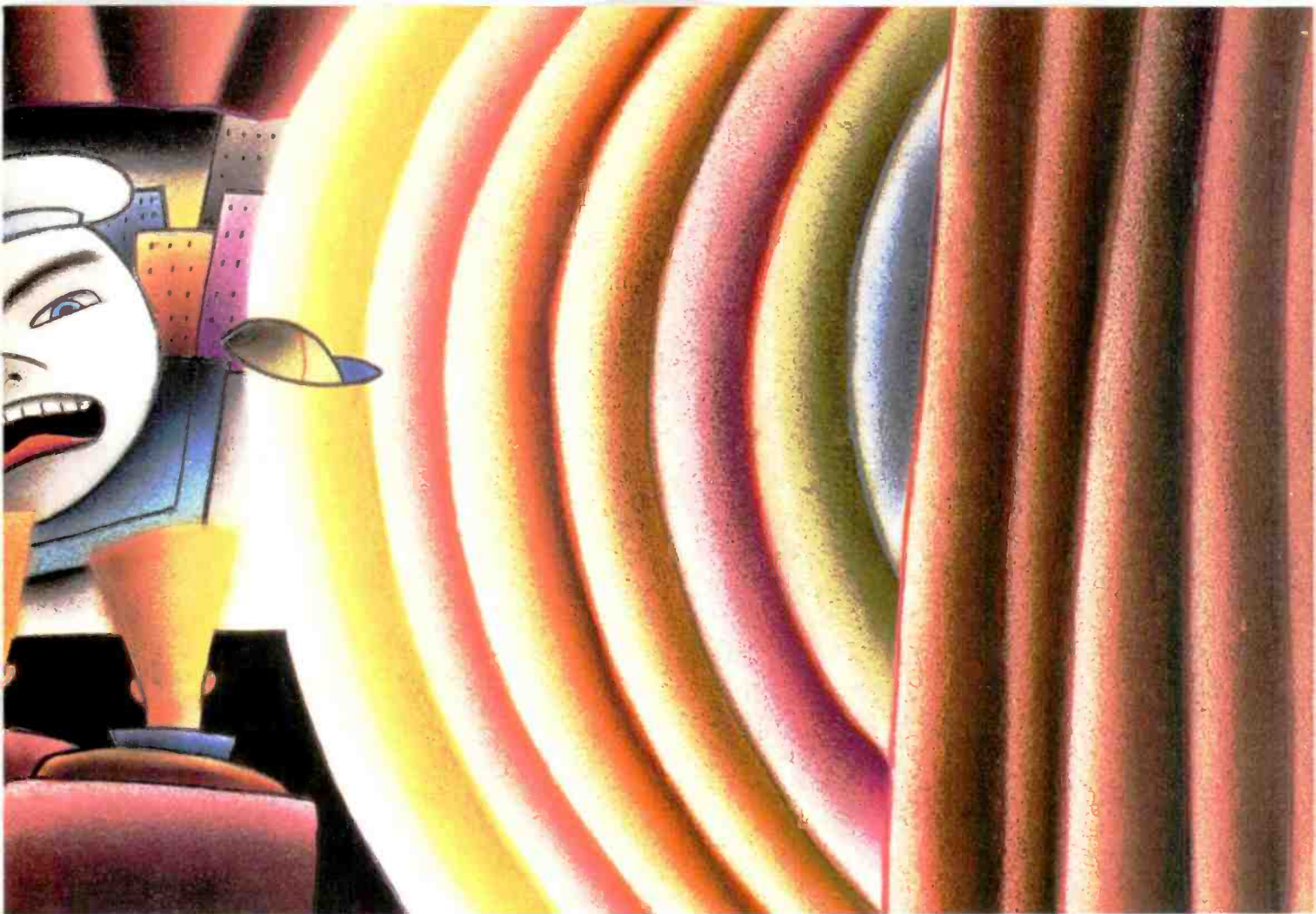
5601 Metro Drive, Baltimore, MD 21215 (301)358-3600

Enter No. 27 on Reader Service Card



**ACOUSTIC**  
S O U N D  
**WAVE CANNON**  
F O R  
**FROM BOSE**  
C I N E M A





Contemporary movie soundtracks often pack a tremendous wallop in the octave between 25 and 50 Hz. Because of speaker limitations and the extremely small amount of ordinary music that contains significant energy at such low frequencies, home playback systems are seldom capable of much output in that band. A well-equipped motion picture theater, on the other hand, can reproduce every growl, rumble, and explosion. The Bose Cinema Sound System uses Bose's Acoustic Wave technology to meet the extraordinary sonic demands of today's films with loudspeakers that are smaller, more versatile, and easier to install than conventional designs.

The current method of recording sound optically on 35-mm motion picture film dates from the 1920s. Although there have been major improvements over the decades in film emulsions, and in

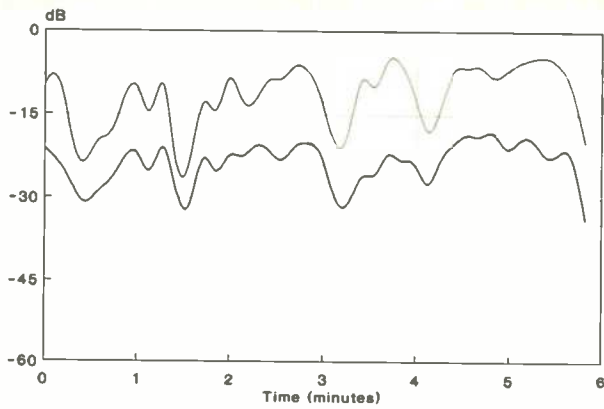
*William R. Short is Principal Engineer of the research staff of Bose Corp., Framingham, Mass.*

## WILLIAM R. SHORT

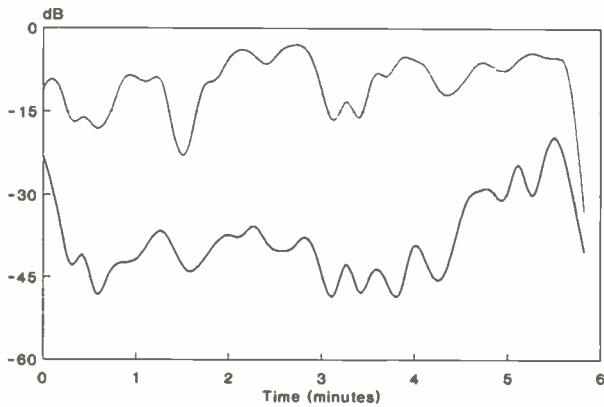
The subwoofer in a movie theater must reproduce a prodigious 100 dB SPL throughout the range from 30 to 60 Hz.

practices and standards, the performance of a mono optical track is somewhat limited. A major improvement was made in the 1970s by the introduction of the Dolby Stereo system to the cinema.

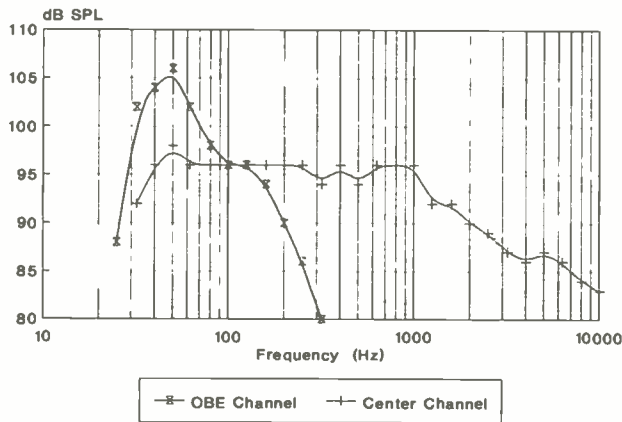
The Dolby Stereo system is more than the familiar noise-reduction system applied to film. There is room for only two discrete soundtrack channels on 35-mm film. The Dolby cinema processor reads these two tracks off the film and applies Dolby A-type noise reduction. (Currently, Dolby SR noise reduction is being used more and more, instead of A-type, which provides further performance advantages.) The two tracks feed a decoder to generate the four channels which are reproduced in the theater. (The left, center, and right speakers are placed behind the screen, while the surround channel is reproduced by many speakers on the side and rear walls.) In addition, the two tracks feed an optical bass-enhancement (OBE) circuit which cleans up the bass signal and sends it to a separate subwoofer output.



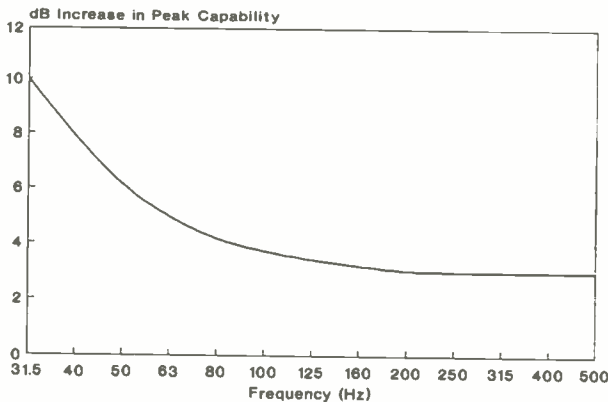
**Fig. 1**—Program level (top) and low-frequency noise level (bottom) for a clip from the 35-mm release print of *Amadeus*.



**Fig. 2**—Same as Fig. 1 but film clip is from videodisc.



**Fig. 3**—Peak level requirements for center and subwoofer channels, as measured from eleven Dolby Stereo 35-mm films.



**Fig. 4**—Additional peak level capability of films using Dolby SR noise reduction as compared to those using Dolby A NR.

Finally, room equalization is provided on all four main channels and on the bass channel.

Most of this processing is familiar to audio enthusiasts. For example, the two-to-four-channel matrix is now widely used in home theater systems to generate the surround channel from home video releases, which frequently use the same two-channel mix as exists on 35-mm film. The one unusual processing step is the OBE circuit. Before describing how it works to clean up the low frequencies on film, let's look at why it is needed.

#### Low-Frequency Noise on Film

Optical soundtracks on film can suffer from several sources of signal degradation. Many of these degradations result in the generation of low-frequency noise and distortion components.

Optical soundtracks inherently have cross-modulation distortion. This type of distortion results from nonlinearities in the film process and causes distortion products whose frequencies are the sum and difference of frequencies in the original audio source material. The exposure and processing of both the original sound negative and of the release print are carefully controlled to minimize cross-modulation distortion at one frequency. However, a paper presented recently shows that optimizing the distortion at one frequency does not necessarily minimize it at all frequencies [1]. Cross-modulation from mid- and high-frequency components can result in distortion products being created at low frequencies. As the level and content of the recorded audio change, the level of the low-frequency distortion products changes as well.

Low-frequency noise can also be generated by the single-ended noise-reduction system that is universally used while recording the original sound negative. This system takes advantage of the fact that opaque film is quieter than clear film. During recording, the d.c. level of the audio is dynamically shifted so as to minimize the amount of clear area on the film soundtrack. Unless carefully designed, this d.c. shift can cause low-frequency noise to be generated.

Additional low-frequency noise can result from uneven processing steps in the film laboratory making the release print. Any streaking or other unevenness in the soundtrack area can result in low-frequency noise.

# ACOUSTIC WAVE CANNON

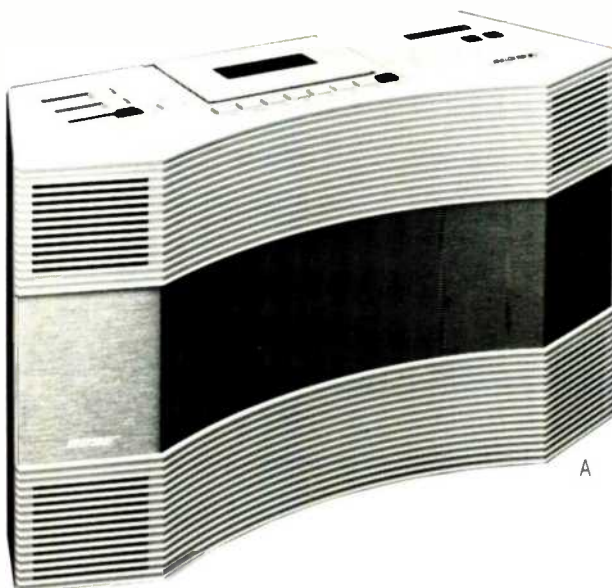
## SOUND FOR CINEMA

In order to show the presence of these types of low-frequency noise, I measured the signal content of an optical soundtrack in a low-frequency band and compared it to the signal content in the mid- and high-frequency portion of the audio band. I used the "Don Giovanni" section of the film *Amadeus* because this clip contains wide-range music with some dialog over the music. Since music contains very little energy below 40 Hz, any significant low-frequency energy in this clip is likely to be due to noise and distortion products. The only effects which might contribute to low-frequency energy occur at the very beginning and end of the clip.

At regular intervals, I sampled the energy level in a low-frequency band, below the frequencies normally present in music, and in a band containing most of the musical energy. The low-frequency band covered the third-octaves from 20 to 32 Hz; the mid- and high-frequency band covered the third-octaves from 160 Hz to 5 kHz. The two bands were sampled simultaneously over the six-minute duration of the film clip. I measured this level for the two tracks on the 35-mm Dolby Stereo release print of the movie. The measured energy level in the two bands is shown in Fig. 1. The low-frequency energy is shown in the lower curve, while the mid- and high-frequency energy is seen in the upper curve. The curves show that the level of low-frequency noise is significant and that its level follows that of the mids and highs closely.

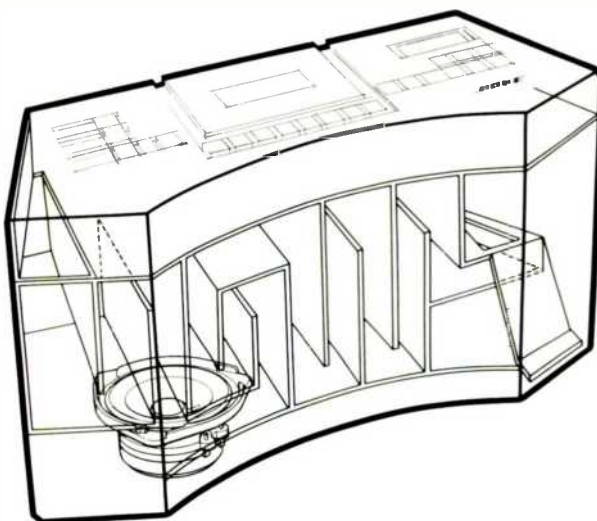
To verify that this low-frequency noise is due to the optical sound process, I made the same test on the same portion of *Amadeus* using the digital audio tracks of a videodisc version of this film (Fig. 2). Whatever low-frequency signal is present on the videodisc is at a much lower and less correlated level.

These measurements show substantial low-frequency noise is present in the 35-mm release print. Low-frequency noise and distortion are especially objectionable since there is rarely any program material at sufficiently low frequencies to allow the psychoacoustic phenomenon of masking to make the noise inaudible. Low-frequency noise is especially undesirable because it is very disturbing, rather than simply annoying. So a system which simply reads the low frequencies off the film



A

Fig. 5 - Exterior (A) and cutaway view (B) of Bose's Acoustic Wave Music System.



B

and reproduces them is unacceptable, as it will also reproduce low-frequency noise and distortion which will be quite audible and objectionable to members of the audience.

### The OBE Solution

The optical bass-enhancement circuit reduces the audibility of the low-frequency noise through the use of a single-ended, downward-expansion system for noise reduction. Very simply, when the bass level recovered off the film is low, the OBE circuit assumes that it is primarily noise and reduces its level further. Bass energy at moderate and high levels is allowed to pass unaltered. About 10 dB of noise reduction is possible.

The low-frequency noise that can be heard on 35-mm movie release prints is absent from videodiscs of the same films.



**Fig. 6**—Bose's Acoustic Wave Cannon, shown with two Bose 802-II theater speakers and the system's active EQ and crossover. The Cannon's barrel is 12 feet long.



**Fig. 7**—The Acoustic Wave Cannon's internal construction.

Since the optical film sound system doesn't have any inherent limit to low-frequency reproduction, the use of the OBE circuit allows optical film sound systems to record and reproduce deep bass with an acceptable level of low-frequency noise.

#### The Use of Bass in Film

Film sound consists of three elements: Music, dialog, and effects. It's usually the effects that provide the deep bass energy. One type of deep bass effect is meant to be subtle: Low levels of continuous, deep bass energy can be used to help create a sense

of fear or danger in the audience. The other deep bass effect is not so subtle: Explosions, spaceships, and similar effects can literally shake the room in a well-equipped theater.

These sorts of effects simply are not present in typical music. Except for pipe organs or synthesizers, there is rarely acoustic energy below 40 Hz in music [2]. Modern recordings having deep bass energy usually have it because of the addition of sound effects to the music.

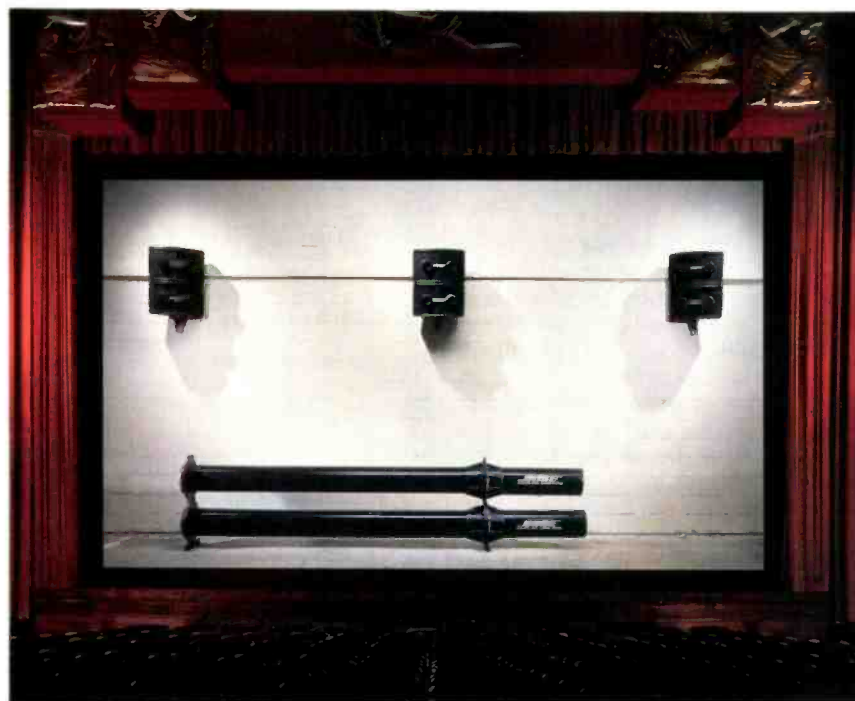
When we began designing the Bose Cinema Sound System, we needed to determine typical spectra present in

film soundtracks. Such studies have been done several times in the past few decades for music recordings. One study that had been done in the field of cinema sound involved measuring the peak sound pressure levels in third-octave bands in the theater as the film played. Such a study doesn't tell us all we need to know. The amplifiers and speakers in the theater were assumed to be fully capable of reproducing the peaks on the film. However, if a power amplifier clipped momentarily on a peak, or if a speaker began to reach its range of nonlinear operation during the measurement, the actual peak level on the film would not be reproduced in the theater and thus would not be measured there.

Thus, in order to determine the requirements for a cinema speaker, we had to measure the optical tracks on release prints of typical films. The Dolby cinema system has specific requirements for playback level. A given level on the film is played back at a specific sound pressure level in the theater when the Dolby Stereo processor is set up to Dolby specifications. So, by measuring the peak level in each third-octave band on the film, we could calculate what sound pressure level would be needed to reproduce that sound in the theater. In this manner, we found the peak levels needed in each third-octave band to reproduce these films in a theater.

We examined 11 films in release at the time the experiment was performed, in the mid-1980s. The films ranged from *Return of the Jedi* and *Ghostbusters* to *Gandhi* and *Passage to India*. A third-octave real-time analyzer was used to find the peak level on 35-mm Dolby Stereo release prints in each third-octave band for the center channel and for the subwoofer OBE channel. By making additional measurements on the Dolby cinema processor and by using Dolby specifications for playback levels in the theater,

**Fig. 8**—Typical behind-the-screen installation of Bose's Cinema Sound System, showing the Acoustic Wave Cannon and three Model 802s.

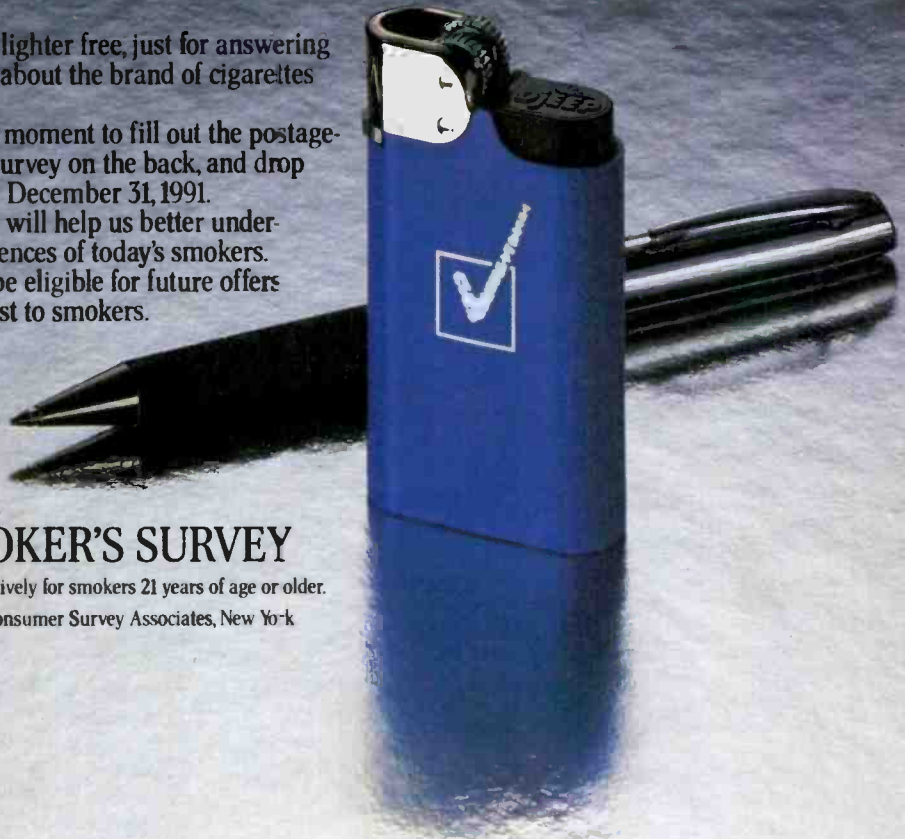


# Smokers, here's a free offer worth checking out.

Get this butane lighter free, just for answering a few questions about the brand of cigarettes you smoke.

Please take a moment to fill out the postage-paid Smoker's Survey on the back, and drop it in the mail by December 31, 1991.

Your answers will help us better understand the preferences of today's smokers. And you could be eligible for future offers of special interest to smokers.



## SMOKER'S SURVEY

Survey exclusively for smokers 21 years of age or older.

© 1991 Consumer Survey Associates, New York



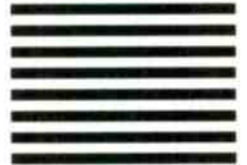
### BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 9116 MARYLAND HTS, MO

POSTAGE WILL BE PAID BY ADDRESSEE

Consumer Survey Associates  
P.O. Box 2515  
Maryland Heights, MO 63043-9872

NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



# Get a free lighter, just for answering this Smoker's Survey.

**For Smokers Only.** Please complete the following information about yourself, fold, seal and mail by December 31, 1991. To receive your free lighter, be sure to sign where indicated.

**Thank you.**



MGVM

Mr.  
 Ms. \_\_\_\_\_  
 Mrs. \_\_\_\_\_

First M.I. Last  
 Address \_\_\_\_\_ Apt. # \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ Birthdate \_\_\_\_/\_\_\_\_/\_\_\_\_  Male  Female  
 Month Day Year

By responding to the following survey and signing below, I certify that I am a cigarette smoker 21 years of age or older. I am also willing to receive free samples of cigarettes and incentive items in the mail, subject to applicable state and federal law.

Signature (required) \_\_\_\_\_

1. What is your regular brand of cigarettes—that is, the brand you smoke most often?

\_\_\_\_\_  
 (full brand name)

2. How long have you smoked this brand?

Less than 1 year  2 to 3 yrs.  Over  
 1 to 2 yrs.  3 to 5 yrs.  5 yrs.

3. Is your regular brand...?

a.  Filter or  Non-Filter  
 b.  Menthol or  Non-Menthol  
 c.  Regular/King Size,  100's or  120's

4. Are any of these words on your pack?

(Check one.)  
 Medium  
 Lights/Low Tar/Milds  
 Ultra/Ultra Lights/Ultra Low Tar  
 Extra Milds/Extra Lights  
 None of these words are on my pack.

5. Do you usually buy it by the...?

Pack  Carton  Both Ways

6. What, if any, was your previous brand?

\_\_\_\_\_  
 (full brand name)

7. The next time you go to the store, if your regular brand were not available, what would you do? (Check one.)

Go to another store to buy my regular brand.  
 Buy another type or length of my regular brand.  
 Wait until the store has my regular brand.  
 Buy a different brand entirely.

8. Out of the last 10 times you bought cigarettes, how many times did you use money-off coupons?

None  3 to 6 times  
 1 to 2 times  7 or more times

9. If your regular brand were not available, which of the following brands would you consider buying? (Check all that apply.)

Alpine  Merit  
 Benson & Hedges  More  
 Bristol  Newport  
 Bucks  Parliament  
 Cambridge  Pyramid  
 Camel  Salem  
 Capri  Saratoga  
 Carlton  Store/Generic  
 Doral  Superslims  
 Kent  Vantage  
 Kool  Viceroy  
 Marlboro  Virginia Slims  
 Other \_\_\_\_\_  
 (full brand name)

10. How many packs of cigarettes did you smoke in the past month?

(Note: 1 carton = 10 packs)  
 Total # Packs \_\_\_\_\_

11. Of these total packs, how many were your regular brand and how many were other brands?

Regular Brand # Packs \_\_\_\_\_  
 Other \_\_\_\_\_ # Packs \_\_\_\_\_  
 (full brand name)  
 Other \_\_\_\_\_ # Packs \_\_\_\_\_  
 Other \_\_\_\_\_ # Packs \_\_\_\_\_

12. Where do you usually buy your cigarettes? (Check one.)

Supermarket  
 Grocery  
 Convenience/Gas  
 Drug Store/Pharmacy  
 Other

13. Which of the following do you enjoy on a regular basis? (Check all that apply.)

Dining out  Attend auto racing  
 Read books  Movies  
 Fashion/clothing  Do home repair/decoration  
 Travel  Gardening/plants  
 Gourmet cooking/fine foods  Work on car  
 Personal computers  Entertain at home  
 Photography  Attend cultural/arts events  
 Spectator sports  Tennis  
 Go to plays/concerts  Bowling  Fishing  
 Golf  Go to bars/nightclubs  
 Puzzles

**Free Lighter Offer** good until 12/31/91, or while supplies last. Please allow 6 to 8 weeks for delivery. Only manufacturer's warranty applies. Not responsible for lost, late, misdirected, mutilated or postage-due mail. Offer good only in U.S.A. Consumer Survey Associates lighter offers are limited to one per person regardless of the number of surveys completed. Void where otherwise prohibited, taxed or licensed. Offer limited to smokers 21 years of age or older.

63274

# ACOUSTIC WAVE CANNON

## SOUND FOR CINEMA

we calculated the peak sound pressure level required to play these films.

The results are shown in Fig. 3. The center-channel amplifier and loudspeaker must be able to produce peaks of 96 dB SPL in each third-octave band from 40 Hz up to 1 kHz, with a gradual roll-off at either end of the spectrum. However, the subwoofer amplifier and speaker must be able to produce over 100 dB SPL in each third-octave band between 30 and 60 Hz. This is a prodigious amount of low-frequency energy.

If we were to make similar measurements on newer films, I suspect that we would find even higher peak levels. All of the films in our original study

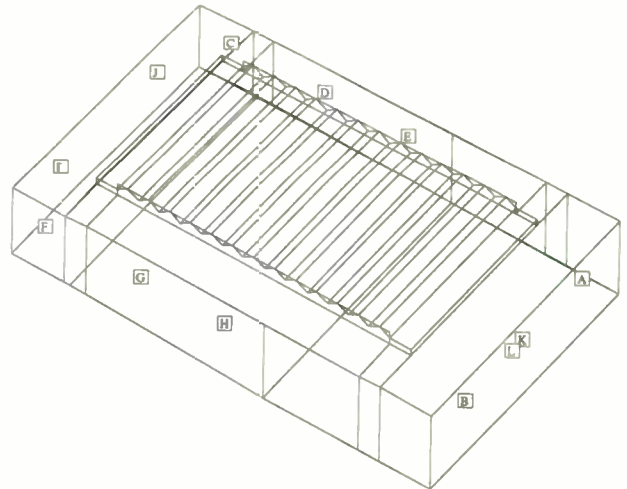
Bose's Modeler computer software can predict sound levels throughout a theater for a given amp power and speaker placement.

were encoded with Dolby A-type noise reduction. As mentioned, an increasing number of current films are using Dolby SR noise reduction. According to information published by Dolby Laboratories [3], Dolby SR allows substantially higher peak levels at the extreme low end of the spectrum, as shown in Fig. 4. It's likely that this greater peak level capability is used by sound mixers and designers, and this places even greater demands on low-frequency loudspeakers.

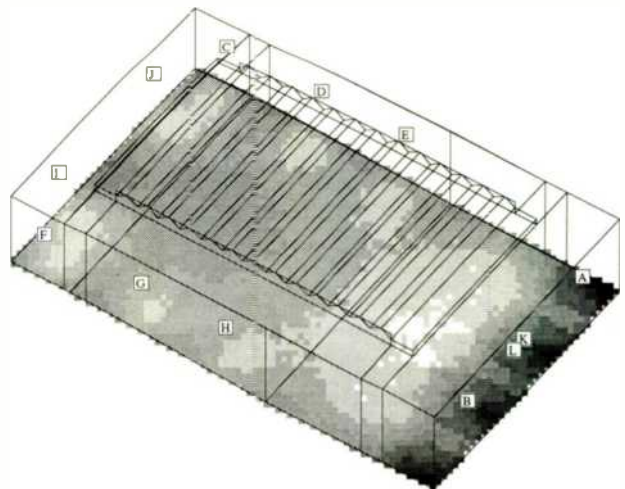
### Bass Reproducers

Knowing the enormous demands placed on bass speakers in the cinema, how do we meet those demands? In order to generate high sound pressure levels at low frequencies, it is necessary to move a lot of air. The most common approach is to use a ported enclosure. The work of Thiele and Small has made the design of such enclosures much more straightforward than it once was. Such boxes end up being large, with large speaker cones, in order to generate the needed sound pressure level.

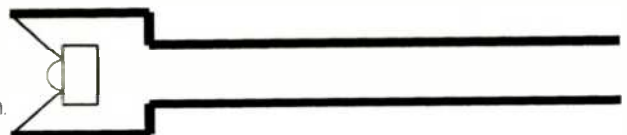
**Fig. 9**—Wire-frame model of typical movie theater, produced with Bose Modeler software. Letters A, K, and B indicate the location of left, center, and right Bose 802 loudspeakers; L indicates the location of the Acoustic Wave Cannon, and C through J show locations of the surround-channel Bose Model 102 speakers.

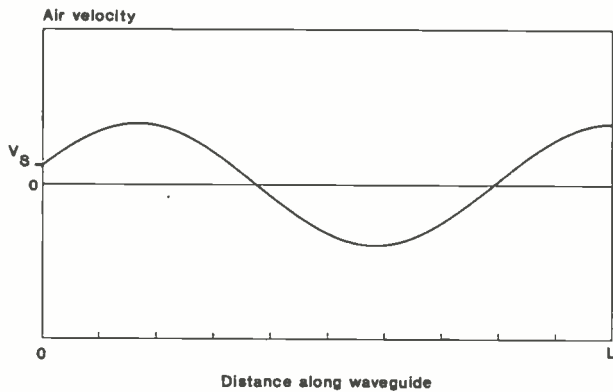


**Fig. 10**—Prediction by Modeler software of SPL in theater's seating area, for the 1-kHz octave band with 1 watt fed to each loudspeaker.

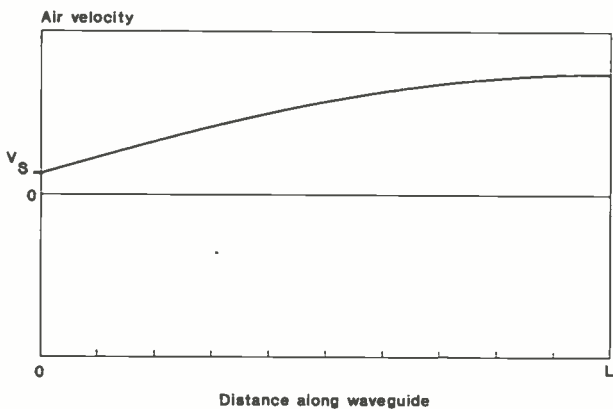


**Fig. 11**—A single-sided Bose Acoustic Waveguide system's internal construction.

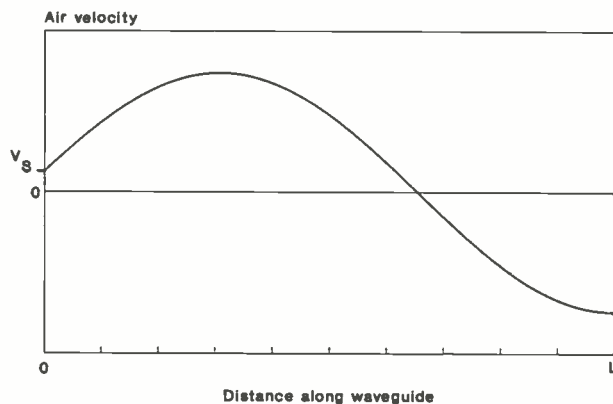




**Fig. 12**—Typical velocity standing-wave envelope.



**Fig. 13**—Velocity standing-wave envelope for the frequency at which the waveguide's length is slightly less than  $\frac{1}{4}$  wavelength.



**Fig. 14**—Same as Fig. 13 but waveguide is slightly less than  $\frac{3}{4}$  wavelength.

Another approach is to use horn-loaded loudspeakers. Horns can have high efficiency, which is one reason why they have traditionally been used in cinemas. However, a simple calculation shows that, in order to reproduce down to 25 Hz, the mouth of the horn must cover 150 square feet; this results in an impractically large structure.

At Bose, we chose to use our Acoustic Waveguide technology to make a bass speaker for cinema applications. This technology allows us to make an efficient bass loudspeaker in a small volume, allowing for a wide variety of installations. The Acoustic Waveguide

principle was invented by Amar Bose and me in the early 1980s. Because of my frustration with existing subwoofers while installing Dolby cinema processors in the late 1970s, one of the first Acoustic Waveguide speaker prototypes I built was a subwoofer for cinema applications.

The first commercial product to use the Acoustic Waveguide technology was the Bose Acoustic Wave Music System, introduced in 1984. This unit, shown in Fig. 5, is an all-in-one system consisting of an AM/FM tuner, a cassette deck, amplifiers, and speakers using the Acoustic Waveguide princi-

ple. The waveguide is folded, allowing its nearly 7-foot length to fit within the cabinet. Despite the system's small size, Acoustic Waveguide technology allows it to have solid, efficient bass performance down to 50 Hz.

The Acoustic Waveguide technology was applied to cinema with the introduction of the Acoustic Wave Cannon, designed by Ken Jacob at Bose, in 1987 (Fig. 6). It consists of a single 12-inch woofer captured between two Acoustic Waveguides totalling 150 inches in length (Fig. 7). Hardware built into the waveguide allows multiple units to be stacked in large installations, and allows the stack to be suspended or wall-mounted if needed.

The complete Bose Cinema System consists of Acoustic Wave Cannons for bass reproduction, Bose 802 speakers behind the screen for the mid and high frequencies, and Bose 102 speakers for the surround channel. A typical behind-screen installation is shown in Fig. 8. An active equalizer and crossover are used. Bose Modeler design software allows designers to predict accurately the audience coverage of the system, the placement and required number of speakers, and the required amplifier power. The designer begins by creating in the computer a "wire-frame" model of the theater, as shown in Fig. 9, and specifying dimensions and materials. Using the model, speakers are placed and aimed, and the resulting sound field is predicted (Fig. 10).

#### Acoustic Wave Technology

How is it possible to create the high sound pressure levels at bass frequencies that films demand, using a speaker as small as the Cannon? The answer lies in Acoustic Wave technology. It permits a relatively small loudspeaker to produce large amounts of low-frequency energy.

The Acoustic Waveguide matches the motion of the loudspeaker cone with the motion of the air more efficiently than can be done by the speaker alone. Its operation is not unlike a lever. If you need to move a stone too heavy for you to lift unaided, you might use a lever to move it. The lever matches your available force and range of motion to a force and motion more suitable for moving the stone. Similarly, a loudspeaker cone is not ideally suited for moving air. Typical loudspeaker technologies have efficiencies of un-



# ACOUSTIC WAVE CANNON

## SOUND FOR CINEMA

der 1%. An Acoustic Waveguide allows for a sensitivity improvement of 6 dB or more.

Acoustic matching devices are not uncommon. A flute or an organ pipe is a matching device. A relatively small breath of air at one end of a flute can create a note loud enough to fill a concert hall. This is possible due to the matching action of the flute. However, a flute or organ pipe matches only one frequency (and its harmonics) at a time. In order to apply this principle to a loudspeaker, we need to be able to make the matching occur over a wide range of frequencies simultaneously.

We can achieve this goal with Acoustic Wave technology, but the details are complex. However, it is possible to get a sense of how Acoustic Wave technology works without having to use a lot of mathematics, by using some explanations and diagrams. First, we'll look at a one-sided Acoustic Waveguide (Fig. 11) before looking at the two-sided Acoustic Waveguide that is used in the Acoustic Wave Cannon. In a one-sided Acoustic Waveguide, one side of the loudspeaker diaphragm is coupled to the waveguide, while the other side radiates into the listening area.

The Acoustic Waveguide can be modelled as an acoustic transmission line. In the case of an Acoustic Waveguide speaker, one end of the transmission line is coupled to the speaker, which we will crudely model as a velocity source at first, and the other end is open to the air. The velocity source launches velocity waves into the waveguide.

Because the acoustical impedance of the waveguide's open end is a poor match for that of the room, velocity waves launched by the speaker in the waveguide are reflected at the open end, setting up standing waves inside the waveguide. Putting it simply, the boundary conditions are that the air-particle velocity at the speaker end of the waveguide must match the velocity of the speaker diaphragm and that the incremental air pressure at the open end of the waveguide must equal zero. The latter condition means that there is no sudden change in air pressure from just inside the open end of the waveguide to just outside it.

At a given point along the waveguide, the air velocity varies sinusoidally in time, with a frequency equal to the driving frequency of the source

## Bose Cinema Sound Installations

### UNITED STATES

#### Arkansas

Fayetteville: Malco Twin  
Jonesboro: Malco's Cinema 10  
Little Rock: UA Park Plaza 7

#### Illinois

Champaign: Country Fair Cinema

#### Ohio

Alliance: Carnation Mall Cinema  
Bowling Green: Woodland Cinema  
Chillicothe: The Movies at Shawnee Square  
Piqua: Miami Valley Cinema

#### Michigan

Bay City: Westtown Theater

#### Oregon

Portland: Moyer Theaters

#### Tennessee

Union City: Hollywood Theaters

### Virginia

Christiansburg: RC Theaters/New River Valley Mall

### OVERSEAS

#### Australia

Brisbane: Hawthorne Twin Cinemas  
Sydney: Bondi Junction Mall

#### China

Jia Shincity: Jia Shan Movie Theatre

#### Germany

Buckeburg: Residenz-Kino  
Wuppertal: City-Kino

#### Japan

Tokyo: Cine Saison

#### South Korea

Seoul: Seoul Cinema Town

#### Switzerland

Lausanne: Open Air Cinema  
Lugano: Open Air Cinema  
Zurich: Open Air Cinema

and with a particular magnitude. The magnitude depends on the boundary conditions and on the length of the tube relative to the wavelength of sound for the source frequency. If the magnitude is plotted along the length of the waveguide, we can see the envelope of the velocity standing wave. Figure 12 shows one possible standing wave envelope. Distance along the waveguide is plotted horizontally, with the source located at 0 and the open end at L. The velocity magnitude is plotted vertically; the velocity of the source is indicated by  $V_s$ .

Note that a fundamental difference exists between Acoustic Wave technology and the more familiar transmission line or labyrinth speaker systems. Typical transmission line speakers use absorptive material or other acoustic resistances to damp out standing waves. In such systems, standing waves are undesirable, and so designers of such systems try to prevent their formation. In Acoustic Wave speakers, though, the standing waves are an essential part of the system's operation. As we will see, the standing waves permit the sensitivity increase that is one of the major benefits of the Acoustic Wave technology. Thus, in designing an Acoustic Wave system, we do everything possible to maximize the generation of standing waves.

If we solve the wave equation in the waveguide for a range of frequencies, we find there are several key frequencies. At frequencies where the length of the waveguide is an odd multiple of one-quarter wavelength (such as  $\frac{1}{4}$ ,  $\frac{3}{4}$ ,  $\frac{5}{4}$ , etc.), the air velocity at the open end of the waveguide is very much larger than that of the source. This con-

The Acoustic Wave Cannon has been designed to deliver large amounts of energy from one 12-inch woofer in a 12-foot pipe.

dition is shown in Figs. 13 and 14. Virtually all of the acoustical energy is radiated from the open end. Since the air velocity at the open end is greater than the velocity of the speaker cone, the energy radiated by the waveguide system is very much greater than the speaker could produce alone.

At frequencies where the length of the waveguide is an even multiple of one-quarter wavelength (such as  $\frac{1}{2}$ , 1,

# ACOUSTIC WAVE CANNON

## SOUND FOR CINEMA

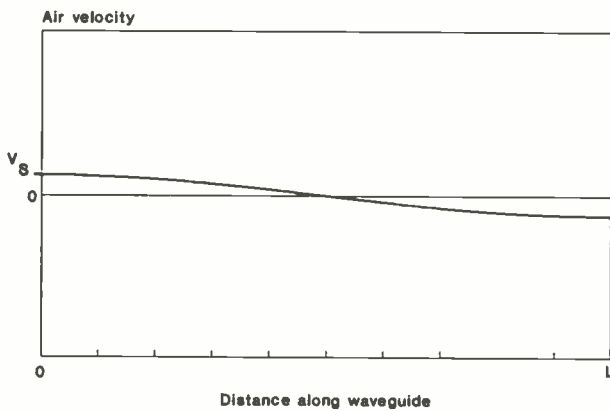
$3/2$ , 2, etc.), the air velocity at the open end of the waveguide is the same as that of the source. For some of these frequencies, where the waveguide is an odd multiple of one-half wavelength ( $1/2$ ,  $3/2$ , etc.), the air velocity at the open end of the waveguide is the same as the source's but with the op-

posite polarity. This case is shown in Fig. 15. Since the source for the waveguide is the rear of the speaker cone, which has the opposite polarity from the front of the cone, the front of the cone and the open end of the waveguide have the same air velocity and polarity. They add in phase, resulting

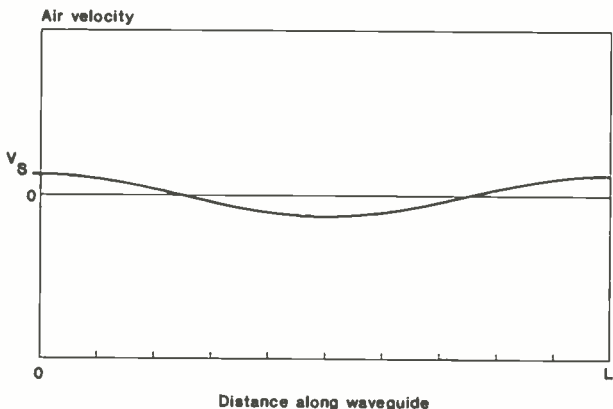
in a doubling, or 6-dB increase, in acoustic output compared to the same speaker in an infinite baffle.

Problems occur when the waveguide length is a multiple of 1 wavelength, shown in Fig. 16. Here, the air velocities at the front of the speaker and at the open end of the waveguide are the same but with opposite polarities. The system acts like an acoustic dipole and has little acoustic output.

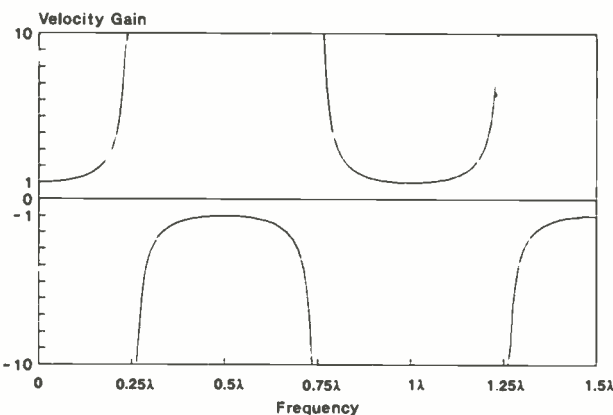
So the waveguide provides both a velocity gain and a polarity reversal that is periodic with frequency. The general form of the velocity gain (for the ideal lossless case) is represented in Fig. 17. As a result of this velocity gain, the Acoustic Wave system pro-



**Fig. 15**—Same as Fig. 13 but waveguide is slightly less than  $1/2$  wavelength.



**Fig. 16**—Same as Fig. 13 but waveguide is slightly less than 1 wavelength.



**Fig. 17**—Waveguide velocity gain as a function of wavelength relative to the waveguide length.

Adding a second tube to the Acoustic Waveguide almost doubles its useful frequency range while smoothing its response.

vides much more acoustic output than the same speaker in an infinite baffle. This improvement in speaker sensitivity for a single-sided Acoustic Waveguide is sketched in Fig. 18. For a range of frequencies slightly greater than three to one, the Acoustic Waveguide system provides substantially greater speaker sensitivity.

The presence of the notch, at the frequency where the waveguide length equals 1 wavelength, might prevent using the system over a broad frequency range, even though the speaker's sensitivity improves again at some frequencies above the notch. However, we can control the depth of the notch through adjustment of some waveguide parameters, allowing us to build full-bandwidth Acoustic Wave systems, such as the system used in the Ensoniq Acoustic Wave Piano with Sound by Bose.

Another approach is to move the notch to a frequency outside the band where the speaker will be used. We can achieve this goal by placing an additional waveguide to the front of the speaker, as is done in the Acoustic

Wave Cannon. This second waveguide reverses the polarity of the velocity contributed by the front of the speaker diaphragm at the appropriate frequency. Since this front waveguide will also provide velocity gain, its addition to the system not only extends the bandwidth but also further improves the system sensitivity.

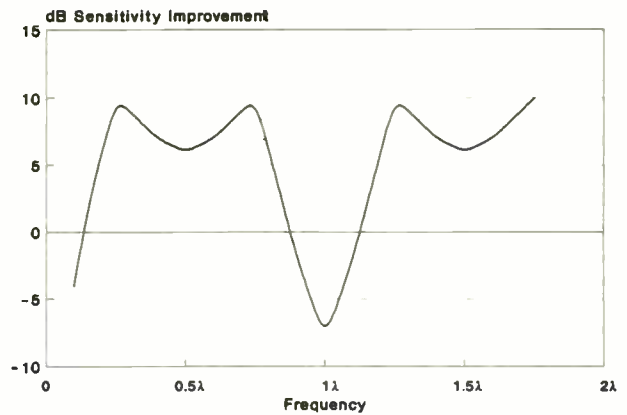
The front waveguide must be one-third the length of the rear waveguide. Under this condition, the velocity gains of the two waveguides are as shown in Fig. 19. At the frequency where the rear waveguide is three-quarters of a wavelength, both waveguides provide considerable gain, and both change their polarities. Thus, the outputs of both waveguides continue to add in phase until the rear waveguide changes polarity at the frequency at which it is five quarter wavelengths long.

As a result, the addition of the front waveguide increases the bandwidth of the Acoustic Waveguide system to a frequency range of greater than five to one. The null which results when both waveguides have the same velocity magnitude but opposite polarity now occurs at the frequency where the rear waveguide length is three half wavelengths. A sketch of the sensitivity improvement for a double-sided Acoustic Waveguide loudspeaker is shown in Fig. 20.

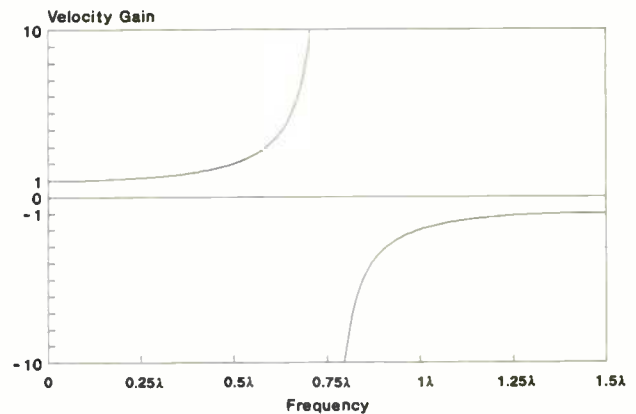
In practice, the operation of an Acoustic Waveguide system is complicated by the fact that the waveguides significantly load the speaker diaphragm. Thus, the loudspeaker is not the stiff velocity source assumed above. The velocity of the speaker cone at the frequencies where the waveguides have significant gain is considerably smaller when loaded by the waveguide than when loaded in an infinite baffle. In addition, the gain of the waveguide is not as great as expected due to the fact that the waveguide has some loss, and because the waveguide is not truly open at one end but, rather, has some air load. Thus, the response of the Acoustic Waveguide speaker cannot be inferred easily from the figures shown.

A more accurate model requires the blending of two different modelling techniques. The first, in which the wave nature of sound is put aside, is called lumped parameter modelling and is commonly used for speaker analysis. In such a model, the loudspeaker and

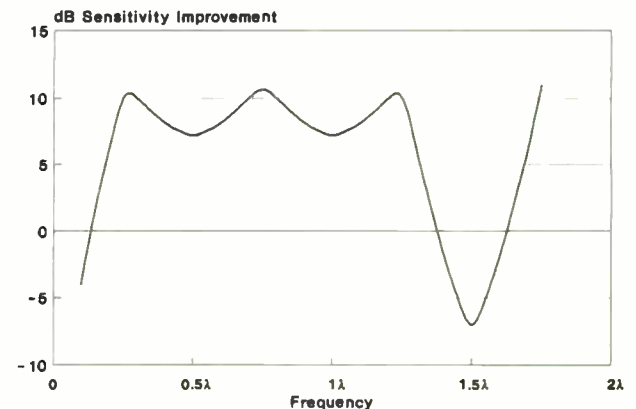
**Fig. 18**—Improvement in loudspeaker sensitivity for a single-sided Acoustic Waveguide system, shown as a function of wavelength relative to the waveguide length.



**Fig. 19**—Waveguide velocity gain as a function of frequency for the long waveguide (dotted curve) and the short waveguide (solid curve) in a double-sided Acoustic Waveguide system. Frequency is shown as a function of wavelength relative to the longer waveguide's length.



**Fig. 20**—Improvement in loudspeaker sensitivity for a double-sided Acoustic Waveguide system, shown as a function of wavelength relative to the longer waveguide's length.



enclosure are represented by acoustical and mechanical springs, masses, and resistances. However, such a model is impractical for modelling devices in which wave phenomena play an important role. The second technique is wave analysis. Wave analysis requires solution of the full wave equation, which is the physical basis for our understanding of acoustics.

In order to model an Acoustic Wave speaker system, we first generate a lumped parameter model of the speaker and couple this model to the solution of the wave equation inside the

Acoustic Waveguide. Rather than obtaining one equation, we get several equations that must be solved simultaneously. There is no closed-form solution, as there is with conventional loudspeaker enclosures, that would allow us to predict speaker performance quickly.

From the equations, we see that there are about a dozen key parameters in an Acoustic Wave system. The electrical and mechanical properties of the speaker, and the physical properties of the waveguide, must be harmoniously selected to create a system

# ACOUSTIC WAVE CANNON

## SOUND FOR CINEMA

with a smooth response while maintaining high efficiency.

Normally, simply placing a loudspeaker at the end of a tube results in resonances, giving a peaky characteristic to the reproduced sound. An appropriate combination of loudspeaker electrical, magnetic, and mechanical properties damps the resonances to the point of inaudibility while maintaining a high system efficiency.

Because of the complexity and interlocking nature of the equations, and because of the large number of key parameters, design of Acoustic Waveguide speakers relies heavily on computer design aids, which can solve the equations and predict a frequency response in a matter of seconds. These aids allow us to design systems to meet the particular needs of specific applications.

New digital movie sound systems bring the promise of five-channel, CD-quality reproduction—even from 35-mm release prints.

Once the acoustic design is completed, careful mechanical design is required to minimize air turbulence in the high-velocity sections of the waveguide and to minimize wall flexing in the high-pressure sections. Correctly constructed units have acoustical performance that matches the computer model to within a fraction of a decibel.

### Future Trends

Through the use of Acoustic Wave technology, it is possible to meet the requirements for bass performance for current films. However, some exciting developments are on the horizon. Eastman Kodak and Optical Radiation have announced a joint program to put a digital stereo optical soundtrack on motion picture film. The Cinema Digital Sound (CDS) system records five full-bandwidth channels plus a bass channel in the normal soundtrack area on motion picture film using 16-bit sam-

ples at 44,100 samples per second [4]. This is an extraordinary achievement, since the required bit size is extremely small. Also, since film has no protective layer over its image surface as a Compact Disc does, the error-correction algorithms of digital cinema sound have to be very robust.

The performance of the five channels is comparable to that of Compact Discs. Frequency response is 20 Hz to 20 kHz,  $\pm 0.5$  dB, with low distortion, extremely low noise (S/N greater than 90 dB), unmeasurable wow and flutter, and minimal crosstalk between channels (channel separation greater than 90 dB). Three of the five channels are placed at the left, in the center, and right behind the screen; the two remaining channels are used for left surround and right surround. The separate bass channel allows prodigious bass effects without diminishing the dynamic range of the other five channels. Further, a digital control channel is used for control signals, including a MIDI track and SMPTE time code, and can be used for purposes such as projection-booth automation, special effects in the theater, and quality-control assurance of the release print and of the theater projection and sound equipment. Originally available only on 70-mm film, the Cinema Digital Sound system is now available on the more commonly used 35-mm film, with exactly the same specifications and performance. To date, six films have been released with CDS soundtracks, and more than 40 theaters have installed CDS playback equipment.

In June 1991, Dolby Laboratories gave a public demonstration of their competing digital optical film sound system, Dolby Stereo SR-D. It has similar performance specifications to the CDS system's. However, the Dolby system keeps the normal analog optical soundtrack in its standard position, and adds the digital information between the sprocket holes along one edge of the film. Digital data compression is used in order to fit all of the audio data into the limited space. The first SR-D release is expected in early 1992, with widespread availability late in 1992.

For the first time in decades, cinemas will routinely be able to play source material having performance equal or better to that of the very best home stereo systems. Like the change that occurred in the recording industry

when Compact Discs were introduced, a digital film sound system will require changes in the way film soundtracks are recorded and mixed. Sloppy practices that currently are hidden in the noise of an analog soundtrack will be painfully obvious to audiences listening to a digital cinema system. The introduction of digital systems will place even greater demands on cinema loudspeakers all across the audio band, and especially in the low-frequency end of the spectrum. We believe that the Bose Cinema Sound System is ready for the demands of digital soundtracks. For over a year, a Bose Cinema Sound System has been used in the Optical Radiation laboratory where the CDS digital film system has been developed. The two digital systems are certain to make a major improvement in the sound quality obtainable from motion pictures.

### Conclusions

Recent films have been shown to contain signals requiring very high sound pressure levels in the bottom octave of the audio band. Current films using Dolby SR noise reduction potentially have even greater demands. And, shortly, there will be digitally encoded film soundtracks capable of enormous dynamic range at frequencies as low as 20 Hz.

The Acoustic Wave technology, as used in the Bose Cinema Sound System, allows accurate reproduction of this bass energy in a small, efficient package. It can meet the demands of soundtracks now, and in the future as the art and science of film soundtracks continue to improve.  $\blacktriangle$

### References

1. Nairn, Charles and Bruce Hofer, "Extended Range Cross-Modulation Testing," 131st SMPTE Technical Conference, October 1989.
2. Fielder, Louis and Eric Benjamin, "Subwoofer Performance for Accurate Reproduction of Music," *Journal of the Audio Engineering Society*, Vol. 36, No. 6 (June 1988).
3. Allen, Ioan, "Technical Requirements of Theaters Playing Back Dolby Spectral Recording Photographic Sound Tracks," 131st SMPTE Technical Conference, October 1989.
4. Flemming, Howard and Ronald Uhlig, "Cinema Digital Sound—The Technology," 132nd SMPTE Technical Conference, October 1990.

**8MM ATTENTION VIDEO OWNERS:**



# OWN YOUR FAVORITE MOVIES ON 8MM.



All Dogs Go to Heaven  
2897022



Driving Miss Daisy  
9822072



Ghost  
8260082



Goodfellas  
€98082



The Hunt For Red October  
8250002



Awakening  
8598012



Steel Dawn  
5978072



Total Recall  
2276032

## TAKE ANY 3 MOVIES FOR \$1.00 EACH

See details below.

PRESUMED INNOCENT	9621002	BLADERUNNER	3104092	FUNNY ABOUT LOVE	8334092	RAIDERS OF THE LOST ARK	9108022	ANNIE	1516052
HARD TO KILL	9535052	THE GRADUATE	3103002	THE KRAYS	8592072	INDIANA JONES & THE TEMPLE OF DOOM	9107032	THE UNTOUCHABLES	4321042
AVALON	8583082	HAMLET (1990)	9706082	PUMP UP THE VOLUME	8576072	INDIANA JONES & THE LAST CRUSADE	9106042	SEX, LIES & VIDEOTAPE	5963042
BONFIRE OF THE VANITIES	9617062	MEMPHIS BELLE	9835022	QUICK CHANGE	9606092	INDIANA JONES & THE LAST CRUSADE	9106042	WILLOW	1982002
FLATLINERS	8575082	NOT WITHOUT MY DAUGHTER	7226032	WELCOME HOME, ROXY CARMICHAEL	8335082	AN OFFICER AND A GENTLEMAN	2021012	THE LAST EMPEROR	1974002
THE RUSSIA HOUSE	7392012	POSTCARDS FROM THE EDGE	8582092	THE ROOKIE	9692042	STAR TREK V: THE FINAL FRONTIER	4486052	BLUE STEEL (1990)	6965002
CHINATOWN	2025072	REVERSAL OF FORTUNE	9697092	ABOVE THE LAW	6336022	INTERNAL AFFAIRS	9129072	RAGING BULL	0500052
AIRPLANE	2033072	ROCKY V	9175002	TANGO & CASH	6474042	GREMLINS 2: THE NEW BATCH	9545032	THE KARATE KID	1710092
BEVERLY HILLS COP	2053022	SIBLING RIVALRY	7759082	ROAD HOUSE (1989)	2875082	PET SEMATARY	4479042	JOE VS. THE VOLCANO	9538022
GHOSTBUSTERS	1742012	WHITE HUNTER, BLACK HEART	9607082	TEENAGE MUTANT NINJA TURTLES (THE MOVIE)	8034032	WHEN HARRY MET SALLY	3914092	LITTLE WOMEN (1933)	2519002
ROXANNE	1960062	ANOTHER 48 HRS.	8278082	COWING TO AMERICA	4416002	BEETLEJUICE	6330082	NINOTCHKA	2693082
BATMAN (1989)	6425042	LETHAL WEAPON	6308062	FATAL ATTRACTION	4393072	SEVEN BRIDES FOR SEVEN BROTHERS	2518012	AN AMERICAN IN PARIS	2533022
TEQUILA SUNRISE	6389082	GLORY	8557002	CASABLANCA	0507082			THE BIG CHILL	1527022
THE WITCHES	9609062	RAIN MAN	2869062					CINEMA PARADISO	3815092
THE NEVERENDING STORY	6046032							THE FABULOUS BAKER BOYS	8134022
THE NEVERENDING STORY II	9690062							ROCKY	0563092

## INTRODUCING THE COLUMBIA HOUSE 8MM VIDEO CLUB

At last, you can purchase your favorite movies on 8MM, to enjoy with your 8MM camcorder, deck, or Video Walkman. The 8MM format is widely recognized for its superior picture and sound quality, portability, and handy compact size. 8MM provides video entertainment in the home and on the go.

Now you can build an entire collection of your favorite movies by joining the Columbia House 8MM Club. Just write in the numbers of the three selections you want for \$1.00 each, plus shipping and handling. In exchange, you simply agree to buy two more 8MM selections in the next year, at regular Club prices (currently as low as \$29.95, plus shipping and handling)—and you may cancel membership at any time after doing so.

Approximately every six weeks (up to 9 times a year), you'll receive a Club mailing, reviewing our Director's Selection—plus scores of alternate choices, including many lower-priced 8MM titles. And you may also receive Special Selection mailings up to five times a year. (That's up to 14 buying opportunities a year.)

You buy only what you want—when you want it! If you want the Director's Selection, do nothing—it will be sent automatically. If you'd prefer an alternate selection, or none at all, just mail the response card always provided by the date specified. And you'll always have 14 days to decide; if not, you may return the selection at our expense.

There's a money-saving bonus plan. If you continue your membership after fulfilling your obligation, you'll be eligible for our generous bonus plan. It enables you to enjoy great savings on the movies you want—for as long as you decide to remain a member.

And there's a 10-day risk-free trial. We'll send details of the Club's operation with your introductory package. If not satisfied, return everything within 10 days for a full refund and no further obligation.

For fastest service, use your credit card and our toll-free number. Call 24 hours a day:

**1-800-538-4411** Dept. DYV

©1991, The Columbia House Company

### Columbia House 8MM VIDEO CLUB

Dept. DYV P.O. Box 1112, Terre Haute, Indiana 47811-1112

Yes, please enroll me under the terms outlined in this advertisement. As a member, I need buy only 2 more selections, at regular Club prices, within the coming year.

Send me these 3 selections for \$1.00 each plus \$1.50 each shipping and handling (total \$7.50)

\_\_\_\_\_

Please Check How Paying:  My check is enclosed 2QR/QS

Charge my introductory 8MM selections and future Club purchases to:

MasterCard  Diners Club  AMEX  VISA

Acct No. \_\_\_\_\_ Exp. \_\_\_\_\_

Signature \_\_\_\_\_


Name \_\_\_\_\_

Address \_\_\_\_\_ Apt. \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

Zip \_\_\_\_\_ Phone No. (\_\_\_\_) \_\_\_\_\_

Note: Membership is limited and Columbia House 8MM Club reserves the right to reject or cancel any membership. Offer limited to continental U.S. (excluding Alaska). Applicable sales tax added to all orders.



*The high end of a newly installed system may sound sweet and smooth, until you find out it's been rolled off by an interaction between component and cable.*

*Herman Burstein*

Every serious audiophile should be alert to possible treble loss caused by a component's high output impedance or the high capacitance of his interconnect cable. If we let  $R$  stand for output impedance in ohms, and let  $C$  stand for cable capacitance in  $\mu\text{F}$  (microfarads), and then multiply one by the other, the result,  $RC$ , will show if there is significant treble loss; we want low  $RC$ .

What is *significant* treble loss? Of course, it varies with hearing ability, taste, and quite possibly other factors. But as a rough guide we may think of *good* high-end frequency response as being down by no more than 3 dB at 20 kHz (except for FM, which is limited to 15 kHz). *Excellent* response would be no more than 1 dB down, and *purist* no more than 0.25 dB down.

Output impedance, which is essentially resistive and therefore called  $R$ , is independent of frequency. But capacitive impedance, labelled  $X_C$ , declines as frequency rises. Output impedance  $R$  and capacitive impedance  $X_C$  form a voltage divider across the signal, with the voltage portion across  $X_C$  going to the next component in the chain. As frequency rises,  $X_C$  declines relative to  $R$  so that the voltage across  $X_C$  drops, causing treble loss. Thus, at a given frequency, loss is determined by the ratio of  $R$  divided by  $X_C$ ; the smaller this ratio, the smaller the loss. Because  $X_C$  varies inversely with cable capacitance  $C$ , we may substitute  $C$  for 1 divided by  $X_C$  and therefore say that the smaller  $RC$  is, the smaller the loss will be at a given frequency.

As can be seen in Table I, treble loss is insignificant when  $RC$  is 1 or less. Fortunately, the output impedance of tape decks, preamps, CD players, surround sound processors, equalizers, etc., tends to be quite low today, usually under 1 kilohm. (The output impedance of even fairly long interconnects is usually below 0.001  $\mu\text{F}$ .) The resulting  $RC$  is usually below 1, and treble

# Impedance, Cables & Treble Loss

response is safe. On the other hand, some components have output impedances of several thousand ohms—as high as 10 kilohms in the case of one passive preamp—and some audiophiles employ unusual or very long cables.

As a “good” scenario, assume a CD player has an output impedance of 200 ohms—quite typical—and that its interconnect to the preamp is a 6-foot, heavy-duty cable whose capacitance

is 30 pF (picofarads) per foot. (One picofarad is one-millionth of 1  $\mu$ F, so to convert pF to  $\mu$ F, we divide pF by 1,000,000.) Accordingly, the cable's capacitance is 180 pF, or 0.00018  $\mu$ F. Therefore

$$RC = 200 \times 0.00018 = 0.036.$$

Treble response is safe indeed!

Now, for the opposite scenario. In an actual case, a CD player's output im-

pedance was found to vary with the setting of its output control; it measured as high as 4,475 ohms. Assume that this CD player is fed directly to the power amplifier, located close to the speakers and requiring a 30-foot interconnect (big listening room). Assume further that the cable's capacitance is 50 pF per foot, for a total of 1,500 pF—or 0.0015  $\mu$ F. (Although conventional shielded cable of high quality typically has capacitance of 25 to 30 pF per foot, the capacitance of some cables, including exotic ones, may be appreciably higher, perhaps as high as 70 pF per foot. Hence 50 pF per foot is not an unreasonable assumption for a bad-case scenario.) In this example, RC could be as great as 6.7125 (the product of 4,475 and 0.0015). As Table I reveals, RC this high produces a loss greater than 2 dB at 20 kHz.

Table I shows loss, in dB, at 10, 15, 20, and 25 kHz for RC values from 1 to 10. To illustrate, if RC is 3, the respective losses at 10, 15, 20, and 25 kHz are 0.152, 0.334, 0.577, and 0.871 dB. (The dB values in the Table have been rounded off.) An RC of 6.7125, as in our example above, produces a loss between 1.96 dB and 2.49 dB at 20 kHz; from the formula at the bottom of the Table, we find the exact loss to be 2.33 dB. At 10 kHz, the loss is 0.71 dB; and at 15 kHz, 1.46 dB, while at 25 kHz, it is 3.25 dB.

While a loss such as 2.33 dB at 20 kHz may not seem distressing, it must be recognized that RC losses are additive. If more than two electronic components are in the audio chain, individual RC losses that are not serious in and of themselves may add up to a total that is significant. (Moreover, there can be treble losses *within* components to be taken into account, possibly adding something on the order of a 1- to 3-dB loss at 20 kHz.)

Summing up, it appears wise to mind not only your Ps and Qs, but also your Rs and Cs. **A**



**Table I—Treble loss at selected frequencies for selected RC values.**

RC	Loss, dB			
	At 10 kHz	At 15 kHz	At 20 kHz	At 25 kHz
1	0.02	0.04	0.07	0.11
2	0.07	0.15	0.27	0.41
3	0.15	0.33	0.58	0.87
4	0.27	0.58	0.98	1.45
5	0.41	0.87	1.45	2.09
6	0.58	1.21	1.96	2.76
7	0.77	1.57	2.49	3.44
8	0.98	1.96	3.03	4.12
9	1.21	2.35	3.58	4.77
10	1.45	2.76	4.12	5.40

Loss is calculated by using the formula:

$$L = 20 \log \sqrt{1 + (JRC)^2}$$

where L is the loss in dB at frequency f, R is the output impedance in ohms, C is the cable capacitance in  $\mu$ F, and J is f divided by 159,155.

To find the RC value corresponding to a given loss L at a given frequency f:

$$RC = K \sqrt{10^{0.1L} - 1}$$

where K is 159,155 divided by f.

You're torn.

Do you park it outside so the  
neighbors can see it?

Or inside, so the birds can't?

You put it inside.

But you leave the garage  
door up.

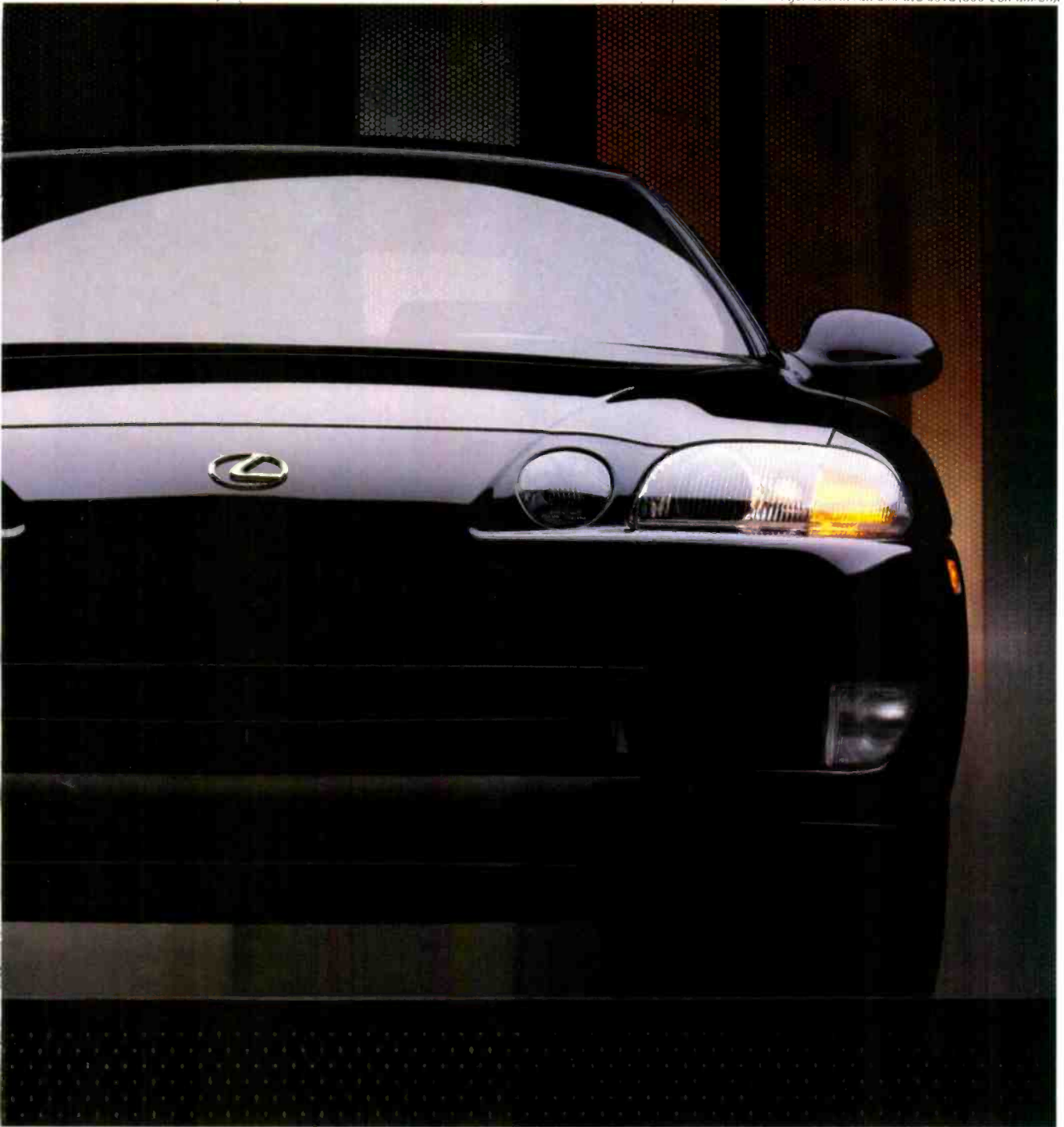
The New Lexus Coupe.



**T**he Lexus Coupe: Four Cam 32-valve 250-hp V8; double-wishbone suspension; driver's-side memory



© 1991 Lexus, A Division Of Toyota Motor Sales, U.S.A., Inc. Lexus reminds you to wear seat belts and obey all speed laws. For more information, call 800-872-5398 (800 USA-LEXUS).



system; leather seats; optional Nakamichi stereo and 12-disc auto-changer.

 **LEXUS**  
*The Relentless Pursuit Of Perfection.*

Enter No. 16 on Reader Service Card

1

## PSB STRATUS GOLD SPEAKER

### Manufacturer's Specifications

**System Type:** Three-way, tower-style, vented-box system.

**Drivers:** 10-in. cone woofer, 6-in. cone midrange, and 1-in. aluminum-dome tweeter.

**Frequency Response:** 36 Hz to 20 kHz,  $\pm 1$  dB, on axis; 36 Hz to 10 kHz,  $\pm 1$  dB, 30° off-axis horizontally.

**Sensitivity:** 88 dB at 1 meter with 2.83 V rms applied.

**Crossover Frequencies and Filter Slopes:** 250 Hz (18 dB/octave, Butterworth) and 2.2 kHz (24 dB/octave, Linkwitz-Riley).

**Impedance:** 4 ohms nominal.

**Recommended Amplifier Power:** 10 to 250 watts per channel.

**Dimensions:** 13½ in. W x 44½ in. H x 14¾ in. D (34.3 cm x 113 cm x 37.5 cm) excluding pedestal; pedestal, 15¾ in. W x 2 in. H x 17 in. D (40.0 cm x 5.1 cm x 43.2 cm).



**Weight:** 95 lbs. (43.1 kg) for single system.

**Price:** \$2,000 per pair. Available in premium dark oak, black oak, or light oak.

**Company Address:** 633 Granite Court, Pickering, Ont., Canada L1W 3K1.

For literature, circle No. 90

The Stratus Gold is the top of Canadian manufacturer PSB's loudspeaker line, which also includes models from \$225 to \$1,400 per pair. The Stratus Gold is a large, floor-standing tower system with a vented-box low end designed around a high-excursion 10-inch woofer.

PSB was the first Canadian loudspeaker company to take advantage of the advanced testing facilities and scientific staff of Canada's National Research Council. The NRC, as pointed out in my review of the Paradigm 7se loudspeaker (see sidebar, "Testing at Canada's NRC," *Audio*, September 1989), is a government-funded Canadian operation whose mandate is to help Canadian manufacturers be competitive in world markets. PSB has made extensive use of NRC facilities, including controlled listening tests in NRC's

International Electrotechnical Commission (IEC) Standard listening room (after which both *Audio*'s New York listening room and my own were patterned), to optimize the Stratus Gold's performance.

PSB has emphasized minimizing resonances, which "cast a muddy veil over every sound," according to their design white paper. The large cabinet of the Stratus Gold employs an innovative scheme of internal bracing and damping to minimize resonances, and weighs in at 95 pounds!

The Gold's tweeter (source: Vifa of Denmark) uses a high-stiffness, low-mass, aluminum-alloy dome with a polyamide suspension. To make the tweeter's off-axis response in the top octave more uniform, PSB adds a phase plug in the form of a ½-inch diameter rigid disk held about 0.050-inch above

the center of the dome by six thin plastic spokes. The disk and spokes are an integral part of the tweeter's molded mounting ring. In addition to modifying the directional response, the disk has the very practical benefit of protecting the dome from roving fingers and other objects.

The 6-inch midrange uses a very large, 28-ounce ceramic magnet, mounted in a cast-magnesium frame, which provides high efficiency and control of its low-end response. The cone is made from a mineral-filled polypropylene material, which provides the proper stiffness and a high degree of internal damping. A soft-rubber dust cap and long-excision rubber surround complete the design. The midrange is mounted in its own closed-box sub-enclosure, which is damped with loosely packed soft fibers, and is located in the top of the cabinet. The bottom wall of the sub-enclosure, which is attached to all four walls of the larger enclosure, also serves as a brace to strengthen the main cabinet. The smaller size of the midrange allows a higher crossover frequency, thus keeping high-energy fundamental tones out of the tweeter and allowing cleaner operation at higher levels.

The crossover between the woofer and midrange, at 250 Hz, is a third-order Butterworth design, which provides both flat on-axis response and flat sound power through the crossover frequency range.

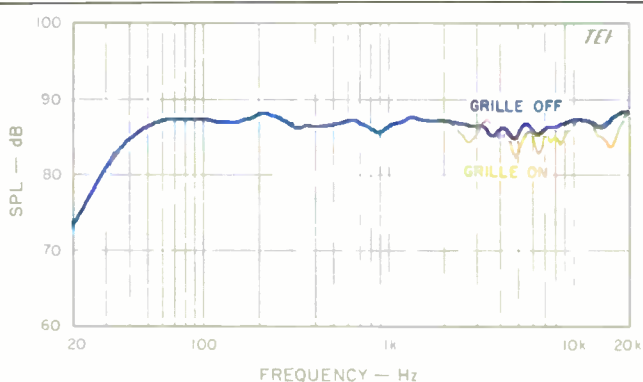
The 10-inch woofer has a massive, 54-ounce magnet and a 2-inch diameter, long-throw voice-coil. Its cone is made of felted paper fiber, treated for increased stiffness, and is held on its periphery by a rubber surround. In a phone conversation, PSB's founder, Paul Barton, stated that the spider of the woofer has been designed with deliberate nonlinearities to essentially eliminate the dynamic offset problems that many high-excision woofers exhibit (see sidebar, "The Oil-Can Effect," in the previously mentioned review of the Paradigm 7se).

The Stratus Gold's cabinet has three shelf braces, strategically placed to provide maximum strength and minimize side-panel resonances. The cabinet is of furniture quality, with oak-veneered side panels and solid hardwood on the top and bottom. For maximum rigidity, the major joints at the top and bottom of the cabinet are locked into place by tongue-in-groove aluminum extrusions.

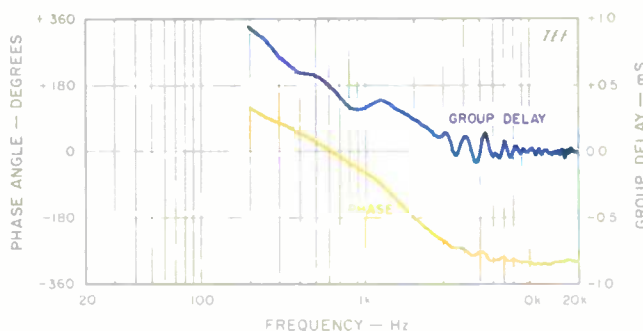
The crossovers use all air-core inductors, wound with 14-gauge wire, and high-voltage capacitors bypassed with small polypropylene capacitors. The crossover between midrange and tweeter is a sharp-cutoff, fourth-order, Linkwitz-Riley design. Its steep, 24-dB/octave slope ensures that only treble energy reaches the tweeter and minimizes lobing problems by keeping the acoustic outputs of the midrange and tweeter in phase.

### Measurements

Figure 1 shows the equivalent, 1-meter, on-axis, anechoic frequency response curve, smoothed with a 10th-octave filter, for an input of 2.83 V rms (2 watts, at the rated 4-ohm impedance). The curve was taken at 2 meters and referenced to a distance of 1 meter, with the microphone normal to the enclosure's front surface, midway between the midrange and tweeter. This point is 36 inches above the bottom of the enclosure and corresponds to the ear height of a



**Fig. 1—On-axis frequency response for an input of 2 watts into 4 ohms (2.83 V rms); measurement made at 2 meters and referenced to 1 meter.**



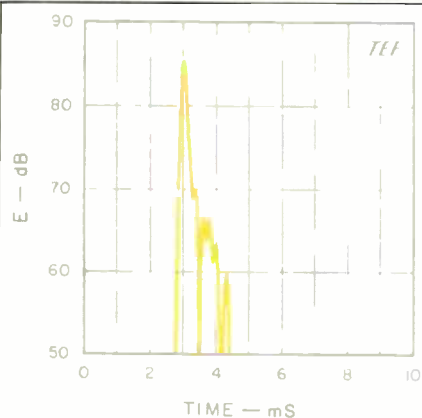
**Fig. 2—On-axis phase response and group delay, corrected for tweeter arrival time.**

seated listener. The figure also shows the effect of the Stratus Gold's grille, which added a  $\pm 2$  dB roughness in the response above 2 kHz. The remaining measurements were taken with the grille off.

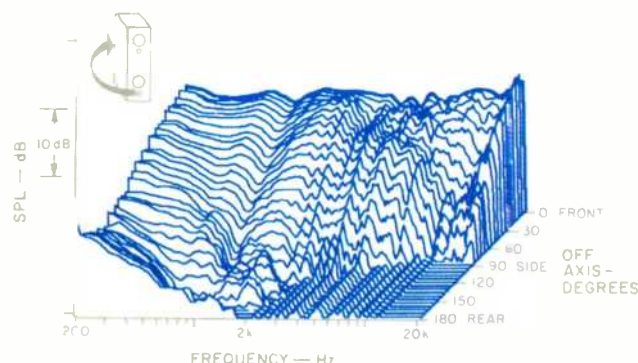
The curve fits within an admirably flat envelope of about  $\pm 1.5$  dB from 40 Hz to 20 kHz, which is only a bit off the manufacturer's rating. The curve exhibits some roughness in the response between 3 and 7 kHz and a slightly rising response above 8 kHz. Averaging the axial response over the range of 250 Hz to 4 kHz yielded a sensitivity of 86.9 dB, only about 1 dB below the manufacturer's 88-dB rating.

The systems were very closely matched, within  $\pm 0.5$  dB, from 100 Hz to 17 kHz. However, at higher frequencies, one system exhibited a narrow, high-amplitude (12-dB) ultrason-

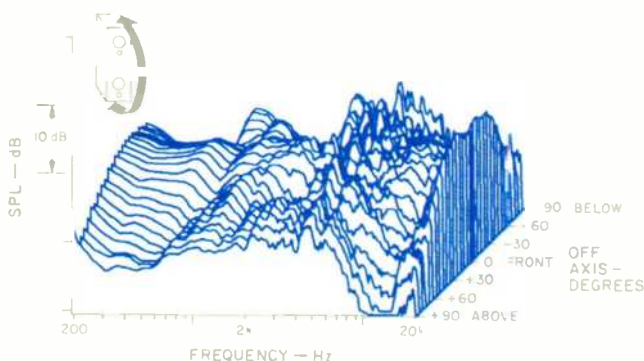
The Stratus Gold's 3-meter room curve is very smooth and flat above 2.5 kHz, the best I've measured in my listening room.



**Fig. 3—**One-meter, on-axis energy/time curve, measured with grille off.



**Fig. 4—**Horizontal off-axis frequency responses, taken from the front, around the side, and to the rear of the speaker.



**Fig. 5—**Vertical off-axis frequency responses, taken from below, up the front, and to the top of the speaker.

ic peak at 22.8 kHz, which made its 20-kHz response 6 dB higher than the other system's. That other system's response, by contrast, was fairly flat up to 25.3 kHz, where it exhibited a slight peak and dip.

A call to Barton revealed that the high-frequency peak was not typical and was due to the tweeter's metal-dome breakup resonance occurring too low. He promptly sent me two new matched tweeters, which I ultimately installed, and I did further listening tests. Before installing them, however, I carefully compared the speakers subjectively, side-by-side, and could not detect any differences. Fortunately, the response differences were exhibited only above 17 kHz, where I could not hear their effects with normal program material. I did do a high-level, ultrasonic sine-wave sweep comparison of the tweeters and could not detect any audible subharmonic distortion in the bad tweeter. I used the unit with the good tweeter for all subsequent tests.

Figure 2 shows the axial phase and group-delay measurements of the system, corrected for the tweeter's time arrival. There is a total phase rotation of about 250° between 1 and 20 kHz. The group-delay curve exhibits oscillations between 3 and 7 kHz, which correspond to the roughness in the axial response noted earlier. These group-delay oscillations are not significant because they result from minimum-phase aberrations in the response, i.e., the oscillations would go away if the axial response were carefully equalized flat with a minimum-phase equalizer (which most equalizers are!). A separate measurement indicated that the midrange lags the tweeter by about 0.25 mS (250 μS). This is little more than one-half wavelength at the 2.2-kHz crossover point.

Figure 3 shows the 1-meter, on-axis, 2.83-V rms energy/time curve (ETC) of the Stratus Gold, for a test signal swept over the range from 200 Hz to 10 kHz. The main arrival, at 3 mS, is fairly compact and well behaved, with some broadening at levels 20 dB below the peak. A broad lower-level group of returns between 3.5 and 4.2 mS is seen, but I did not take the time to investigate the source of these returns. A perfect energy/time curve would appear as a single sharp spike centered at 3 mS, with a width of about 1 mS at the base (the 50-dB line) and tapering to a rounded point at the top.

Removing the woofer reveals a well-constructed box with tight fit. An internal partition separates the top of the enclosure to make a housing for the midrange. All panels are made from medium-density fiberboard (MDF), ¾-inch thick. The top and base of the cabinet are solid, ¾-inch oak and look very handsome. The cabinet is braced internally with MDF panels that divide the cabinet into separate compartments but have four large, square holes for air circulation.

To damp internal reflections, gray woolly fiber is used inside the box rather than fiberglass. Unfortunately, most of the system's damping fiber was placed rather loosely inside the cabinet, with many loose particles, and had a tendency to shoot out the port under high-level excitation at low frequencies!

A high-level, low-frequency sine-wave sweep revealed no significant cabinet side-wall resonances except for a front-panel resonance in the area at the bottom of the woofer, in the 130- to 180-Hz range. This resonance caused a moder-

# COOL JAZZ, HOT OFFER.



**Natalie Cole**—Unforgettable (Elektra) 422-279

**Spyro Gyra**—Collection (GRP) 420-950

**Wynnton Marsalis**—Thick In The South Vol. I Soul Gestures In Southern Blue (Columbia) 425-587

**Wynnton Marsalis**—Uptown Ruler Vol. II Soul Gestures In Southern Blue (Columbia) 425-595

**Wynnton Marsalis**—Levee Low Moan Vol. III Soul Gestures In Southern Blue (Columbia) 425-579

**Dave Koz** (Capitol) 420-539

**Lee Ritenour**—Lee Ritenour Collection (GRP) 425-876

**Michel Petrucciani**—Playground (Blue Note) 423-020

**Josephine Baker** (DCC Compact Classics) 420-729/390-724

**Courtney Pine**—Within The Realms Of Our Dreams (Antilles) 420-463

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

**Various Artists**—Blue Note Plays The Music Of Cole Porter (Blue Note) 419-713

## ANY 8 CDs FOR 1¢

PLUS A CHANCE TO GET ONE MORE CD—FREE!

See details below.

**Don Grusin**—Zephyr (GRP) 420-976

**The Best Of Freddie Hubbard** (Blue Note) 419-465

**Dianne Reeves**—I Remember (Blue Note) 418-756

**The Best Of Herbie Hancock** (Blue Note) 419-408

**Yellowjackets**—Greenhouse (GRP) 416-198

**Harper Brothers**—Artistry (Verve) 425-082

**Michael Brecker**—Now You See It (Now You Don't) (GRP) 411-769

**Bob James**—Grand Piano Canyon (Warner Bros.) 408-906

**Harry Connick, Jr.**—We Are In Love (Columbia) 406-645

**The Gary Burton Quartet**—Reunion (GRP) 405-118

**Best Of George Benson** (CBS Associated) 403-246

**Kenny G**—Live (Arista) 401-505

**Stanley Jordan**—Cornucopia (Blue Note) 387-142

**The Crusaders**—Healing The Wounds (GRP) 419-952

**Wynnton Marsalis**—Intimacy Calling—Standard Time, Vol. 2 (Columbia) 417-675

**Birell Lagrene**—Acoustic Moments (Blue Note) 421-511

**Traut/Roddy**—The Great Lawn (Columbia) 420-760

**Take 6**—So Much 2 Say (Reprise) 413-310

**The Best Of John Coltrane** (Atlantic) 412-114

**Ella Fitzgerald**—All That Jazz (Pablo) 410-035

**Larry Carlton**—Collection (GRP) 407-825

**Film & The B.B.'s**—New Pants (Warner Bros.) 406-017

### LEGENDARY JAZZ PERFORMANCES

**Hubbard/Turrentine/Hancock**—In Concert (CTI) 423-269

**Patti Austin**—Live At The Bottom Line (Epic/Associated) 423-244



**Sarah Vaughan**—The Divine (Columbia) 374-280/394-288

**Bix Beiderbecke**—Volume 1—Singin' The Blues (CL Jazz Masterpieces) 418-335

**Bill Evans**—Waltz for Debby (Riverside) 376-335

**The Best Of Art Blakey And The Jazz Messengers** (Blue Note) 416-016

**Herbie Hancock**—Maiden Voyage (Blue Note) 408-724

**Billie Holiday**—Lady's Decca Days Volume One (MCA) 407-635

**Thelonious Monk**—The Genius Of Modern Music Vol. 1 (Blue Note) 407-445

**Ray Charles and Betty Carter** (DCC Classics) 376-293

**Ornette Coleman**—The Shape of Jazz to Come (Atlantic) 371-641

**John Coltrane**—Giant Steps (Atlantic) 371-591

**The Best Of Dexter Gordon** (Blue Note) 409-243

**The Greatest Hits Of Ramsey Lewis** (Chess) 363-895

**Charles Mingus**—Mingus Ah Um (Cl Jazz /Masterpieces) 354-795



**Chet Baker/Gerry Mulligan**—Carnegie Hall Concert (CTI) 423-251

**The Dave Brubeck Quartet**—Time Out (CL Jazz Masterpieces) 353-060

**Miles Davis**—Kind of Blue (CL Jazz Masterpieces) 353-045

**Lionel Hampton**—Mostly Ballads (Musicmaster) 424-309

**Mingus Dynasty**—The Next Generation Performs Charles Mingus (Columbia) 423-079

**David Sanborn**—Another Hand (Elektra/Musician) 423-103

**Special EFX**—Peace Of The World (GRP) 419-960

**Best Of Cannonball Adderley**—The Capitol Years (Capitol) 419-671

**Best Of Thelonious Monk** (Blue Note) 419-663

**Tom Scott**—Keep This Love Alive (GRP) 422-022

**The Best Of Earl Klugh** (Blue Note) 419-655

**The Best Of Sonny Rollins** (Blue Note) 419-473

**The Best Of Stanley Turrentine** (Blue Note) 419-424

**Jean Luc Ponty**—Tchokola (Epic) 420-224

### POPULAR HITS

**Boyz II Men**—Cooley High Harmony (Motown) 424-754

**Sting**—The Soul Cages (A&M) 424-440

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

**Van Halen**—For Unlawful Carnal Knowledge (Warner Bros.) 420-273

**Paula Abdul**—Spellbound (Virgin) 420-257

**R.E.M.**—Out Of Time (Warner Bros.) 417-923

**C & C Music Factory**—Gonna Make You Sweat (Columbia) 416-933

**Michael Bolton**—Time, Love & Tenderness (Columbia) 415-711

**Extreme**—Pornograffitti (A&M) 409-003

**Mariah Carey** (Columbia) 407-510

**Dave Grusin Collection** (GRP) 378-398

**Duke Ellington Orchestra**—Digital Duke (GRP) 357-350

**George Benson/Earl Klugh**—Collaboration (Warner Bros.) 356-501

**Diane Schuur**—Pure Schuur (GRP) 415-331

**Stanley Clarke/George Duke**—3 (Epic) 403-352

**Basia**—London Warsaw New York (Epic) 401-752

**Grover Washington, Jr.**—Anthology Of Grover Washington, Jr. (Elektra) 338-632

**Best Of The Manhattan Transfer** (Atlantic) 312-009

© 1991, The Columbia House Company

### HERE'S HOW TO GET YOUR 8 CDs FOR 1¢...

- Just mail the coupon together with check or money order for \$1.86 (that's 1¢ for your first 8 CDs, plus \$1.85 for shipping and handling).
- You agree to buy just six more selections in the next three years, at regular Club prices (currently \$12.98 to \$15.98, plus shipping and handling)—and you may cancel membership at any time after doing so.
- Free Music Magazine sent every four weeks (up to 13 times a year), describing the Regular Selection for your listening interest, plus hundreds of alternates. And Special Selection mailings up to six times a year (total of up to 19 buying opportunities).
- Buy only what you want! If you want the Regular or Special Selection, do nothing—it will be sent automatically. If you'd prefer an alternate selection, or none at all, just mail the response card always provided by the date specified.
- You always have 10 days to decide; if not, you may return the Selection at our expense.
- Half-Price Bonus Plan. If you continue your membership after fulfilling your obligation, you'll be eligible for our money-saving bonus plan. It lets you buy one CD at half-price for each CD you buy at regular Club price.
- 10-Day Risk-Free Trial. We'll send details of the Club's operation with your introductory package. If not satisfied, return everything within 10 days for a full refund and no further obligation.
- Extra Bonus Offer: you may take one additional CD right now at the super-low price of only \$6.95—and you are then entitled to take an extra CD as a bonus FREE! And you'll receive your discounted CD and your bonus CD with your 8 introductory selections—a total of 10 CDs in all!

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

**COLUMBIA HOUSE, 1400 N. Fruitridge Ave. 371/F91**  
**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. I am enclosing check or money order for \$1.86 (that's 1¢ for the 8 CDs indicated, plus \$1.85 for shipping and handling). 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 ME THESE 8 CDs FOR 1¢** (write in numbers below):


My main musical interest is (check one): (But I may always choose from any category)

- Jazz  
 Crusaders, Earl Klugh
- Soft Rock  
 George Michael, Michael Bolton
- Classical  
 Vladimir Horowitz, Itzhak Perlman

Mr.  Mrs.  Miss \_\_\_\_\_ Age \_\_\_\_\_

\_\_\_\_\_  
 \_\_\_\_\_

Address \_\_\_\_\_ Apt. \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Do you have a VCR? (C4)  Yes  No **3ZR-8F-RN**

Do you have a credit card? (C3)  Yes  No

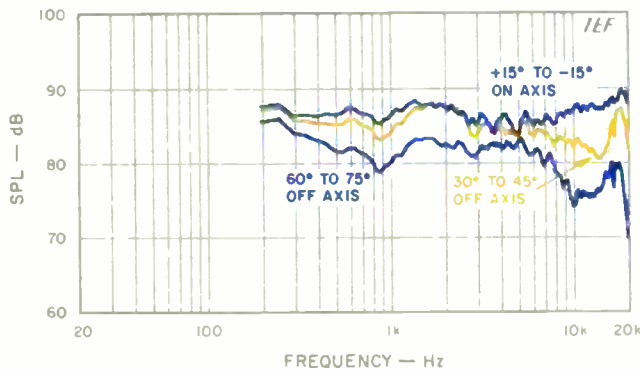
Extra Bonus Offer: also send me this CD for which I am enclosing an additional \$6.95.

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

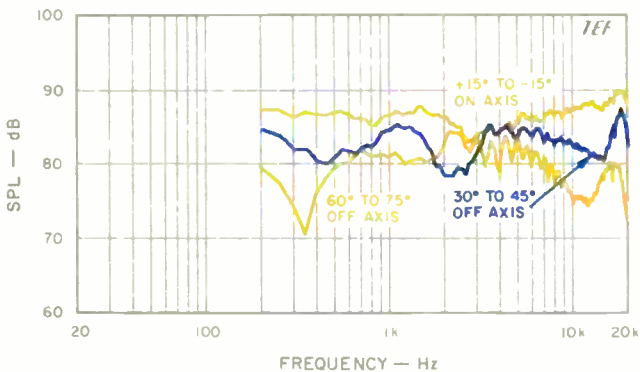
Note: we reserve the right to reject any application or cancel any membership. These offers not available in APO, FPO, Alaska, Hawaii, Puerto Rico, write for details of alternative offer. Canadian residents serviced from Toronto. Applicable sales tax added to all orders.

**COLUMBIA HOUSE: Terre Haute, IN 47811**

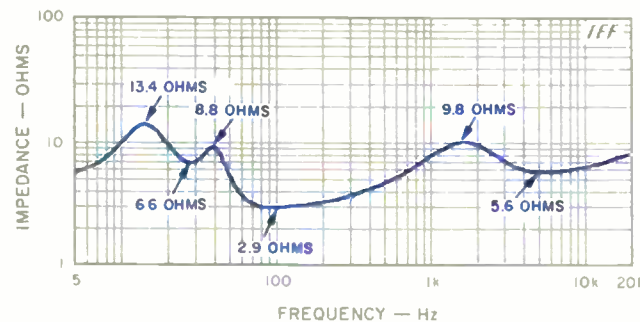
At low frequencies, output is so high and distortion so low that distortion products for 440-Hz tones fell below my analyzer's threshold.



**Fig. 6—Mean horizontal responses, derived from data of Fig. 4.**



**Fig. 7—Mean vertical responses, derived from data of Fig. 5.**



**Fig. 8—Magnitude of impedance.**

ate, internal vibrating sound at high-level excitation (both systems had this problem). A comparison of the woofer's excursion with the port open and closed (covered by hand) revealed that the port reduced the woofer's excursion about 50% at the Helmholtz box resonance of about 28 Hz. The woofer did not exhibit any detectable dynamic offset effects (a rare trait). Wind noises were minimal at high drive levels.

The woofer's linear excursion capability was a healthy 1/2 inch, peak to peak, with a very high excursion limit of about 1 inch, peak to peak. The woofer overloaded gracefully at high levels, with no objectionable noises. The effective piston diameter of the 10-inch woofer was about 8 1/4 inches (measured from the middle of the surround on one side to the middle of the surround on the other).

The crossover of the Stratus Gold consists of 13 parts: Four inductors, five capacitors, and four resistors. All inductors are air-core. The crossover is hand-wired on a piece of hardboard and mounted on the rear of the cabinet, behind the woofer. Film and nonpolarized electrolytic capacitors are used. All internal wiring is stranded 14-gauge, with push-on terminal clips for driver connection. A notable feature is the hand selection of inductors and capacitors to meet a very tight,  $\pm 1\%$  tolerance (according to the supplied schematic). Resistors are held to a  $\pm 2\%$  tolerance.

The lower, 250-Hz, crossover is a third-order (18-dB/octave) Butterworth design with the woofer connected in reverse polarity from the midrange and tweeter. I verified this by noting the inward movement of the woofer cone with application of a positive d.c. voltage to the positive inputs of the system. The crossover schematic also confirmed the reversed-polarity connection to the woofer and that there was no polarity inversion in the signal going to the midrange and tweeter.

The phase response of the upper crossover was investigated by noting the change in axial frequency response with the tweeter connections reversed. A Linkwitz-Riley crossover design dictates that the drivers be exactly in phase with each other at all frequencies throughout the crossover region, thus yielding no lobing error (i.e., aiming the main crossover directional lobe directly ahead). If the polarity of either driver is reversed, a very deep null should result in the axial response at the crossover frequency. With the tweeter reversed, the on-axis response null was only about 15 dB deep, which indicates that the individual responses are about 20° to 25° (rather than 0°) out of phase when connected normally. Further investigation revealed that the main crossover directional lobe, rather than being aimed directly ahead, was aimed somewhat upward, which caused the slight out-of-phase condition. This optimizes coverage for seated to standing listeners, at the expense of listeners below axis.

The horizontal, "3-D," off-axis curves of the Stratus Gold are shown in Fig. 4. Unlike the "3-D" curves in my previous reviews, these are not normalized to the on-axis response. For a system with perfect off-axis response, all the off-axis curves would have the same shape as the on-axis curve (including any axial aberrations). The on-axis response curve is shown as the bold curve at the rear of the graph. The curves are well behaved and indicate good, wide horizontal coverage. Not clearly shown on the right side of the

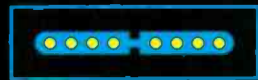
# WOW, WHAT A DIFFERENCE!

*"It's amazing how much better my system sounds with AudioQuest® cables. I can't believe what I've been missing!"*

AudioQuest makes a full line of cables; speaker, audio-interconnect, video, S-video, fiber-optic and installation cables. All are engineered to bring you maximum performance.

Over the last 12 years AudioQuest has continually improved and refined its cable designs to reduce all types of cable-induced distortion — and, to do it cost-effectively. Many different constructions and grades of copper and silver are used depending on the budget.

AudioQuest *F-18* speaker cable is one of three very flat cables which use multiple-solid conductors. The sound is sweet and clean because strand interaction is eliminated, while skin-effect and resistance are kept to a minimum.



F-18\*



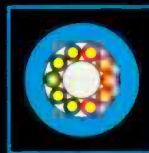
AudioQuest *Indigo Hyperlitz*® speaker cable uses geometry similar to our most expensive cables, yet is very affordable. The spiraled solid conductors maintain an absolutely consistent position and are far enough apart to prevent magnetic interaction. The clarity, dynamics and sense of acoustic space are incredible.

AudioQuest *Diamond Hyperlitz*® interconnect cable uses our patented construction which eliminates strand interaction and minimizes distortion caused by insulating materials. Teflon insulation, FPS™ solid long-grain silver, and resistance-welded, direct-gold plated, FPC™ plugs make this cable sound incredible. The aural invisibility of this cable is something you will have to experience for yourself.

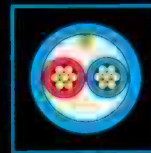
AudioQuest's absolute commitment to value doesn't mean that all AudioQuest products are inexpensive. It does mean that the expensive products are also an excellent value when used with better systems.

No matter what type of equipment you have, you can maximize your system's performance with AudioQuest cables. Contact your local AudioQuest dealer and listen for yourself. You will hear the difference!

\*All diagrams are 1½ times actual size.



Indigo Hyperlitz\*



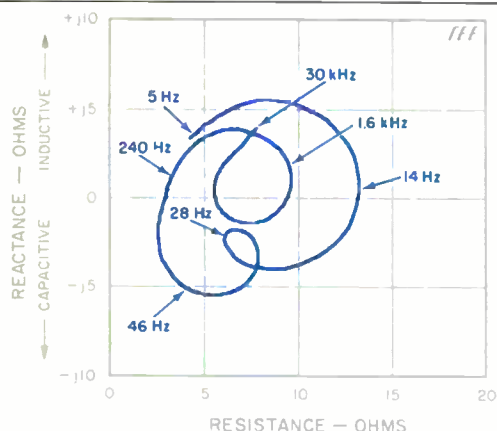
Diamond Hyperlitz\*

## audioquest®

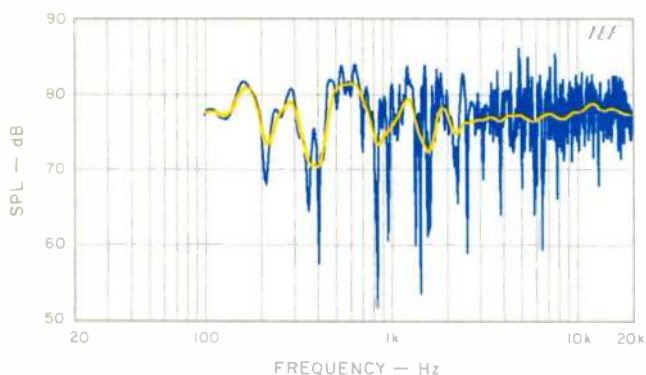
Tel: 714-498-2770 Fax: 714-498-5112  
P. O. Box 3060, San Clemente, CA 92674 USA

Distributed in Canada by Audio Products International  
3641 McNicoll Avenue • Scarborough, Ontario M1X 1G5  
Tel: 416-321-1800 • Fax: 416-321-1500

I fed in so much power that my lab lights kept time with the test bursts, all without nasty sound or damage to the speaker.



**Fig. 9—Complex impedance, showing reactance and resistance vs. frequency.**



**Fig. 10—Three-meter room response, showing both raw and smoothed data.**

graph is an increase in the off-axis, high-frequency response between 15 and 18 kHz, which indicates an abrupt widening of the coverage in this range.

Figure 5 shows the vertical off-axis curves, also in non-normalized form. The on-axis response (the bold curve in the middle of the graph) is somewhat obscured by adjacent curves. The raised responses at the rear of the plot, which unfortunately have been visually emphasized by the chosen "3-D" view angle, are at extreme down angles and thus not too important. In general, the off-axis curves are well behaved and indicate fairly smooth vertical response, particu-

larly for angles of 0° to 15° above axis (not clearly shown in the graph), which correspond approximately to the heights of a sitting and a standing listener.

Figures 6 and 7, respectively, show the NRC-style mean horizontal and vertical on- and off-axis response curves. The mean axial (+15° to -15°) horizontal response curve in Fig. 6 is reasonably flat and extended except for a slight depression in the range from 2.5 to 8 kHz, coupled with some response roughness and a general rising trend above 8 kHz. Up to 7 kHz, the 30° to 45° mean response is surprisingly close to the axial curve, both in shape and level. The response starts falling above about 7 kHz but exhibits a high-frequency peak, at about 18 kHz, that indicates the abrupt widening of the coverage seen in Fig. 4. The 60° to 75° off-axis response is fairly flat up to 7 kHz but, like the 30° to 45° mean response, rolls off above that point and exhibits a high-frequency peak above 15 kHz.

Figure 7 shows the mean vertical responses of the Stratus Gold. The mean vertical axial-response curve is very similar to the mean horizontal axial-response curve shown in the previous figure. This signifies that the sound of the Stratus Gold should change very little in the primary listening window, for both lateral and vertical movements. Examination of the individual curves that comprise the mean axial response (not shown) indicates that the up curves are significantly smoother through the crossover region than the down curves. This is a direct result of the slight out-of-phase condition and lobing noted earlier. The 30° to 45° mean response shows narrowing-coverage directional effects of both crossovers, which result in response dips at 400 Hz and 2 kHz. Both vertical off-axis mean curves exhibit the same high-frequency roll-off and peak phenomena that the horizontal off-axis mean curves exhibit.

Figure 8 shows the Stratus Gold's magnitude of impedance plotted over the extended range from 5 Hz to 20 kHz. The system had a low of 2.9 ohms at 100 Hz and a high of 13.4 ohms at the subsonic frequency of 15 Hz. The very low impedance in the bass and upper-bass range between 55 and 350 Hz make the Stratus Gold a demanding load for any amplifier. Only amplifiers with high current capability should be used with the Stratus Gold. The impedance's 2.9-ohm minimum and 3.4:1 variation (from 9.8 to 2.9 ohms) in the audio passband make the Stratus Golds quite sensitive to cable resistance. To keep cable-drop effects from causing response peaks and dips greater than 0.1 dB, cable series resistance should be limited to a (low) maximum of about 0.050 ohm (50 milliohms).

The Stratus Gold's complex impedance plot, over the range from 5 Hz to 30 kHz, is shown in Fig. 9. The smooth nature of the spirals indicates that there are no problems. The phase angle of the impedance (not shown) reached a maximum of +39° at a subsonic 7 Hz and a minimum of -53° at the bass frequency of 48 Hz.

The system's 3-meter room curve, with raw and sixth-octave smoothed responses, can be seen in Fig. 10. The Stratus Gold was located in the right-hand stereo position, aimed at the listening location, and the test microphone was placed at ear height (36 inches) at the listener's position on the sofa. The system was swept from 100 Hz to 20 kHz with a sine-wave signal of 2.83 V rms (corresponding to 2 watts



## THE QUESTION

that has driven us crazy for years is "where do I go to buy AudioQuest® products?" The challenge was that even AudioQuest had a hard time knowing which of our hundreds of dealers carried which AudioQuest products. It drove you and us crazy.

Now, at last, we have

## THE ANSWER

AudioQuest Centers are dealers who have contracted to keep in stock most AudioQuest cables and accessories, including at least four models of interconnect, eight speaker cables, four video and S-video cables, digital and fiber optic cables, Sorbothane® CD Feet™, Big Feet™ and LaserGuide™. AQ Centers also have these cables on demonstration and **available for loan!**

AudioQuest also has hundreds of other dealers who will be pleased to help you with your AudioQuest needs, however the AudioQuest Center dealers listed below have made an extra commitment to help guarantee your satisfaction.

## AUDIOQUEST CENTERS

The following dealers are listed alphabetically within each state.

- |  |  |  |  |
|--|--|--|--|
| <b>CA, Tustin</b><br>Digital Ear<br>(714) 544-7903                 | <b>CA, Redondo Beach</b><br>Systems-Design Group<br>(213) 370-8575 | <b>MD, Kensington</b><br>Soundworks<br>(301) 929-8600            | <b>NM, Albuquerque</b><br>Absolute Audio Store<br>(505) 293-9092 |
| <b>CA, Santa Barbara</b><br>Mission Audio<br>(805) 682-7575        | <b>CO, Boulder</b><br>Listen Up<br>(303) 444-0479                  | <b>MI, Farmington Hills</b><br>Almas Hi Fi<br>(313) 553-4360     | <b>NC, Raleigh</b><br>Audio Advice<br>(919) 828-9221             |
| <b>CA, Monterey</b><br>Monterey Stereo<br>(408) 649-6303           | <b>CO, Colorado Springs</b><br>Listen Up<br>(303) 633-2600         | <b>MI, Rochester</b><br>Almas Hi Fi<br>(313) 650-1700            | <b>OH, Columbus</b><br>Progressive Audio<br>(614) 299-0565       |
| <b>CA, Santa Monica</b><br>Optimal Enchantment<br>(213) 393-4434   | <b>CO, Denver</b><br>Listen Up<br>(303) 778-0780                   | <b>MI, Royal Oak</b><br>Almas Hi Fi<br>(313) 549-8090            | <b>PA, Edgewood</b><br>Better Sound Concepts<br>(412) 731-3737   |
| <b>CA, Los Angeles</b><br>Paris Audio<br>(213) 820-1397            | <b>GA, Marietta</b><br>Audio Atlanta<br>(404) 499-0145             | <b>MI, Grand Rapids</b><br>Classic Stereo Ltd.<br>(616) 957-2130 | <b>PA, Willow Grove</b><br>Soundex Electronics<br>(215) 659-8815 |
| <b>CA, San Francisco</b><br>Performance Audio<br>(415) 543-4505    | <b>IL, Chicago</b><br>Superior Audio Systems<br>(312) 226-4848     | <b>MO, Columbia</b><br>Columbia Photo & Video<br>(314) 443-0503  | <b>TN, Nashville</b><br>Nicholson's Stereo<br>(615) 327-4312     |
| <b>CA, San Francisco</b><br>Performance Audio(2)<br>(415) 441-6220 | <b>KS, Overland Park</b><br>Audioport, Ltd.<br>(913) 341-2222      | <b>NE, Lincoln</b><br>Sound Environment<br>(402) 489-8766        | <b>TX, El Paso</b><br>Soundquest<br>(915) 779-5421               |
| <b>CA, Oakland</b><br>Pro Audio Electronics<br>(510) 654-6630      | <b>KS, Lawrence</b><br>Kief's Audio Video<br>(913) 842-1811        | <b>NE, Omaha</b><br>Sound Environment(2)<br>(402) 489-8766       | <b>WA, Seattle</b><br>Definitive Audio<br>(206) 524-6633         |
|  | <b>ME, Scarborough</b><br>New England Music Co.<br>(207) 883-4173  | <b>NJ, Lawrenceville</b><br>Hal's Stereo<br>(609) 883-6339       | <b>WV, Wheeling</b><br>Sterling Sound<br>(304) 243-1033          |

## AUDIOQUEST FULL LINE CENTERS

A few very dedicated dealers have made a total commitment to guarantee you access to all AudioQuest cables.

AQ Full Line Centers **stock, demonstrate, and loan** virtually the entire AudioQuest cable range. These dealers have made a very serious commitment. They can satisfy all your cable and accessory needs.

**AZ, Phoenix**  
Sounds Like Music  
(602) 993-3351

**FL, Tampa**  
Audio Visions  
(813) 871-2989

**MA, Arlington**  
Audio Vision  
(617) 648-4434

**MI, Dearborn**  
Almas Hi Fi  
(313) 584-1860

**NY, New York**  
Sound By Singer  
(212) 924-8600

**NY, New York**  
Stereo Exchange  
(212) 505-1111

Both lists have grown since preparing this ad. Please call 714-498-2770 to ask about new AQ Centers near you.

### FREE LASERGUIDE SAMPLE

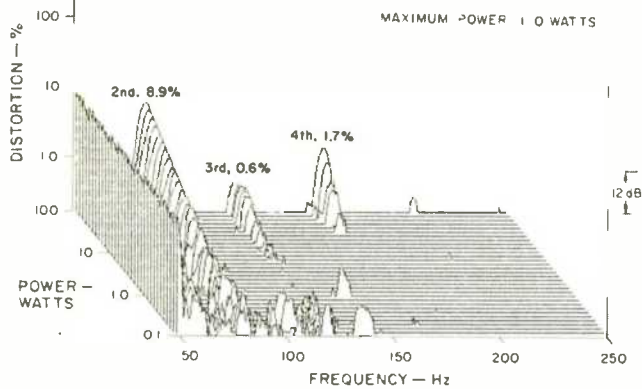
Please fill in this coupon and take it to your nearest AQ Center to receive a free sample of LaserGuide, the optical disc treatment (CD, LaserDisc, CD ROM) specifically designed to cut refraction on polycarbonate discs by 50%. A difference you can plainly see and hear.

Name \_\_\_\_\_

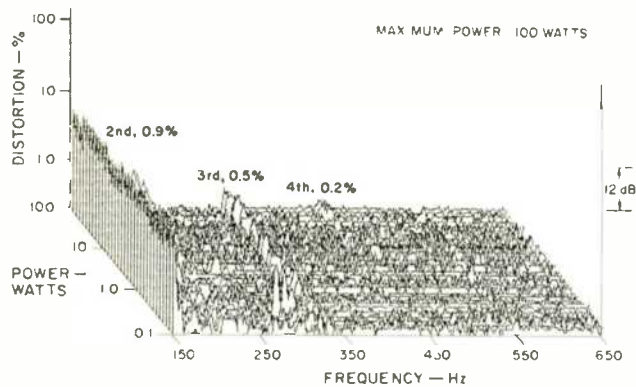
Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

The sound was wide-range, clean, and balanced, with excellent dynamic range and stable imaging.



**Fig. 11—Harmonic distortion products for the musical tone E<sub>1</sub> (41.2 Hz).**



**Fig. 12—Harmonic distortion products for the musical tone A<sub>2</sub> (110 Hz).**

into the rated 4-ohm impedance). The parameters of the time-delay spectrometer's sweep were chosen so as to include 13 mS of the room's reverberation along with the direct sound. The curve is well behaved and extended except for some room-effect response roughness below 1.5 kHz. Above 2.5 kHz, the curve is very smooth and flat, the best I've measured in my listening room.

The distortion of single-frequency tones versus power level, for the musical notes of E<sub>1</sub> (41.2 Hz) and A<sub>2</sub> (110 Hz), are shown in Figs. 11 and 12. Distortion products for A<sub>4</sub> (440 Hz) were below the measuring capability of my equipment.

These measurements indicate the level of harmonic distortion generated by the system with the application of a single-frequency sine wave at power levels from 0.1 to 100 watts (-10 to 20 dBW, a 30-dB dynamic range), in steps of 1 dB. The power levels were computed using the rated system impedance of 4 ohms (20 V rms = 100 watts, etc.).

The E<sub>1</sub> (41.2-Hz) harmonic distortion data is shown in Fig. 11. The full-power distortion, at 100 watts, only reached a moderate 8.9% second harmonic. At 41 Hz, 100 watts generates a loud 101 dB SPL at 1 meter. The A<sub>2</sub> (110-Hz) harmonic data is shown in Fig. 12. The second harmonic reached only 0.9% at full power, and the third was even lower, at 0.5%. At 110 Hz, the system generates a loud 104 dB SPL at 100 watts at 1 meter.

The IM on a 440-Hz (A<sub>4</sub>) tone, created by a 41.2-Hz (E<sub>1</sub>) tone of equal input power level, is shown in Fig. 13. At full power, the distortion only reached 3.6%. The distortion specs of the Stratus Gold are among the lowest I have measured.

The short-term, peak-power tone-burst input and output capabilities of the system are shown in Figure 14. The peak input power was calculated by assuming the measured peak voltage was applied across the rated 4-ohm impedance. At higher frequencies, where the Stratus Gold's impedance is near 8 ohms, this results in higher than actual power levels, and vice versa when the impedance is below the rated 4 ohms.

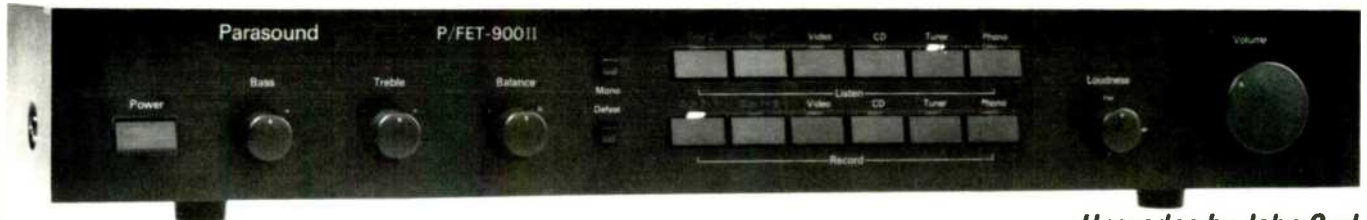
The lower curve of Fig. 14 shows the maximum power-handling capacity of the Stratus Gold. At all frequencies above 125 Hz, the output limit of my power amplifier (a Crown Macro Reference) was reached before the speaker's limit was reached! The jump in input power between 400 and 500 Hz is a result of my changing the amplifier from parallel-mono to bridged-mono operation. The parallel-mono mode is used for loads below 4 ohms (like the Stratus Gold's impedance from 50 to 400 Hz), while bridged mono is best for loads of 4 ohms or more. Above 800 Hz, the system could handle peak voltages in excess of 200 V, which is 10 kW into a 4-ohm load or 5 kW into 8 ohms, and still provide somewhat clean output and not be harmed. ("My speaker can handle 10,000 watts, nyah nyah nyah!") The mid- and low-frequency power-handling capacity of the Stratus Gold was also very good, more than 100 watts at 20 Hz. The power levels were so high that the lights in my lab were keeping time with the test bursts!

The upper curve in Fig. 14 represents the peak sound pressure levels the Stratus Gold can generate at a distance of 1 meter on axis for the power levels shown in the lower curve. Also shown on the upper curve is the "room gain" of a typical listening room at low frequencies, which adds about 3 dB to the response at 80 Hz, and 9 dB at 20 Hz. Above 500 Hz, the peak output rises to nearly 126 dB. With room gain, a single Stratus Gold can generate peaks in excess of 110 dB SPL above 26 Hz, and 120 dB above 60 Hz! Of course, these figures will improve for two systems operating in stereo with bass signals that are common to both channels. The Stratus Gold definitely does not require a subwoofer! Its maximum output in the low-frequency range from 30 to 150 Hz exceeds that of most of the speakers I have evaluated with this test.

# Parasound

*The Class A discrete FET*

## **P/FET-900II Preamplifier**



*Upgrades by John Curl*

*And the sonically similar*

## **C/PT-1000R Preamp-Tuner**



# PRE-EMINENTS

Premiering Parasound's latest preamplifier and preamp-tuner.

Famed designer John Curl has upgraded both line and phono stages in the superb new P/FET-900II.

The first preamp-tuner with an FET line stage, the versatile C/PT-1000R also features wireless remote control.

Feel the genius in these pre-eminent designs.

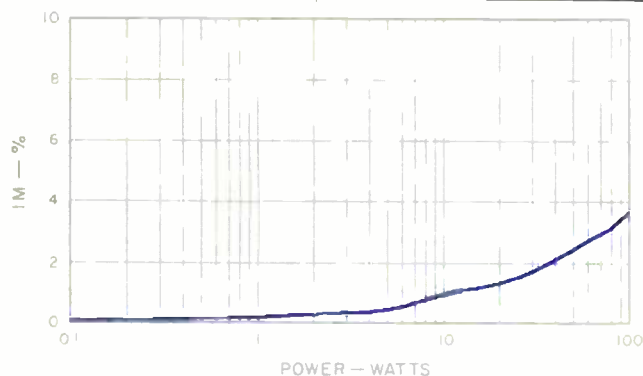
Hear them now.

**Parasound**

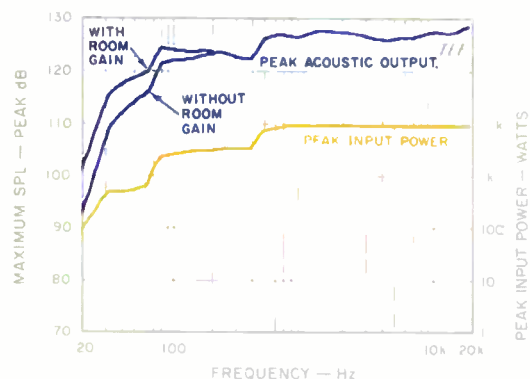
*affordable audio for the critical listener*

- CMOS contact-free electronic switching
- Precision German Roederstein resistors
- German Wima audiophile-grade capacitors
- Gold-plated circuit board mount connectors
- Defeatable tone controls, variable loudness
- Two pairs of line output connectors
- All discrete FETs, no ICs P/FET-900II
- Separate record & dub selector P/FET-900II
- Glass epoxy circuit boards P/FET-900II
- AM/FM tuner, mpx blend switch C/PT-1000R
- Smooth FET line stage C/PT-1000R
- High, low and CD focus filters C/PT-1000R

Bass organ notes that had made my reference speakers stumble were handled without a whimper by the Stratus Golds.



**Fig. 13—IM distortion on 440 Hz (A<sub>4</sub>) produced by 41.2 Hz (E<sub>1</sub>), mixed in one-to-one proportion.**



**Fig. 14—Maximum peak input power and maximum peak sound output vs. frequency at 1 meter on axis. The power-handling capabilities are extremely high; see text.**

### Use and Listening Tests

The Stratus Gold systems have been designed for flat response without the aid of any nearby reflective boundaries that may provide bass reinforcement. This made them very suitable for use in my usual speaker positions, a significant distance from any reflecting surfaces. All listening was done in my listening room, which measures 15½ x 27 x 8 feet, with the Stratus Golds 8 feet apart and canted in

toward my listening position on the sofa, about 10 feet away. This location placed them about 6 feet away from the short rear wall and 4 feet from the side walls.

Driving equipment included the Onkyo Grand Integra DX-G10 and Enlightened Audio Designs (EAD) "Ultra" modified Rotel RCD-855 CD players, along with the Jeff Rowland Consummate preamp and Model 7 power amplifiers, all connected with Staigh Wire Maestro interconnects and speaker cables.

I did most of the listening before the measurements, although some listening was done after I had replaced the tweeters with known good units. It turned out that only one of the original tweeters was not typical. None of the after-the-fact listening tests changed my original impressions of the systems.

Connection to the Stratus Gold is through a pair of heavy-duty double-banana jacks on the bottom of the system. Two pairs of jacks are provided, to facilitate bi-wiring the system. For the non-bi-wired state, the pairs are connected with large gold-plated straps. Because the jacks are on the bottom of the system, attachment of the cables is difficult unless the system is lying on its side. Since I had to make and break connections several times during these tests, I took a shortcut, doing a balancing act by tipping the system slightly forward, reaching under the rear of the system with plug in hand, and making connection by feel. But this really is not the way to do it, because the system could fall forward! I did not bi-wire the Stratus Golds for my listening evaluations.

The appearance and the fit and finish of the Golds are excellent. My wife and family really liked the oak finish. Particularly handsome are the bevelled top and base of the system; it's quite obvious that they are made from solid pieces of oak, because the wood grain maintains continuity all around the edge and along the bevels.

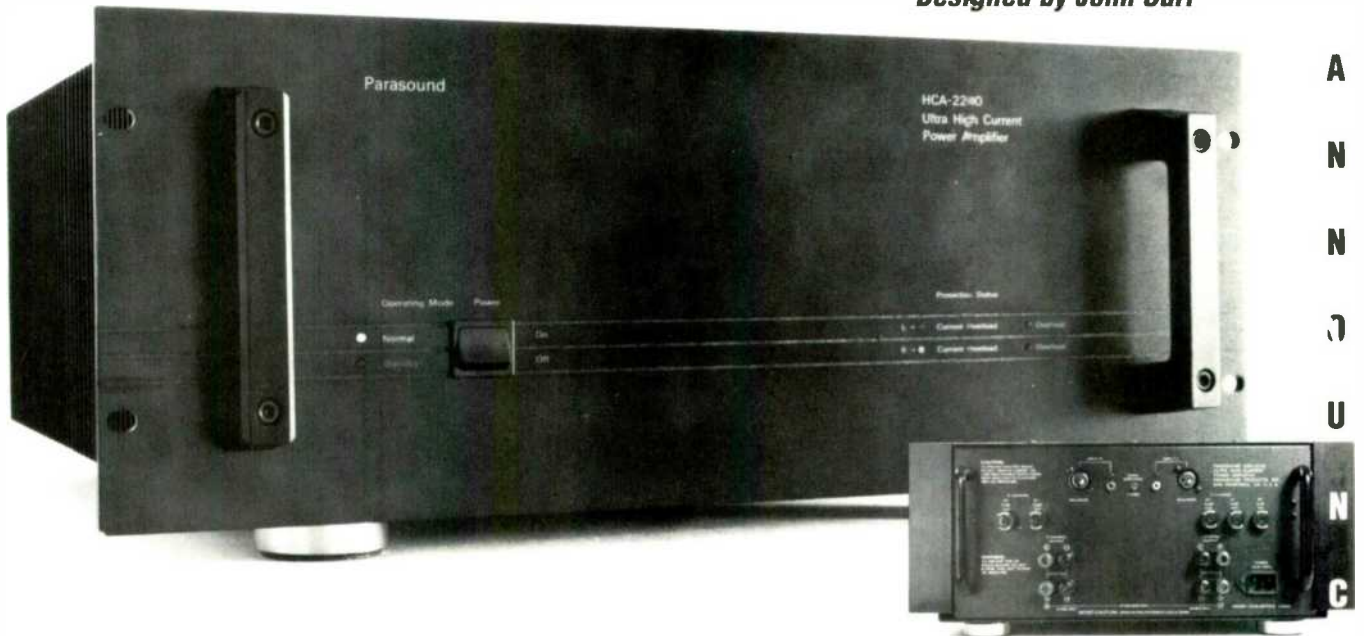
The Stratus Golds produced a very clean, balanced, wide-range sound that competed with my reference systems (B & W 801 Matrix Series 2) on nearly an equal basis. The PSB systems were slightly more bright than the references, with a very open, revealing character. With the grilles off, they were noticeably brighter than the reference systems, but with the grilles on, the high-frequency differences were much smaller. Overall, however, I preferred the system's sound with the grille off, and all the following listening was done in that condition.

Andrew Rangell's piano playing on J. S. Bach's *The Goldberg Variations* (Dorian DOR-90138, a great piano CD) demonstrated the Golds' good balance, presence, and smooth upper bass. Orchestral climaxes on Igor Stravinsky's *Petrouchka* and *Rite of Spring* (Chesky CD 42, one of Chesky's excellent CD remasterings of early '60s analog recordings) were reproduced very cleanly and demonstrated the Golds' excellent dynamic range. The organ pedal notes played by E. Power Biggs, on the Saint-Saëns "Organ" Symphony (CBS Odyssey MBK 38920, another good remastering from an old analog source) were handled very well, but the upper harmonics of the strings on the same selection were emphasized a bit too much for my taste.

With the Consummate preamplifier in mono mode, the center image of the Gold loudspeakers was very stable with

# Parasound

*Designed by John Curl*



## CURRENT EVENT

*THE ULTRA HIGH CURRENT*

**H C A - 2 2 0 0 P O W E R A M P**

Parasound announces our world-class amplifier, designed by John Curl.

World-renowned over 20 years for his brilliant advances in high-end audio. You can feel his genius in the stunning new HCA-2200.

Hear it now.

**Parasound**

*affordable audio for the critical listener*

- 50 amp continuous, 90 amp peak current
- 220 watts/ch. 8 $\Omega$ , 365 watts/ch. 4 $\Omega$  or 2 $\Omega$
- 750 watts mono 8 $\Omega$ , 1,000 watts mono 4 $\Omega$
- 130V/ $\mu$ second slew rate, DC servo coupled
- Dual-mono twin 1200VA toroid transformers
- 100,000mF computer grade capacitors
- Independent regulation of Mosfet drivers
- Matched complementary J-FET inputs
- 24 B-matched 60MHz, 15A output transistors
- Balanced XLR and gold unbalanced inputs
- Two pairs of 5-way terminals for bi-wiring

The PSB Stratus Golds will appeal both to audiophiles who emphasize accuracy and to a wider audience that wants loud but clean rock.

frequency and was of minimal width. Imaging and sound-staging were both top-rate.

The Stratus Gold passed the pink-noise, stand-up/sit-down test with excellent results. Hardly any noticeable tonal changes in upper-mid response were noted at any position, sitting or standing. The systems' low-frequency output on third-octave band-limited pink noise equalled that of the reference systems at all frequencies from 31.5 Hz on up. However, in the two lower third octaves, at 20 and 25 Hz, the Gold's output was diminished and was accompanied by significant chuffing sounds in the vented-boxed ports. The third-octave low-frequency test signal is very demanding because the signal causes high woofer displacement (and resulting high port velocities), but it does not have any higher frequency spectral components that can mask the air-rush noises. Typical program material having high low-frequency energy levels always has some higher frequency content that usually masks these types of noises.

The bass notes between 3:41 and 3:44 on track 15 of Dorian's very demanding organ version of *Pictures at an Exhibition* (DOR-90117), when the organ is played all-stops-out during the finale, made my reference systems stumble. But the Stratus Golds handled the difficult passage without a whimper (and even at higher playback levels!). Track 2, however, at times 0:50 to 1:02, contained some program information that triggered the front-panel vibration in the

lower area of the woofer, noted in the "Measurements" section. (I searched for such a passage after I had done the measurements.)

The dynamic range of the Stratus Gold was nicely demonstrated by playing the heavy-metal track "Rock and Roll Animal" from the CD *The Final Frontier* by Keel (MCA Records MCAD-5727) at near concert levels. (I'll bet you didn't know that the lead singer of this group, Ron Keel, is my twin brother—just kidding!) For those *Audio* readers who like to play music (?) at these levels, the Golds will do it very nicely.

The solo electric bass passage starting at time 3:04 from "The Chain" on Fleetwood Mac's *Rumours* CD (Warner Bros. 03010-2) could be played loud and clean, with a low end that could be felt! The hand-claps and cymbal crashes on track 9, "I Don't Want To Know," were particularly effective through these PSB systems.

At \$2,000 a pair, the Stratus Golds provide considerable performance and first-class looks for the money. They should appeal both to the audiophile crowd, for whom accuracy, balance, and imaging are important, and to a wider audience that likes loud rock 'n' roll, for whom the ability to play loudly and cleanly is important. The low impedance of the Golds through the upper bass range, however, means that higher quality, more expensive amplification is required along with low-impedance cabling.

D. B. Keele, Jr.

# Evolution of Sound



**High sensitivity/low impedance transducers:** superb performance at amazingly high volume **High-Tech design:** advanced design for today's look **Padded unbreakable headband:** fully adjustable for easy listening comfort **Ultra lightweight:** ideal for travel or use at home **Combination plug:** suitable connection for home stereo, VCR and personal/portable equipment **TV version:** personal listening with independent volume control and long headphone cable. Features and benefits leading towards the **Evolution of Sound** from beyerdynamic

Please send me more information.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**beyerdynamic** 

5-05 Burns Ave. Hicksville, NY 11801  
tel. (516) 935-8000 · fax (516) 935-8018

Enter No. 8 on Reader Service Card

# THE 1966 FORD MUSTANG



Replica shown smaller than 7 1/2" actual length.

Photos depict replica not actual car.

## A Meticulously Engineered Die-Cast Metal Replica of One of America's Greatest Cars

In 1964, the Ford Motor Company introduced its legendary Mustang, and the car took America by storm!

The Mustang opened to rave press reviews and unbelievable sales success... over 1,200,000 cars sold by the end of the 1966 model year! This unique cross between a sports car and family sedan gave a lot of "bang for the buck" and became an instant American classic.

The Mustang never failed to deliver extraordinary performance and great looks for a terrific price. Now, you can own a remarkably detailed replica of this fabled classic car.

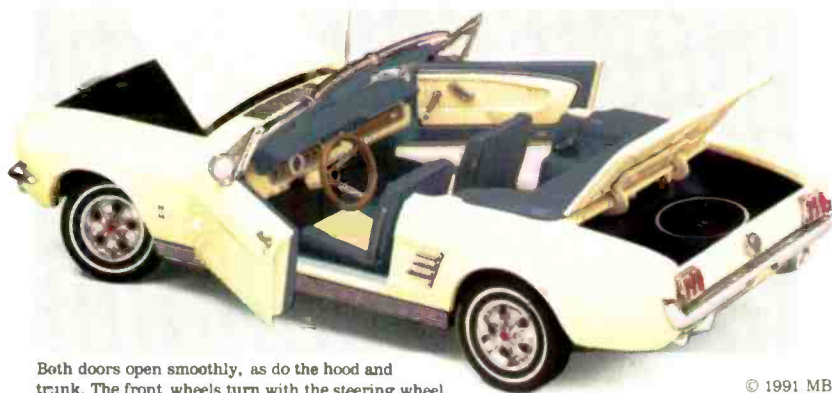
### Hand-assembled!

Over 140 scale parts go into making this authentic replica in the large 1:24 scale. All the important components – the body, chassis, drivetrain and engine block – are crafted in metal and polished before painting. Every single component is inspected before the replica is assembled by hand.

### A Danbury Mint exclusive.

This extraordinary replica is available exclusively from the Danbury Mint. You need send no money now. Simply return the Reservation Application. The price of \$88.50 is payable in three monthly installments of \$29.50.

Reservations are accepted on a first-come, first-served basis. Mail your reservation today!



Both doors open smoothly, as do the hood and trunk. The front wheels turn with the steering wheel.

*The Danbury Mint*

47 Richards Avenue • Norwalk, Conn. 06857

### RESERVATION APPLICATION

## THE 1966 FORD MUSTANG

The Danbury Mint  
47 Richards Avenue  
Norwalk, Conn. 06857

Please return promptly.

Please accept my Reservation Application for the 1966 Ford Mustang. I need send no money now. I will pay for my replica in three monthly installments of \$29.50\*, the first in advance of shipment.

My satisfaction is guaranteed. If I am not completely satisfied with my replica, I may return it within 30 days of receipt for prompt replacement or refund, whichever I prefer.

\*Plus any applicable sales tax and \$1.25 shipping and handling.

Name \_\_\_\_\_

Please print clearly

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_

Check here if you want each installment charged to your:

VISA  MasterCard  Discover  Am. Exp.

Credit Card Number \_\_\_\_\_ Exp. Date \_\_\_\_\_

Signature \_\_\_\_\_

Name to print on certificate of ownership (if different from above)

Allow 4 weeks after initial payment for shipment.

457E4A1

## 2

## LUXMAN F-114 SURROUND SOUND PROCESSOR/ AMPLIFIER

### Manufacturer's Specifications

#### Power Amplifier Section

**Power Output (8-Ohm Loads):** 50 watts per channel, 20 Hz to 20 kHz.

**Rated THD:** 0.05%.

**Dynamic Power, Center Channel:** 70 watts into 8 ohms, 100 watts into 4 ohms, 140 watts into 2 ohms.

**IM Distortion at 50 Watts:** Less than 0.07%.

**Peak Short-Circuit Current:** 20 amperes.

**Damping Factor, 50 Hz, 8 Ohms:** 60.

**Frequency Response:** 7 Hz to 80 kHz, +0, -1.0 dB; 3 Hz to 200 kHz, +0, -3 dB.

**Input Sensitivity:** 1.0 V.

**Slew Rate:** 30 V/ $\mu$ S.

#### Preamplifier/Surround Processor Section

**Input Sensitivity (Full Gain):** 150 mV.

**Input Overload:** More than 9.0 V.

**Input Level Control Range:** 28 dB.

**Frequency Response (+0, -3 dB):** Front channels, 3 Hz to 200 kHz in "Bypass" mode, 15 Hz to 25 kHz in "Normal" (Dolby Pro-Logic) mode; center channel, 15 Hz to 25 kHz in "Wide" mode; rear channels, 40 Hz to 7 kHz in Dolby Pro-Logic modes.

**S/N (re: 500-mV Input, 0-dB Gain):** Front channels, 95 dB in "Bypass" mode, 90 dB in "Wide" mode; center channel, 90 dB in "Wide" mode; rear channels, 75 dB in Dolby Pro-Logic modes.

**Preamp Output Levels:** Variable, 1.0 V; fixed, 300 mV.

**Rear-Channel Delay:** 15 to 30 mS in Dolby Pro-Logic modes, 5 to 80 mS in "Hall" or "Stadium" mode.

#### Video Section

**Video Bandwidth (-3 dB):** 20 Hz to 7 MHz.

**Input/Output Level:** 1.0 V peak to peak/75 ohms.

#### General Specifications

**Power Requirements:** 120 V a.c., 60 Hz, 50 watts (no signal).

**Dimensions:** 17 $\frac{1}{4}$  in. W x 4 $\frac{3}{4}$  in. H x 14 $\frac{3}{4}$  in. D (43.8 cm x 12.1 cm x 37.5 cm).

**Weight:** 17.2 lbs. (7.8 kg).

**Price:** \$800.

**Company Address:** 19145 Gramercy Place, Torrance, Cal. 90501.

For literature, circle No. 91





Luxman has long been noted for doing things a bit differently, and its recently introduced F-114 surround sound processor/amplifier carries on that tradition. Rather than attempt to incorporate everything for the audio requirements of a five-channel "home theater" installation, Luxman has chosen to design the F-114 with owners of existing stereo systems in mind. So if you own a stereo receiver or a stereo integrated amplifier, you need only add the F-114 and three speakers (one center and two rear) to enjoy Dolby Pro-Logic decoding of video movie soundtracks, as well as concert hall, stadium, and simulated stereo effects. Also, one of the three Dolby Pro-Logic modes accommodates those who do not wish to add a center-channel speaker. The F-114 is so configured that any or all of its outputs may be fed to separate, more powerful amps if desired; when used in this way, the unit can be thought of as a surround sound processor/preamplifier.

The Dolby Pro-Logic circuitry used in the F-114 consists of a purely analog decoder with low-noise digital delay for the rear channels. Each of the three amplifier channels has an FTC power rating of 50 watts per channel into 8 ohms. Each can deliver 140 watts into 2 ohms under dynamic music conditions. The amplifier design uses discrete driver and output devices in a Darlington full-complementary configuration. A black-anodized, finned heat-sink provides the needed heat dissipation. A heavy double-shielded transformer, fast-recovery rectifier diodes, and large filter capacitors are used in the power supply. The amplifiers incorporate Luxman's Duo-Beta feedback design, utilizing one full-range feedback loop to widen bandwidth and improve transient response, and another, direct-coupled servo loop to maintain d.c. balance while providing good control of subsonic woofer motion.

The F-114 is supplied with a full-function remote control that, among other things, can be used to govern the unit's motor-driven master volume control. When the F-114 is hooked to a TV monitor, an on-screen display shows surround settings, rear delay time, and channel levels. A pink-noise test generator is provided for adjusting relative levels of all speakers when using Dolby Pro-Logic. Separate center- and rear-channel level-adjustment controls are found on both the front panel and the remote. Jacks are provided for



control interlinks with some other Luxman components having "Bus Line" jacks, and for connection of remote-control receptors in other rooms.

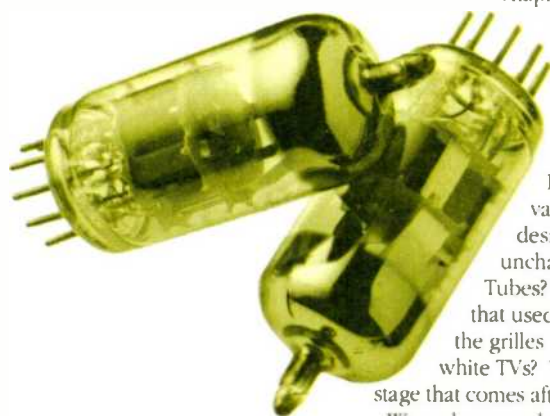
### Control Layout

Versatile as the F-114 is, Luxman has still managed to give it a fairly simple and unimposing front-panel layout. The power switch is at the extreme left. Nearby is a display with an LED showing approximate input level for each channel and a digital readout showing time delay in mS or output level in dB. Further to the right are indicators for the surround mode in use. Mode selection is handled by a row of seven pushbuttons to the right of the display. The first three, for Dolby Pro-Logic, are "Normal," "Phantom" (for use without a center speaker), and "Wide" (for use when the center-channel speaker is a full-range unit able to handle bass frequencies). The next three buttons select "Simulated Stereo," "Hall," or "Stadium." The seventh pushbutton, "Bypass," changes the sound back to normal stereo, with only the stereo system's original left and right front amps and speakers operating. This mode might be used for comparison with surround stereo or for reproducing program sources that don't lend themselves to surround processing. A button for selecting the desired time delay is near the display, while a large rotary master volume control is at the right. Additional controls arranged along the lower edge of the front panel include center and rear speaker on/off buttons, rotary knobs for input level and balance, and buttons to raise and lower rear and center volume.

Most of the aforementioned functions are accessible from the remote control. Additional functions found only on the remote include "On/Off" and "Manual" buttons for the test-

# CAN TUBES WARM UP CD SOUND?

How a very old technology can make a brand new compact disc player sound extraordinarily good.



Our new SD/A-490t has a clock that "ticks" 33 million times a second, multi-stage noise shaping, pulse width modulators and enough other edge-of-the-art circuitry to finally qualify us for entry into the hallowed Compact Disc Techno-Jargon Hall of Fame.

But it also includes two vacuum tubes whose classic design has remained unchanged for over 35 years.

Tubes? Those warm glass things that used to glow cheerily through the grilles of old radios and black & white TVs? Yes. In an important circuit stage that comes after all the digital wizardry.

We and many other critical listeners believe that this anachronistic addition to an already excellent CD player design significantly enhances its sound. Read on and decide for yourself.

## THE AMPLIFIER THAT DOESN'T AMPLIFY.

Between a CD player's D/A converter and external outputs is circuitry called a buffer amplifier stage. When you hear the word amplifier, you think of something which makes a signal louder. But that's not a buffer amp's purpose. In fact, contrary to popular lore, a CD player's buffer amplifier doesn't boost the signal strength at all — the final output of a CD player's D/A converter already has sufficient voltage to directly drive a power amplifier!

Instead, the buffer amp is a *unity gain* device which 1) increases output current, and 2) in the process, acts as a sort of electronic shock absorber.

A signal emerging from a CD player's digital-to-analog conversion process has sufficient voltage but insufficient current for proper interaction with a preamplifier or power amp. By acting as a current amplifier, the buffer stage helps lower impedance to a level that's

compatible with modern components — about 50 ohms in the case of the SD/A-490t.

At the same time, the buffer stage helps isolate the relatively fragile D/A chip set from the nasty outside world of demanding analog components.

## TUBES VERSUS SOLID STATE.

All compact disc players have buffer amplifiers. But more than 98% of them use solid state devices for this stage: either integrated op-amp circuits or discrete transistors.

A handful of hard-to-find, esoteric designs in the \$1200 to \$2500 range employ one or more tubes instead. As does our readily-available \$699 SD/A-490t. For fundamental physical reasons, tubes have different transfer function characteristics than transistors. When used in ultra-expensive, audiophile preamplifiers and power amplifiers, their sound is variously described as "mellower", "warmer", "more open and natural" or simply "less harsh than solid state".

At the heart of these perceived differences are three basic facts:

1. Tubes produce *even*-order distortion (i.e. 2nd, 4th, 6th harmonics, etc.) while transistors create *odd*-order distortion, particularly 3rd harmonics which are less psychoacoustically pleasant.
2. In a buffer stage, a tube acts as a pure Class A device, which is considered the optimal amplifier configuration. Op-amps function as Class A in and Class B out, with potential crossover distortion as voltage swings from positive to negative.
3. Tubes "round off" the waveform when they clip. When over-driven, solid state devices cut off sharply, causing audible distortion.

## THE SD/A-490t'S OUTPUT SECTION

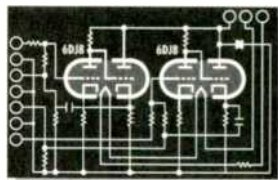
Our new CD player uses two 6DJ8 dual triodes (each literally two separate tubes in a single glass envelope) placed between the digital-to-analog converter and a motorized volume control.\*\*

Operated at less than 30% of their maximum capacity, these tubes achieve a highly linear output voltage with very low static and transient distortion while providing very high dynamic headroom.

And because they're "loafing" at 1/3 their rated current capability, the SD/A-490t's tubes are designed to last the life of the CD player without replacement or need for adjustment.

## A "LESS IS MORE" DIGITAL APPROACH FOR CLEANER ANALOG SOUND.

It would be pointless to have a tube output stage if the digital circuitry which precedes it





wasn't first rate. The SD/A-490t uses Single-Bit D/A circuitry to eliminate a form of exceedingly audible distortion inherent in most current CD player designs, and to provide better signal linearity than ever before.

If you've read current CD player brochures, you've probably stumbled across descriptions of de-glitcher circuits, laser trimming and even 22-bit converters. All these are merely fixes, applied to the same basic kind of D/A converter in an attempt to overcome built-in shortcomings.

In contrast, the SD/A-490t uses a completely new technology which avoids many of the problems that older approaches have struggled to surmount. We'd have to buy a whole section in this magazine to fully explain the differences (if you're interested, call 1-800-443-CAVR for an appropriately long and detailed brochure), but here's a short synopsis.

Traditional converters require 16 separate reference circuits, each of which must be accurate to one part in 65,536 — but, due to the realities of mass production, rarely are. If they're not "dead-on", an unpleasant form of noise called *zero-cross distortion* is produced. Because Carver's Single Bit D/A Converter transforms a 16-bit signal into a 1-bit pulse signal array, the "ladder" of 16 ultra-high-precision reference devices is not required: In effect, the SD/A-490t need only manipulate a stream of varying-width on/off pulses instead of having to accurately create 65,536 different amplitude levels at all times.

Zero-cross distortion is non-existent, and the SD/A-490t's Single Bit converter is able to decode linearity in excess of 115 dB below peak level with exceptionally low noise. You'll particularly notice the difference in the heightened purity and clarity of music during very quiet passages. Every nuance, intonation and harmonic of the original recording is there. Yet

*The Carver SD/A-490t. At \$699, its suggested retail is \$500 less than the nearest competitor with tube output\*\**

"digital" harshness is noticeably absent even before it enters the SD/A-490t's mink-lined tube stage.

### AN ARRAY OF FEATURES AS RICH AS ITS SOUND.

We've designed the SD/A-490t to be both useful and easy-to-use. 21-key front panel or remote programming. Fixed and variable output. Programming grid display.

Random "shuffle" play. Variable length fade. Automatic song selection to fit any length of tape. Even index programming for classical CD's.

Plus our proprietary Soft EQ circuitry which compensates for variables in spacial (L-R) information and midrange equalization found in many CD's mastered from analog tapes.

### BRING YOUR TWO BEST CRITICS TO A CARVER DEALER.

It's tempting to further regale you with how well we think the SD/A-490t's tubes and Single Bit circuitry improve the sound of a compact disc. But your own ears should be the final arbiter of quality.

Thus you are invited to bring a few familiar compact discs down to your local Carver dealer and compare for yourself, hopefully creating your own superlatives in the process.

Suffice it to say that almost all critical listeners not only are able to hear a difference, but prefer the sound of the remarkably affordable SD/A-490t's dual triode transfer function.

### THE SD/A-490t

- Dual 6DJ8 Vacuum Tube Output Stage
- Over-sized Disc Stabilizer Transport
- 24-Track Programming with 21-key front panel & remote input
- Music Calendar Display
- Indexing
- Random Play
- Motorized Volume Control
- Time Edit/Fade Taping Feature with user-variable time parameters
- 2 to 10 Second Variable Length Fade
- Exclusive Carver Soft EQ (Digital Time Lens) circuitry
- Optical and Coaxial
- Digital Outputs
- 3-inch (8cm) CD Compatibility



*Bob Carver*

# CARVER

CARVER CORP. LYNNWOOD, WA. U.S.A.  
Call 1-800-443-CAVR for information and dealer listings.

*\*A device which neither amplifies nor attenuates a signal is said to have unity gain. In other words, what goes in comes out unchanged. Or does it?*

*\*\*Remote control variable output is a wonderfully convenient feature, but it would be pointless to eliminate solid state circuitry in the buffer amp stage and then use a solid state circuit for the final gain attenuator. So the SD/A-490t changes volume the old fashioned, physical way: a nice, clean carbon potentiometer, in this case, physically rotated by a small motor.*

*\*\*\*Source: 1998 *Audio Magazine* Annual Equipment Directory.*

The remote control not only lets you operate the unit from your chair but lets you display its status on your TV screen.

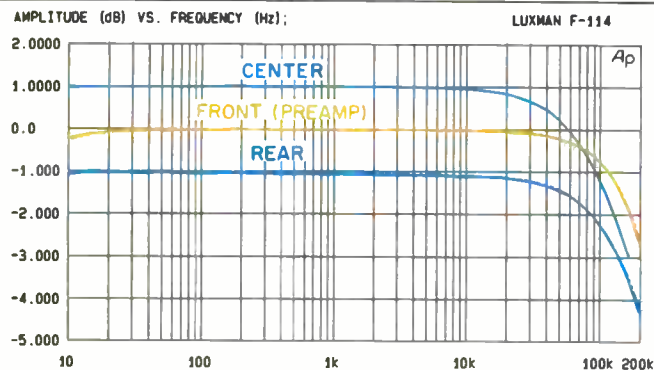


Fig. 1—Frequency response; curve for front-channel preamp output was taken in "Bypass" mode. Center- and rear-channel curves have been displaced for clarity.

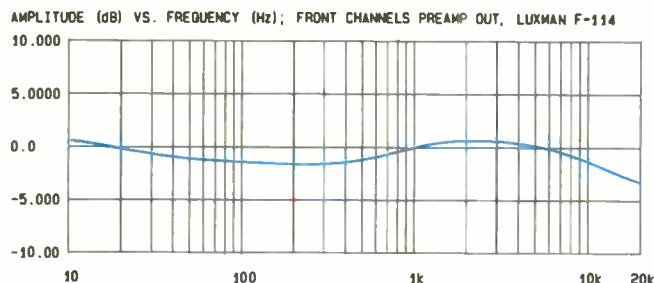


Fig. 2—Frequency response of front-channel amplifier in "Stadium" mode, smoothed and normalized; see text. Note change of scale from Fig. 1.

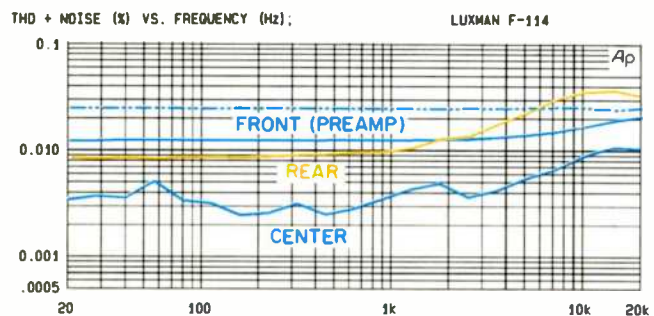


Fig. 3—THD + N vs. frequency for center and rear amplifiers at full rated power (50 watts/channel into 8 ohms) and for left and right front preamp outputs in "Bypass" mode. The difference between the left channel (solid curve) and right channel (dashed curve) is probably due to noise rather than distortion.

tone generator and a "Display" button used to show the unit's functional status on the screen of a connected video monitor.

The rear panel is equipped with a pair of line input jacks, fixed and variable preamplifier outputs for the front channels, fixed-level outputs for the rear and center channels (including a pair of center outputs, for some reason), and variable rear and center outputs connected by wire jumpers to their respective amplifier inputs. Five-way binding posts are provided for rear and center speaker connections. One video input and one video output are provided; presumably, those owning several video program sources will hook them to their main A/V receiver and connect the receiver's video output to the F-114, as shown by a diagram in the manual. Other jacks include a ground terminal, the "Serial Remote" input and output jacks for Luxman's multi-room remote-control system, and "Bus Line" jacks for hookups to other, similarly equipped Luxman components.

### Measurements

As I have indicated in previous test reports, it is extremely difficult to measure the frequency response and distortion versus frequency of surround processors because of the time delay between their inputs and outputs. Happily, the Luxman F-114 at least makes it easy to measure the performance of the three power amplifier channels by feeding signals into them directly.

Figure 1 illustrates the extremely flat response of these amplifiers—nearly as flat as that of the front preamp outputs, which I have included for comparison. (These front outputs would normally feed the signal back to the tape monitor or play inputs on your main system's receiver, preamp, or integrated amp, to reestablish a signal path to your front speakers.) To obtain this response curve for the front preamp outputs, I used the "Bypass" mode, which eliminates all surround sound processing.

Figure 2 represents my attempt to plot the response of the preamplifier/surround processor section of the F-114 when it was set to the "Stadium" mode. Attempting to plot a response curve where time delay is involved results in a series of jagged hills and valleys, as the metering system of my Audio Precision System One test gear tries (in vain) to follow the changing, but delayed, frequencies during a sweep. The Audio Precision gear has a "smoothing" function, however, which, with enough passes, averages out these false peaks and valleys. The result is shown in Fig. 2, and as claimed, response extends just beyond 20 kHz for the -3 dB point.

Figure 3 shows THD + N versus frequency for the F-114's power amplifiers and front preamp outputs. The amplifier stages easily met their distortion specifications at rated power output (50 watts per channel) at all frequencies from 20 Hz to 20 kHz, as shown in the graph. At mid frequencies, rear-channel THD + N is around 0.01%, rising to around 0.03% at 20 kHz, still well below the 0.05% THD rating. Center-channel THD + N is even lower, with readings as low as 0.004% at 1 kHz and just over 0.01% at 20 kHz. Once again using the "Bypass" mode, I measured THD + N versus frequency at the preamplifier output jacks, for a rather substantial 2.0 V output. While THD + N is

# AUDIO ON-SALE AT THESE FINE STORES

## AUDIO DEALER LISTING

### ARIZONA

**Phoenix**  
Sounds Like Music  
2734 W. Bell Road - Suite 1306

### CALIFORNIA

**Los Angeles**  
Henry Audio  
2050 S. Bundy Drive

### Newport Beach

Audio By Design, Inc.  
1000 Bristol St., N.

### San Diego

Stereo Design  
9353 Clairmont Mesa Blvd.

### Victorville

ON THE GO AUDIO  
12401 Hesperia Rd., Unit #5

### COLORADO

**Boulder**  
Listen Up Inc.  
2034 Arapahoe Street

### Colorado Springs

The Sound Stop  
528 South Tejon

### CONNECTICUT

**Milford**  
Starlander Beck  
354 Woodmont Rd.

### DELAWARE

**Newark**  
Hale Corp.  
70 E. Main Street

### FLORIDA

**Daytona Beach**  
Crystall Clear Sounds  
2800 S. Nova Rd.

### Miami

Joe's News  
1549 Sunset Drive

### Oakland Park

Commercial Audio/Video  
2904 N.E. 8th Terr. #203

### INDIANA

**Michigan City**  
Audio Connection  
324 Dunes Plaza

### Portage

Who's Your Entertainment  
P.O. Box 22

### LOUISIANA

**Baton Rouge**  
Art Colley's Audio Specialists  
711 Jefferson Hwy

### MAINE

**Limestone**  
Gervais Sound Center  
53 Foster Avenue

### MARYLAND

**Lutherville**  
Gramophone Ltd.  
10801 Tony Drive

### MASSACHUSETTS

**Northhampton**  
Sound & Music Inc.  
Millbank Place 351  
Pleasant Street

### Otis

Custom Audio Works  
Route 8

### Plymouth

PM Systems  
20 Court St.

### MICHIGAN

**Bad Axe**  
Grewe Systems Ltd.  
112 S. Port Crescent

### Dearborn

Little Professor  
22174 Michigan Ave.

### Rochester

Rochester Book Center  
1410 Walton Blvd.  
Rochester Hills Plaza

### MISSISSIPPI

**Oxford**  
Curtis Mathis Home Ent.  
2008 University Ave.

### 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

**Batavia**  
Unicorn Audio  
206 E. Main

### Hicksville

Avtronics Ltd.  
260 Old Country Road

### Lake Grove

Audio Den Ltd.  
Smith Haven Plaza  
2021 Nesconset Hwy

### Lake Placid

Audio-Vision  
Cold Brook Plaza

### Merrick

Performance Audio Svc.  
2064 Sunrise Hwy

### New Paltz

New Paltz Audio  
Cherry Hill Center

### New York

Park Avenue Audio  
425 Park Avenue South (29th St.)

Stereo Exchange Inc.  
194 Mercer Street

### Orchard Park

Stereo Chamber Inc.  
Union & Orchard Pk. Rds

### NORTH CAROLINA

**Bollington**  
America Multimedia  
P.O. Box 215 A

### Durham

CD Superstore  
5410 N. Highway 55

### Morganston

Audio Service Center  
202 S. Sterling Street

### 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.

### PENNSYLVANIA

### Wexford

Audio Insights  
10441 Perry Hwy #13

### TEXAS

### Dallas

Omni Sound  
19020 Preston Rd.

### Houston

Home Entertainment  
2617 Bissonnet

Soundscape  
2304 Portsmouth

### McAllen

Showery Stereo  
320 S. 10th

### VIRGINIA

### Richmond

Stereo Trading Post  
8705 W. Broad Street

Stereo Trading Post  
9550 Midlothian Tpke.

### WASHINGTON

### Seattle

Bull Dog News  
4208 University Way N.E.

Definitive Audio  
6017 Roosevelt Way N.E.

### WISCONSIN

### Williamsbay

Musics Greatest Hits & Co.  
186 Elcorn Rd.

### NOVA SCOTIA

### Sydney

Powerhouse Audio Video  
337 Welton Street

### MANITOBA

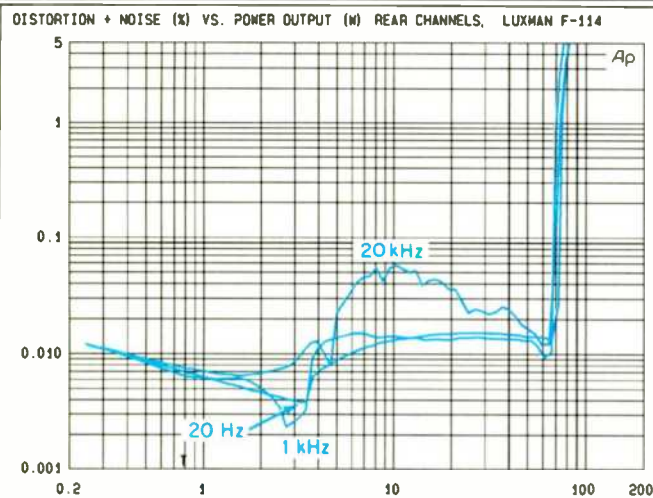
### Winnipeg

Brian Reimer Audio  
1053 C Street Mary's Road

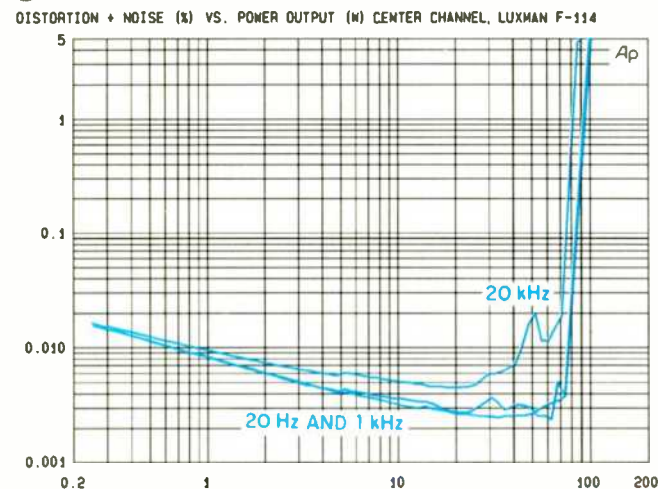
Stereo Master Ltd.  
1793 Portage Avenue

Dealers interested in Audio should call 1-800-221-3148

The distortion of the rear and center amps at full rated power was far lower than specified at all audio frequencies.



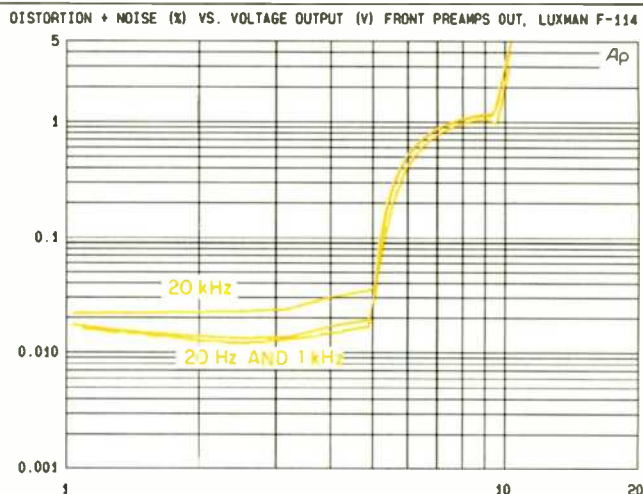
**A**  
**B**



**Fig. 4—THD + N vs. power output for rear channels (A) and center channel (B) with 8-ohm loads.**

somewhat higher for the right channel than for the left channel, the flatness of the right-channel curve suggests that the difference is due more to noise than to THD. At any rate, worst-case THD + N, even at this high output level, is only around 0.26%.

The power amplifier sections of the F-114 are very conservatively rated. Figure 4A shows how THD + N for the rear-channel amplifiers varied as a function of power output, at three test frequencies. In all cases, overload clipping occurs at power outputs of between 60 and 70 watts per channel. The center-channel power amp did even a bit better than that, as shown in Fig. 4B, with clipping occurring between 70 and 80 watts per channel, depending on the test frequency.



**Fig. 5—THD + N vs. output voltage for front preamp variable outputs.**

The front-channel THD + N, measured at the preamp output jacks, will vary according to the relative settings of the master and input level controls. Figure 5 shows THD + N versus output voltage for the worst-case combination of control settings. Even under these test conditions, there was no serious increase in THD until the output voltage rose above 5 V—a signal level not likely to be found at the tape outputs of any receiver or integrated amp I know of. The purpose of this test was to make certain that introducing the F-114 into the tape monitor loop of an existing stereo system would in no way degrade that system's performance, even when the F-114's sound processing functions are not used. I was satisfied that such was the case, in view of the low distortion readings obtained in this test.

In order to separate the actual harmonic distortion from the residual noise of these amplifier sections, I ran an FFT spectrum analysis of the harmonic components that appear at the rear speaker outputs when feeding a 1-kHz signal to produce rated power output of 50 watts per channel. Results are shown in Fig. 6A. Dominant harmonics are 2 and 3 kHz, and both are about 100 dB below reference level. Higher order harmonics, though present, would not materially affect the actual THD percentage figure, which works out to be a mere 0.0014%! Results for the center channel, under the same test conditions, are virtually the same, as shown in Fig. 6B.

I measured the signal-to-noise ratios of the F-114 for a variety of conditions. With 500 mV applied and gain set to 0 dB, S/N at the front preamplifier outputs measured 96 dB in the "Bypass" mode and exactly 90 dB in the "Wide" Dolby Pro-Logic mode. Center-channel S/N was also 90 dB under these conditions. Rear-channel S/N measured 79 dB, while center-channel noise was 78 dB below the 1-watt output reference level with 500 mV applied to the line-level inputs. Spectrum analyses of residual noise versus frequency are shown in Fig. 7 for the rear and center channels.

# Hear the difference.

## *Introducing the new* McIntosh XR250 Loudspeaker System

Driven by the desire to create speakers that could accurately reproduce original music...and tantalized by the elusive combination of variables required for a uniform field of sound... McIntosh scientists used research spanning over two decades to untangle the labyrinth of theoretical leads to a conclusion of audio distinction: The McIntosh XR 250 Loudspeaker System.

The XR 250 is a four element, three-way loudspeaker system combining two (patent pending) Low Distortion/High Power ten inch woofers; a carefully matched five inch mid-range radiator; and a one inch wide dispersion dome tweeter.

### **LD/HP Driver Performance Benefits**

The XR 250's ten inch woofers feature the McIn-



tosh (patent pending) LD/HP Driver Technology. This pioneering design reduces harmonic and intermodulation distortion by over 10 dB compared to previous woofers! The LD/HP Driver is capable of producing extremely high levels of excursion with low levels of second order harmonic distortion. The result is an unprecedented clarity in voice and a lack of distortion interference in the lower mid-range. Thanks to LD/HP Driver Technology, the bass response of the XR 250—once just an ideal—is now a reality.

We invite you to *hear the difference* in the comfort of your own home.

## **McIntosh®**

**Crafted with pride in the United States by  
dedicated, highly trained craftspeople.**

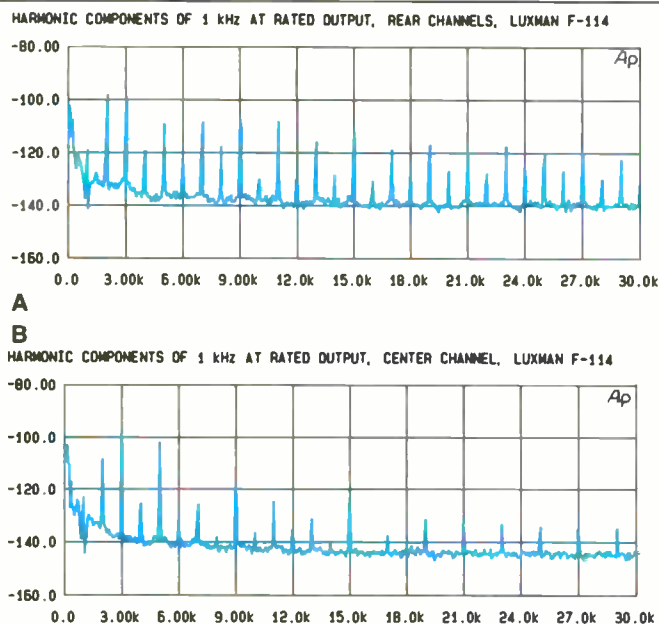
For information on McIntosh products and product reviews, please send your name, address and phone number to:

McIntosh Laboratory Inc.  
Department 11A  
PO Box 96 East Side Station  
Binghamton, NY 13904-0096

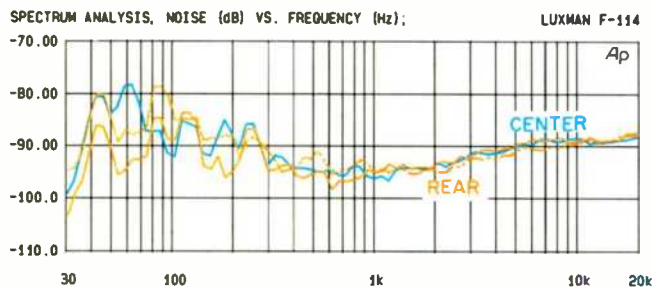
Enter No. 19 on Reader Service Card

Copyright 1991 © McIntosh Laboratory Inc.

The Luxman F-114 seems ideal for someone who wants to add surround without scrapping any existing components.



**Fig. 6—Spectrum analyses of harmonics for 1-kHz signal at rated output for rear channels (A) and center channel (B). Analyses are averaged result of 16 acquisitions, to reduce displayed noise and improve display of coherent signals.**



**Fig. 7—Spectrum analysis of residual noise for center and rear channels; output reference level is 1 watt. Left rear channel is shown by solid curve, right rear by dashed curve.**

### Use and Listening Tests

Setting up the Luxman F-114 and integrating it into my existing surround sound system involved substituting the unit for another preamplifier/surround sound processor I had installed more than a year ago. Amplifier components remained the same for my front-channel speakers, KEF 105 Series II units. I used a pair of fairly small Clements Audio Little "d" speakers for the rear channels and a self-powered Bose Video RoomMate for the center channel, connecting the latter to the center-channel preamp output of the Luxman F-114. Instead of listening to CDs, I chose to use the system for its primary purpose—viewing Dolby Surround-encoded motion pictures and listening to how well soundtracks would be decoded by this unit.

A recent videodisc I acquired is the French film *Le Maître de Musique* (roughly translated, *The Music Master*), released on a Pioneer LaserDisc in Japan (PILF-1016). As all dialog is in French, with subtitles in Japanese, I had chosen this disc not for its story but because its soundtrack—the background music as well as selections that figure in the plot—includes 26 separate classical music excerpts and opera arias. Here in this superbly photographed period piece is everything from Mozart to Mahler, with bits of Verdi, Schumann, Bellini, and even Offenbach thrown in for good measure.

Dialog, using the "Normal" Dolby Pro-Logic mode, remained perfectly fixed on screen, where it belonged, while all of this musical treasure enveloped me just as I had hoped a soundtrack would in a Dolby Surround film. To my mind, this kind of visual and aural enjoyment is what home theater should be all about.

I played some concert videodiscs in both the "Hall" and "Stadium" modes and satisfied myself that the time-delay range is more than adequate for most types of music. With 80 mS of delay and using the "Hall" mode, I was able to approximate the acoustics of a small cathedral, let alone a large concert hall. My own preference was for a delay of about 30 to 40 mS while listening to orchestral works, as they might be heard in a typical concert hall. Particularly well reproduced in the "Hall" setting was an early LaserDisc, made in 1982 and issued by Pioneer Artists, featuring the famed Russian cellist/conductor Mstislav Rostropovich playing the Dvořák Cello Concerto in B Minor with the London Philharmonic Orchestra under the direction of Carlo Maria Giulini. This stereo recording was not Dolby encoded, but thanks to the recording's intelligent mix, the solo cello remained centered while the orchestral accompaniment spread out across my re-created soundstage. Rear channels contributed just the right amount of hall ambience, once I adjusted the parameters using the remote control. I find that a remote is especially useful when enjoying surround sound: It lets you make adjustments from your listening location instead of running up to the controls again and again and then discovering, after you finally return to your seat, that the settings aren't what you wanted after all.

The Luxman F-114 seems ideal for the owner of a stereo system who wants to add surround sound without having to scrap a current amplifying setup or receiver. Indeed, the F-114 offers easy (and relatively inexpensive) entry into the world of home theater.

*Leonard Feldman*



# The Art and Science of Harman Kardon. Worth a trip to Paris.



There are many reasons to take a trip to Paris Audio-Video Showrooms. And one of the best is you'll find the most extensive collection of highly-acclaimed Harman Kardon offerings displayed under one roof.

Such as the top-of-the-line HK3600 A/V receiver (from the company that invented the receiver). The TL8500 and TL8600 – the new standards in carousel CD changers with Harman Kardon's own 3D Bit Stream technology. And, of course, the TD4600 cassette deck. The first to offer Dolby\* S noise reduction.

These and many other fine examples of the finest in high-performance home entertainment are waiting to be discovered. Come to Paris Audio-Video Showrooms. And discover the Paris difference.

## PARIS

Audio-Video Showrooms  
12401 Wilshire Blvd. W. Los Angeles, CA 90025

3

## MAS DCC-1 DIGITAL CONTROL CENTER

### Manufacturer's Specifications

**Inputs and Outputs:** Seven analog audio inputs and three outputs, three digital audio inputs and two outputs, two composite video inputs and outputs, two S-video inputs and outputs.

**D/A Converter:** 18-bit with eight-times oversampling for sampling rates of 48, 44.1, and 32 kHz.

**Power Requirements:** 10 watts, 120 V a.c. (100 V or 240 V optional), 50 or 60 Hz.

**Dimensions:** 16 in. W x 2 in. H x 8 in. D (40.6 cm x 5.1 cm x 20.3 cm).

**Weight:** 11 lbs. (5 kg).

**Price:** \$1,195, remote control, \$150.

**Company Address:** Music and Sound Imports, 450B Pike Road, Huntingdon Valley, Pa. 19006.

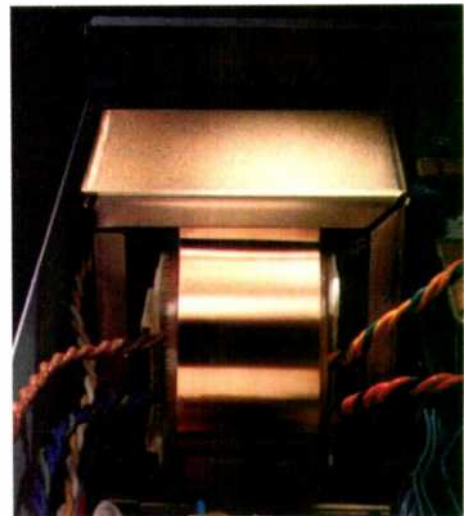
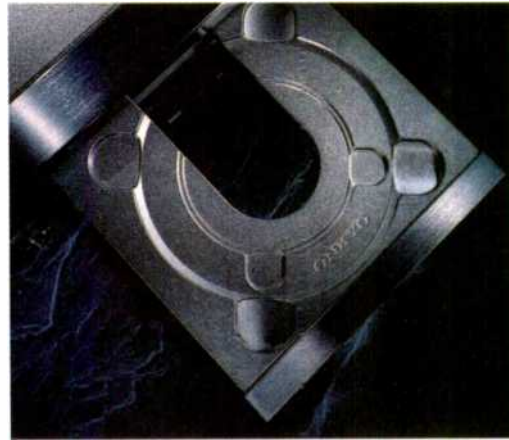
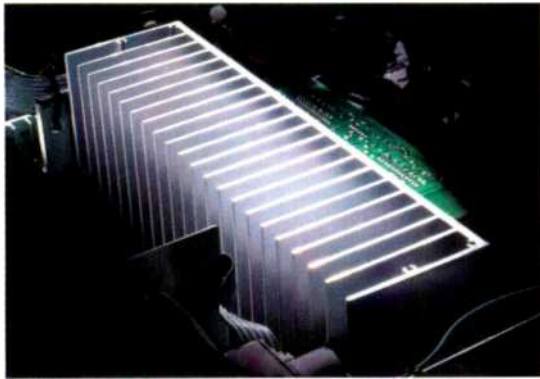
For literature, circle No. 92

The Music and Sound (MAS) DCC-1 digital control center combines audio and video switching with facilities for several digital inputs. An on-board D/A section converts these digital audio inputs to analog signals for input to the switching part of the system. An audio preamplifier line stage is included for volume and balance control of the selected source. Legend has it that the creator of the concept for this piece got fed up with all the various switch boxes in his own

audio/video setup and set out to design a system that would combine proper switching facilities with audio control and capability for direct digital input from a LaserDisc player and other digital sources. The DCC-1 is the result of that effort.

The DCC-1 is typical in size for a solid-state preamp. The front panel even looks like that of a preamp, which, to a large extent, it is. Controls on the front panel, from left to





## It's easy to see why ONKYO sounds well made.

Unfortunately, most of us never get to see the inside of a component before we buy it. If we did, our choice would be narrowed down to one brand.

Onkyo.

At Onkyo, we believe quality dictates a component's performance, not some meaningless techno babble or glitzy convenience feature.

That's why inside an Onkyo you'll find only heavy duty transformers and oversized heat sinks. Independent power supplies and Discrete Outputs. Metal disc trays, face plates and chassis. On virtually all our models, from entry level on up.

It's only then that such important home entertainment technologies like Multiple Room/Multiple Source and Dolby Pro Logic will truly perform beyond expectation.

So when you're seriously looking at audio/video components, remember this

It's always easy to see why Onkyo sounds well made.



# ONKYO

200 Williams Drive, Ramsey, N.J. 07446 201-825-7950

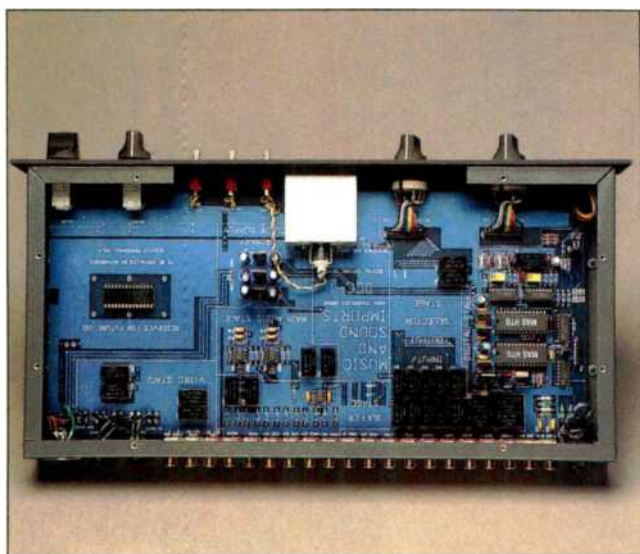
Dolby Pro Logic is a registered trademark of Dolby Laboratories Licensing Corporation

Things get interesting when you look at the rear panel, with its 40 phono jacks, two optical digital jacks, and five S-video connectors.

right, are a rotary signal selector switch, a similar rotary selector switch for recording, toggle switches for an external audio processor loop, audio line amplifier bypassing, audio muting, and finally, two rotary controls for audio balance and volume. At the left end of the panel are five LED indicators in a vertical row. The top three of these indicate what sampling frequency is being used for the selected digital input. Second from the bottom is a "Locked" indicator that illuminates when a suitable digital input signal is present. A pre-emphasized digital signal is indicated by the bottom LED. An attractive backlit annunciator in the middle of the panel proclaims in red lettering that the unit is the MAS DCC-1 Digital Decoding Center.

Things get interesting when contemplating the rear panel. There are 40 (count 'em) phono jacks, two optical digital input jacks, five S-video connectors, and a multi-pin DIN connector for receiving the juice from the unit's external power supply. Most of the phono connectors are vertically paired left and right analog stereo inputs or outputs. Two of the phono jacks, however, are coaxial digital outputs carrying the selected digital source signal, which can be fed to a digital recorder or a processor such as a stand-alone D/A converter or a digital signal processor with digital inputs. Two more signal jacks are used for digital inputs 2 and 3. The two optical inputs are for digital inputs 1 and 2. An internal jumper on the p.c. board selects either the optical or coax input for digital input 2. Of the six phono jacks used for composite video input/output, two are for connection to video monitors, two are for video output to VCRs, and the remaining two are used for the video input from such sources as VCRs, LaserDisc players, or cameras. The five multi-pin S-video connectors allow for the connection of two VCRs and a monitor. All in all, a very impressive if somewhat intimidating rear panel! I strongly recommend a very thorough reading of the owner's manual before attempting to hook up this piece of gear.

What's inside a unit like the DCC-1, and how does it work? First of all, like almost any audio preamp, it selects various audio inputs and routes them through a volume and balance control and then into its output line amplifier. Instead of a phono preamp, it has a D/A section for converting digital audio input signals to analog. The analog output of the digital section is then selected like any other external audio



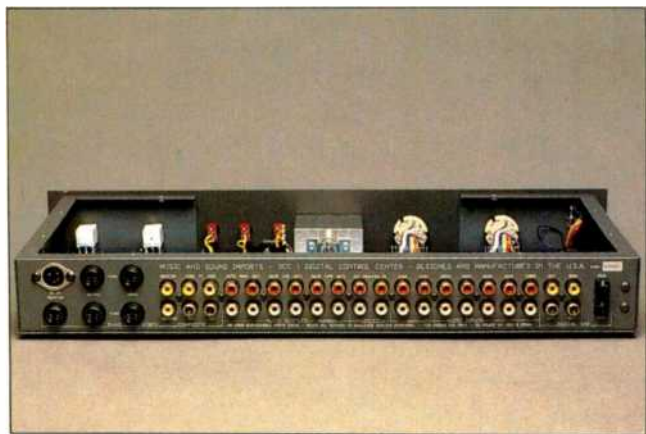
input. Now add some video inputs and outputs to fill out the picture of what the DCC-1 is. When the video sources are selected, their audio signals are switched in for listening or recording just like the other audio sources. In addition, the video signals are switched to the video monitor for viewing, with composite and S-video signals going only to their respective "Monitor" jacks. Two video sources can be hooked up at once; if both sources are VCRs, signals can be copied from either VCR to the other.

What makes the DCC-1 workable and such a neat unit inside is that all the switching is done with miniature reed relays. The front-panel switches really control switching relays, which are mounted at the rear of the unit near the signal input/output connectors. This allows the audio, video, and digital signals to be separated from each other for low coupling interference, with the relays located at the appropriate points of use.

Inside the DCC-1 we find a large p.c. board that takes up the entire interior area. This is a very attractive board, and construction and parts quality seem to be of a high order here. The D/A converter takes up approximately 20% of the board at its left edge. Power-supply regulators, the output amplifier circuitry, and relays take up perhaps 50% of the board area, creating an open, uncluttered look. A 28-pin LSI socket near the right edge of the p.c. board, marked "Reserved For Future Use," accepts the optional remote-control circuitry.

#### Circuit Description

Starting with the digital section, the various digital inputs are coupled into the four inputs of a quad three-state buffer device. The coaxial digital inputs don't appear to be terminated in 75 ohms, as I have seen done in other digital decoders. The optical input transducers that convert the optical inputs to TTL output levels are complete p.c.-mounted assemblies—keen little devices. The quad three-state buffer acts as a signal selector for the digital inputs, and its output feeds the digital output connectors and serves as the input for the next chip in the processing chain.



These days "Home Theater" is a term liberally applied and widely advertised.

But having defined the category in the first place, we reserve the right to elevate its true meaning. So here goes: Home Theater, by definition, must rival or exceed the very best movie theaters. The ones with popcorn and first-run features.



*We invented the liquid-cooled, aspherical lens to deliver the highest resolution on the widest screen.*

sound transcends videotape, too. Which brings us to the receiver through which it's amplified: The Elite VSX-95.

With up to 370 watts\* driving five discrete channels. And all the hallmarks of Elite, including handpicked components and gold-plated terminals.

In concert with Dolby® Pro Logic circuitry, it powers another essential of Home Theater—surround sound.



## THE ELITE HOME THEATER. IT STANDS AT THE VERY PINNACLE OF THE CATEGORY WE CREATED.

Not just in the quality of picture but in the quality of sound. A big screen alone does not a home theater make. What does make it is the extraordinary system pictured here.

*Handpicked complementary capacitors reduce cross talk while improving imaging and transient response.*



To deliver that sound, Elite TZ-9LTD speakers, notable for their studio heritage, ceramic graphite tweeters and midrange drivers, and urushi cabinetry.

At its heart, the Elite® LD-S2 LaserDisc Player. The most accurate device for the reproduction of a moving picture in the home. "So far superior to any previous LaserDisc player," said one reviewer, "that any comparison is really unfair." As to VHS systems, digital LaserDisc outstrips analog videotape as thoroughly as digital CD does the analog cassette. Any "home theater" without a laser picture source is not a contender. LD

*Any LaserDisc outperforms any videotape. And the LD-S2 outperforms all other LaserDisc players.*



Finally, to complete the picture, the Elite PRO-95 Projection Monitor. Optimized to deliver the ultimate on-screen image. Its liquid-cooled aspherical lens—our own invention—projects an incredibly sharp picture of 820-line resolution. Linear white circuitry—also invented here—eliminates unwelcome blues and yellowed whites.

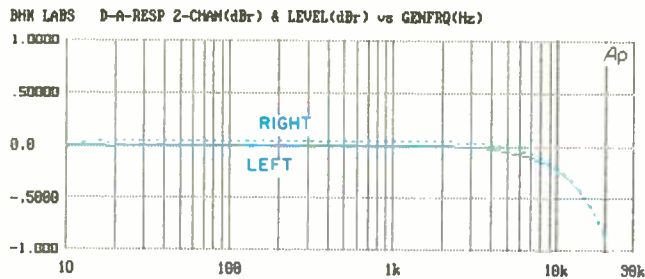
The result is the brightest and most vivid colors ever seen on an electronic screen.

We invite you to visit your Elite dealer to see Home Theater as intended by its maker. And discover the ultimate way to watch a movie.

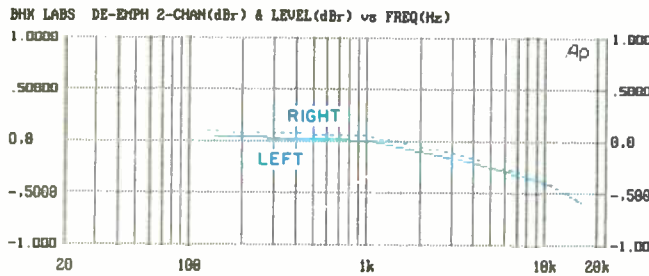


For the name of a select Elite dealer in your area, please call 800-421-1606, ext 702. © 1991 Pioneer Electronics (USA) Inc., Long Beach, CA \*Continuous average power output of 125 watts per channel front min., with no more than 005% THD, 40 watts per channel rear and 40 watts center min., with no more than 00% THD at 8 ohms from 20 to 20,000Hz. Actual on screen image.

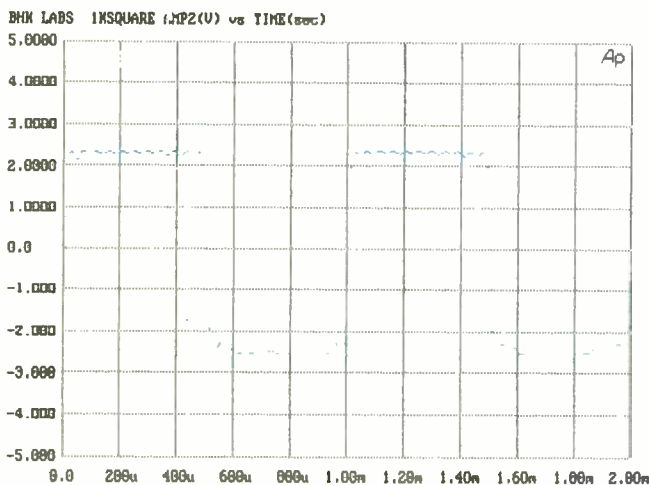
The distortion performance of the digital section was very good, as was its S/N, better than  $-100$  dBA.



**Fig. 1—Frequency response for digital input signal without pre-emphasis.**



**Fig. 2—Frequency response for pre-emphasized digital input signal, with de-emphasis engaged.**



**Fig. 3—Response of D/A section to digitally generated square waves.**

This next chip is an LSI digital interface receiver that takes the digital signal from a CD player, DAT recorder, or satellite receiver and converts it to a form suitable for the oversampling digital low-pass filter that follows. Like others of its kind, this digital receiver has a crystal-controlled phase-locked loop which synchronizes with the incoming digital signals. Other information about the selected digital signal, such as signal lock, de-emphasis, and the sampling frequency of the selected input signal, is decoded by the receiver chip.

Next in the signal chain is the aforementioned eight-times oversampling, digital low-pass filter. This LSI chip is a committed digital signal processing (DSP) chip that implements a sharp, low-pass filter function with linear phase characteristics. Output of the low-pass filter is to the following digital-to-analog converter chips.

The D/A converters, from Analog Devices, are 18-bit units with eight-times oversampling that are connected with a trimpot adjustment for the most significant bit (MSB). De-emphasis is done in a passive network at the outputs of the D/A converters, and it is switched in or out, as required, with reed relays. A passive RC low-pass filter on the output of the D/A converters feeds the signal selector.

The selected audio source goes into the volume and balance control circuit. Following this circuit, the signal encounters the muting switch (which shorts it to ground when activated), then the "External Processor" loop selector switch, and, finally, the bypass/normal switch. If "Bypassed" is chosen, the signal goes to the output connectors without going through the output amplifier. If the switch is set to its "Line Amplifier" position, the signal passes through a noninverting amplifier with a gain of 6 (an Analog Devices IC op-amp) to the two pairs of main output-signal connectors. The output amplifier circuit can be reconfigured to provide balanced outputs by moving a jumper on the p.c. board that connects another IC op-amp of the same type to invert the phase of the signal fed to one of the main output connectors. Neat option!

The signal to be fed to the audio recording outputs is buffered by an IC op-amp of the same type as the main output amplifier, in a unity-gain, noninverting configuration.

Video switching is achieved by reed relays in the video section of the p.c. board. Two separate video switching circuits are employed, one for the composite video signals handled by the phono plugs and the other for the S-video connectors.

The DCC-1 has seven voltage regulators. Incoming d.c. voltage from the external power supply is of the order of  $\pm 22$  V d.c. Two of the IC regulators are used to produce  $\pm 15$  V d.c. for the output op-amps and the tape-out buffer. A third regulator appears to provide regulated  $+12$  V d.c. for the switching relay coils! The remaining four regulators are employed in the digital circuit area and provide separate regulated  $\pm 5$  V d.c. power sources for analog (D/A) and digital circuits.

#### Measurements

I didn't have any sources with optical output, so all testing of the digital front-end was done with electrical signals either from a Magnavox CDB-560 CD player or from the SPDIF



## Build your audio/video system on a solid bass.

Velodyne subwoofers are already known as the finest in the world. Now, the same revolutionary patented technology is available in an exciting new design.

### Introducing "The Foundation Series"

*The new Servo F-1000, Servo F-1200, and Servo F-1500:  
Designed with style and elegance to fit every need.*

The clean, undistorted bass of a Velodyne subwoofer provides the solid foundation on which to build a superb sound system. By reducing the rigorous demands of low bass from your main speakers, your system will have increased dynamic range and clarity that you never thought possible.

Each unit in The Foundation Series is completely self-contained with amplifier and adjustable cross-over, and upholds our commitment to quality: As long as there are people who appreciate perfection, Velodyne will continue to produce it.

**Velodyne**  
*The Bottom Line In Bass*

**Velodyne Acoustics, Inc.**

1070 Commercial St., Suite 101 San Jose, CA 95112 408/736-7270 800/VELODYNE

In Canada: Positive Marketing 416/671-8990

In Europe: Boffi Audio Rack Hi-Fi 39-02/331-04256

For More Information



Call 1-800-451-2248

Enter No. 35 on Reader Service Card

I don't remember some of my LaserDiscs sounding quite as good before as they do now that I have the DCC-1 in my A/V setup.

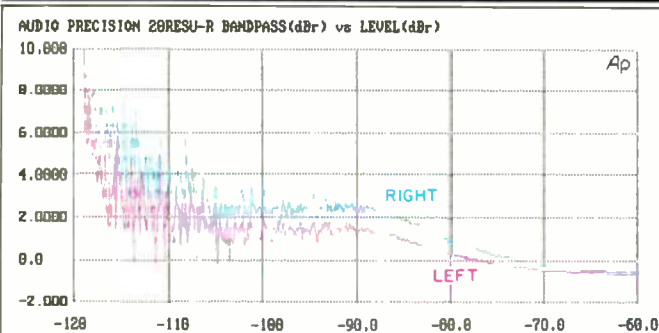


Fig. 4—Fade-to-noise test.

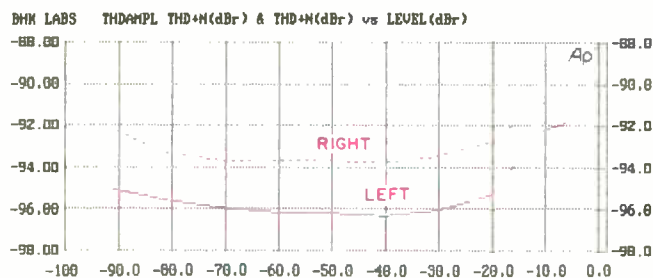


Fig. 5—THD + N vs. input level, D/A section.

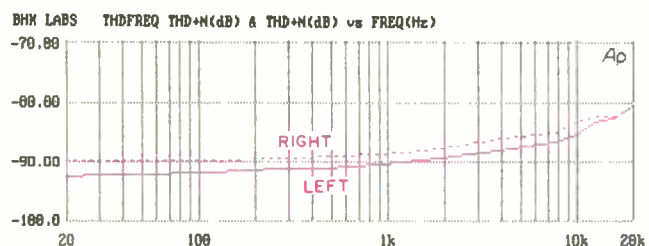


Fig. 6—THD + N vs. frequency, D/A section.

output from my dual-domain Audio Precision System One measuring system. Measurements were made at the tape-out connectors. Nominal full-scale output was about 1.72 V.

Frequency response without pre-emphasis is shown in Fig. 1. The curve in the figure was made using the Audio Precision system's digital generator output, but results were substantially the same when using a CD player and the CBS CD-1 test CD. Figure 2 shows the response with the de-emphasis equalizer engaged. Square-wave response at full level is depicted in Fig. 3. As can be seen, the digital low-pass filter is compressing the ringing ripple peaks. This is benign behavior, and not unique to the DCC-1. A look at the D/A section's impulse response nicely illustrated the linear phase of the DCC-1 (not shown), evidenced by mirror-image behavior on either side of a central peak.

Moving on to the subject of linearity and distortion, deviation from linearity of measured output amplitude versus known amplitude on the test disc is plotted for left and right channels in Fig. 4. The test signal linearly decreases from -60 to -120 dB. These results, which agree well with those obtained by using discrete levels on the test CD, are good, in general. Total harmonic distortion plus noise is plotted as a function of recorded level in Fig. 5 and plotted as a function of frequency in Fig. 6. Figure 7 is the spectral analysis of a CCIF-type IM distortion signal made up of 11- and 12-kHz signals of equal amplitude, adding up to full-scale level. The first-order difference distortion signal, 1 kHz, is at or below the noise level. Second-harmonic distortion of both frequencies shows up, with a strange nonharmonic frequency in between, a result I have seen in some CD players and separate processors. Low-level monotonicity, not shown, looked quite good when checked. All in all, I think the distortion performance of the digital section of the DCC-1 is very good.

Signal-to-noise performance of the DCC-1 was very good, measuring better than 100 dB below full scale with A-weighting (either with the transport on pause or playing track 4 of the CD-1 test disc, which is a digital-zero, "no signal" track). When measured wide-band, the noise was still about 95 dB down, which is very good in my experience. The EIAJ quantization noise, which is a measure of the D/A converter noise contribution when being exercised with signal, was -96 and -95 dB for left and right channels, respectively. The EIAJ dynamic range (which measures the A-weighted THD + N at a -60 dB level and then adds 60 dB to the result), came out at -98.6 and -96 dB for left and right channels, respectively. A final look at noise is shown in Fig. 8, a third-octave sweep of the outputs when playing a 1 kHz, -80 dB signal. Again, results of this test are quite good when compared to those from other digital processors I've measured.

Interchannel crosstalk turned out to be virtually identical in the two directions (left to right and right to left), increasing with frequency almost at a perfect 6-dB/octave rate, which is usually caused by capacitive coupling between circuits. Although the amount of crosstalk was not as low as I have seen in CD players, I don't think it is enough to detract from stereo separation.

Turning our attention to the analog portion of the DCC-1, gain and sensitivity of the line section were measured first.



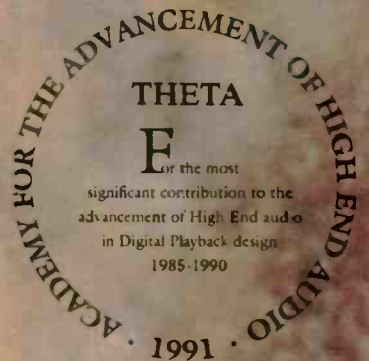
# It's a 1-Bit. It's fully programmable. And it's a Theta.

## Introducing Theta DS Pro prime

The latest and most affordable in Theta Digital's award winning family of digital to analog converters.

The only one-bit D to A with a *fully programmable* high speed computer.

A breakthrough at only \$1250.



*Digital Done Right*

### Theta Digital Corporation

5330 Derry Ave., Suite R, Agoura Hills, CA 91301

(818) 597-9195 FAX (818) 597-1079

Enter No. 33 on Reader Service Card



**Nothing fits like an E&J and soda.**



MELLOWED IN AGE 20+ YEARS

ORIGINAL  
EXTRA SMOOTH

E&J

BRANDY

The DCC-1 adds nothing spurious, and I found it quite listenable, not edgy or irritating as some D/A circuits are.

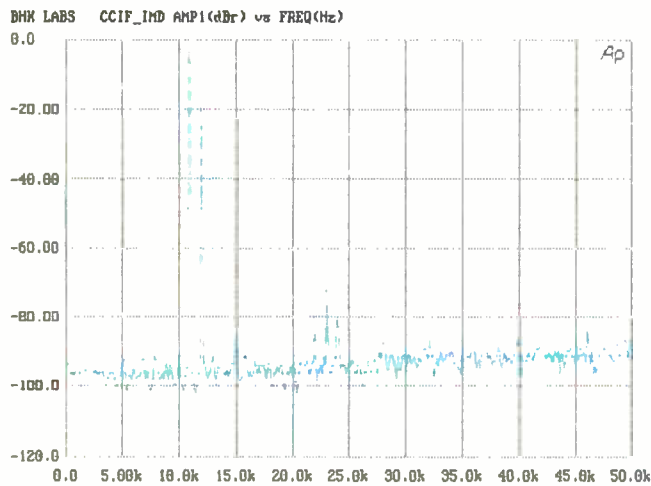


Fig. 7—Spectral analysis of digital CCIF-IM distortion signal, 11 and 12 kHz in equal amplitude.

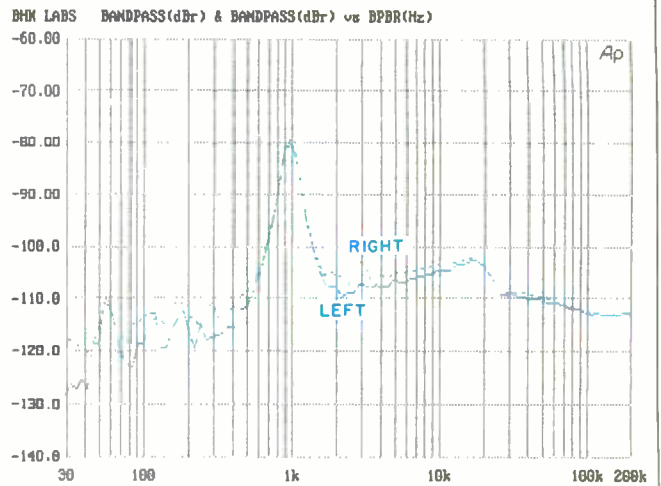


Fig. 8—Third-octave noise spectrum with -80 dB digital signal at 1 kHz.

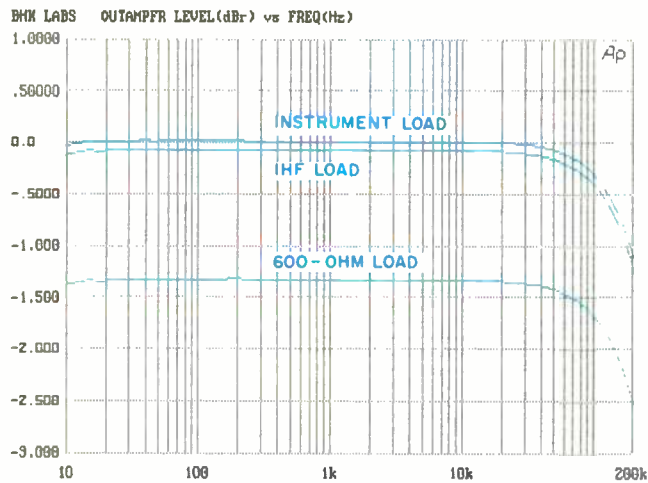


Fig. 9—Frequency response of analog line-amp section.

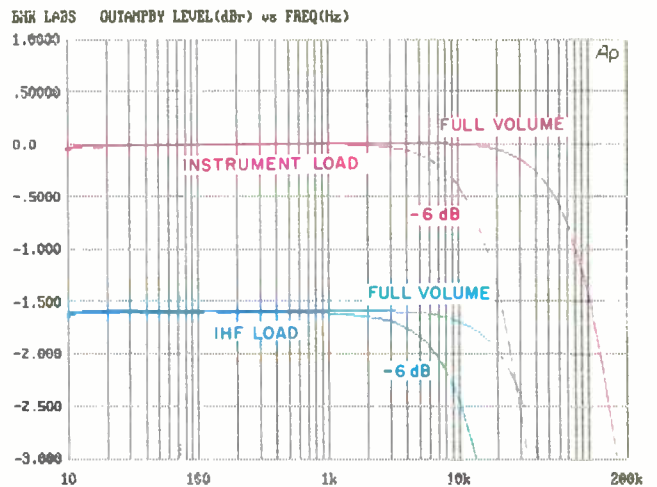


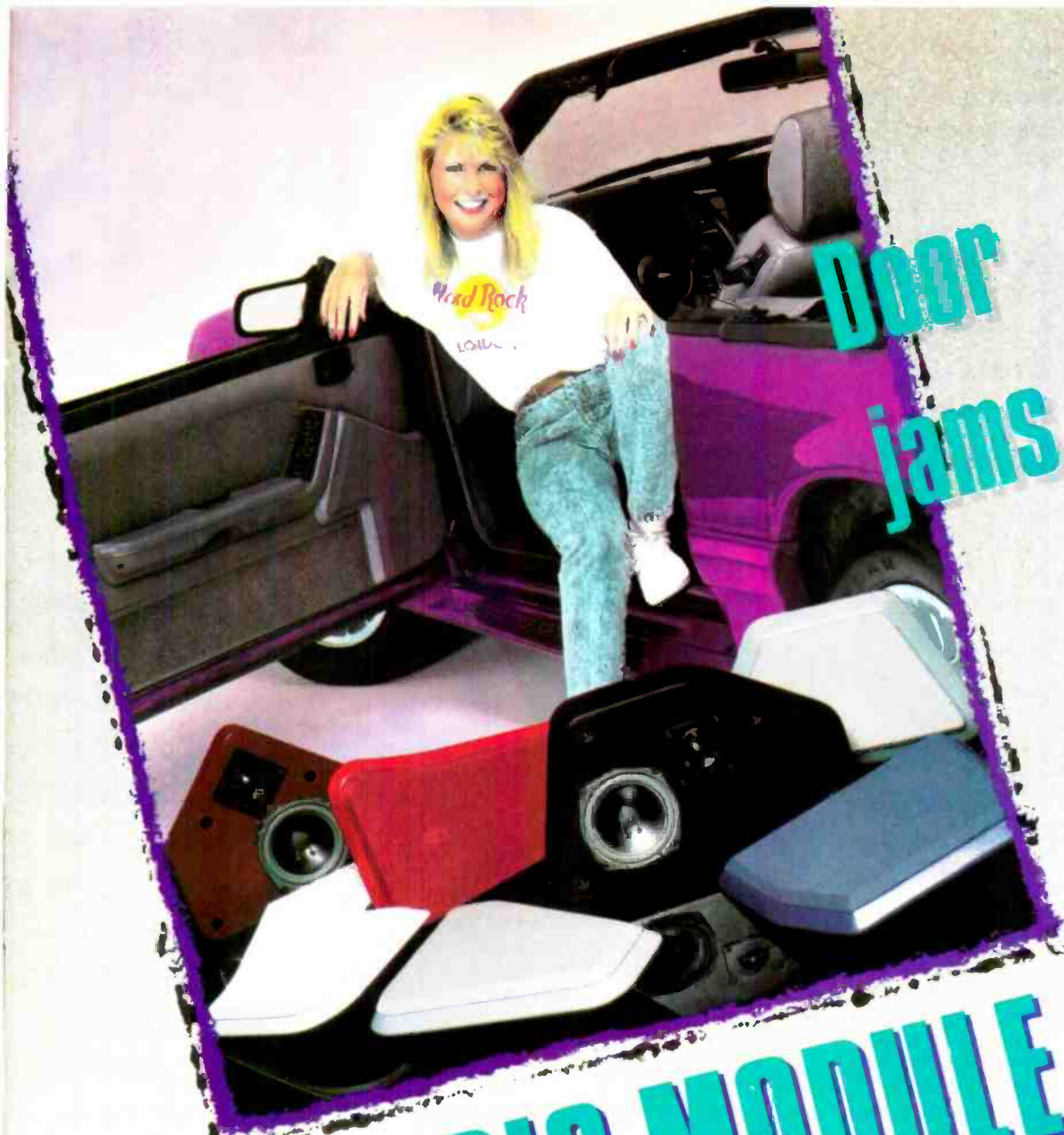
Fig. 10—Frequency response with line amp bypassed; see text.

Gain was 14.2 and 13.8 dB for left and right channels, respectively, with instrument loading. IHF loading reduced the gain by about 0.1 dB. IHF sensitivity (the input voltage to produce 0.5 V out with volume at maximum) turned out to be 98.6 and 102.7 mV, respectively, for left and right channels.

Frequency response of the line section is plotted in Fig. 9. The top curve in the figure is with the instrument loading from my Audio Precision gear, amounting to about 400 pF in parallel with 100 kilohms per channel. The middle curve is

the response with IHF loading, and the bottom curve shows the response with the instrument loading bypassed. Since the output is direct coupled, there is no low-frequency loss with this load, even though it is of lower than normal impedance.

With the output amplifier bypassed, frequency response will be a function of capacitive loading and the position of the volume control. Some idea of this effect can be seen in Fig. 10. The widest bandwidth in the top curve is for instrument loading and a wide-open level control. The instrument



DOOR  
jams.

# MUSIC MODULE

B U I L T  
A  
S P E A K E R S Y S T E M S

Finally, you can afford true custom sound in your car. MTX Music Modules are specifically designed to fit your car's exact interior dimension. Engineered and computer-shaped, MTX Music Modules use high-performance componentry, complete with crossover networks. Pre-engineering makes installation and mounting fast and easy. Color-matching is easier still with spray dye and matching grille cloth available from your authorized MTX dealer. For about the price of a pair of conventional coaxials you can enjoy high performance custom sound with factory fit and finish.

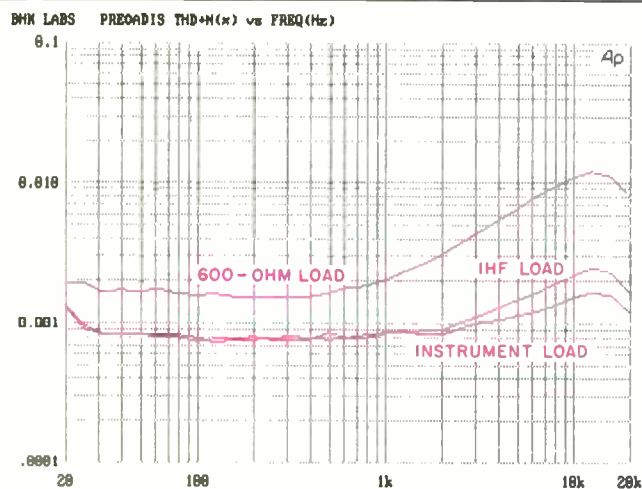
See and hear the latest revolution in car audio at an MTX dealer soon. From the company that's serious about custom sound. Write us at 555 West Lamm Road, Freeport, IL, 61032, or call 1-800-223-5266.

U S A  
T H E



Serious about sound

The DCC-1 is cleverly conceived and executed for both pure audio and audio/video applications.



**Fig. 11—Line-amp distortion vs. frequency and load, at 5 V output.**

load is reasonably typical of what might be used in the real world with interconnects 1 to 2 meters long. The wide-bandwidth section of the bottom curve is, again, with volume full up, but this time with instrument load. With the volume control turned down to reduce the output level about 6 dB, the greater output resistance reduces high-frequency response with both loads, as shown, more so with the IHF than with the instrument load. From a practical standpoint, 1 to 2 meters of interconnect cable would be okay in this bypass operating mode, but higher capacitances are going to start taking more of a bite out of the upper end of the audio range.

Distortion performance of the DCC-1's line amplifier is very good, with the results for THD + N at 5 V output shown in Fig. 11. From the top down, the loads were 600 ohms, IHF, and instrument. As can be seen, the DCC-1 is a quite competent 600-ohm line driver, and in practice will drive any practical load it would likely encounter.

Interchannel crosstalk for the line section with the output amplifier enabled was very similar to that for the digital section (not shown), being slightly worse with the volume control 6 dB down and slightly better with the volume control turned fully up. Interchannel balance of the volume control was okay, but I've seen considerably better in admittedly more expensive gear. The IHF signal-to-noise ratio for the line section with the output amplifier engaged was -88 dB for both channels.

#### Use and Listening/Viewing Tests

My approach to evaluating the performance of the DCC-1 was to first put it in my video system and then to try

it out in my audio system. My video system has been in its present form for some five to six years. The signal from the TV cable is split, feeding a Sony 25-inch XBR monitor TV's antenna input directly and feeding the antenna input of a Magnavox VCR via the cable descrambling box. A Magnavox player is used for LaserDiscs. Attenuated speaker output of the monitor, as well as the direct audio outputs of the signal sources, are fed via a selector switch to a pair of prototype three-way video speakers powered by built-in, 60-watt/channel amps.

For these tests, I borrowed another, newer VCR with Super-VHS capability and a new LaserDisc player with digital sound output. The two VCRs were connected to the two switchable video inputs, which permitted either machine to record to the other. The video outputs of the LaserDisc players were still switched by the video input switching of the monitor, with their respective audio outputs switched by the DCC-1. The DCC-1 handled the audio sources well when it was used in place of the resident setup. It would have been nice if the DCC-1 had had one or two more switchable video inputs, but even so, it functioned very well in my setup and, with the other VCR, allowed my wife, the resident videophile, to dub various tapes. Sound and video quality were quite good, and I didn't notice any particular degradation of either over my normal setup. In fact, I don't remember some of my LaserDiscs sounding quite as good as they do now with the DCC-1 setup.

Evaluation as an audio preamp and digital processor was done in my normal music-listening/audio-reviewing system. Signal sources included an Oracle turntable fitted with a Well Tempered Arm and a Spectral MCR-1 Select cartridge, a Krell MD-1 CD transport feeding a Wadia 2000 decoding computer, a Nakamichi 250 cassette player, a Nakamichi ST-7 tuner, and a Technics 1500 open-reel recorder. Preamps on hand were the excellent First Sound Reference II passive preamp/controller and a newly purchased Quicksilver Audio tube unit. A pair of Carver Silver Seven tube power amplifiers were used to drive Spica Angelus speakers and some prototype two-way speakers of the new Genesis Technologies line.

Putting on my "fussy and critical" hat, I started out by playing CDs through the whole circuit of the DCC-1. Although the resulting sound didn't have the overall believability of the Wadia 2000 going through the First Sound or the Quicksilver Audio preamplifiers, the sound was pretty darn good. After all, there is a considerable price differential between the reference Wadia and the DCC-1! After experimenting with the output amplifier bypass switch, I found I preferred the sound in the "Bypassed" mode. Any sonic difficulties of the DCC-1 seemed to be mostly sins of omission, meaning that it left things out rather than adding things that weren't in the program material. I found it quite listenable and was pleased to note that it wasn't edgy or irritating, as so many CD players and inferior external processors are.

The DCC-1 is a cleverly conceived and executed unit. It is certainly competent in its main purpose as a controller in an audio/video setup, and also is very likely to find considerable acceptance as a preamp/digital decoder in a main audio system.

*Bascom H. King*

# One step ahead.



In 1986, Museatex introduced our first power amplifiers to international critical acclaim. They were referred to as "Mighty Mites" and "Giant Killers" by audiophile reviewers.

Today, the proponents of massive Class A amplifiers are scrambling to design their own amplifiers that meet the performance and aesthetic standards set by Museatex.

Museatex's new Melior Amplifiers use brains rather than brawn to give you audiophile performance in a package that will fit conveniently into any decor.

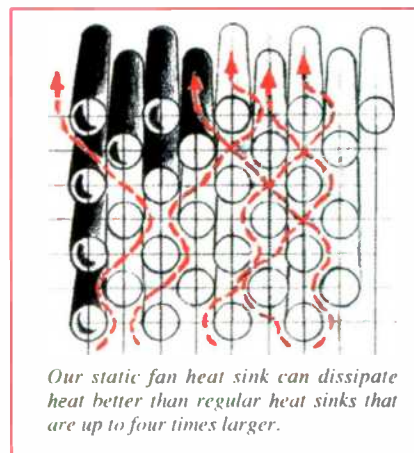
Museatex has always believed that performance should not have to come at the expense of convenience. That is why Ed Meitner and the design team at Museatex rejected the idea that a superior sounding amplifier has to be big, heavy and reach uncomfortably high operating temperatures. Our power amplifiers use several proprietary designs to provide a high current amplifier that can drive complex speaker loads.

Our unique static fan heat sinks use asymmetrically arranged metal rods which create convection currents to dissipate heat without resorting to unwieldy size or noisy fans. This allows us to pack our amplifiers in attractively sized packages that are 60% smaller than if we were to use conventional heat sinks which use fins.

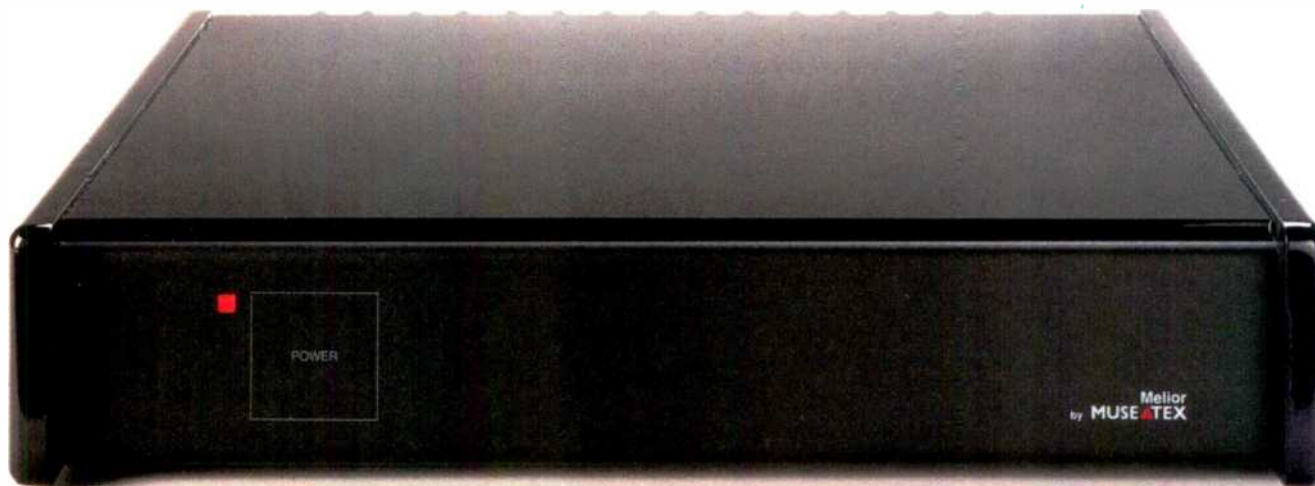
The floating charge power supply isolates the transformer, rectifier stage, and power source from the amplifier to provide cleaner sound that is not contaminated by power line impurities. The large bank of capacitors provide seemingly unlimited head room to handle music peaks.

The sophisticated protection circuits, incorporated completely outside the audio signal path, prevent damage to your speakers and other associated components in the event of system malfunctions.

Whatever your musical tastes, the Melior amplifiers will perk up your ears and blend in with any decor without heating up or cluttering up your home.



*Our static fan heat sink can dissipate heat better than regular heat sinks that are up to four times larger.*



*Visit a Museatex dealer to find out more about the complete family of Museatex audio and video products including speakers, sub-woofers, amplifiers, FM Tuner, digital converters, projection TV, and accessories.*

**MUSE-TEX**

(403) 273-2552 Fax: (403) 272-3860 or toll-free at 1-800-463-3447

Enter No. 25 on Reader Service Card

## FORTÉ AUDIO MODEL 4 POWER AMP

**Company Address:** InConcert,  
7325 Roseville Rd., Sacramento,  
Cal. 95842.

For literature, circle No. 93

Audiophiles can sometimes be divided into classes: One class chooses its amplifiers on the basis of sheer power—the ability to drive any speaker to any conceivable volume; another class believes that all amplifiers sound alike or can only have their sound characterized by a committee. The Forté Model 4 is not for either of those groups. The Model 4 is a gem of an amplifier, but its quality depends on your willingness to accept an amplifier limited to 50 watts per channel, albeit with a continuous maximum current capability of 16 amperes and a peak current capability of 50 amps.

The other technical specifications of the Forté Model 4, incidentally, are relatively conventional. Input impedance is 47 kilohms, and bandwidth is 3 Hz to 100 kHz between  $-3$  dB points. As is usually the case with modern transistor power amplifiers, distortion is vanishingly small. The damping factor, however, is a comparatively high 400, and output noise is less than  $300 \mu\text{V}$ , which is better than many amps in this price range.

The Forté Model 4 is a Class-A power amplifier costing \$1,795—unusually low for a Class-A design. At a given price point, true Class-A operation inevitably sacrifices power relative to Class-AB operation, and it is interesting to note that the Class-AB members of the Forté family have substantially more power output.

Many audiophiles argue, however, that Class-A operation offers substantial benefits in terms of more linear operation, sweeter musical harmonics, more musical detail, a better defined soundstage, and added depth and air.

The Model 4 was designed by a team led by Nelson Pass, designer of the more expensive Threshold power amplifiers, who has produced a long series of truly excellent Class-A designs.



The technology of the Forté Model 4 is also interesting because it is a non-inverting, complementary symmetry design and is one of the first power amps to use insulated-gate bipolar transistors in its output stage. These are new transistors that Pass feels exhibit the most advantageous characteristics of both bipolar and MOS-FET devices, and perform with enough inherent accuracy to make overall feedback correction unnecessary. This is said to eliminate any of the dynamic anomalies that characterize wide-band corrective-loop systems.

The Model 4 has no special control features (just an LED to show that the amplifier is on), RCA input jacks, and five-way binding posts for the speakers. I should note, however, that it is a relatively compact design, exhibits no mechanical noise, and runs cool enough to place in any reasonably well-ventilated area. This is an amplifier that is very easy to live with.

I did not, however, begin this review by calling the Forté Model 4 a gem because of its technology. Rather, it is a gem because it is a truly musical amplifier. It has the kind of musical sweetness that I normally associate with tube designs, or with much more

expensive high-end designs. From the mid-bass on up to the highest octave, a well-broken-in Model 4 produces an open, airy sound, does an excellent job of reproducing low-level transients, reveals the details of the soundstage in terms of both imaging and depth, and handles complex musical and vocal passages without ever seeming to lose definition or the fine harmonics of the music. (As is the case with most power amps, the Model 4 needs a couple days of breaking-in to sound its best.)

This is the kind of amplifier that is perfect for an average-sized apartment or home listening room where your goal is a musically believable, natural experience with the kinds of music that suit home listening. Chamber music, small jazz groups, rock recordings that emphasize subtlety rather than power, ballads, and small vocal groups really come alive. Demanding instruments like the piano, flute, and harpsichord are very well handled, without the touch of hardness common in most transistor amplifiers at competing prices.

Using the Forté Model 4 does involve some trade-offs. For one, it is not an amp for rock 'n' roll or top orchestral volume. It sounds louder than its out-



# HOW YOU CAN UPGRADE YOUR SYSTEM TO STATE-OF-THE ART SOUND QUICKLY, EASILY AND GET UP TO \$300.00 WORTH OF FREE MOBILE FIDELITY COMPACT DISCS WITH VORTEX ACOUSTICS' AFFORDABLE STATE-OF-THE ART COLLECTION.

Company Address: 9450 7th Street, Unit F, Rancho Cucamonga, CA 91730 (714) 466-4662.

If you spend days running around auditioning speakers on somebody else's electronics in somebody else's sound room, you're wasting your time. And you run the risk of wasting large sums of money on speakers that sound terrible in your home. Be smart. Pick the speakers that best suit your needs from the state-of-the-art VORTEX COLLECTION. And if you are one of the first 100 buyers, you will receive UP TO \$300.00 in FREE Mobile Fidelity compact discs.

## LISTEN FOR 30 DAYS AT NO RISK.

Call 1-800-437-VORTEX and have your choice of speakers shipped to your front door. Listen to them at your leisure for 30 days in your own home. With your own music and your own electronics. If you don't like them, we'll take them back.

## IF YOU MUST HAVE THE BEST, GO TO THE TOP OF THE LINE: THE KEVLAR REFERENCE SCREENS. PRICE: \$3000.

These transmission line speakers use the most expensive materials and cutting-edge technology in their construction. The bass and mid-range drivers are formed from Kevlar, a space-age material so light and strong that it is used to make bulletproof vests. Corey Greenberg was "really knocked out" by these speakers, calling them "highly musical with pinpoint imaging and depth out the . . ."

*(Corey Greenberg on the sound of the Kevlar Reference Screens at the 1991 SCES. Stereophile, Vol. 14 No. 8-August 1991)*

## YOU CAN BUY A GREAT PREAMP WITH THE MONEY YOU SAVE ON THE LEGENDARY VORTEX SCREENS. PRICE: \$1750.

But you won't need to buy another amplifier because these large floor standing systems feature our Patent Pending "Servo Control" crossover network. This revolutionary development automatically compensates for impedance variations and has the effect of actually upgrading your amplifier!



*Meet Albert von Schweikert, Chief Designer for Vortex, with the speaker chosen by Mobile Fidelity Sound Labs as a reference system.*

"All Vortex speakers feature a revolutionary design breakthrough: The Vortex Transparency Factor™. After 12 years of testing and research, we have been able to combine the power and authority of dynamic drivers with the clarity associated with electrostatics-giving you the best of both. All Vortex speakers are accurate, highly musical, and free from "listener fatigue" so you can enjoy your music for hours on end."

*-Albert von Schweikert*

The Screens also give you triple transmission line bass modules for the tightest, deepest bass possible in speaker construction, and transmission line midrange loading for maximum imaging and accuracy. These are the speakers chosen by Mobile Fidelity Sound Lab as their reference system. You have to *listen* to these speakers to believe how good your system can sound.

## A REMARKABLE BREAK-THROUGH IN SPEAKERS UNDER \$1000. INTRODUCING THE VORTEX FORCEFIELD SERIES:

### THE BIPOLAR FORCEFIELD 800. PRICE: \$795.

Surround yourself with exciting sound and music with precise image and depth projection — these new bipolar speakers turn your listening room into a concert hall! You actually get two complete speaker systems mounted back-to-back in each cabinet. Because you get twice the number of drivers in each cabinet,

each driver only works half as hard. A total of eight woofers unite to give you the effect of one giant 15" subwoofer for effortlessly clean and powerful deep bass. The four 1" tweeters are so understressed that you get clear, undistorted highs even at extreme volume levels. We have optimized the treble for vocal reproduction. So these speakers are ideal for use in high end video systems where you *must* have perfect clarity for dialogue and the singing voice.

### THINK CLEAN. GO DEEP. THE SUPER-EFFICIENT FORCEFIELD 600. PRICE: \$595.

You won't need a megawatt amplifier to feel the shudder of low organ pipes or the weight of orchestral bass viols through the twin, heavy-duty 6-1/2" woofers of these remarkable speakers. That's because we've made them incredibly efficient 91db @ 1 watt/1 meter! Even moderately powered receivers or video systems will come alive in front of you with a clean, solid 3-dimensional *forcefield*. And our patented wide angle tweeter guarantees you pinpoint imaging. You also get compact size for more flexibility in smaller rooms. What you *don't* get is compromise.

### CONVENIENCE AND QUALITY: THE FORCEFIELD MINI MONITORS. PRICE: \$295. OPTIONAL SUBWOOFER MODULE. PRICE: \$295.

Even if Vortex's very affordable satellite/subwoofers are the only speakers you ever own, you won't miss out on musically accurate, clean, deep sound. And these speakers also give you the ultimate in unobtrusive convenience. They can become almost invisible. And they make an almost invisible dent in your checkbook. But we guarantee the sound you get will be very pleasing to your ears. We like these speakers so much that we think every home should have a set!

### REMEMBER — VORTEX IS AFFORDABLE STATE-OF-THE-ART.

Don't miss out!  
Call 1 (800) 437-VORTEX right now and get your FREE compact discs.

TRANSPARENCY FACTOR  
**VORTEX**

P.O. Box 1316, Guasti, CA 91743

**mobile fidelity**  
**sound lab**  
a division of MFSL, INC.  
THE STATE OF THE ART IN THE ART OF SOUND

Enter No. 36 on Reader Service Card

## THE LIMITS OF INTERCONNECT CABLE PERFECTION NEED NOT BE THE LIMITS OF YOUR POCKETBOOK.

Every M Series® interconnect cable incorporates a refined design, combining advanced *Time Correct*™ windings with our patented *Bandwidth Balanced*™ multi-gauged conductor technologies, our latest *Multi Twist*™ construction and *IsoTec*™ vibration dampening. All M Series® cables are terminated with our revolutionary *Turbine Design*™ RCA connector, providing a high mass, high pressure contact for the best sonic connection available. Balanced XLR's are available on every M Series® cable. For all of its technology, the final result of M Series® is great music. Pure and simple. For those striving for audio cable perfection—at any price level—we invite you for a close audition of the new M Series® interconnect cables at your exclusive M Series® dealer. You will find no limits.

INTRODUCING  
THE CABLES FOR  
PERFECTIONISTS.

M1500®

M1000® MK III

M850®

M550®

M350®

**M SERIES**®  
Advancing The Art Of Listening

**MONSTER CABLE**

274 Mattis Way, South San Francisco, Ca 94080-6761

We invite you to hear our new M Series® cables. Please call to find the dealer nearest you. (800) 726-6001

M Series® Patent Nos. 4,932,897/4,808,130/4,777,324/4,752,253/4,742,912/4,743,712/4,731,506/4,538,023/4,468,083/29997/29689/043361/M89042425/ND-25095

Enter No. 24 on Reader Service Card

The Forté Model 4 is a gem, not so much for its interesting Class-A technology as for its truly musical sweetness.

put wattage would suggest (perhaps in part because it is capable of peak dynamic power levels well above 100 watts, or because exceptionally clean and detailed power amps always sound louder than their rated power), but it still cannot drive large, power-hungry speakers to their limits.

Another trade-off is that the bass, while very good down to quite low frequencies, is scarcely as extended and powerful as the deep bass you find in more expensive units. Overall, the low end is better defined and controlled than in many competitively priced transistor amplifiers, and much better defined and controlled than in any competitively priced tube amplifier I have heard, but there are limits to the bass and lower midrange dynamics.

In saying earlier that the Model 4 has an unusual sweetness, I do not mean to imply that its overall timbre and dynamic balance are similar to those of most tube amplifiers. There is no gentle roll-off in the upper octaves. There is a great deal of treble information and considerable upper-octave excitement, and the Model 4 is a very revealing amplifier indeed. It will get the best out of a fine cartridge or CD player with well-recorded material, but it will not forgive a mediocre preamp or poor recording.

Good as the upper midrange is, I do not want to imply that it equals or surpasses that of amplifiers costing two to three times as much. I did a great deal of comparative listening with the Forté and higher priced Class-A amplifiers. The upper midrange of the Model 4 is, beyond a doubt, good enough to raise the question of whether any further improvement in higher priced competitors has reached the point of diminishing returns. But with more costly units you can hear more soundstage detail, you can hear subtle improvements in truly demanding choral music and mass string passages, and solo piano and guitar notes do sound a bit more natural.

This is also an amplifier with a natural, rather than an exaggerated, soundstage. You will get more depth information when it is on the recording, but there is no tendency to add depth. The soundstage is not wider than usual, and the imaging is not striking. I would argue that you may well be sur-

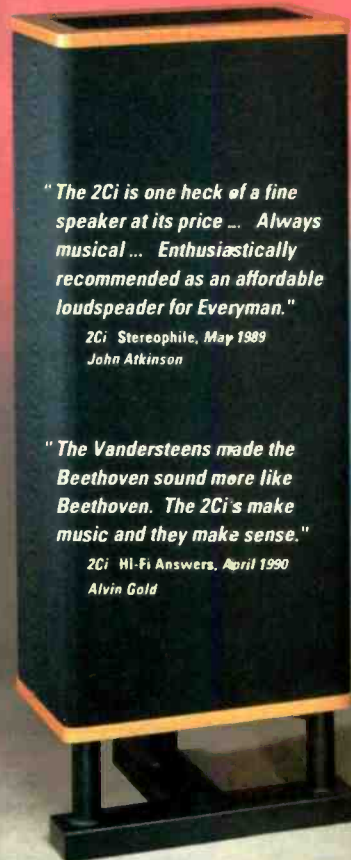
prised at how much soundstage information your collection has if you have been listening to less revealing amplifiers, but you will make that discovery in isolated moments over a long period of time, and not by hearing the Forté Model 4 impose a whole new set of characteristics on the soundstage.

In short, this is an amplifier for people who truly love music, not sheer sound. The Forté Audio Model 4 is ideal for driving loudspeakers that emphasize subtlety and transparency without presenting extremely complex loads and high power demands.

Anthony H. Cordesman

**Discover Superb Performance!**

VANDERSTEEN AUDIO



*"The 2Ci is one heck of a fine speaker at its price ... Always musical ... Enthusiastically recommended as an affordable loudspeaker for Everyman."*

*2Ci Stereophile, May 1989  
John Atkinson*

*"The Vandersteens made the Beethoven sound more like Beethoven. The 2Ci's make music and they make sense."*

*2Ci Hi-Fi Answers, April 1990  
Alvin Gold*



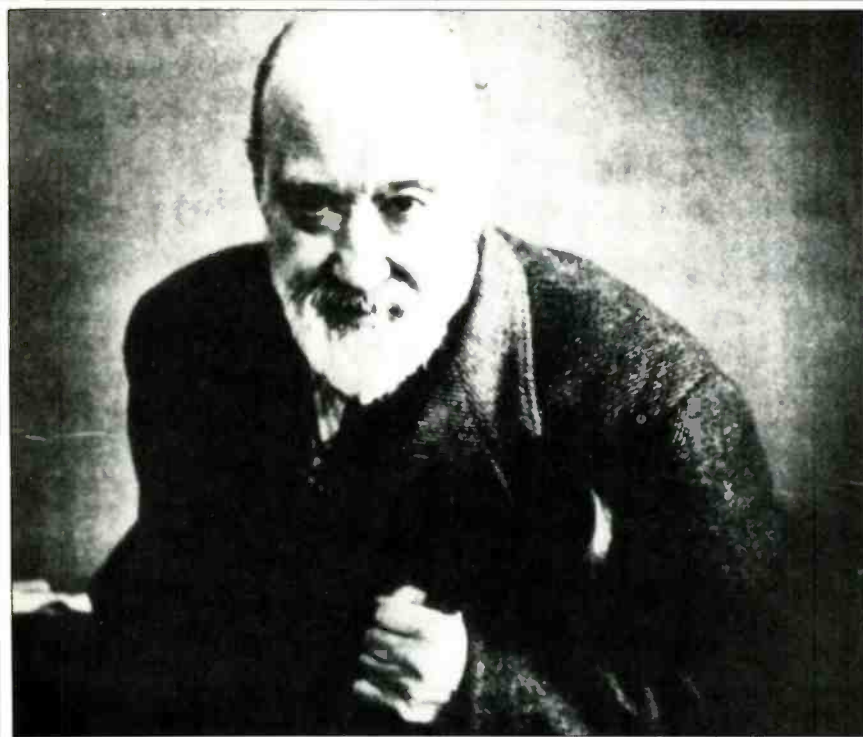
VANDERSTEEN AUDIO  
116 West Fourth St., Hanford, CA 93230  
(209) 582-0324

**DIMENSIONAL PURITY**

*The Vandersteen Model 2 series has been the leader in loudspeaker value and performance since 1977. The Model 2Ci uses new materials and technology to establish a new reference for affordable speaker performance. The Model 2Ci is now available at select audio dealers carefully chosen for their ability to assemble a musically satisfying system.*

*Write or call for a brochure and the name of your nearest dealer.*

## IVES FOR THE AGES



**Charles Ives: The Sonatas for Violin and Piano.** Gregory Fulkerson, violin; Robert Shannon, piano.

**Bridge BCD 9024A/B**, two CDs; DDD; 79:52.

**Ives: The Songs of Charles Ives—Vol. 1.** Henry Herford, baritone; Robin Bowman, piano.

**Unicorn-Kanchana DKPCD 9111**, CD; DDD; 60:05.

**Aaron Copland: Old American Songs (Sets 1 and 2); Ives: Songs.** Samuel Ramey, bass; Warren Jones, piano.

**Argo 433 027-2**, CD; DDD; 51:41.

When a personality as heterodox and maverick as that of Charles Ives confronts you, such epithets as eccentric, cranky, quirky, and cantankerous hardly cover it.

Ives derived his material from the homiest of American sources: Hymns, folk tunes, and popular ballads; the greater your familiarity with such sources—especially with their texts—the richer the tapestry of associations Ives' music weaves in your mind. In transmuting that cozy material into his own art, though, Ives blazed trails yet undiscovered even by such more recognized pioneers as Schoenberg,

Stravinsky, and Milhaud. Little wonder that few of even our best informed musicians half a century ago had even heard of Ives, and that, of those who had, many had sincere doubts about his sanity. Almost no one even bothered to read through his scores, let alone learn and perform them.

Today Ives ranks as a national icon, recognized worldwide as possibly the most important composer this country has produced. That doesn't make his music any easier for the new listener, but it does mean people at least take it seriously. The works on these three releases afford splendid access to the wild, rough, bardic, 100% American world of that extraordinary Connecticut Yankee, Charlie Ives. He was a Yale star athlete (track and baseball) and graduate who became a Manhattan insurance millionaire and, in his spare time, erupted music that finally won wider recognition only shortly before his death in 1954, at the age of 80.

The sonatas for violin and piano draw heavily from Ives' customary well-springs, his songs perhaps even more so. During his lifetime, since almost nobody would touch his music even with a barge pole, Ives had to publish it himself, and surely all musical history

offers nothing comparable to the 114 Songs he published in 1922. They range from superb (Vachel Lindsay's "General William Booth," about the Salvation Army's founder) to god-awful; in his preface, Ives specifically dismissed eight as "of no musical value." He wrote many of his own texts, some of truly dreadful quality ("When we're through this cursed war/All started by a sneaking gouger..."), but he also took from Browning, Emerson, Longfellow, Whitman, and others of his favorites. Put it all together—especially with his four symphonies and other outpourings—and you have a unique collective oeuvre which has secured Charles Ives a position in the world's musical pantheon.

Of the performers here, only Samuel Ramey has star rank or quality. Regrettably, he's concentrated on songs hardly more challenging than the dear old favorites Aaron Copland set so beautifully, but he does sing everything with his customary vocal refulgence. Fulkerson and Shannon, on *Sonatas for Violin and Piano*, and Herford and Bowman, on *Songs of Charles Ives*, do Ives and the listener greater service by not shying away from works that even today daunt most celebrity artists (one salient exception: Dietrich Fischer-Dieskau). In all instances, the engineers have acquitted themselves well, at times brilliantly. The Unicorn-Kanchana set—from England!—bears the notation "Volume 1," and that will make Charles Ives-lovers' hearts leap up indeed.

Paul Moor

**Salute to France.** Harmonie Ensemble, Steven Richman.

**Music and Arts CD-649**, CD; DDD; 68:34.

"Five Rarely Heard French Works for Small Orchestra" is the subtitle of this enchanting collection. Four of these are lesser known pieces. The major work here—Poulenc's "Aubade"—has had other recordings, but this is a praiseworthy account and fits in well with the rest of the 20th-century French works. Ralph Votapek is the soloist in this work—really a piano concerto with chamber orchestra. All the pieces here share a certain French clarity and élan, though varying greatly in instrumentation and style.

# The Legends.



# The Legacy.

From Jazz to Blues to Rock, the Legacy series is dedicated to presenting the definitive portrait of an artist's work or career. All Legacy releases are enhanced by state-of-the-art audio technology, detailed booklets, extensive biographies, personal notes, and rare photos.

## "Forty Years: The Artistry Of Tony Bennett"

Frank Sinatra calls him "the best singer in the business." This career-spanning Deluxe Box Set features 87 Tony Bennett performances - including all his hits - on 4 CDs or 4 Cassettes.

## "The Byrds"

The ultimate collection from one of the most influential bands of the '60's. Over 4 hours of music featuring all their chart hits, unreleased tracks, and 4 newly recorded songs.

## "Chicago: Group Portrait"

17 Top-20 hits by one of the most successful recording acts of all time are among the 63 songs included on this 4 CD or 4 Cassette Boxed Set covering the years 1969-1980.

## "Billie Holiday: The Legacy Box 1933-1958"

The lady sings the blues like only she can on this 70 song retrospective of her illustrious career. Featuring all her best loved songs, plus 3 unreleased tracks and 7 alternate takes.



For a Legacy catalog write: Legacy, P.O. Box 5000, Cranbury, New Jersey 08512. For a Legacy 70 minute CD Sampler featuring a wide range of musical styles, enclose \$4.00 to cover postage and handling.

"Columbia," "Epic," "Legacy," and • Reg. U.S. Pat. & Tm. Off. Marca Registrada/® is a trademark of Sony Music Entertainment Inc. ©1991 Sony Music Entertainment Inc.

**EXPAND  
YOUR  
HORIZONS  
WITH VIDEO**

**ORDER  
TOLL  
FREE**

**1-800-533-8161**  
Ext. # 10A61

**GREAT AIR BATTLES**



**GREAT AIR BATTLES**, Includes four volumes;

- The Jet Wars
- The Fighter Aces
- Chopper Fury
- and Warbirds of World War II.

**\$59.95** VP008

**Jacques Cousteau**



**Jacques Cousteau**, Includes the Amazon, Tahiti, New Guinea, Antarctica, Australia and Pioneer of the Sea. 6 films in the collection I VP005

**\$145.95**

**Jack Nicklaus**



**Jack Nicklaus Golf My Way Vol. 1 (Hitting the Shots)**

Two hours of ball-striking instruction by golf's all-time master. Covers the full swing of fundamentals, the short game and other important factors. VI008

**Jack Nicklaus Golf My Way Vol. 2 (Playing the Game)**

Get lower scores through better game management. Includes a lot of special shot making techniques. Learn and improve from the master. VI009

**\$119.95 ea. or set for \$229.95** VP007

**COSMOS**



**COSMOS**, This award-winning series includes 13 volumes of thought-provoking issues that are vital to the survival of our species on earth. From the stars and planets to the nuclear arms race, it's a treasure for every household. VP004

**\$239.95**

**Glory**



**Glory Gift Pack**, The academy award-winning film Glory and a special documentary on the 54th regiment, narrated by Morgan Freeman. VP002

**\$44.95**

**CIVIL WAR SET**



**CIVIL WAR SET**, Includes 3 volumes of the 125th anniversary battle re-enactment.

- The Antietam, (the bloodiest day in American History). VI027
- Chickamauga, (river of death). VI028
- and New Market (field of honor). VI029

**\$27.95 ea. or set for \$59.95** VP003

**Baseball Classics**



**Baseball Classics** Includes 2 videos from the all-time great ball players from the 1950's.

- 1952 & 1953 World Series Highlights. VI025
- 1954 World Series Highlights. VI026

**\$29.95 ea. or set for \$42.95** VP002

To order call our **TOLL FREE LINES**. We accept Visa, MC, AE or send a check or money order for price, item no. plus \$3.95 ea. or \$7.95 per set. New Jersey residents add 7% sales tax.

To: **American Promotions Inc.**  
PO Box 700, Emerson, NJ 07630

Dept. #65-10A61

A6



Thomas Allen projects warm intimacy, suggesting an accomplished friend you've invited into your living room to sing Brahms.

Conductor Richman plays horn in the American Symphony Orchestra in New York City. He founded Harmonic Ensemble over a decade ago, and the group has presented an NYC series of concerts that is noted for its unique programming.

Reynaldo Hahn's "Le bal de Beatrice d'Este" is a delicate seven-movement mini-suite that conjures up stately court balls of Renaissance Italy. Darius Milhaud, one of the famous "Les Six," is represented by his Symphony No. 5 for 10 Wind Instruments (of 1922). Despite the versatility of his huge catalog of varied compositions, Milhaud's music is always distinctly identifiable. With his spare neo-classical bent, he was disdainful of what he regarded as the oversized orchestral forces demanded by Wagner, Richard Strauss, and their ilk. His little symphony offers a lighthearted alternative whose piquant harmonies contrast well with the Hahn piece.

The first of two Ibert works here is his brief Concerto for Cello and Wind Instruments. His mixture of impressionism and classicism is heard in this opulent and tuneful concerto with soloist James Kreger. The instrument is brought forward of the ensemble in the recording, so that its part offers contrast with the winds, but not so far as to inflate the cello's size or spread it across the stereo stage.

The second Ibert work is an example of some of his numerous efforts for stage, film, and radio, as well as the element of humor that often creeps into his felicitous moods. It grew out of music for a play but ends up as a musical travelogue in the style of his well-known orchestral gem "Escapes." "Suite Symphonique—Paris" is the title, and, as

expected, it takes on a witty musical tour of the City of Lights, visiting the Mosque, a restaurant, a travel agency, a fair, the suburbs, and even Le Metro—complete with sound effects.

The recording, taped in Florence Gould Hall, in New York City, appears miked at a respectable distance from the instruments—even the piano and cello—and therefore preserves a good picture of the hall's natural ambience without blurring the delicate instrumentation. This charming salute deserves to be part of the collection of anyone open to exploring chamber music out of the commonplace but not out of a tonal-centered realm. *John Sunier*

**Brahms: Songs.** Thomas Allen, baritone; Geoffrey Parsons, piano.

**Virgin Classics VC 91130-2, CD; DDD; 61:53.**

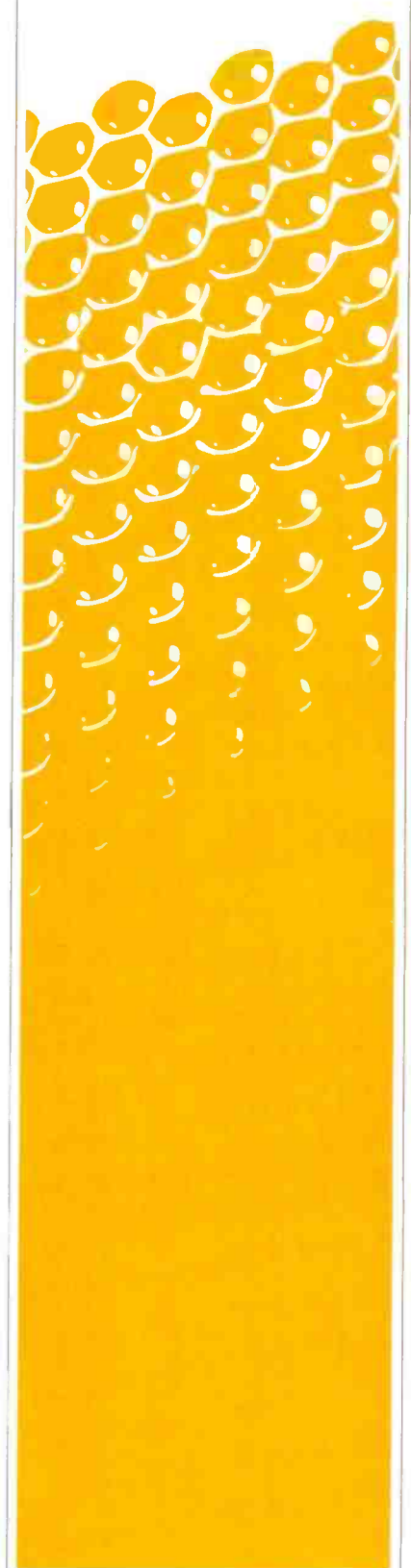
**Brahms: Four Serious Songs; Schumann: Liederkreis, Op. 24 and Op. 39.** Victor Braun, baritone; Antonin Kubelik, piano.

**Dorian DOR-90132, CD; DDD; 60:17.**

These two fine records may be more alike in their musical approach to German Lieder than in recorded sound and perspective. Virgin recorded in EMI's Studio One at Abbey Road and achieved a clean, close-up sound with a pleasant sense of space (especially around the voice) and beautifully detailed piano tone. Dorian, working in the Troy Savings Bank Music Hall (its standard and much-praised venue), achieved a bigger, richer, more distant sound that materially alters the listener's relationship to the music.

Actually, each approach is appropriate to the singer and to the songs. Allen's somewhat lighter, more lyrical voice projects a warm intimacy that suggests an accomplished friend you've invited into your living room to practice his artistry on his favorite Brahms. The program is pieced together from songs of miscellaneous vintage and poetic thrust, arranged to complement each other. Aside from this balanced contrast, the selection is quasi-random.

None of Braun's three groups is a song cycle in the strictest sense of telling a story whose progression should be maintained intact. But Schumann's Op. 24 is all to Heine texts, Op.





# “Have you seen Elvis?”

Convenient, compact, durable, wonderful sound—the endearing qualities of compact discs. Trouble is, you’ve quickly collected so many CDs that finding *Blue Suede Shoes* when you want to play it has become a real problem.

Until now.

The Proceed CD Library stores, organizes, and gives you flexible access to your *one hundred* favorite compact discs. Not just a high-capacity CD changer, the CD Library lets *you* organize your CD collection, in the way that works best for *you*.

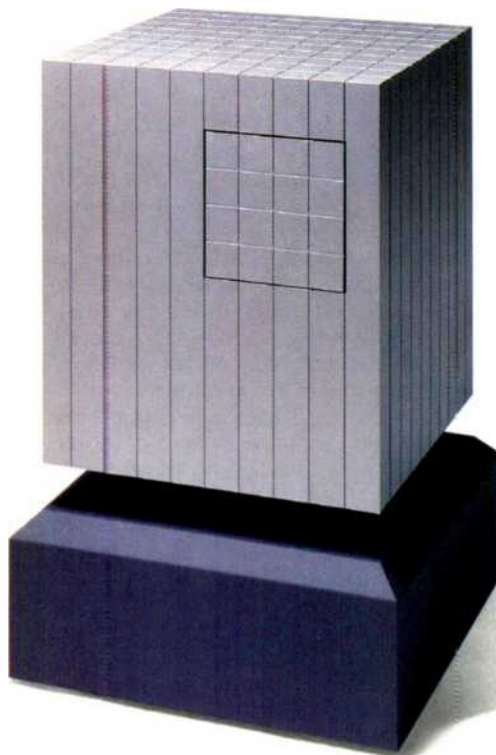
No more juggling jewel boxes. No more scrambling to find the right liner notes. The CD Library’s powerful remote-control unit, the Communicator, displays titles, artists, and tracks not by number but *by name*. You’ll also be able to define up to fifteen “music types” (we don’t choose them—*you do*).

From playing a single track on a specific CD to playing a custom sequence of dozens of tracks or CDs, the CD Library lets *you* choose how to play your favorite music—from anywhere in your home. Want to play an hour of baroque music?

How about all of your jazz CDs? Or a continuously repeating sequence of pre-’68 Beatles? It’s up to you.

Such power and convenience don’t come at the expense of first-class sound. Comparable to any of today’s “audiophile-quality” single-disc CD players, the CD Library’s superb sonics are the result of the same engineering that produced the acclaimed Proceed PCD, PDP, and PDT.

## 100-CD LIBRARY



Visit your nearest Proceed dealer, and discover what the Proceed CD Library can do for you and your music.

Who knows what you’ll find?

 P R O C E E D





The sheer sound of Elgar's Symphony No. 1 is gorgeous, and the recording matches it wonderfully.

39 is all to von Eichendorff texts, and the Brahms are settings of passages from Luther's translation of the Bible. There is thus a greater formal unity (of vintage, as well as text) to each group, and the Brahms is truly Olympian: A series of ruminations on death on the eve of the composer's own. Thus this is music that can—and, in the case of the Brahms, must—be considered in a less casual sense than Virgin's program. Both Dorian's sound and Braun's more stentorian approach are consistent with this.

If you limit your Lieder listening and want to choose between the two recitals, that's strictly a matter of taste. You can't go wrong with either one. Each of the four performers is truly excellent, and there's no dead weight among the songs on either disc. *Robert Long*

**Elgar: Symphony No. 1 (1908).** Royal Philharmonic Orchestra, Sir Yehudi Menuhin.

**Virgin Classics VC 7 90773-2,** CD; DDD; 50:54.

Aha! At last (in 1908) Britain produced a real, genuine top-level *symphony*. That entire nation gave a sigh of relief. England was back in the music game again. So now you may hear it, the symphony of symphonies, the great British masterpiece. As of 1908, never forget.

It is an interesting, highly professional work, gorgeously orchestrated in the fulsome manner of that day (when musicians were available in quantity for an easy price and hi-fi had never been

heard of). It is music of an astonishingly thick and yet flexible texture, full of a thousand themes that somehow never get more than a few notes beyond their start, and of an almost passionate Romanticism, a mass of sighs and pantings and whispers and great roars of brass—yes, impressive. But other than this, it remains Elgar, the old, ever-shifting, always NutraSweet (we used to say saccharine), on-the-edge-of-cloyiness Elgar and not a bit like the real moderns of that day, unless maybe a few hints of the very British Strauss (Richard).

No—even after a long musical life I can't warm up to this great British masterpiece, even if it is beautifully projected with the aid of that mellow adopted Britisher, Sir Yehudi Menuhin. Elgar waited even longer than Brahms before he dared try the Mount Everest of music; he was 50. For him, then, it seems to have been a matter of extreme discipline—taut, tight music instead of the all-out and sometimes pretty corny Elgar of less ambitious sorts. One can read a lot into this music. And if worse comes to worst, the sheer sound of the symphony is gorgeous, and the recording matches it wonderfully. That ought to be enough to tempt you.

P.S. As you listen, look at the picture of Elgar in his prime. Such a dandy you never saw, the perfect Britisher complete with gloves and cane. It says a lot, too, this picture.

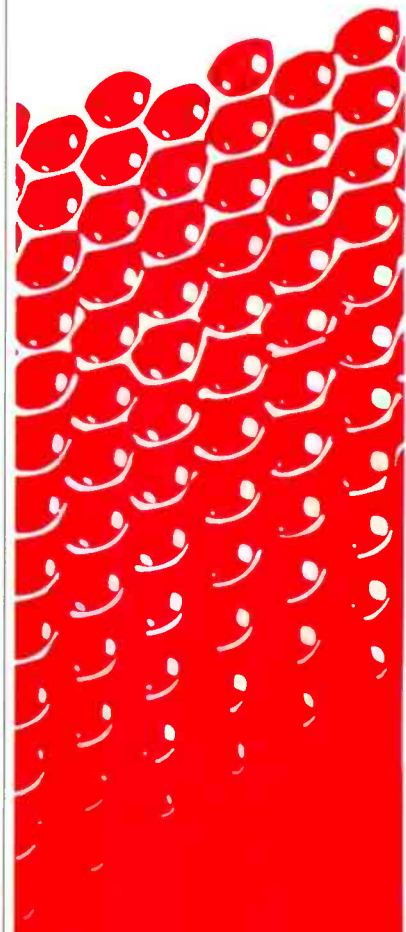
*Edward Tatnall Canby*

**Mendelssohn: Piano Trios.** Fontenay Trio.

**Teldec 2292-44947-2,** CD; DDD; 58:12.

When the Rembrandt Trio's Mendelssohn and Schubert First Trios appeared, I commented (January issue) that the long-ignored Mendelssohn trios seemed to be coming into their own. Now we have a fine account of both on Teldec. Judging by the names and photograph, the Fontenay Trio is young and German; judging by the playing, it is mature and perceptive.

Mendelssohn's two trios are so different that it is understandable if you like one more than the other. Both are superb, however, and the near-oblivion in which they have lain for a century



The electrostatic  
loudspeaker  
technology company

Since 1974  
no alternative  
audio marque  
has displayed  
such creative  
circuit design,  
superior  
craftsmanship  
and finish,  
greater dynamic  
capability, or  
presented a more  
deeply satisfying  
music involvement.

To receive detailed  
information on all  
Threshold audio  
components write:  
Threshold Corporation  
7325 Roseville Road,  
Sacramento, CA 95842;  
or call 1 (800) 888 8055.

*more  
than  
audio  
excellence*

**Threshold**



Threshold  
components are  
exclusively  
distributed by



division of  
Threshold  
Corporation

**In their recording of Mendelssohn piano trios, the Fontenay Trio offers first-rate musicianship with superb sound pickup.**

is utterly undeserved. The first is rhapsodic—the essence of early Romanticism. The second is denser (particularly in its outer movements) and more architectural in a sense. Startling to some listeners is Mendelssohn's use, in the development of the finale, of the chorale tune best known in the United States as the hymn "Praise God from Whom All Blessings Flow." The connection with the use of "Ein feste Burg" in the "Reformation" Symphony is inescapable.

If you want both trios, this disc is an excellent choice. The musicianship is first-rate and the studio sound pickup superb: Juicy enough to give the trio space without muddying its sound in the slightest. But if you favor the first trio, I think the palm must go to the Rembrandt, which achieves a rare perfection in seeming possessed by the music. By contrast, the Fontenay is a little cerebral—a little self-conscious—especially in the first movement. And its scherzo and finale sound slightly forced; the scherzo, in particular, is spurred onward, whereas the Rembrandt simply allows it to scamper along at its own pace, so to speak.

Teldec's sound is marginally superior to Dorian's for some tastes, however. Dorian has the advantage of the Troy Savings Bank's succulent acoustics; while Teldec goes for a similar direct/ambience balance, it lacks the richness of Dorian's venue and, as a by-product, achieves a cleaner delineation of the piano, in particular. But the differences in sound and even performance are not great enough to be a deciding factor for many listeners.

*Robert Long*

**The Young Tarasov.** Sergei Tarasov, piano. **MCA AED-68018**, CD; DDD; 69:07.

A notable debut recital, this. Despite his rather emaciated appearance in the cover photograph, Tarasov possesses exceptional power. Listen in particular to the Scriabin Etude on track 4. Its very, very Russian soul almost seems to seep out of the speakers and fill the listening room like a thick fog. The other Russian pieces that open the disc are a Tchaikovsky *dumka* and two Rachmaninoff Etudes Tableaux.

These are followed by the Schubert A Major Sonata, D. 557 (not the great D. 959), the Brahms Paganini Variations, and Liszt's Mephisto Waltz No. 1. Tarasov may find a little more in the finale of the Schubert than is really there, but he is not insensitive to style and period. At the same time, he certainly is aware that his virtuosity (or want of it) can influence his career for years to come. Perhaps he will presently feel secure enough to add charm to the power, brilliance, and delicacy that are manifest here. I hope so.

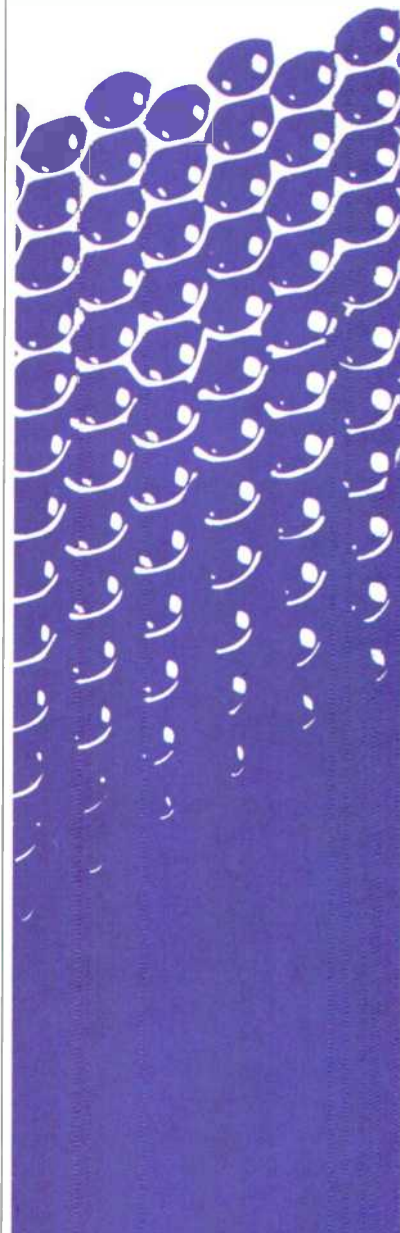
This disc is from the recent digital Art & Electronics Series (as opposed to the similarly packaged Melodiya analog issues). The Russian recording crew has captured just enough of the lusciousness inherent in the Great Hall of the Moscow Conservatory to suggest its richness without compromising the clarity of the piano. *Robert Long*

**John Field: Four Piano Sonatas.** Míceál O'Rourke. **Chandos CHAN 8787.**

John Field was Irish, born in Dublin, a piano and composing child wonder whose father, like Mozart's, was his first and most demanding "agent." He took the whole family off to London to exploit the burgeoning piano school there and to work as an assistant to the famed Clementi. This pianist is Irish, even unto a Gaelic spelling of Michael, and his dedication to Field is a warm thing. This is not profound Romantic music, but heartfelt and beautifully shaped. The composer was only 18 when he wrote the first three sonatas. The fourth, 10 years later, is not that different. Very pleasant early Romantic music. *Edward Tatnall Canby*

**Rimsky-Korsakov: Antar; Russian Easter Festival Overture.** The Philharmonia Orchestra; Yevgeny Svetlanov, conductor. **Hyperion CDA66399.**

Yevgeny Svetlanov provides a spirited performance of the Russian Easter Overture, but the real gem on this CD is the rarely played "Antar" symphony, which is cast in the same musical mold as "Scheherazade." Svetlanov gets splendid playing from the Philharmonia in this colorfully orchestrated work. The exquisite melodies in the impassioned music of the fourth movement are particularly well conveyed by the excellent sound. *Bert Whyte*



MARTIN-LOGAN, LTD.

P.O. Box 741, 2001 Delaware  
Lawrence, Kansas 66044  
1-913-749-0133

Weight:  
33 lbs.  
4 oz.

# Introducing a receiver with so much going for it, there's hardly enough room to do it justice.

Hidden Control Panel

Due to Yamaha's patented HCA Circuitry, the RX-950 delivers pure Class A performance, yet runs exceptionally cool. The amplifier in Yamaha's new audio-dedicated receiver will never degrade to Class AB, no matter how high the output.

A massive 11 lb. 6 oz. power transformer ensures high output power even when driving low-impedance loads.

The RX-950 features TOP-ART. A new system design that virtually eliminates interference between channels and delivers maximum signal purity.

40 Presets

Auto Search Tuning

Pure Direct Switch bypasses all tone and balance controls and the pre-main coupler to maximize signal purity.

When the RX-950 is used with other Yamaha RS-compatible components, the entire system can be controlled by a single remote control.

Motor-driven input selector and volume controls with LED indicators. A superior system which eliminates the noise and distortion inherent in electronic switching.

Manual Up/Down Tuning

Record Out Selector allows you to record one source while listening to another.

Front Panel Headphone Jack

Speaker terminals with heavy gauge connectors for optimum results.

Less Control

Optional Utility Ter

Sleep Timer (From Remote Control)

UI List



The RX-950 delivers 120 watts RMS per channel into 8 ohms from 20-20,000 Hz at no more than 0.015% THD. Or 180 watts RMS per channel into 4 ohms from 20-20,000 Hz at no more than 0.03% THD.

To keep output impedance to a minimum, speakers are switched in front of their terminals, rather than at the switch position.

For signal purity, exceptionally thick 1.6 mm high quality wire is used to route signals through the amplifier.

The thick base of the RX-950 has exceptional anti-resonance, anti-magnetic and superior damping characteristics.

Offers 4 dedicated audio inputs and 2 video inputs.

Bass and treble turnover frequency control.

The new RX-950 combines the performance of the finest separates with the convenience of a receiver.

Ideally suited for multiple speaker installations. Up to six different zones can be controlled at one time through additional amplifiers connected to the two extra pre-amp outs.

Dimensions: (W x H x D)  
17 1/2 inches x 6 1/2 inches x 17 1/2 inches

Integrated Multi-Function LCD Display

Timer features Yamaha's Direct PLL IF Count Synthesizer, a microprocessor-controlled tuning system to lock onto the weakest broadcast frequencies.

Continuously variable loudness control, maintains natural tonality, even at low volume levels.

The RX-950 is designed to serve as the core component of your custom installation system.

High Gain AM Loop Antenna

The heavy chassis and extra large feet of the RX-950 are designed for maximum vibration damping.

**YAMAHA**® © 1991 Yamaha Electronics Corporation USA, P.O. Box 6600, Buena Park, CA 90622



*Focus*

**LEGACY**  
LOUDSPEAKER SYSTEMS  
SINCE 1983

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. 29 on Reader Service Card

## SWAMP THANG



**Living with the Law:** Chris Whitley  
Columbia CK 46966, CD; ADD; 47:02.

Sound: A- Performance: A

Chris Whitley's music is sly and seductive blues drenched in a saucy New Orleans gumbo. Part of Whitley's appeal is his songs, but even more of it is Whitley himself—he has a sure sense of what he does and what he wants to do, stylistically and otherwise.

The foundation of it all is Whitley's slide-guitar playing, using an array of National steel-bodied instruments constructed in the '20s and '30s. National was the instrument of choice for many of the best early country bluesmen, and like them, Whitley has evolved a vocal style that echoes the characteristics of his guitar, effortlessly slipping in and out of falsetto.

The odd thing about this album's very New Orleans-based feel is that Whitley hadn't been in the Crescent City for more than a short while before making the record with Malcolm Burn, an associate of producer Daniel Lanois. Yet the sound fits Whitley perfectly. Burn's very sympathetic production is steamy and ambiently sensuous,

with that sexy slide guitar always right up front.

Whitley's songs are a strong suit, as he mates striking lyric imagery to haunting melodies. The opening, "Living with the Law," sets a tone for the album as a melody from the slide guitar establishes an atmosphere of danger and foreboding while lyrics follow with a desperate tale of life on the larr. Then, "Big Sky Country" celebrates love that lasts. Daryl Johnson's big, loping bass line paces this one, but the startling contrapuntal backing vocals are an album highlight. Whitley's lead voice brings Little Feat's Paul Barrere to mind.

"Kick the Stones," which is also featured in the soundtrack of the hit movie *Thelma and Louise*, is set in a ghost town roadhouse after the final blow-off of a steamy affair. Anger hangs hot in the air. Peter Conway's growling harmonica part is especially memorable. "Phone Call from Leavenworth," done solo and acoustic more than anything else here, lets Whitley's Delta blues roots show. His performance is a chiller. "Poison Girl" and "I Forget You Every Day" let a gentler side show, while

"Dust Radio" is a very private, yearning vision. The one spot on the album that I really dispute is Bill Dillon's way over-the-top guitar solo in "The Long Way Around," which seems more ostentatious than effective.

Chris Whitley is one of the most fully realized new artists I've heard in years, and one of the most compelling. He is genuinely possessed of a bluesman's mindset, and he sounds like he really does have hellhounds on his heels. *Living with the Law* is a wonderful album that is sure to be on a lot of "best of the year" lists. *Michael Tearson*

**Luck of the Draw:** Bonnie Raitt  
Capitol C2-96111, CD; AAD; 53:47.

Sound: B+ Performance: A-

If pain and suffering are prerequisites for great art, nobody bothered to tell Bonnie Raitt. With *Nick of Time*, her 1989 breakthrough, she proved that there's nothing like getting one's life straightened out and finding personal success and true love to boot.

It would be easy to damn *Luck of the Draw* as no more than *Nick of Time*'s glib successor, but that would miss the point. Although this new album tills no new artistic ground, it's the product of hard lessons learned and hard-found peace. If there is a little less sass in Raitt this time around, there's a lot more confidence and joy than I can ever remember on her records, and that is precisely the strength of *Luck of the Draw*. The album is an affirmation of love validating life.

From the openers, Shirley Eikhard's "Something to Talk About" and the duet with Delbert McClinton on Linda and Cecil Womack's "Good Man, Good Woman," the main theme is set in motion. Bonnie's songs "Tangled and Dark" and "Come to Me" avow her intent to take on the risk of commitment, while John Hiatt's cautionary "No Business" (with Hiatt on guitars and vocal) throws a welcome bit of irreverence into the pot.

"One Part Be My Lover," written by Bonnie and her new husband Michael O'Keefe, really is the core of the album. Both sides of a relationship are represented as each finds a way to let go of the past, clearing the way for a future together. Two Paul Brady songs, each featuring Richard Thompson on

# **OPTIMUS**

# **LIVE IN CONCERT!** <sup>SM</sup>

**T**he performance that continues where others end can be yours tonight with this Optimus<sup>SM</sup> carousel CD changer.

The CD-6120 plays up to five compact discs in sequence for hours of music, or up to 32 selections in the order you desire. You can choose random play, repeat or skip selections, even enjoy a 10-second "preview" before you decide. The convenient design lets you easily view disc titles and add or remove discs during play. Most importantly, the sound is superb—pure digital stereo with the energy of the live performance.

Optimus brand equipment is designed, crafted and tested to the highest quality standards in consumer electronics. It's technology that performs for you. Hear it today.



**Radio Shack** <sup>®</sup> SINCE 1921  
**AMERICA'S TECHNOLOGY STORE** <sup>™</sup>

A DIVISION OF TANDY CORPORATION

Enter No. 28 on Reader Service Card



If there is a little less sass in Bonnie Raitt this time around, there's a lot more confidence and joy.

guitar, further amplify the main theme. The closer, "All at Once," is the sad flip side, a postscript that Bonnie wrote about a troubled friend who has lost her peace.

This is a much more powerful and surer album than I first thought it was; the smoothness of the Don Was production let it glide past me. Attentive listening, however, revealed the album's considerable heart. Although I still wish there was more of Bonnie's bluesy, sassy side here, there's plenty of her delicious slide guitar. (And while I think of it, why hasn't she ever done a longform concert video to capture what a studio audio recording can't?) In the end, *Luck of the Draw* is far more than satisfactory. *Michael Tearson*

**Rag & Bone Buffet:** XTC  
Geffen GEFD-24417, CD; AAD; 78:28.

Sound: A- Performance: A

Since rock 'n' roll's British Invasion, if not before, record collectors and fanatics have been sent into frenzies collecting alternate versions of songs not generally made available on long-playing formats. XTC continues feeding that tradition, and has more or less made a religion of it. Principal songwriters Andy Partridge and Colin Moulding have plenty of unused material, thus making the release of *Rag & Bone Buffet* a necessity.

Four of the songs are from the period of XTC's *English Settlement*, which was a two-record album in the U.K. (one in the United States), a couple are from the *Skylarking* era, four are from the *Drums and Wires* period, and the rest fall in between. There's a total of 24 songs, and they include perhaps the group's best work (a version of "Respectable Street" that barely differs from the familiar one) as well as their worst ("Strange Tales, Strange

Tails'). There is some material culled from *Beeswax*, their vinyl B-side tribute of some years back, but 19 of the 24 are previously uncompiled.

XTC's best work has been when the band casually goes into the studio to record a few songs. And although their albums are fine (particularly *Black Sea*), the singles are better. Partridge and Moulding excel when they have the ability to focus on a track or two at a time, or when they're just "throwing away" a B-side.

In addition to this anthology of the obscure, Geffen and Virgin have done a very good job of reissuing the group's early albums on Compact Disc, adding a couple of odd tracks here and there to provide a little more value for the money (six on *Mummer*, three on *Drums and Wires*, one on *Go 2*, and seven on *White Music*). The mastering job is fine, and as these were well-recorded albums (for the most part) in the first place, the music holds up quite well. It's strange that the



powers that he didn't include the *Go + EP* on the *Go 2* reissue, and there are plenty of other singles from the same period that didn't make it on. However, if they did include everything that fit and made sense, then no one would buy *Rag & Bone Buffet*. At least with the combination of these CDs, you can have some semblance of chronology to your XTC collection without having to drag out old singles.

*Jon & Sally Tiven*

**Stages: The Lost Album:** Eric Andersen

Columbia/Legacy CK 47120, CD; AAD/ADD; 58:19.

Sound: A- Performance: A

Talk about hard luck stories! After 1972's *Blue River*, his best record to that date, Eric Andersen returned to Nashville for the next one, which felt like it could be the big one. Sessions went beautifully, even better than for *Blue River*, and *Stages* was on the release calendar. Players like producer Norbert Putnam, David Briggs, pedal steel ace Weldon Myrick, and Leon Russell populated the project. Joan Baez sang a cameo on the gorgeous "Woman, She Was Gentle." Eric was genuinely excited about the album.

Then CBS lost the master tapes and album artwork between Nashville and New York. Lost them! And Eric subsequently left the label (who wouldn't?) for Arista, where he recut most of the songs a couple of years later for an album called *Be True to You*. Well done, but not magical. The moment had passed and the inertia was killed.

Cut to the late '80s. Columbia, now owned by Sony, has set up a reissue program called Legacy. The day before Halloween '89, the *Stages* tapes turned up as a result of a two-year search of the vaults, and the decision to finally release the album was made.

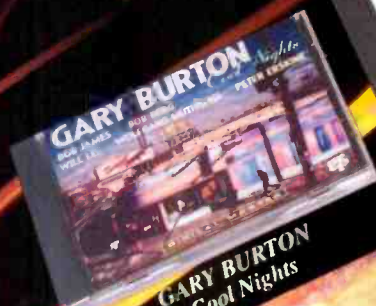
*Stages* really is as good as Eric always said it was, and it is a true pleasure to hear it at last. For the "reissue," Eric added three excellent new songs produced by Steve Addabbo, who helmed Andersen's terrific *Ghosts Upon the Road* on Gold Castle last year. Key players include Rick Danko and Garth Hudson of The Band, Eric Bazilian of Hooters, drummer Andy Newmark, and Shawn Colvin, who

Photograph: ©David Gahr

Photograph: ©Carla Gahr



# THE SHAPE OF MUSIC IN THE 90'S



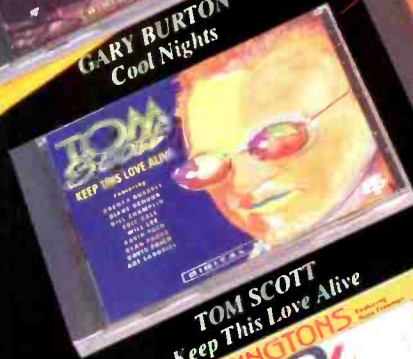
**GARY BURTON**  
Cool Nights



**SPYRO GYRA**  
Collection



**ACOUSTIC ALCHEMY**  
Back On The Case



**TOM SCOTT**  
Keep This Love Alive



**CHICK COREA ELEKTRIC BAND**  
Beneath The Mask

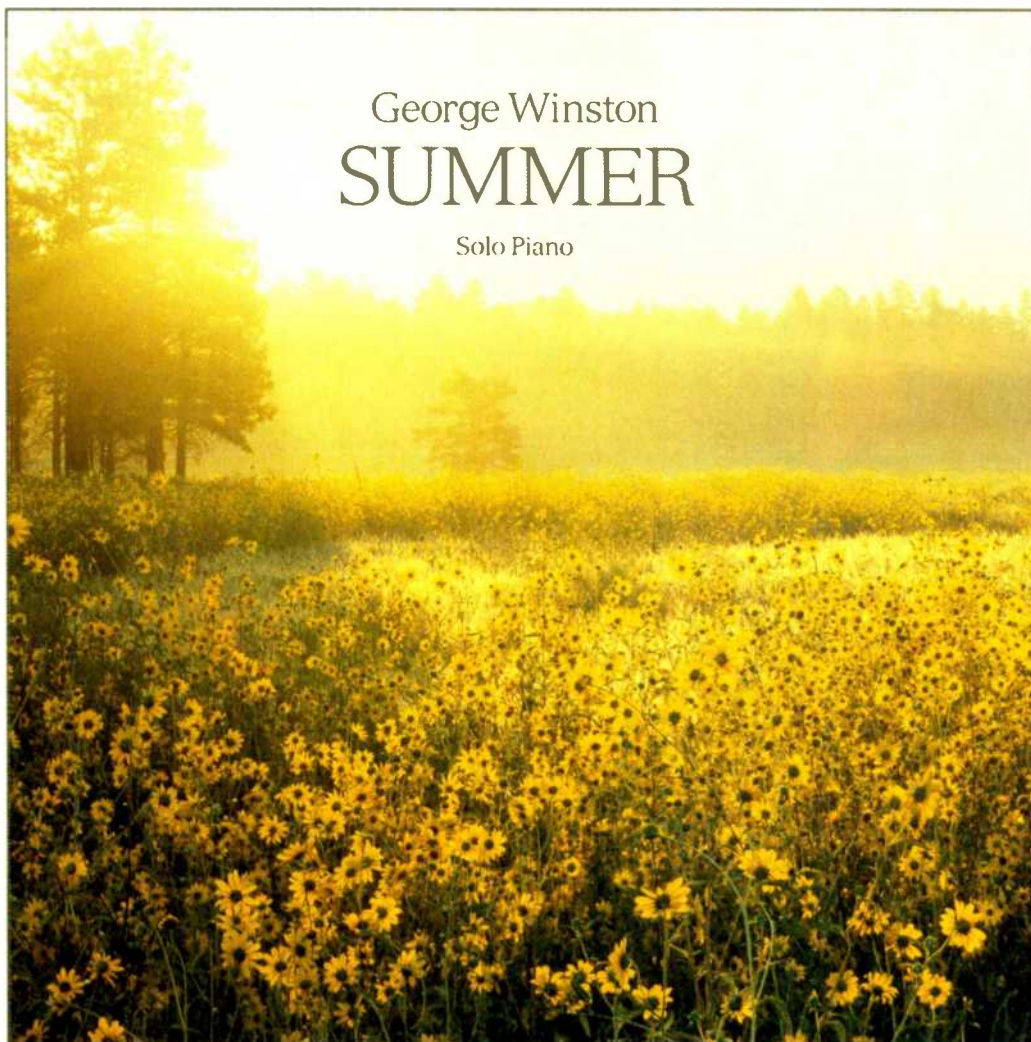


**RIPPINGTONS**  
FEATURING RUSS FREEMAN  
Curves Ahead



Available on  
GRP Compact Disc,  
and 90 Cassette.  
©1991 GRP Records, Inc.

THE  
DIGITAL MASTER  
COMPANY



George Winston  
**SUMMER**

Solo Piano

The latest from George Winston

Fifteen new piano solos on Windham Hill

On LP, CD and Cassette



1991 Windham Hill Productions Inc

Photograph: ©Carla Gahr



John Gorka's new album is a dark journey, but there is a compelling thread of hope running through it.

adds startling support vocals. The new songs complete the circle.

*Stages* is way past overdue, but it still sounds fresh and new. My highest recommendation. *Michael Tearson*

**Jack's Crows:** John Gorka. **High Street/Windham Hill 72902-10309-2.**

John Gorka's songs make vivid, knowing portraits of love's problems, houses replacing farms in his current home of Bethlehem, Pa., and friends enduring hard times. While he has a dark, mournful voice—with an inevita-

ble sadness that permeates many of his songs—there exists a welcome hint of whimsy ("I'm from New Jersey"). Guest performers include Shawn Colvin, the Turtle Island String Quartet, and Michael Manning. While *Jack's Crows* is a dark journey, there is a compelling thread of hope that runs through it and elevates Gorka's work.

*Michael Tearson*

**Hey Man!:** Richard X. Heyman. **Sire/Warner Bros. 9 26506-2.**

Heyman's strength lies in his songwriting. On that front, specifically, are melodic ideas and progressions that often venture into unpredictable territory without getting lost. As an album, *Hey Man!* improves as it goes along. The Dylan/Petty/McGuinn-esque "In the Scheme of Things" begins with a beautiful 12-string guitar-meets-Hammond intro, which qualifies as the album's spine-shivering moment. "Side-tracked" is a piano-driven rocker that, reaching for comparisons, sounds

marginally like a Costello or Nick Lowe song. Noteworthy is the fact that Heyman plays almost every part on the record—from drums to guitars and bass to piano and harmonica. With only himself at the helm, Heyman provides the listener with an undistracting look at his craft.

*Michael Bieber*

**Bluerunners.** Island 422-848 277-2.

Take a little '60s surf, a little saxified rockabilly, throw in an acid-rock guitar solo, then immerse them in zydeco, and you might come up with something like The Bluerunners' eponymous debut. Combining electric guitars and a modern rock beat with traditional Cajun orchestration, including accordion and washboard, The Bluerunners create good-time music that should have broad party appeal. This is not the first nor necessarily the best zydeco/rock fusion, and the mix is not perfect, but The Bluerunners do get the head bobbing and the feet shuffling, which is quite enough.

*Michael Wright*



**B&K COMPONENTS, LTD.**

1971 Abbot Road  
Buffalo, NY 14218-3241 USA  
NY: 716-822-8488  
FAX: 716-822-8306  
1-800-543-5252

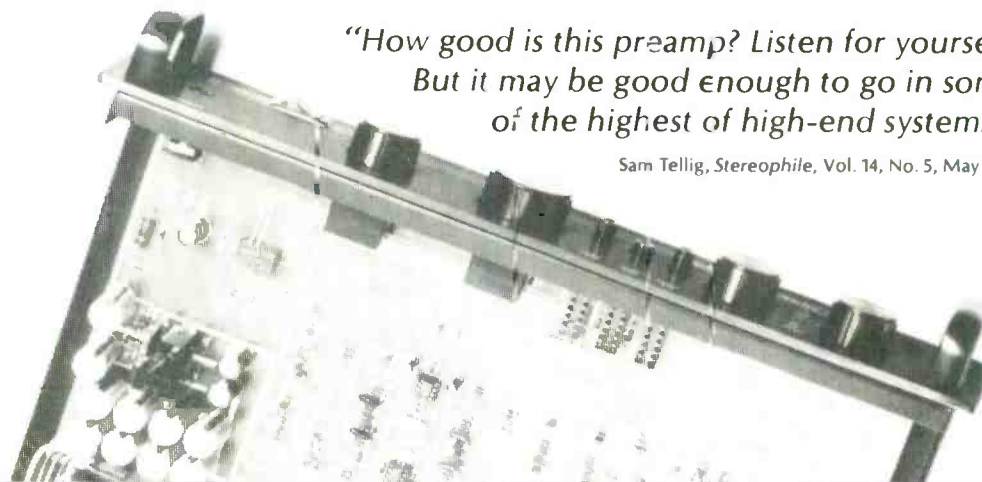
A point of view that you may never see but is an important feature of B&K units: all design, engineering, manufacturing and service takes place under one roof in Buffalo, New York. This allows B&K to integrate all phases of product development and manufacturing as a team. Our processes have been refined to provide you with state of the art audio equipment that is both reliable and affordable.

## A Point Of View

*"How good is this preamp? Listen for yourself. But it may be good enough to go in some of the highest of high-end systems."*

Sam Tellig, *Stereophile*, Vol. 14, No. 5, May 1991

Sonata Series  
Pro-10MC  
Pre-amplifier



Enter No. 7 on Reader Service Card



Audio Hall of Fame member Henry Kloss created the dominant speakers of the '50s (AR), '60s (KLI) and '70s (Advent). Now he's created a new kind of surround sound loudspeaker. *The Surround.*

# His Latest Idea Seems To Come Out Of Nowhere.

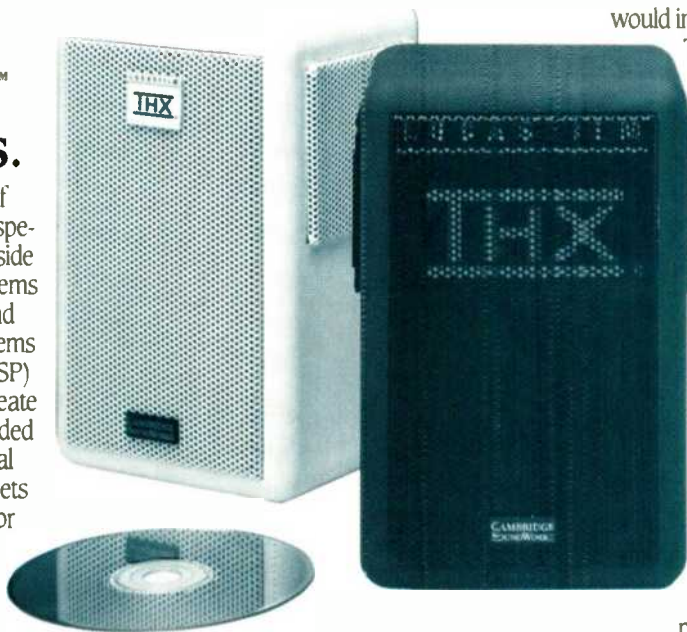
## Introducing The Surround™ By Henry Kloss.

The Surround is a new *kind* of speaker system. One of the first specifically designed for use as rear/side speakers in surround sound systems of all types. Dolby Surround™ and Dolby Surround Pro Logic™ systems ... or Digital Signal Processing (DSP) surround systems. It will even create surround sound effects when added as rear speakers to a conventional stereo system. The Surround meets even the most stringent criteria for use in a home surround sound system.\*

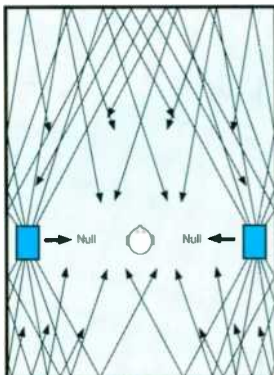
### Dipole Radiator Technology.

Unlike other speakers, the purpose of rear/side speakers in a Dolby Surround or DSP system is to "surround" the listener with uniform, *non-directional* ambient sounds. Conventional speakers are designed to create a precise, "stereo stage"—the opposite of what you want from a surround speaker. The Surround, however, is a dipole radiator. It contains a 4" low frequency driver facing "forward" out of the cabinet, and two 3" high frequency drivers—one on each *side* of the cabinet.

When mounted on the side walls of your listening room, The Surround's two high



frequency drivers direct sound towards the front and rear of the room. The sounds then reflect off the surfaces of the room, and finally reach the listener from *all* directions...almost as if the music was "coming out of nowhere." The result is surround sound the way it was meant to be heard.



### Price Breakthrough.

Like all our products, The Surround was designed by Audio Hall of Fame member Henry Kloss. It is manufactured in Newton, Mass., and sold *only* factory-direct. Because we eliminate expensive middle-men, our products sell for *much* less than they

would in stores. We are able to introduce The Surround at \$399 per pair—less than half of any other surround loudspeaker in its category.

### Try The Surround Risk-Free For 30 Days.

The Surround is backed by the Cambridge SoundWorks 30 Day Total Satisfaction Guarantee. So there's no risk. Our audio experts (not phone clerks) are on duty 365 days a year to answer your questions. This is the simplest, most risk-free way to get the right deal on the right stereo components.

### Free Audio Catalog.

Our new 48-page color catalog has specials on systems and components from Pioneer, Philips, Denon, Nakamichi, Thorens and Cambridge SoundWorks—including complete Dolby Surround systems that start at under \$1,000.

\*The Surround is manufactured under license from Lucasarts Entertainment Company. Lucasfilm THX is a trademark of Lucasarts Entertainment Company.

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

## CAMBRIDGE SOUNDWORKS

154 California St., Suite 104, Newton, MA 02158

### 1-800-AKA-HIFI

1-800-AKA-HIFI (800-252-4434) Fax: 617-332-9229 Canada: 1-800-525-4434 Outside U.S. or Canada: 617-332-5936

© 1991 Cambridge SoundWorks, Inc. Cambridge SoundWorks and The Surround are trademarks of Cambridge SoundWorks, Inc. AR and Advent are trademarks of Jensen Laboratories.

# WORLD'S LARGEST SMALLEST RECORD STORE

## ALMOST FREE CD

New catalog subscribers may choose to receive a **free** Rykodisc CD sampler, *Steal This Disc 3*. The 72-minute CD contains 23 tracks, including a song from the new Nils Lofgren release, plus Jimi Hendrix, Jerry Jeff Walker, Frank Zappa, Badfinger, Ringo Starr & His All Starr Band, Devo, Country Joe, McGear, David Bowie and more. Reg. Price: \$9.99 + S&H. **New Subscribers pay only the \$3.95 S&H Charge.** (55328)



## CD Samplers from \$4.99

**Contemporary Jazz Masters Sampler, Vol 1.** — 16 Cuts, including selections by Miles Davis, Paul Desmond, Art Farmer, Maynard Ferguson, Alan Holdsworth, Tom Scott and more. (43486) \$9.99

**JVC World Sounds Catalogue** —40 cuts, with music from all over the world. (Bulgaria, Zaire, Tibet and more!) (49063) \$4.99

**Alligator Records 20th Anniversary Collection.** Over 30 historic cuts including songs from Albert Collins, Hound Dog Taylor, Lonnie Brooks, and more. (55761) 2 CDs \$14.99

**Alligator's Genuine Houserockin Music -Vol. 1** (43488) **Vol. 2** (43489) **Vol. 3** (43490) **Vol. 4** (44863) \$6.99

**IMP Classics 3-CD Samplers**-This collection includes three \$5.00 coupons, which are redeemable by purchasing any IMP Classics title from Bose Express Music. (56896) 3 CDs \$14.95

**Dorian Digital Sampler Vol III** - This sequel presents highlights from the On the Banks of Hellcon and more (51776) \$4.99

**Teldec Classics International** - 22 Cuts, highlighting Tekdec's Spring 1991 releases. (61539) \$4.99



## Any Recording in This Issue \$12<sup>99</sup>

You can order any title reviewed or advertised in this issue, that is regularly priced less than \$17 per CD, for our new subscriber low price of \$12.99/CD (only \$7.99 for cassettes), plus \$3.95 shipping and handling *per order*. Just call 1-800-233-6357 or use the coupon to order. Please include artist, title, format & inventory number, if known.

# BOSE EXPRESS MUSIC CATALOG

**B**ose Express Music Catalog is like having an enormous record store all to yourself. You can shop for the music you want, when you want it. We carry everything in print in Rock, Jazz, Blues, Pop...you will find it all here in our 240 page, 50,000-title source book.

We carry the complete catalog of all the major labels, plus independents like Sheffield, Delos, MFSL, Alligator, RYKO, Chandos, Telarc, Chesky, Dorian ...in total, over 1,000 independents. Ordering from us couldn't be easier. Call our 800 number, or send the order form to us by fax or post.

Our 240-page CD, Tape and Video Catalog includes over 50,000 titles. Your first issue includes a refund certificate for \$6.00, plus \$50.00 in additional merchandise credits. There is no purchase obligation or unrequested shipments.

## Free Updates

New subscribers will receive 1 Free year of Updates, covering new releases & monthly specials.

# 1-800-233-6357

### SUBSCRIPTION/MAIL ORDER FORM

- Start the Updates & send the 240-page Catalog (\$6.00/yr, refundable on the first order from the Catalog)
  - Yes. Please include my FREE Rykodisc Sampler, *Steal This Disc 3*. I'm enclosing an extra \$3.95 for Shipping and Handling. (55328)
  - Send me the attached list of recordings checked above(include artist, title, format [CD or CA] & number) or I'm enclosing \$12.99/disc + \$3.95 S&H per order (*Music orders Only*)
  - Check or  Credit Card  Visa  MC  AMEX
- (Outside U.S. Credit Card Only, Please)

CC # \_\_\_\_\_ Exp \_\_\_\_\_  
 Name \_\_\_\_\_  
 Address \_\_\_\_\_  
 City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

CALL 1-800-233-6357 OR MAIL WITH PAYMENT TO:  
**BOSE EXPRESS MUSIC**  
 The Mountain, Framingham, MA 01701  
 Fax: 508-875-0604

## FOLLOW THE LEADER



**Mr. Lucky:** John Lee Hooker  
**Point Blank/Charisma 91724-2**, CD;  
 AAD; 47:23.

Sound: A- Performance: B+

John Lee Hooker's skill as a bluesman is exceeded only by his commercial viability. While his contemporaries have fallen in and out of fashion, Detroit's musical gift to the blues world has stayed on top for four decades without missing a beat. *Mr. Lucky* is a twilight-years tribute to Hooker by a mere handful of his countless admirers: Albert Collins, Ry Cooder, Robert Cray, John Hammond, Jr., Carlos Santana, Johnny Winter, Keith Richards, and Van Morrison, among others.

Hooker is in many ways an unlikely candidate for such far-reaching influence. Although born near Muddy Waters' Mississippi birthplace, his blues are vastly different than Muddy's. Hooker's uniquely personal music is built on a more basic, one-chord style that places a greater emphasis on sudden rhythmic shifts and emotional immediacy than instrumental prowess.

His effect on rock includes his material, his emotional commitment, and guitar boogies that will live as long as bar bands survive.

John Lee's musical spontaneity has long thwarted studio bands raised on predictable chord changes. Worse yet, he rarely performs the same song the same way twice. That explains why, for this recording, its star contributes vocals to bands fronted by his friends rather than having them sit in with him and attempt to follow along. You can't complain, however, about an album that coaxes good performances out of such crack bands as those of Robert Cray, Albert Collins, and Carlos Santana. Hooker's resonant, sensual voice is in great form, and he certainly sounds as if he's having a ball.

Credit producer Roy Rogers, however, with keeping Hooker from becoming a guest on his own album. Rogers has paired Hooker with John Hammond, Jr. on two cuts in which the underappreciated Hammond approximates Hooker's own acoustic style. On "Susie," genre-player extraordinaire

Johnny Winter faithfully recalls Hooker's early band recordings.

*Mr. Lucky* is a far cry from Hooker's early days, when he recorded with a board under his foot to amplify his tapping while his producer placed a microphone in a toilet in order to achieve a primitive echo. *Mr. Lucky* makes clear how little of his musical vision John Lee Hooker gave up over the years.

Roy Greenberg

**Black Science:** Steve Coleman and Five Elements

**RCA/Novus 3119-2-N**, CD; AAD; 51:05.

Sound: A- Performance: B-

**Man-Talk for Moderns, Vol. X:** Greg Osby

**Blue Note CDP 7 954142**, CD; AAD; 54:18.

Sound: B+ Performance: C+

The union of street funk and jazz intellect has been an ongoing concern, possibly since the days of Buddy Bolden (1868-1931), but certainly since Miles Davis' *A Tribute to Jack Johnson* (1970). M-BASE (Macro-BASIC Array of Structured Experimentation) is a loose-knit, Brooklyn, New York-based collective that's spent a lot of time at this intersection. Steve Coleman has been the leading light of M-BASE, and *Black Science* follows closely on the heels of last year's *Rhythm People*. His music is driven by funk rhythms, but the grooves are angular and chopped.



# WDS WISCONSIN DISCOUNT STEREO

## Call Toll Free: 1-800-356-9514

### Cassette Decks



**Teac V370X** ..... \$79  
Dolby B/C, auto tape selector

**JVC TDW305 TN** ..... **Special**  
Titanium finish, twin A/R, full logic, continuous play

**JVC TDV541 TN** ..... **Special**  
3 head, full logic, Dolby B/C/Hx Pro, MPX

**Sherwood DD1230** ..... **\$166**  
Auto-reverse, dubbing deck, Dolby B/C

### CD Players



**Teac AD-3** ..... **\$229**  
Combination CD/cassette deck, Dolby B/Hx Pro, remote

**JVC XLM505 TN** ..... **Special**  
6 disc magazine, titanium finish, 4 way repeat, direct access remote

**JVC XLZ441** ..... **Special**  
Single CD player, 1 bit DAC, 32 track programmability

**Sherwood CD1192R** ..... **\$129**  
8X oversampling, Digi-Link system, remote

**Magnavox CDC-552** ..... **\$189**  
5 disc changer, 16 bit, 20 track, change 4 during play

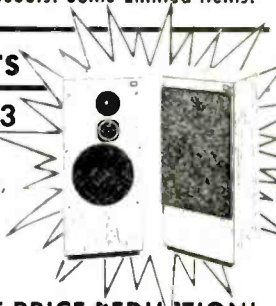
- ▶ Best Pricing AND Best Service
- ▶ Fast Delivery
- ▶ 30-Day No Lemon
- ▶ Service Protection Plans Available
- ▶ 1000's of Products
- ▶ 10-Day Return\*

Some items closeouts. Some Limited Items.

### Speakers

**JBL L100t3**

**\$699** pr.  
3-way, 400 wts, 12" woofer, 5" midrange, 1" dome tweeter



**CLOSEOUT PRICE REDUCTION!**

### Car Audio



**Clarion 9772** ..... **\$219**

Removable, 20 presets, seek, scan, auto-reverse, 60 watts

**Clarion 9701** ..... **\$188**

Standard chassis, seek, A/R, 25 watts, bass & treble

**JBL T602** ..... **\$72**

6.5" 2 way speakers, 80 watts, 55-23K Hz

**Pyle "Toobz"** ..... **\$99**

Tube style bass reflex system, 8" woofer

### Stereo Receivers



**JVC RX-705** ..... **Special**  
100 watts, Dolby Pro Logic Surround Sound, 4 built-in amps

**JVC RX-505** ..... **Special**

80 wt, Dolby Surround Sound, 7 band EQ

**JVC RX-305** ..... **Special**

50 watts, A/V remote, 40 presets

**Sherwood RA-1142** ..... **\$128**

50 watts, quartz tuning, 24 presets

### Mini Component Systems

**JVC MX50** ..... **Special**



35 wts per channel amp, tuner, CD player, tape deck, 2 way speakers, 7 band EQ, 5-way program timer, full logic, Dolby B.

**Denon G-05** ..... **In Stock**

36 watts per channel, Tuner with 12 presets, Dolby B, music search

**Panasonic SC-CH7** ..... **Special**

20 watts per channel, CD with 20 track programming, Dolby B/C

<b>Nintendo Super NES</b>	.....	<b>\$189</b>
<b>Gameboy</b>	Bo Jackson	..... \$25
<b>Titles</b>	Dr. Mario	..... \$15
	Final Fantasy	..... \$27
<b>Nintendo</b>	F-15 Strike Eagle	..... \$33
<b>Titles</b>	Red October	..... \$36
	Videomations	..... \$38
<b>Super NES</b>	Pilot Wings	..... \$39
<b>Titles</b>	Sim City	..... \$39

### Gift Electronics



**Bearcat RD9-XL**

**\$88**

Micro Detector, X, K Bands, mute

**Whistler 5000** ..... **\$199**  
Remote sensor, 3 band, digital display

**Southwestern Bell** ..... **\$59**

**Cordless Phone.** Top rated, long range, last number redial

**Sony CFD454** ..... **\$169**

CD portable, mini component design, 5 band EQ

**Sony D-303 Discman** ..... **\$269**

1 Bit D/A converter, Mega Bass, top mount controls



\*10-Day Return Policy: Return items accepted within 10 days of purchase. (Must get prior authorization.) Original condition. 10% restocking fee. Shipping and handling not refundable.

**WDS, 2417 W. Badger Road, Madison, WI 53713**

**Hours:**  
**Monday-Friday: 8-8 • Saturday: 8-5:30**  
**Sunday: Closed**

### WDS—Your complete holiday shopping center for:

- Sony • Hitachi • JVC • Magnavox • Canon • Panasonic • Quasar • Zenith • Sharp • Sylvania • Toshiba • Fisher • Sherwood • Soundcraftsman
- Teac • Aiwa • Suono • Ortofon • Shure • Stanton • AAL • Bose • Advent • Design Acoustics • Infinity • Jamo • Blaupunkt • Clarion • Alphasonik
- MTX • Pyle • BEL • Bearcat • Cobra • American Bell • Code-A-Phone • Bell South • Phone Mate • Freedom Phone • Koss • Brother • Smith Corona
- Nintendo • ... and many more that cannot be nationally advertised!

• **Call today for current product and pricing information.** •

Steve Coleman's music is driven by funk rhythms; compatriot Greg Osby chooses a silkier sound.

Drummer Marvin "Smitty" Smith drops odd accents and cross-rhythms, while bassist Reggie Washington uses the slap and twang vocabulary of R&B players.

Greg Osby is a compatriot of Coleman's in M-BASE, but he chooses a silkier rhythm sound whose funk is

transmuted through fusion. You can hear echoes of Weather Report, particularly in his catchy melodies and synthesizer arrangements. Osby's lines are often doubled, either by synthesizers triggered with his saxophone or from keyboardists Edward Simon and Michael Cain.

The roots of Steve Coleman's music are a synthesis of Miles Davis, fellow altoist Ornette Coleman (no relation), and Sly Stone or George Clinton. "The X Format (Standard Deviation)" recalls Davis groups from the early 1970s with the keyboard stabs of James Weidman drawn from Chick Corea. The choppy, but kicking, drums and bottom-heavy electric bass could've walked down Broadway from Davis' *On the Corner*. And Coleman's solo is as free an exploration as any from the Davis band.

Like Miles, Coleman understands that tying a solo into the rhythm section allows the player more freedom than standard chord changes, and Coleman takes full advantage of it as he blows across the slash-and-hack grooves of Smith and Washington. He probably learned that lesson—along with Marvin "Smitty" Smith—from playing in bassist Dave Holland's band. Holland guests on a couple of tracks, notably the blues on "A Vial of Calm." His supple, walking lines are a nice break from Washington's chunky slaps.

Greg Osby, on the other hand, is a soloist who plays more from chord changes than rhythm. In that sense he also shares a sensibility with Weather Report's Wayne Shorter. Silky ballads like "For Here to Go," "Like So . . ." and "Carolla" speak with the slick voice of "lite jazz," although Osby's solos are meatier and more cutting than Kenny G's. Like Coleman, however, he sounds best when he liberates himself from the chord changes. Perhaps it's telling that the freest playing occurs on "Balaka," where he and Steve Coleman create an interwoven duet over a hard-edged funk groove. It's a beautiful arrangement, with elaborate percussion and the voice of Hochmad Ali Akkbar wafting through the background like an Arabian ghost.

Osby's street sensibility comes out in a sort of house remix of "Cad'lack Back" called "2th (Twooth)," where the same rhythm track is used for a breathier, more open arrangement dominated by synthesizers.

These and other M-BASE musicians have often used vocals in their music. Coleman's songs hark back to the 1960s with "Beyond All We Know," a spiritually inclined, floating ballad sung by Cassandra Wilson, another M-BASE member. "Ghost Town" is an anti-drug

## PREAMPLIFIERS HIGH END SPECIFICATIONS

	Integrated circuit or op amp gain stages	Discrete class A input and output stages	Fully regulated DC external power supply	Separate DC power supplies for each channel (dual mono)	Two separate power supplies + and - rail of each channel	Separate power supplies for Military grade epoxy sealed resistor	Military grade epoxy sealed resistor (R1000)	Teflon wired gold plated circuit board	Input and output jacks	Matched transistors	Penny and Gile custom made conductive plastic potentiometer	Country of manufacture	Price
Aragon 24Ksp	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	U.S.	\$1250
Aragon 24K	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	U.S.	\$1500 with phono

Conventional specifications have little to do with sound quality. They also bear little relationship to the value of a preamplifier. The above specifications, on the other hand, are found exclusively in the world's finest and costliest preamplifiers.

Although preamplifiers with the above "High End Specifications" may have differences in sound when compared with one another, they all share a certain musical quality, that being "High End"—because quality can only come from quality.

Aragon...internationally recognized as the finest value in high end audio.

**MONDIAL DESIGNS LIMITED**  
2 Elm Street, Ardsley NY 10502 • 914-693-8008

Enter No. 23 on Reader Service Card



ORDER HOTLINE

# 1 800 • 542 • SAVE

## Call Us Last For The Guaranteed Lowest Price

**ADC SS525 Equalizer/Analyzer**  
 • Computerized automatic equalizer/  
 spectrum analyzer with memory &  
 remote control • Customized music  
 included, and pink noise generator  
 built-in

**\$289**



**PROTON 440 Digital Tuner**



- Advanced Schottky noise reduction circuitry
- Ultra wide-band, low-noise IF circuitry that optimizes frequency response
- Digital synthesis tuning
- 12 Memory presets (6am - 6pm)
- Search and scan modes

**\$179**

**#1 Rated TV In Last Ten Years!**

**MR13 Monitor/Receiver**

- 13" Color TV w/remote
- 3 VHS input, 4 video, 470 lines of resolution
- Full audio mixing
- Time/clock, review ch


**\$399**

**NAD**

**ADVENT Maestro**  
*Sound As It Was Meant To Be Heard*

With an incredible 750 watts peak power handling, three drivers and a precision crossover, the Maestro is fully capable of accurately reproducing the entire range of digitally recorded music.

**\$199 ea.**  
 ORIG. \$699 NOW



*Listen and You'll See*

- An outstanding 2-way monitor speaker for small room environments
- Suitable for amplifiers with 10W to 75W output

**\$259**  
 ORIG. \$420 NOW



**PROTON AA1150 Power Amplifier**



Proton's Dynamic Power on Demand feature enables amplifiers to cover a wide dynamic range of digital audio. The AA-1150 offers many more technically advanced features, including Dual Mono construction with two separate power supplies and two discrete amplifiers for optimal channel separation and drastically reduced crosstalk. • 50W per channel power output • 7.0dB Dynamic headroom @ 8 ohms • High current capacity • Protection circuitry.

**\$259**  
 ORIG. \$519  
 NOW 1/2 PRICE

**DENON The First Name In Digital Audio**  
**DT-400 Table Radio**



- AM/FM Hi-Fi stereo Radio w/2nd speaker
- Quartz clock with radio alarm
- 5 station presets for each AM & FM
- The DT400 represents a successful blend of sonic performance and sensible ergonomic design.
- Power rated at 25W/ch

**\$199**  
 ORIGINALLY \$400 1/2 PRICE

**LUXMAN DESIGN SERIES**  
 Modest Size, Maximum Performance

- A-007** 40 W/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, Double-speed dubbing

**LUXMAN 5 YEAR WARRANTY**

**\$995**  
 ORIGINALLY \$240C NOW LESS THAN ORIGINAL DEALER COST

**CELESTION Performance, Technology, & Style**

Intruding 'Third Dimension' Satellite/Subwoofer System

- SL700 SL600SI
- SL6SI SL12SI
- Celestion 3 Celestion 5
- Celestion 7 Celestion 9

**CALL FOR PRICE**



**LUXMAN DZ-92 Remote Compact Disc Player**



Features: Dual digital to analog converters • 4-fold oversampling digital filter • All metal housing and chassis for excellent shielding • Advanced 3-beam laser • 20 selection programmed play • Multi-function remote control and Luxman techniques such as "Duo-Beta" dual feedback and STAR circuitry layout to eliminate interstage and common ground unwanted signal couplings & minimize delay

**\$139**  
 ORIGINALLY \$280 NOW LESS THAN 1/2 PRICE

**HUGHES MODEL AK-100**  
 AUDIO PRODUCTS SOUND RETRIEVAL SYSTEM



In a dramatic SRS demonstration at a Hughes Laboratory, the effect blew me away!

Ken Pohlman  
 Stereo Review, September 1991

Perhaps the most effective stereo enhancement system, one that even simulates full surround sound...  
 Len Feldman  
 Video Review, March 1991

**CALL FOR PRICE**

**ads SUPER SAVER**

**R4 Receiver**

- 150 watts @ 0.03% THD at 8 ohms • Built-in clock and multi-function timer • Master remote control for armchair programming
- Superb digital FM tuner allows fine tuning for best reception

**\$569**  
 Orig. \$1200

**C3 Cassette Deck**

- 3-head monitoring cassette deck • 2-motor DC direct drive with servo castan (with quartz lock) • Extremely stable horizontal loading transport • Dual speed (1.78 & 3.34)

**\$399**  
 Orig. \$850

**.....SUPER SALE...SOME OVERSTOCK...SOME ONE-OF-A-KIND.....**

ADC 200 Spectrum analyzer/analyser	\$99	dbx SF150 Stereo imaging speakers (demo)	\$499	Denon DCP150 Portable disc player	CALL	JVC KSRI35 AM/FM Auto reverse car radio	\$119	Panasonic CGB510 AM/FM Auto reverse car radio	\$109
ADC 3010/3015 Satellite subwoofer system	\$249	Beacont 147XL 10 bands, 10 channels scanner	\$129	Philips Cartridge 12" cassette, 1/2" cassette & Orkley	\$6.99	JVC KSRG8 Auto reverse car radio	LOW	Panasonic SLNP1A Portable cassette player	\$139
ADC 1320 Receiver w/CD changer	\$269	Nady WH90 Stereo wireless headphones	\$78	Fisher PC9120 12" cassette, 1/2" cassette	\$269	JVC HRD910U 12" cassette with remote	\$399	Sony D180K Portable CD player	CALL
ADS L7E 2 way bookshelf loudspeaker	\$299	K260 AFC headphones	CALL	Sony NP55 Cassette battery	\$39	JVC XLMG600 Car CD changer	\$329	Sony D203 Portable CD player	CALL
Hofler DH500 2 drives w/bridge kits (for both)	\$999	Camber 2.0T1 2 way speakers	\$269	Fox AF080 Cassette radio	\$139	JVC XLM405 Cassette changer	\$219	Panasonic KXT3620 Cassette phone	\$75
Target BT1 Tilt & swivel wall speaker bracket	CALL	ADS M9/90 2 way speakers	CALL	Grado 2+ High quality phono cartridge	\$69	Luxman G007 Cassette changer	\$399	Sony SPP50 Cassette phone	CALL
ADS L200E Monitor w/2 way loudspeaker	CALL	Cerwin Vega Sat 6 Remote subwoofer system	CALL	Hofler P500 Professional amplifier	\$499	Memorex AV8 Programmable universal remote	\$69	Panasonic RXDT55 Auto reverse CD portable	FOR
AKG K145 Stereo headphones	\$59	Cerwin Vega SW12B 2 way subwoofer	\$185	JVC XL2441TN 12" cassette remote CD player	CALL	Memorex WM200 Auto reverse cassette	\$99	JVC PCX300 Auto reverse CD portable	LOW
Altec Lansing A301 Floor standing speaker Only \$800	\$299	Cobra 19+ 4 channel CB radio	\$49	JVC GRAX5 12" cassette	LOW	Niles SP51 Auto reverse selector	\$74	Sony CFD50 Auto reverse cassette recorder	PRICE
B&W Matrix 2 Limited quantities available	CALL	Senheizer HD560 Stereo headphones	CALL	JVC UX1 Cassette system	PRICE	Panasonic SCT705 2 way system with CD changer	\$399	VCR Plus Cassette programmer	\$57

# FACTORY AUTHORIZED

ONLY authorized dealers offer you the protection of a manufacturers warranty with your purchase; at other dealers, you may have no warranty at all. Authorized dealers stock only components designed for the U.S., and have the training to help you select the right one for you.



**FOR INFORMATION • CUSTOMER SERVICE**  
**201 • 838 • 3444**

Meadtown Shopping Center Order By Fax 201 • 838 • 2516  
 Route 23  
 Kinnelon N.J. 07405

7 day exchange on defective merchandise • Not responsible for typo errors • Shipping charges are not refundable • No sales tax on out of state purchase • Honest price, friendly service • Non commissioned salesman

Enter No. 32 on Reader Service Card



**The Kamikaze Ground Crew got their start playing off-the-wall accompaniments for The Flying Karamazov Brothers, the juggling act!**

rap by Dave Mills. His sometimes clever, sometimes facile wordplay reminds us that rap's roots go back to the jazz poets of the '50s and '60s.

The M-BASE collective has always promised more than they delivered. Their talk of synthesizing improvisation, funk, rap, and anything else that struck their fancy calls for a balancing act that outstrips their sense of equilibrium. But Coleman and Osby show there are more than a few ways to fall off the fence.

*John Diliberto*

**The Scenic Route:** Kamikaze Ground Crew

**New World/Counter Currents NW 400-2, CD; DDD; 63:37**

Sound: A Performance: A

This eccentric hodgepodge, which stretches the concept of new music

beyond its breaking point, could be a cherry bomb dropped by some European musical terrorists like The Wil em Breuker Kollektief or The Bonzo Dog Band. Actually, it comes out of the "New Vaudeville" performance genre in San Francisco. These "six horns and a drummer" got their start playing off-the-wall accompaniments for The Flying Karamazov Brothers, the Marx Brothers-flavored, circus-like act of jugglers.

The 18 tracks on *The Scenic Route* carom dizzily off such diverse styles as circus band and street music, world folk music, the brass band tradition, New Orleans jazz, loft jazz, rock, classical chamber music, Kurt Weill, big band, fusion, and funk. (Most of the tracks are credited to band members Peter Apfelbaum, Steven Bernstein, Gina Leishman, and Doug Wieselmann.) The Kamikaze Ground Crew's members, all terrific musicians, play nearly 40 different instruments—almost all of them acoustic, and no synthesizers are used

(though some passages may sound like they are indeed synthesized). Sonics are clean and precisely soundstaged, as though multi-miking was minimized.

A good example of what these folks do is "Canon," which starts as a speedy, sophisticated contemporary music exercise but, as it progresses, is beset by ennui and brings in a Parisian-sounding musette, ending with blatant Ravel-quoting.

If you're extremely catholic in your musical tastes and want to know what happens when a circus band accompanies a Gagaku performance, or when various wind instruments explore the subterranean end of the frequency spectrum (tunefully), or when the Kamikazes imagine Stravinsky writing his "Tango" for Woody Herman's Herd (for whom he wrote his *Ebony Concerto*), then this anarchistic aggregation is for you. Sort of hard to believe the recording was made possible by a *Reader's Digest* fund for the support of jazz.

*John Sunier*

# Looks small. Sounds BIG!

We moved our 10" woofer to the bottom of the Design Acoustics PS-10a, not just to make it look smaller, but to make it sound much better.

The compact front baffle creates a smaller acoustic source, reducing diffraction for superior definition and clarity, and more precise stereo imaging.

High-efficiency bass, radiated from the unique slot-loaded down-firing woofer, is consistently smooth and powerful anywhere in the room.

To learn more about the unique Point Source™ difference of the PS-10a, write or call 1-800-933-9022 for literature and dealer list today.

**PS-10a Point Source™  
3-Way Loudspeaker  
System**



Available in Oak and Contemporary Black Ash Finish



**DA DESIGN®  
ACOUSTICS**

An Audio-Technica Company

1221 Commerce Drive, Stow Ohio 44224 • (216) 686-2600

Visit these specialty retailers  
for professional consultation

# DEALER SHOWCASE

## ARIZONA

### HIGH-END!!

ARCHE: ARCHIVE: AUDIO ALCHEMY  
AUDIO POWER INDUSTRIES  
AUDIOQUEST FULL LINE CENTER  
CREEK CWD DAY SIQUERRA DPA  
ENERGY EPDS EXPOSURE KRILL  
KRILL DIGITAL LINN MARANTZ  
MAGNUM DYNALAB McORMACK MIRAGE  
NAKAMICHI PHILIPS PAC PROAC REGA  
ROOMTUNE ROTEL SCIENTIFIC FIDELITY  
SIMPLY PHYSICS SOUND ORGANIZATION  
TARA LABS TEMPORAL CONTINUUM TARGET

ARIZONA'S PREMIERE AUDIO STORE  
**SOUNDS LIKE MUSIC**  
**REAL HI-FI SYSTEMS**  
274 West Bell Road Suite 1306 Phoenix, Arizona 85023  
(602) 923-3351

Open 7 days... accepting most Major Credit Cards  
We want to help you choose the best HI-FI...

## CALIFORNIA

In Southern California

### AUDIO DEN

SERVICE SUPPORTING SALES

Service & Selection

Audio Den proudly offers hi-definition audio & video for the discriminating music lover  
We also do custom home installations.

Electronics	Speakers	Accessories
Jeff Rowland	Acoustat	Audio Quest
Counterpoint	Boston	CWD Furniture
Bryston	Acoustics	Mod Squad
McIntosh	M&K	Signet
Mod Squad	Mirage	Sumiko
Sonographe	Sonance	Nitty Gritty
Stax	Vandersteen	Kimber Cable
NAD	Turntables	AKG
Luxman	Thorens	Beyerdynamic
Denon	Sonographe	WBT
Bang & Olufsen	Denon	Esoteric Audio
Fosgate	Video	
Shure HTS	Proton	
	NAD	

15600 Roscoe Boulevard  
Van Nuys California 91406  
(818) 781-4700

## CALIFORNIA

### HCM

AUDIO

1015 Mangrove  
Chico, CA  
95926  
916-345-1341

Arcic • Audio Alchemy  
Audio Quest • Celestion  
B&K • Bose • Clavis  
Counterpoint • Fried  
Dahlquist • Klipsch  
Music Reference • NAD  
Nelson Reed • SME  
Nitty Gritty • Pac Idos  
SOTA • STAX • VMPS  
Straightwire • Tara Labs  
Lexicon, and more

MAKING HI-END AUDIO  
AFFORDABLE SINCE 1972

Please call or visit

800-222-3465

## CALIFORNIA

### VALUEable

Products, Service and Consultation  
designed to give you the maximum  
performance for your dollar.

Adcom • B&W • Polk • NAD • Celestion  
Carver • Counterpoint • M&K • Denon  
Terk • Proton • Sota • ADS • Optonica  
Canon Video • Tera • Stax • Magnum  
Ambria • Mod Squad • Thorens  
Lexicon • Grado • Signet • Klipsch  
Nitty Gritty • Tara Labs • AudioQuest  
Paradigm • Talisman • Sumiko  
Sharp Vision • Sonance • SME  
Bang & Olufsen • Acoustat  
Fosgate • Definitive Technology

Systems  
Design  
Group

(213) 370-8575  
1310 Kingsdale Ave  
Redondo Beach, CA. 90278  
Mon-Fri 11am-7pm  
Sat 11am-6pm

## CALIFORNIA

Proven: "The Best Sound In L.A."



### 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

### SERIOUS AUDIOPHILES DESERVE SERIOUS SERVICE.

Acoustat • Advent • AKG • Audible Illusions •  
Audio Control • Audio Pro • Audiophile • Audioquest •  
Beyer Dynamic • Blaupunkt • Bose • California  
Audio Labs • Canon • Cardas • Celestion •  
Counterpoint • CWD • Dahlquist • DCM •  
Dual • Fosgate • Grado Signature • Hafler •  
Harman Kardon • Jamo • JBL • JSE • Lexicon •  
Magnum Dynalab • MEA • Mod Squad (McGormack) •  
NHT • Niles Audio • Nitty Gritty • Ohm Acoustics •  
Onkyo • Ortofon • Parasound • Philips • Pioneer •  
Precise • ProAc • Proton • PS Audio • Revox • SME •  
Sonance • Sony • Sumiko • Stax • Straightwire •  
Talisman • Tara Labs • Tice • TDK • Thorens •  
Ungo Box • Velodyne • VPI

AUDIO/VIDEO  
Reference

Call Us ... (213) 517-1700  
Fax Us ... (213) 517-1732

18214 Dalton Ave., Dept. A11, Gardena, CA 90248

## CALIFORNIA

### THE DAT-ING GAME



TIRED OF FLIRTING AROUND WITH LESS THAN  
QUALITY EQUIPMENT? TIRED OF WAITING  
FOREVER FOR DCC? BEEN THINKING ABOUT  
BUYING A DAT—BUT NOT QUITE SURE WHICH  
ONE IS RIGHT FOR YOU? Call The DAT Store—

And let our experts help. The DAT Store has a large selection of  
Digital Audio Tape Recorders—Time Code, professional, portable  
and home DATS. Models from Akai, Casio, Denon, Fostex,  
Hitachi, JVC, Nakamichi, NEL, Panasonic, Pioneer, Sharp, Sony,  
Tascam, Technics, and others. The DAT Store  
also carries a huge assortment of DAT related  
accessories—everything from blank tape to  
computer programs.

Our salespeople will make sure that you're  
matched with your perfect DAT.  
AFTER ALL, BUYING A DAT IS  
NOT JUST ANOTHER GAME.



2624 WILSHIRE BLVD. SANTA MONICA, CALIFORNIA 90403  
213-828-6487 Mon-Fri 9-6/Wends 1-4 Sat 10-6

## 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, Rockcast, cs, Velodyne

MOBILE AUDIO: ADS, Alpine, Blaupunkt, B&W, Boston  
Acoustics, KEF, Zapco, Z Box

VIDEO: CWD, Diaper, Denon, JBL, Luxman, Pulsar, Stewart,  
Sharpvision, Sony, Sony Pro, Ultravision

- Audio/video systems from the industry's 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

## GEORGIA



NAD • Thiel • B&W •  
Acoustat • Rotel • Jeff  
Rowland Design • Linn  
Products • Proceed •  
Audioquest • B&K •  
Optonica Video • Sharp  
Vision • Straightwire

Specialty Hi-Fi & Video  
Atlanta, GA

404-565-2118

# DEALER SHOWCASE

## ILLINOIS

### Reel to Real Designs

Authorized Dealer:

- B&K/Sonata
- 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

## MAINE

Acurus . . . Aragon . . . Ariston  
 . . . Audible Illusions . . . Audioquest . . .  
 Audio Research . . . Bryston . . . Canon . . .  
 Compact Discs . . . Counterpoint . . . Creek  
 . . . CWD . . . Denon . . . Dynavector . . .  
 Grado . . . Jamo . . . Lexicon . . . Livewire  
 . . . Magneplaner . . . Magnum Dynalab . . .  
 Mariah . . . Mark Levinson . . . Mission . . .  
 NAD . . . Near . . . Nova . . . Pinnacle . . .  
 Revolver . . . SME . . . Sota . . . Stax . . .  
 Sumiko . . . Sumo . . . Symdex . . . Thoren  
 . . . Tiffany . . . Vandersteen . . . 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:

Adcom, Advent, AR, Audible Illusions, Audioquest, B&K, Bedini, Beyerdynamic, Cardas, Celsestion, Counterpoint, Dual, Hafler, Harman/Kardon, KEF, KLH, Klyne, Maplenoll, Marantz, Mirage, Monster Cable, Morel, NAD, Nakamichi, Ortofon, Proton, QUAD, Revox, Sennheiser, SME, Shure, Sony ES, Stax, Straight Wire, Teac, Technics, Thorens, Velodyne, VPI, and many more.

303 Newbury St., Boston, MA 02115  
**(617) 267-1001**

414 Harvard St., Brookline, MA 02146  
**(617) 277-0111**

INTERNATIONAL BUSINESS ACCEPTED

## MASSACHUSETTS

## CarFre

Audio Video Systems

Brands Carried:

Apogee	Esoteric Audio
Bang & Olufsen	Symo
Threshold	Canton
Forté	Optonica
Mirage	Vidikron
Acuras	Stewart Filmscreen
NAD	Sonance
Celestion	Contour Designs
Lexicon	THX LucasFilm
Fosgate	
A/R	
Musetex	

31 Schoosett St. (Rte. 139)  
 Pembroke, MA 02359

Tel: (617) 826-4422  
 Fax: (617) 826-8531

## MICHIGAN

**MICHIGAN!**  
 Experience the magic of  
 music with:

Aragon	Musical Concepts
Audible Illusions	NBS Audio Cables
Audioquest	Nitty Gritty
Audio Alchemy	Ram Labs
Cary Audio	RoomTune
Convergent Audio	Ryan Acoustics
Technology	Sound Lab
Golden Dragon	Straight Wire
IDOS	Superphon
Maston Audio	Symphonic Line
MSB Technology	Wadia
Music Reference	

Exclusively at:

**AUDIO ILLUSIONS**  
 17920 10 Mile Rd.  
 East Detroit, MI 48021  
**(313) 772-8822**

## MINNESOTA

**1(800)274-0644**

**LARGEST SELECTION & LOWEST PRICES in the Country! Call! Call! the Needle Doctor HAS IT ALL !!**



The needle doctor sells all major lines of needles and cartridges. Great variety! He stocks old styluses, accessories, and turntables, too.

Free Turntable Clinics  
 M-Th 10-7 Fri-Sat 10-6  
 419 14th Avenue SE  
 Minneapolis, MN 55414

Jerry Raskin's  
**Needle Doctor**

(612)378-0543

## NEW JERSEY



AKG	PINNACLE
ALLISON	PIONEER
ALPHASONIK	PIVOTELLI
ALTEC LANSING	PREMIER
AUDIO LAB	RCA
BAZOOKA	RICOH
BEYER DYNAMIC	SANSUI/VINTAGE
BLAUPUNKT	SIGNET
BOSE	SONOGRAPHE
BOULDER	SONRISE
CANON	SONY
CAMBER	SSI
CELESTION	STEWART
CODE ALARM	SUMIKO
CONCORD	SYNTHESIS
DAHLQUIST	TDL
ECLIPSE	THORENS
ESOTERIC	TIFFANY
FINYL	TOSHIBA
HAFLER	TRIAD
HARMAN KARDON	VAN DEN HUL
JBL	
MAPLENOLL	
MAGNAVOX	
MINOLTA	
MITSUBISHI	
M&K	
MKO	
MOD SQUAD	
MOTIF	
MUSE	
MUSIC & SOUND	
NIKON	
NILES	
NSM	
OHM	
PARASOUND	
PARSEC	
PENTAX	
PHOENIX GOLD	

**213 South Street / Route 24**  
**Morristown, New Jersey 07960**

If You're In Our Area...Stop By & See Our Store

**201-984-8080**

## NEW JERSEY

Music & Video Systems for the Novice & Connoisseur

## Savant Audio & Video

Consultancy - Custom Systems - Acoustic Treatment  
 Installation - Retail

Air Tangent • Allegro • Apogee • Arcici • Athena  
 Audio Prism • AudioQuest • Basis • Benz • Cardas  
 Chesky • Chicago Speaker Stand • Clarity Audio  
 Clearaudio • Creek • Delos • Dorian • Dynaudio  
 Electron Kinetics • Eminent Technology • Essence  
 First Sound • Fosgate • German Acoustics  
 Harmonia Mundi • Klyne • Last • Lectron  
 Magnan • Merrill • Mod Squad • Mogami • Morch  
 Nestorovic • Neutrik • Nimbus • Opus3 • Pro Ac  
 Q E D • Rega • Reference Recordings • Room Tune  
 Rotel • Sequerra • Sheffield Lab • Sims • Sumiko  
 Superphon • Symphonic Line • Tara Labs • Target  
 Ucc Audio • Vendetta Research • Wadia  
 Water Lily • WBT • YBA • and More

**(800) 628-0627 (609) 799-9664**  
 in New York & New Jersey

## NEW JERSEY

## Audio/////Connection

- |                     |                   |
|---------------------|-------------------|
| * Acoustic Energy   | * MFA & PSE       |
| * Audible Illusions | * Morch           |
| * B & K             | * Music Reference |
| * Counterpoint      | * Parasound       |
| * Dynaco            | * Quicksilver     |
| * Filed             | * Rega            |
| * Kimber Kable      | * Rotel           |
| * Kingergeitics     | * Spendor         |
| * Lectron           | * Spica           |
| * Linaeum           | * Tadao Speakers  |
| * Magnum Dynalab    | * Tice            |
| * Melos             | * VAC             |
| * Musical Fidelity  | * Vandersteen     |
| * Mod Squad         | * VPI             |

615 Bloomfield Avenue,  
 Verona, N.J. 07044

**(201) 239-1799**  
**TUBES & CABLES**

# DEALER SHOWCASE

NEW YORK

## KRELL, UNITY, PURIST, HARLEQUIN & YOU... PARTNERS IN MUSIC.

We invite you to audition the world's first fully-balanced audio system...featuring fully-balanced digital source and electronics by KRELL, balanced liquid jacket interconnects and speaker cable by PURIST AUDIO DESIGN, and the world's only fully balanced loudspeaker systems by UNITY AUDIO.

Featuring:



Air-Tangent, Audioquest, Basis, Day-Sequerra, Grado Signature, Koetsu, Lineum, McCormack, Mod Squad, Purist Audio Design, Tice Audio and Unity Audio

**718-479-6155**



216-11 Kingsbury Avenue Bayside, New York 11364

NEW YORK

## ALPHA STEREO

Quality Components. Professional Installation & Service



"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, Target, Atlantic Technologies, Audio Alchemy

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 YORK

audio-technica *twice*

**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.

**LYLE CARTRIDGES**  
115 South Corona Avenue  
Valley Stream, N.Y. 11582

Phones Open Mon-Sat 9 am-8 pm

ortofon SHURE STANTON

NEW YORK

## PRECISION AUDIO CULTIVATION BY LALETTIN

IN NEW YORK BY APPOINTMENT (212) 874-6904



MAPLENOLL "APOLLO" SONICALLY SUPERIOR

NEW YORK

## up/scale™

Infinitely Adjustable Modular Component Display System

from \$155-

**NYAudio**  
516/277-8361

NORTH CAROLINA

## RMS AUDIO

AUDIOPHILE SPEAKER SYSTEMS

- Reference Monitors
- Silhouette Audiophile Series
- Silhouette Reference Series
- Adjustable Isopoints
- Designer Grills & Cabinets

RM-I SILHOUETTE II

FOR LITERATURE AND DEALER INFO  
CALL 1-800-326-6721  
914 E. FRANKLIN BLVD.,  
GASTONIA, N.C. 28054

PENNSYLVANIA

## PHILADELPHIA AUDIOPHILES

- |                   |                 |                |
|-------------------|-----------------|----------------|
| Acoustic Energy   | JS Engineering  | PS Audio       |
| Atfis Audio       | Kimber Kable    | PSB            |
| Audible Illusions | Kinergetics     | Rega Planar    |
| Audio Alchemy     | Klyne           | Roksan         |
| Audiolab          | Koetsu          | Rotel          |
| Audioquest        | Maplenoll       | Snell          |
| Bitwise           | Meridian        | Soundcraftsmen |
| B&K Components    | Micromega       | Sound Lab      |
| Celestion         | Mission/Cyrus   | Stax           |
| Classé            | MIT             | Straightwire   |
| Counterpoint      | M&K Sound       | Sumiko SME     |
| Deltach           | Monitor Audio   | Superphon      |
| Duntech           | Muse            | Target         |
| Dynavector        | Music Reference | Unity Audio    |
| Eminent Tech.     | NAD             | Van Den Hul    |
| Genesis           | Oracle          | VPI            |
| Jadfs             | Parasound       | Well Tempered  |
| J.A. Michell      | Philips CD      | XLO Electric   |

Plus a large selection of audiophile LP's & CD's

**SOUND SERVICE CO.**  
8010 Bustleton Ave. Philadelphia, PA 19152  
(215) 725-1177 Bank Cards Accepted

TENNESSEE

## caj CUMBERLAND AUDIO GROUP

Now Under New Management

REPRESENTING:  
APOGEE • AUDIO QUEST •  
B&K AUDIO •  
CALIFORNIA AUDIO LABS •  
CELESTION • CLASSE AUDIO •  
CONRAD-JOHNSON •  
COUNTERPOINT • HALES AUDIO •  
LINN • MARTIN-LOGAN • MIT CABLE •  
MOD SQUAD • NITTY GRITTY •  
REGA • ROTEL •  
JEFF ROWLAND DESIGN GROUP •  
SOTA • STAX • SUMIKO •  
TARGET • V.A.C. •  
THETA DIGITAL •  
VANDERSTEEN •  
WELL TEMPERED •  
WILSON •  
& MORE  
Plus CD's & LP's

CREDIT CARDS •  
DELIVERY •  
SET UP

MON-SAT 11-6

4119 HILLSBORO RD • NASHVILLE, TN 37215  
(615) 297-4700

TEXAS

## Houston!

The Esoteric Ear Expands

Announcing the opening of our second location at 2144 Portsmouth in the Shepherd Plaza. We're across from the Sound Warehouse on Shepherd Drive just north of Hwy 59. Now central and south Houstonians can discover how The Esoteric Ear has become Southeast Texas' leading A/V store. Don't Settle For MidFi Any Longer!

We Feature the Finest Audio/Video

Acurus • Aragon • Anodyne • Apogee • AQ • Centaur Carver • Counterpoint • Kinergetics • Krell • Proton Museatex • Paradigm • Sharpvision • Pioneer Elite SimplyPhysics • MKO • Fosgate • TC Sounds • Lp's CD's • Magazines...and more!

**The Esoteric Ear**  
13158 Veterans Memorial Dr. • Torrey Square Retail Center  
Phone 537-8108 • Fax 537-9618  
2144 Portsmouth • Shepherd Plaza Shopping Center  
Phone 523-8108 • Fax 523-4422

# DEALER SHOWCASE

## VERMONT

**Vermont's  
Audio Leader!**

SUMIKO  
ARISTON  
TARA LABS

PARADIGM • A&R CAMBRIDGE  
DENON • SUPERPHON • KLIPSCH  
B&K • ADVENT • ADS • ROTEL  
MARANTZ • REGA • STRAIGHTWIRE  
PROTON • AUDIO CONTROL • AKG  
SENNHEISER • CREEK • GRADO  
TARGET • GOLDRING • AUDIOLAB  
SPICA • KIMBER • AIWA  
PRO-AC • VPI • MAGNUM  
SHARP VISION • ATLANTIC PATTERN

"INTELLIGENT AUDIO AT  
REASONABLE PRICES"  
802-863-4372



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-ARISTON-AUDIOQUEST-B&W-GRADO  
HAFLER-LUXMAN-MODSQUAD-MONSTER  
NAD-ONKYO-ORACLE-ROTEL-SME-MIT  
SUMIKO-THORENS-WHARFEDALE  
5-YEAR WARRANTIES ON ALL NEW EQUIPMENT.  
100% FINANCING AVAILABLE.  
FREE INSTALLATION IN CONNECTICUT VALLEY & NYC

SCIENTIFIC STEREO

128 MAIN ST. BRATTLEBORO VT 05301  
802-257-5855  
800-456-4434

## WISCONSIN

# Specialized Sound

where listening has created a new  
kind of stereo store... since 1962

B&W • CWD • Linn • Stax • Revox • Rotel • Apogee • Canton  
Bryston • Proceed • Thorens • Meridian • Quad ESL  
Nakamichi • CAL Audio • Counterpoint • Mission/Cyrus  
Monster-Cable • Conrad-Johnson • Magnum/Dynalab  
Boston Acoustics • B&W • CWD • Linn • Stax • Revox • Rotel  
Apogee • Canton • Bryston • Proceed • Thorens • Meridian  
Quad ESL • Nakamichi • CAL Audio • Counterpoint  
Mission/Cyrus • Monster-Cable • Conrad-Johnson • Mag

(608) 271-7744

621 South Gammon Road  
Madison, WI 53719

# AD INDEX

## Firm (Reader Service No.) Page

Adcom (3)	24
Audio Research (4)	Cover II
AudioQuest	51, 53
Audiostream (6)	Cover IV
B & K (7)	103
Beyerdynamic (8)	58
BMG	17 & 18
Bose Express Music	105
Cambridge Soundworks (9, 10, 11)	8, 9, 104
Carver	62 & 63
Columbia House	41, 49
Counterpoint (12)	Cover III
Crutchfield	16
Design Acoustics	110
Gallo	78 & 79
GRP (13)	101
Hafler (14)	26
JBL (15)	22 & 23
Levinson	3
Lexus (16)	44 & 45
Luxman (17)	21
Martin-Logan	91, 93, 95
Maxell (18)	12 & 13
MBI, Inc.	59
McIntosh (19)	67
Mobile Fidelity (20)	25, 27
Mondial (22, 23)	19, 108
Monster Cable (24)	86
MTX	81
Museatex Audio Inc. (25)	83
Nakamichi	15
Onkyo	71
Parasound	55, 57
Paris Audio (1)	69
Peugeot	5
Philip Morris	34a & b*
Pioneer (26)	73
Polk (27)	28 & 29
Proceed	92
Radio Shack (28)	99
Reel to Real (29)	97
Shure Brothers (31)	16
Sony	6 & 7, 10 & 11
Sony Music	89
Sound City (32)	109
Theta (33)	77
Threshold	94
Vandersteen (34)	87
Velodyne (35)	75
Vortex Acoustics (36)	85
Windham Hill	102
Wisconsin Discount Stereo	107
XLO Electric (37)	1
Yamaha	96
Touch Tone Participant	
*Regional Ad	

CUSTOM INSTALLATION-  
PRODUCTS & SERVICES

## ILLINOIS

# CHICAGO SUBURBS

## PERSONALIZED DESIGN AND INSTALLATION OF CUSTOM AUDIO/VIDEO SYSTEMS

• Soundstream • Parasound • Amrita •  
Sonance • Fosgate • KEF • Philips  
Audio/Video • JBL Video • B&K •  
Paradigm and others

*Audiophile*

OF ST. CHARLES

411 South 2nd Street, St. Charles, Illinois 60174

**708-513-1042**

## NEW JERSEY

# NEW JERSEY

Surround Yourself with  
Custom Designed Sound

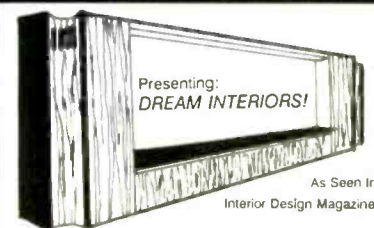
*Wired 4 Sound*



Custom Audio/Video Designs

P.O. Box 683, Clifton, NJ 07012  
1-800-879-3230  
1-201-773-3077 FAX

## NEW YORK



As Seen In  
Interior Design Magazine

- Use Your Own Design or Use Our Custom Design Services
- Finest quality Craftsmanship
- Exotic Woods and Lacquers
- Free Standing and Built-in
- Motorized Mechanisms
- Pop-up Television Cabinets
- Motorized Window Shades
- Complete Home Theater Design

**Lowell/Edwards**

INTEGRATED HOME ELECTRONICS AND CABINETRY  
979 THIRD AVENUE, FIFTH FLOOR, NEW YORK, NY 10022  
(212) 980-2862 / FAX (212) 980-2864

Screened  
Porch  
11'8" x 11'8"

Family Room  
19'4" x 13'4"

Breakfast  
Room  
12' x 9'

Kitchen

Family Room

Breakfast Room

Bath

Sunr

Mu

KITCHEN

# CLASSIFIED ADVERTISING

For advertising rates—please call 800-445-6066 (9am-5pm e.s.t.).

## ANNOUNCEMENTS

### AUDIO CLASSICS

**Buy-Sells-Trades-Repairs-Modifies. AMPLIFIERS:** Adcom GF4555 Pro \$499; Audio-Research D110B \$799; M100 \$3250; Cary SLA70DLH \$1075; SLM70 \$1995; Classe DR8 \$1999; conrad-johnson MF80 \$1150, MV75A1 \$999; MV100 \$1833; Counterpoint SA12 \$825, SA20 \$1199; Dynaco MkIII \$299, ST70, \$249; Forte 3 \$899; Haller XL600 \$1125; Krell KMA200 \$4799, KSA80B \$2700, KSA100II \$2499, KSA250 \$4425; Lazarus H1A \$1149; Marantz 8 \$999, 8B \$1199; McIntosh MC30s \$599, MC40 \$249, MC60s \$1100, MC240 \$999, MC250 \$429, MC275 \$4-5000, MC502 \$599, MC754 \$675, MC2100 \$675, MC2105 \$599, MC2002 \$1300, MC2505 \$549, MC2300 \$1599, MC2500 \$2800, MC2600 \$3995, MC3500 \$6000, MC7200 \$2125, MC7270 \$1850; Phase Linear 700 \$499; PS Audio 200C \$999, Quad 405 \$315; Quicksilver Mono \$759; Sonograph SA120 \$625; Soundstream DA1 \$699 **CD PLAYERS:** B&O 4500 \$499, CDX \$299; Cal Aria MkIIID \$1675, Genesis \$1375; Cary CAD855 \$689; Kinergetics KCD40 \$1499; Krell MD2C \$2689, SBP32X \$2935; McIntosh MCD7005 \$1200, MCD7007 \$1500; Nakamichi CDP2A \$329; Philips CD60 \$349, LHH1000 \$1999; PS Audio Digilink II \$649; Sonograph SD1 Bela \$295 **CROSSEOVERS:** Crown VFX2A \$299; Tannoy X05000 \$599; **EQUALIZERS:** Haller DH160 \$119. **HEADPHONES:** Stax Demos Gamma \$259, Lambda \$359, Pro1 \$475, Signature \$1175, SR5NB \$228, SR34 \$96, SR84 \$149, SRM111 \$488 **INTEGRATED AMPLIFIERS:** McIntosh MA230 \$299, MA5100 \$349, MA6100 \$549, MA6200 \$1199; NAD3240 \$239; Parasound CA220 \$85; Soundstream RA100 \$349 **PREAMPLIFIERS:** Adcom GFP55 \$399, SLC505 \$120; Classe DR5 \$1499, DR6 \$1198; conrad-johnson PV4 \$299, PV5 \$749, PV6 \$499, PV7 \$499, PV8 \$999, PV9 \$2199, PV10 \$759, Counterpoint SA5.1 \$999, SA7.1 \$399, SA1000 \$599; Crown IC150 \$159; Denon DAP5500 \$749; Electrocompanist PreampIwre II \$449; Forte 2 \$799; Haller Iris \$649, SE100 \$287; Harman-Kardon Citation 21 \$249; Krell KBL \$3599, KSP7B \$2200; Lazarus Cascade Classic \$650; Luxman C1010 \$199; Marantz 7C \$1899, McIntosh C11 \$600, C20 \$599, C22 \$1900, C24 \$335, C26 \$450, C27 \$750, C28 \$550, C31V \$1200, C32 \$999, C33 \$1575, C504 \$550; Motif MC9 \$799; Nakamichi CA5All \$649; Parasound PR200 \$149; Precision Fidelity C7All \$330, C8 \$399; Reference Line 1000 \$299; Spectral DMC10 \$797; Tandberg TCA3002A \$299, Win MCG10 \$599. **PROCESSORS:** AudioSource SS-One \$99; Carver TX1-11A \$99; dbx 3BX III \$299; Harman-Kardon 44 + \$99; Philips DAC960 \$599, LHH100 \$499; Shure HTS5000 \$399; Yamaha DSP100U \$399. **RECEIVERS:** B&O 3000 \$299, 3300 \$399; Carver 2000 \$999; McIntosh MAC1700 \$399, MAC4100 \$1099, MAC4280 \$1539, MAC4300V \$2200; Nakamichi Receiver 1 \$599, Receiver 3 \$399, SR2A \$299, SR3A \$449, TA1A \$229, TA2A \$359, TA3A \$599. **SPEAKERS:** Apogee Centaurus \$1199; B&O 3000 \$499, 5000 \$2157, \$2200 \$99; B&W 804 Matrix \$1250, Dahlquist DQ8 \$699, DQ12 \$999, DQ20 \$1699; Entec SW1 \$2399; JAMO Art \$199, SW60 \$249; JBL Pro 4406 \$399, 4408 \$529, 4410 \$729; JSE .6 \$399, 1.8A \$1499; KEF 102 \$475, 103 3 \$1119; Klipschorns Rosewood \$3499; Magnepan MG3.3 \$2499; Martin-Logan CLSIIIa \$2399; McIntosh XR14 \$599, XR16 \$699, XR1052 \$1499, XL1 \$349, XL1W \$399, XL10 \$449; Parasound BPIA60 \$199; Proac Mintower \$1399, Studio III \$899; Ryan MCL3 \$999; TDL Studio 1 \$999, 3 \$1569; Velodyne Servo ULD12 \$1199, ULD15II \$1669. **TAPE DECKS:** B&O 2000 \$249, 3300 \$299, 9000 \$449; Concertone 93-4 \$499; Revox A77 \$349. **TEST EQUIPMENT:** McIntosh MPI4 \$1400; Nakamichi T100 \$700; Sound Technology 1000A \$600, 1400A \$500, 1700B \$2499. **TUNERS:** Carver TX111a \$395; Creek T40 \$299; Dynaco FM1 \$79; Haller Iris \$375, SE130 \$289; Magnum Dynalab Elude \$1099, FT11 \$399, F205 \$199, FT101 \$465; Marantz 10B \$1799; McIntosh MR55 \$199, MR65B \$499, MR71 \$399, MR77 \$749, MR78 \$1199, MR80 \$1299, MR95 \$839, MR7082 \$1099; T DQ260 \$149; Quad FM4 \$199; Sansui TUX701 \$299. **TUNER PREAMPS:** McIntosh MX110 \$499, MX112 \$499, MX113 \$499, MX117 \$1299. **TURNABLES:** Empire Troubadour \$99; Sonograph SG3MT \$595; VPI HW19III \$889. **FREE Catalogue. 8AM-5PM EST Mon.-Fri., AUDIO CLASSICS, POB 176 AAA, Walton, NY, 13856.**

607-865-7200

## ANNOUNCEMENTS

**BE A RECORDING ENGINEER!** Train at home for High Paying-Exciting Careers. FREE Information. AUDIO INSTITUTE, 2258-A Union St., Suite AZ, San Francisco, CA 94123.

**CASH PAID FOR AUDIO & VIDEO EQUIPMENT. BUY-SELL-TRADE & REPAIR. AUTHORIZED DEALER. JBL, ROTEL, AUDIOQUEST, STEREO CLASSICS, 75 CHURCH ST., NEW BRUNSWICK, NJ 08901 (908) 220-1144. FAX. (908) 220-1284**

**Stax Headphone Amp Modification. Dramatically improve your Stax headphone amplifier. We make real improvements using highest-grade Cardas internal wire, Cardas connectors and TRT Wonder Caps. Stax SRM-1 MK2 solid state amp mod or Stax SRM-T1 tube amp mod, only \$199.95 plus \$9.95 return shipping. Specially-selected Gold Aero replacement tubes for Stax SRM-T1 amp \$89.95/set plus \$4.95 shipping. All work guaranteed two full years. Call 1-800-334-0295 or 1-616-451-3527, or Fax 1-616-451-0709. Professional Mod Service, Inc., 225 Oakes SW, Grand Rapids, MI 49503.**

**FREE CATALOG** of audio kits, components, boards, accessories, cable, connectors, books, software, test CDs, AND MORE available from America's AudioSource since 1969. **Old Colony Sound Laboratory, PO Box 243AA, Peterborough, NH 03458. USA; 24-hour tel. (603) 924-6371, fax (603) 924-9467**

**ANNOUNCING "STEVE'S AUDIO ADVICE." HUNDREDS OF GREAT PRODUCTS AT THE ABSOLUTE BEST PRICES. TALK DIRECTLY WITH STEVE OVER 20 YEARS OF EXPERIENCE. B&K, PHILIPS, MAPLENOLL, MAGNUM, QUAD, CARY, AUDIOQUEST, MORDUANT SHORT, 3A, VMPS, & MUCH MORE! RECEIVE AN EXTRA 5% DISCOUNT BEFORE RELEASE OF OUR CATALOG. NATIONWIDE, CALL 1-800-752-4018.**

**AUDIO UNLIMITED in Colorado** offers competitive values on Acoustic Energy, Acrotec, Airlight, Aural Symphonics, Chario (the new Italian monitor), Coda, Dynavector, Ensemble, Ikeda Cartridges, Lazarus, Magnum Dynalab, Maplenoll, McCormack, Mod Squad, Musical Design, Muse 100/150 Amps, and Model 18 Subwoofer, RoomTunes, Tice and more. Call John Barnes, (303) 922-8151, (303) 698-0138, fax (303) 922-0522.

**NEW AUDIO POWER METER-** Ideal for measuring power output of amplifiers. Measures audio power output from 1MW to 200 Watts within response range of 20Hz to 40 KHz +/- 0.5 db. Offers 12 popular impedance ranges. Price \$1,995. For information, contact: Harbin Test Systems, (901) 794-1667 or fax (901) 794-2515.

**High-end and hard-to-find audio components bought and sold. All types. New and used. Daily specials. Closeouts. Best prices! AUDIO AMERICA (Virginia). Call 1-703-745-2223.**

**NEW AND USED PROFESSIONAL DJ/BAND EQUIPMENT—WHOLESALE PRICES. LIGHTING, FOGGERS, P.A., CLUB INSTALLATIONS—CALL FOR 50-PAGE BOOKLET CATALOG. (502) 782-1172.**

**ABSOLUTELY THE ULTIMATE IN HIGH-END AUDIO BRANDS!** (See Oct. '91 AUDIO under Announcements). Competitive Pricing! Unbiased, Expert Advice; Best Trades Offered! (Top Pay for Vintage Tube Equipment); Restoration & Modification work also done. **Audio Classics Enterprises. Call 1-(405) 842-3033.**

**SPEAKER BRACKETS:** Finally the ideal bracket for hanging any type or size of speaker easily in a multitude of positions. Universal Speaker Brackets: PO Box 4173, West Hills, CA 91308. Tel: (818) 999-3525

## Subscribe to the: AUDIO TRADING TIMES

**Hundreds of Used & Demo Bargains From Across The USA**  
Call: (715) 479-3103 For More Info.

**Dealers: Advertise Free!!**

## We Make Good Amps & Preamps Sound Great!

At Professional Mod Service, we make new and used amps and preamps sound dramatically better. We make the bass more powerful and the mids and highs clearer. We make products sound better than when they left the factory!

We specialize in Adcom, B&K, and Haller, but we love to work on Audire, Belles, Crown, Citation, Dynaco, McIntosh, Moscode, and many others, too. If it's a high end amp or preamp, we can upgrade and improve it.

### So Much Improvement For So Little Money

Don't be fooled by our low prices. We install real improvements, developed with factory engineers. We use only premium materials including the finest capacitors, resistors, wiring and connectors. And our technicians are real pros with years of experience. All work is guaranteed for two full years.

### Our Low Prices

Deluxe Amp Mod ..... \$199.95  
Super Amp Mod ..... 299.95  
Deluxe Tube Amp Mod/Refurbish ... 279.95  
Deluxe Preamp Mod ..... 179.95  
Deluxe Tube Preamp Mod ..... 249.95  
Custom Mods/Repairs ... at reasonable rates  
*Add \$12.95 return shipping for amps, \$9.95 for preamps.*

### Dramatically Improved Sound—In Just Two Weeks

For a dramatic sonic improvement, send us your amp or preamp today. Enclose a check, money order, or credit card information. In just two weeks, we'll revamp it, thoroughly test it, and return it by UPS, insured. Your satisfaction is guaranteed.

**1-800-334-0295**

Amex/Visa/MC/Discover

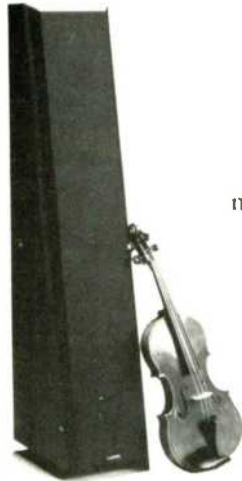
**Professional Mod Service, Inc.**

225 Oakes SW  
Grand Rapids, MI 49503  
616-451-3527 • FAX 616-451-0709

# THORENS

Introduces for 1991 the **3-Speed TD-180** for 33/45/78 with factory installed cartridge for \$400. Contact your nearest dealer or BLR/THORENS 718-441-0895, 84-03 Cuthbert Road, Kew Gardens, NY 11415.

## New England Audio Resource NEAR-50M



The 50 M's three alloy diaphragms neither warp, break-up, nor ring. So you get more music, and less loudspeaker noise.

Our range includes domestic, outdoor, architectural, and professional loudspeakers.

679 Lisbon Road, Lisbon Falls, ME  
(800) 552-5517

## 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.

**LOUDSPEAKER COMPONENTS-KITS.** Dynaudio, Morel, Eclipse, Focal, Peerless, Eton, Vifa, more! Crossover parts-design books also. Catalog \$2. Meniscus, 2442 28th St. S.W., Wyoming, MI 49509. (616) 534-9121.

**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.

**HIGH OUTPUT, HIGH EFFICIENCY, WIDE RANGE LOUDSPEAKER KITS.** MAGNIFICENT SOUND, AFFORDABLE PRICE! CATALOG \$1. LAWRENCE AUDIO, 1417 WARNER, PITTSBURGH, PA 15233.

**A & S SPEAKERS** imports the world's finest speaker components, crossovers, and kits: Dynaudio, Scan Speak, Focal, Morel, MB Electronics, Peerless, Polydax, SEAS, LPG, Eton. We also ship VMPS systems and kits and Parasound Amplifiers. Free literature. 3170 23rd Street, San Francisco, CA 94110. (415) 641-4573; Fax (415) 648-5306.



### SING WITH THE WORLD'S BEST BANDS!

An Unlimited supply of Backgrounds from standard stereo records! Record with your voice or perform live with the backgrounds. Used in Professional Performance yet connects easily to a home component stereo. This unique product is manufactured and sold Exclusively by LT Sound - Not sold through dealers. Call or write for a Free Brochure and Demo Record.

**LT Sound**, Dept. AD-3, 7980 LT Parkway  
Lithonia, GA 30058 (404) 482-4724  
Manufactured and Sold Exclusively by LT Sound  
**24 HOUR PHONE DEMO LINE: (404) 482-2485**

## LOUDSPEAKERS

**PYLE DRIVERS** — 50 ALL NEW woofer models. Also PIONEER OEM woofers, mids, tweeters and MCKENZIE pro-sound speakers. Dealer inquiries? MC VISA, SRS, 318 South Wahsatch, Colorado Springs, CO 80903. (719) 475-2545.

**THE ULTIMATE IN RECYCLING!** Easy to install foam surround kits available from Ken's Hi-Fi Clinic. \$24.95 per pair + \$3.00 S & H. P.O. Box # 1088, Flat Rock, NC 28731 or (704) 693-3459 24 hrs day. Visa/MC.

**BOZAK SPEAKER REPAIRS**, using original manufacturer's machinery, specifications, techniques and dies. Quality workmanship. NEAR 207-353-7308.

Looking for **REAL ACCURACY?** New & Unique Line! Point source. Phase coherent. Compact design. Fine wood enclosures. Catalog: MARSHALL ACOUSTICS, 27 Music Square East, Suite 291, Nashville, TN 37203. 615 649-2380.

**ADVANCED AUDIO INC.**—HIGH PERFORMANCE LOUDSPEAKERS AT FACTORY DIRECT PRICES. 30 DAY MONEY BACK GUARANTEE. FREE LITERATURE. RD2 BOX 18, LEECHBURG, PA 15656.

## ELECTROSTATIC SPEAKERS

Vacuum tube controlled. Latest technology and modular design. "Risk free" thirty day home trial. Uncompromised performance at factory direct pricing. DAVID LUCAS, INC., DEPT. A, 924 HULTON ROAD, OAKMONT, PA 15139. (412) 828-1967.

**ROTTED WOOFERS REPAIRED!** Professional foam replacement. Guaranteed work—not a kit. Fast and inexpensive. Send stamped envelope for information to: NEVISIONICS, 650 Baxter Ave., Suite 101A, Louisville, KY 40204.

**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.

**M.O. SPEAKERS** CARRIES FINE SPEAKER SEPARATES FROM VIFA, FOCAL, AUDAX, PEERLESS, MOREL, LPG, VERSA-TRONICS, EMINENCE, DYNAUDIO & MORE! WE OFFER AN EXTENSIVE PARTS SELECTION FOR CROSS-OVER DESIGN, SPEC SHEETS, FULL TECHNICAL SUPPORT, COURTEOUS SALESPEOPLE AND GOOD PRICES! VISA/MC. SOME RESTRICTIONS APPLY. M.O. SPEAKERS (SHIPPING & RECEIVING ONLY!), 105 MARKET STREET, SAN RAFAEL, CA 94901. (415) 459-3767.

**BOSE, ADVENT, JBL** Top quality service on all types of home speakers. Refoam surrounds, stock and upgrade replacement parts, x-overs, grills, etc. Established 1977. Qualified, fast and fair prices. **SPEAKER-WORLD**, Monday - Saturday 10 am - 6 pm EST. MC, VISA, Am. Exp. (813) 544-3611, 1-800-369-0388.

**BANG & OLUFSEN—B&W—CARVER—KEF—ADCOM—NAKAMICHI—a/d/s—REVOX—DENON—HARMON/KARDON—CELESTION—POLK—INFINITY—KLIPSCH—BEST PRICES! MANUFACTURERS U.S.A. WARRANTIES. AMERISOUND SALES INC. (904) 262-4000.**

**SPEAKER REPAIRS.** Grills, Woofers, Mids, Tweeters & X-Overs. 15 Yr Old Tampa Based Company Specializing in All Brands Home Speaker Reconciling & Repairing. **THE SPEAKER EXCHANGE**, 1242 E. Hillsborough Avenue, Tampa, Florida 33604. 813-237-4800.

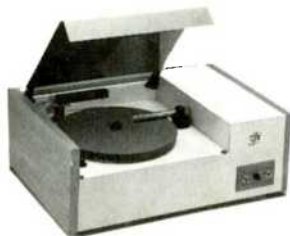
## FOR SALE

**CASH for USED AUDIO EQUIP. BUYING and SELLING by PHONE. CALL for HIGHEST QUOTE. (800) 388-9443.** The Stereo Trading Outlet, 320 Old York Road, Jenkintown, PA 19046.

**AUDIO BEST:** LA, ORANGE, SAN BERNADINO, CALIFORNIA. HOT COMPONENTS: CELESTION SL-3000, COUNTERPOINT, TARALAB, PS DIGITLINK; AUDIBLE ILLUSIONS; MODSQUAD; ACOUSTAT; SPICA; VMPS; MAGNUM; FOSGATE; B&K, SUPERPHON, MUSIC REFERENCE, SOUNDLAB, MAPLENOLL, SYSTEMDEK, GRADO, MONSTER, STRAIGHTWIRE, MUSIC CONCEPTS. (714) 861-5413, APPOINTMENT.



## ATTENTION RECORD COLLECTORS



What do the Library of Congress, the Smithsonian Institute, hundreds of radio stations, record stores and libraries have in common?

They all use VPI Record Cleaners to clean their valued records.

**"VPI—THE PROS CHOICE!"**

VPI Industries Inc., 77 Cliffwood Avenue, #3B, Cliffwood, NJ 07721  
Tel: 908-946-8606 Fax: 908-946-8578



## FOR SALE

AAA-CALL US NOW!!! Luxman, Carver, ADS, Nakamichi, Denon, Boston Acoustics, NAD, Celestion, B&W, Adcom, Hafler, B&K, Onkyo, Proton, Snell, DCM, Counterpoint, JSE, Spica, M&K, Bose, VPI, Nitty Gritty, Sumiko, Thorens, Velodyne. 414-727-0071 FOR THE LOWEST PRICES!

**FULL WARRANTY!!  
MOST ITEMS IN STOCK!!  
OPEN SUNDAYS!!**

Custom cables and terminations, Camacs, XLR balanced, hi-flexibility tonearm sets; custom Shallcross volume controls; MIT MultiCaps & Wonder Caps-solder-wire; Vishay & Holco resistors, all types audio connectors, tonearm and chassis wires; wide selection of high-end accessories/mod parts. \$1 catalog (\$3 overseas); MICHAEL PERCY. BOX 526, INVERNESS, CA 94937. (415)669-7181.

### AAA—AUDIO ELITE IN WISCONSIN!!!

HAFLER, PS AUDIO, B&K, JSE, NAKAMICHI, PROTON, CARVER, ONKYO, ADS, VPI, DCM, FRIED, NITTY GRITTY, SUMIKO, THORENS, SNELL, M&K, LUXMAN, BOSE, PHILIPS, VELODYNE and any others you desire. (414) 725-4431.

**CALL US WE CARE!!!**

### AAA—LOW PRICES—HIGH END EQUIPMENT!!!

PS AUDIO, HAFLER, B&K, CARVER, NAKAMICHI, LUXMAN, THORENS, M&K, SNELL, ONKYO, PROTON, FRIED, SUMIKO, BOSE, PHILIPS, DCM, VELODYNE, ADS, VPI, JSE and any others you desire. AUDIO ELITE. (414) 725-4431, Menasha, Wisconsin

**OUR PRICES CAN'T BE BEAT!!!**

**DYNACO ST70 UPGRADES:** Gold EL34 Sockets, 1215 Microlarad on-board solid state B+, Triode output, more. DoReTech Audio Services, Box 6054, South Hackensack, NJ 07606-4354. Phone/Fax: (201) 843-0488.

**SAVE 40% ON HIGH-END home speakers, subwoofers, amplifiers. FREE CATALOG, 3021 Sangamon Avenue, Springfield, IL 62702. 1-800-283-4644.**

## ATTENTION AUDIO BUYERS!!!

AUTHORIZED DEALER FOR... ADS, ALPHASONIK, CARVER, DENON, DUAL, HAFLER, INFINITY, KENWOOD, KICKER, MONSTER CABLE, ONKYO, ORTOFON & SONANCE! THE SOUND APPROACH, 6067 JERICHO TPKE, COMMACK, NY 11725 (800) 368-2344.

FOR TWENTY YEARS WE HAVE BEEN THE SOURCE FOR REEL-TO-REEL TAPES & HARD-TO-FIND RECORDING SUPPLIES AT DISCOUNT PRICES. CATALOG AVAILABLE. ALSO INCLUDES VIDEO. SOUND INVESTMENT CORPORATION, 3586 PIERCE DR., CHAMBLEE, GA. 30341 (800) 659-TAPE(8273), in GA: (404) 455-0968, FAX: (404) 458-0276.

Add four inputs with our DBP-2J(5) switchbox. High quality, proven design. \$69.95; DB SYSTEMS, POB 460, RINDGE, NH 03461. (603) 899-5121.

## AUDIO NEXUS=QUALITY

Featuring legendary VANDERSTEEN loudspeakers & ROTEL CD Players.

Apogee • Audio Alchemy • Audioquest • B&K • Cary • Celestion • Counterpoint • Esoteric • Forte • Fried • JSE • Kimber Kable • Magnum Dynalab • Melos • PS Audio • Rotel • Jeff Rowland • SME • Sony ES • Sota • Stax • Target • Vandersteen • Vendetta • Wadia. **SUMMIT, NJ (908) 277-0333.**

**BEST TRADES OFFERED! WE BUY, SELL, TRADE, CONSIGN MOST HIGH-END PRODUCTS. AUDIO DOCTOR, 1518 W. COMMERCIAL, BUFFALO, MO 65622. (417) 345-7245. COD/VISA MC.**

**ARIEL...SPECIALIZING IN COST EFFECTIVE HIGH-END.** B&K, ProAc, Musical Concepts, Straightwire, Target & More. Authorized Dealer, Carmel, IN. Visa/MC. (317) 846-9766, 5-10PM.

**SAN FRANCISCO AREA: IRRESISTIBLY priced audiophile components/accessories. Shipped/delivered. Worlds best! By appointment only. 444 Eastwood, Petaluma, CA 94954. (707) 765-1992.**

**ATTENTION MUSIC LOVERS!** Audio Alchemy, Altis, Arcici, Boulder, Coda, Clavis, Flatline, Genesis, Irmedia, Jadis, Music Metre, Pamassus, PS Audio, Soundwave Fidelity, Straightwire, VMPS, XLO & more! Call (313) 342-2475 for prices & info. Gil Morrison.

## FOR SALE

### WANTED: MCINTOSH / DYNACO

WANTED: MCINTOSH, MARANTZ, DYNACO, ALTEC, JENSEN, FISHER, CITATION, JBL, ELECTROVOICE, LEVINSON, AUDIO RESEARCH, CONRAD JOHNSON, WESTERN ELECTRIC; **TUBE SOLID STATE.** (713)728-4343. FAX: (713)723-1301. MAURY CORB, 12325 ASHCROFT, HOUSTON, TEXAS 77035.

**Acoustat 2 + 2's** with black cloth and walnut bases. Includes transformer covers and Supercon binding post. Excellent condition, \$1,200. Call (402) 443-4450.

**FOR SALE:** Tandberg 3009A mono power amplifiers, 180W each, EC, list \$2,800 pair, asking \$1,275; Counterpoint SA2000 Preamplifier, new in box, warranty transferable, list \$1,500, asking \$1,050; Soundstream C-1 Preamplifier, duo mono, pure Class A, remote controllable, never used, list \$1,500, asking \$975. Call Greg at (312) 341-0428.

## ANALOG/DIGITAL WAR!

### THE BATTLE RAGES ON AT CSA!

THE BEST WEAPONS TECHNOLOGY HAS TO OFFER

AUDIO RESEARCH • ACURUS • ARAGON • KRELL  
KRELL DIGITAL • B&W • CAL • DUNTECH • JADIS  
LUXMAN • MEITNER • NAD • POLK • THIEL • SILTEC •  
CARDAS • MARTIN/LOGAN • DAY SQUIERRA • BASIS  
WADIA • GRAHAM • KOETSU • PROAC • BOSTON

CSA AUDIO UPPER MONTCLAIR, NJ 201/744-0600

## CD STORAGE+™

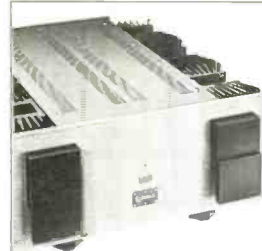


No. A300

Store 300 CD's behind glass doors. Five adjustable shelves with brass bookends hold single & multiple CD's, Videos and Cassettes — in any combination. Comes in Solid Oak, Walnut, Teak or Cherry. Can stack or wall mount.

**FREE Literature and Prices:**  
Call 1-800-432-8005  
FAX 1-201-748-2592

**SORICÉ** P.O. Box 747-1  
Nutley, NJ 07110



### BRANDS ON DISPLAY MODELS AND SERIAL

- KRELL MDA 300 MONO AMPS
- ACURUS
- APOGEE CENTAUR
- MIRAGE M 5
- SONY TAEB05 BALANCED PREAMP
- CAL GENESIS & SYSTEM 1 D/A
- a/d/s! M20
- NSM 100 CD CHANGER

2781 S. ONEIDA ST.  
GREEN BAY, WI 54304  
(414) 494-8999

**HI-FI HEAVEN**



## AUDIO VIDEO

- Acoustat • Acoustic Research • ADC • ADS • Amd
- AKG • Alpine • Altec Lansing • Ambico • Atlantic Technology • Audio Quest • Audio Source • B & O • B & W • Bazooka • BBE • Beltronics • Belloggett • Camber • Canon • Canton • Carver • Celestion • Carvin Vega • Cooustic • CWD • DBX • Denon • Eclipse • Epicure • Fisher • Fox • GE • Grundig • Hafler • HiFonics • Hitachi • Infinity • JVC • K40 • Kenwood • Lexicon • Luxman • MB Quart • •Low Low Prices • •

**201-838-3444**

- Minolta • Mission • Mitsubishi • Monster Cable • NAD • Nady • NHT Labs • Niles • Olympus • Onkyo • Optonica • Orion • Panasonic • Phase Linear • Philips • Pinnacle • Pioneer • Precision Power • Proton • Parsec • RCA • Rockford Fosgate • Sharp • Sanyo • Sonance • Sony • Soundcraftsman • Soundstream • Stax • Stillwater • Sunpack • Surround Sound • Tamrac • Teac • Technics • Thorens • Toshiba • Triad • Yamaha • ••••And Many More•••••

## CAR STEREO

## THE CLASSICS REVISITED

PV11 Preamplifier, MV52 Amplifier.  
All-tube components priced under \$2000 each.



the conrad-johnson group  
2800R Dorr Ave. • Fairfax, VA 22031 • 703-698-8581



## The mark of a true Denon.

This sticker tells you who is an authorized Denon dealer and who isn't.

Some people who offer Denon products are not authorized dealers. That can lead to problems.

First, *only* authorized dealers offer you the protection of a Denon warranty with your purchase: at other dealers, you may have no warranty at all.

Authorized Denon dealers stock only components designed for the U.S., and have the training to help you select the one right for you.

Authorized dealers know Denon technology inside and out and stock factory parts for your Denon to preserve true Denon sound.

So before you buy your Denon, look for this Denon Authorized Dealer Sticker.

It assures you of the authentic Denon technology and support you expect. And nothing less.

To find your nearest AUTHORIZED Denon Dealer call: 1-201-575-7810 (9:00 am-5:00 pm EST) **DENON**

## FOR SALE

**USED AND DEMO EQUIPMENT:** Jeff Rowland Group Model 7 amplifiers, Audio Research SP-9, LS-1, CL-60 & D125, Counterpoint SA-220; MIT Interconnect Speakerwire, Terminator, Vandersteen 2c; Magneplaner 3.3, 2.6, 1.4, SMGa, Mark Levinson 20.5, 23 & 26; Revox B126 & B250; mirage; Adcom GFA-565; msc. Call **AUDITION AUDIO** for pricing and details at (801) 467-5918. Visa, MC, Amex accepted.

**Cable TV Descramblers, Converters, Accessories.** Name Brands. Lowest prices. Best service. Call **CABLE READY COMPANY**, (800) 234-1006 for FREE 16-page color catalog.

## AUDIO NOUVEAU

THE NEW WAVE IN VALUE FOR THE DOLLAR EQUIPMENT. FEATURING B&W • ADCOM • SONY ES • MIRAGE • ENERGY • B&K • NAD • MONSTER • AUDIOQUEST • AND MORE! CALL TODAY. (716) 394-6180. AMEX/VISA/MC. CANANDAIGUA NY.

## 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 (213) 397-9668

## FOR SALE

**CD PLAYERS!** We offer the finest modifications available for Philips/Rotel/Magnavox CD players. Starting at just \$199. Money back guarantee! **SYNERGY**. (313) 542-7851.

**60 YEARS IN BUSINESS...WE MUST BE DOING SOMETHING RIGHT.** If it's a much-in-demand audiophile product, we're likely to have it for immediate shipment. Consult with one of our quiet experts or just order U.S. - warranted components directly. **VISA/MC**. Ask for Steve K. or Dan W. **SQUARE DEAL**, 456 Waverly Ave., Patchogue, NY 11772. (516) 475-1857; (800) 441-DEAL.

**MOSCODES, FUTTERMANS—ALL BRANDS TUBE ELECTRONICS—SERVICE AND CUSTOM MODIFICATIONS BY GEORGE KAYE.** MOSCODE DESIGNER. CUSTOM FUTTERMAN OTL™ 1. CONVERT HAFLERS TO MOSCODES HYBRID. KAYE AUDIO LABS, INC., 238 Liberty Ave., New Rochelle, NY 10805. (914) 633-3039.

**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.

**AUDIO CABLES & MORE** DON'T PAY EXORBITANT PRICES FOR TOP QUALITY. WE HAVE YEARS OF EXPERIENCE IN WIRE MANUFACTURING AND HAVE SIMULATED THE HIGH PRICED BRANDS. HIGH PRICED EQUIVALENTS AS LOW AS 35 FT. WE DEMYSTIFY WIRE TECHNOLOGY. SEND FOR EXPLANATION LITERATURE WHICH ALSO INCLUDES ALL OUR AUDIO PRODUCTS PRICE LIST OR CALL OUR LITERATURE REQUEST # (800) 321-2108, 24 HRS/DAY. L A T INTERNATIONAL, DEPT. A, 317 PROVINCETOWN RD., CHERRY HILL, NJ 08034.

**UPGRADE FOR LESS!** ROGERS' AUDIO IS OFFERING BEST PRICES ON USED AUDIO COMPONENTS. BUY—SELL—TRADE. CALL (509) 966-4431.

## AA/SOUND ADVICE

**LOW PRICES/FAST DELIVERY!** DENON, NAD, CELESTION, B&W, ADCOM, CARVER, NAKAMICHI, BOSTON ACOUSTICS, LUXMAN, HAFLER, ADS, M&K, ONKYO, B&K, PROTON, DCM, SNELL, BOSE, VELODYNE, PHILIPS, SPICA, COUNTERPOINT, AND MORE! 414-727-0071.

FULL WARRANTY!  
MOST ITEMS IN STOCK!!  
OPEN SUNDAYS!!

**CALL US!!**

**PREAMPSTRAVAGANZA!** PSAUDIO45, UPGRADED SONYE77ESD, LREMOTE, DIG CONVERT. SONYB450-\$195, CITATION25, REMOTE-\$395 (900), GAS-THAEDRA, AMPSUSAY?? MUSE100, BRYSTON3B-\$400, TANDBERG3026, PHASE700II, SUMOANDROMEDA2, CARVER - CALL. RECEIVER: YAMAHAII30TI, WARRANTY-\$495 (1200), TANDBERG2060-\$195. CASSETTES: PIONEERCTF950, TASCAMI22, 2SP3HD - \$250. MUST MAN BE BORN AGAIN? JOHN 3:1-18. HOSANNA AUDIO. (313) 949-4567.

## GAS EQUIPMENT OWNERS

From repairs and updates to complete rebuilds, we are the **GREAT AMERICAN SOUND** experts! Since 1977. **GASWORKS**, 8675 Northview Street, Boise, Idaho, 83704. (208) 323-0861.

**NEW JERSEY:  
STOP SEARCHING!  
QUICKSILVER  
&  
VANDERSTEEN  
AUDIO CONNECTION  
201-239-1799**

AUDIBLE ILLUSIONS, VAC, PSE, SPICA, B&K, ROTEL, MUSIC REFERENCE, UNITY, MAGNUM DYNALAB, MELOS, REGA, LINEAUM, MUSICAL FIDELITY, MORCH, SPENDOR, FRIED, CARDAS, COUNTERPOINT & MORE!!

## Threshold

DAC 1/e  
digital  
to analog  
converter

more than  
audio excellence

The Threshold DAC 1/e processor incorporates proprietary "jitter" reduction and conversion circuitry designed by Mikael Bladelius. These yield the unprecedented performance of approximately 20 picoseconds "jitter" and 24 bit static linearity.

This extraordinary conversion accuracy defines the DAC 1/e superiority to conventional processors and provides the musicality from digital recordings for which audio connoisseurs have been waiting.

for complete information on the Threshold DAC 1/e write: Threshold Digital Components 7325 Roseville Road Sacramento, California 95842 or call: 1 (800) 888 8055.

Threshold components are exclusively distributed by



division of Threshold Corporation



## FOR SALE

**AUDIO DEN Authorized Sales and Service.** ADCOM, ARAGON, ARCAM, B&K, CAL, CELESTION, CONRAD-JOHNSON, KINERGETICS, KLIPSCH, MAGNEPAN, MIRAGE, MIT, MONSTER CABLE, NAD, NAKAMICHI, PARADIGM, ROGERS, SHURE ULTRA, SONOGRAPHE, SOTA, STAX, THETA DIGITAL, VELODYNE, VTL & YAMAHA Audio Den, 2021 Smith Haven Plaza, Lake Grove, NY 11755. (516) 360-1990.

**AUDIO BY VAN ALSTINE = AUDIOPHILE QUALITY** at affordable prices because we sell direct to you. Our new 500V US slew rate Omega amplifier circuits, our patented Fet-Valve hybrid tube-mostel components, and our complete new Super Pas Four hybrid preamplifier kits are original engineering designs that eliminate transient distortion, are durable and rugged, and sound closer to live than anything else at a rational price. Our B&W crossover upgrades are famous - check with us if you want a much better 801 Matrix, 803 Matrix, or DM640. Complete wonderfully-musical factory wired amplifiers, preamplifiers, tuners, and CD players **Dynaco owners** - our rebuild kits for all Dyna preamps and the St-70 are \$195 each, including all new PC cards. Check our ratings in **Stereophile**, **The Absolute Sound**, and **Sensible Sound**. We design new circuits for most Dyna and Halfer solid-state components too. Now ultimate musical enjoyment is much less expensive. Write or call for our new illustrated catalog. Audio by Van Alstine, 2202 River Hills Drive, Burnsville, MN 55337. (612) 890-3517.

**THE GREAT PRICES OF FALL AT HI FI FARM. OUR BEST PRICING TO DATE ON B&K, PHILIPS, QUAD, VMPS, AND ALL OTHER GREAT PRODUCTS WE CARRY. ASK ABOUT OUR 30 DAYS TO PAY PROGRAM. CALL 1-800-752-4018.**

A compact loudspeaker with extended highs, uncolored mid-range AND solid bass? The Reference 1c proves that good things come in small packages! Free literature. Ariel Acoustics, P.O. Box 87261, Canton, MI 48187.

## PAUL HEATH AUDIO

AUDIOSTATIC, CONVERGENT AUDIO, PS AUDIO, VAC, GENESIS, B&K, STAX, MERLIN, AUDIBLE ILLUSION, CLEMENTS, MAPLENOLL, PHILIPS, MUSIC REFERENCE, QUICKSILVER, XLO, CARDAS, LINDSAY GEYER, SIMPLY PHYSICS, MFA, MAGNUM DYNALAB, RAY LUMLEY & MENTMOR, 217 ALEXANDER ST., ROCHESTER, NY 14607. (716) 262-4310.

**CALL TOLL FREE! 1-(800) 826-0520.** NAD • ONKYO • HARMAN KARDON • CARVER • VELODYNE • HAFLER • M&K • LEXICON • CELESTION • AUDIOCONTROL • TARGET • ATLANTIC TECHNOLOGY • PROAC • ACOUSTAT • CWD • FRIED • MONSTER CABLE • NILES AUDIO • THORENS • STAX • GRADO • DAHLQUIST • KINERGETICS • NITTY GRITTY • PROTON • APATURE • TERK • SOUND SELLER, 2808 CAHILL RD., MARINETTE, WI 54143. FAX (715) 735-5838, PHONE (715) 735-9002.

**Mark Levinson 20.5 Reference mono amplifiers, \$8,200 a pair.** Mint condition, boxes and packing material. Call Marc at (708) 475-1461.

**EXPERIENCED, FRIENDLY ADVICE! FREE SHIPPING! MIRAGE, PS, CWD, STAX, KINERGETICS, THORENS, PHILIPS, AUDIOQUEST, FRIED, MONSTER, QUAD, SPICA, STRAIGHTWIRE, MORE!! READ BROTHERS, 593 KING, CHARLESTON, SOUTH CAROLINA 29403. (803) 723-7276.**

**CABLE TV DESCRABLERS/CONVERTERS. ABSOLUTELY THE LOWEST PRICES! MONEY BACK GUARANTEE. ADVANCED ELECTRONICS, 2140 SHATTUCK #2082, BERKELEY, CA 94704. ORDER NOW! 1-800-659-3018.**

## MUSICAL CONCEPTS

...offers the most elegant modifications for **ADCOM/B&K/HAFLER** components, also **PHILIPS/ROTEL/MAGNAVOX** CD players! **NEW! PA-1** front-end boards for **HAFLER** amps—budget bliss! **EPOCH III, ERA III, ENIGMA III** and **EDEN 1-BIT CD** players (\$595-\$3295). Compare our CD players to others at any price! Try our stunning CD "TRANSPORT" with your DAC, only \$595! **MUSICAL CONCEPTS, 16 PATTERSON PLAZA, ST. LOUIS, MO 63031. (314) 831-1822.**

**ALL NEW SIDEREALKAP!** The most highly reviewed premium audio grade capacitor has been completely redesigned. Audition the new Siderealkap for the ultimate in musical accuracy. Product information available. **Sidereal Akustic, 9974 Scripps Ranch Blvd. #120, San Diego, CA 92131. Tel: 619-578-4226. Fax: 619-578-4059. Dealer and OEM inquiries invited.**

## FOR SALE

ACOUSTIC ENERGY, LOUDSPEAKER TECHNOLOGY ATC-SCM-20, AUDIOQUEST, AUDIBLE ILLUSIONS, ASC, B&K SONATA, CLASSE AUDIO, CARDAS CABLES, CELESTION, CODA TECHNOLOGIES, ESOTERIC, ENSEMBLE, ENTEC, GENESIS TECHNOLOGIES, KIMBER, LEXICON, MERIDIAN, MAGNUM DYNALAB, MISSION CYRUS, NILES, PURIST AUDIO CABLES, PSE PROFESSIONAL SYSTEMS ENGINEERING, PHILIPS AUDIO VIDEO, REGA, STAX, SONRISE CABINETS, SOUND ANCHOR, TARA LABS CABLES & ELECTRONICS, TICE AUDIO, TARGET, V.A.C. VALVE AMPLIFICATION COMPANY, VELODYNE. **NEW LOCATION: JS AUDIO, 15454 OLD COLUMBIA PIKE, BURTONSVILLE, MD 20866. 301-989-2500. FAX: 301-989-2552. VISA, MASTERCARD, AMEX.**

**FREE WHOLESALE CATALOG FOR DEALERS ONLY ON DJ EQUIPMENT, AMPS, PAs, GUITARS, ETC. CALL CDC WHOLESALE DISTRIBUTORS (502) 782-0671.**

## 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



**SONY ES**

AR SONY ES  
NAD The leader  
M&K in digital  
STAX technology.  
SOTA Highest  
BOSE build quality,  
NILES 3 years  
GRADO parts and  
PHILIPS labor  
warranty.  
LUXMAN Compact disc  
LEXICON players and  
PS AUDIO changers,  
THORENS DAT  
PARADIGM Receivers,  
AUDIOQUEST Cassette  
and used Recorders,  
equipment Surround  
Processors

**617 547 2727**

95 Vassar Street  
Cambridge, Mass  
02139

For the latest in Sony ES, please visit the world's smallest Hi-Fi shop



## Madisound Bookkeeper's Revenge Sale



You've got to sell this stuff!

Quantity Available	Description	Price Each
220	Peerless 1510 sealed box 8" poly woofer, foam surround 10 oz mag, Fs 45hz, Qts. 8, Vas 45.	\$18.00
290	Philips AD1624 polycarbonate dome tweeter with ferrofluid, 4 inch round, cut out 3", 92db, 8 Ω, dome guard.	\$12.50
80	Focal T-120KF Kevlar tweeter w/ferrofluid, 93db, cutout 4 3/8" audiophile favorite!	\$48.00
75	Audax MHD12P25FSMSQB, cast frame 5" high output md, 93+db, 450hz to 5.5khz with isolation chamber.	\$20.00
450	Dan Mar 12" sealed box or replacement woofer, 1" vc, 50 watts, priced below 1960 level!	\$12.00
200	Eminence 12" poly, Fs 248, Qts. 32, Vas 299 Ltr, 93db 8 Ω	\$25.00
215	Peerless 1759 10.5" vented box long throw poly woofer, Fs 22, Qts. 34, Vas 125, Xmax 8.5mm peak, 4 Ω only.	\$45.00
360	Famous Maker 6.5" sealed box paper cone woofer, Fs 69, Qts 55, Vas 10 Liters.	\$7.50
64	Eminence 10" Paper, Fs23, Qts 43, Vas 269Ltr, 92db 4Ω only	\$25.00
145	Vifa D25AG05 aluminum dome tweeter, ferrofluid cooled, 90db, cutout 3 1/8". Try a metal dome for a modest cost!	\$14.00
104	Dynaudio 30W100 8Ω, 4" voice coil, 12" poly woofer with foam surround, Fs 20, Qts 48, Vas 409 Liters! The very best!	\$175.00
2050	Carli 12 μd polyester with axial leads. A chance to try our highest quality mylar.	\$2.25
1500	100 μd Lo DF bipolar electrolytic, axial leads. At these prices you can't afford not to stock up.	\$1.75
20,500	Plessey 2.2 μd mylar axial 1/2" leads 63wv.	10 for \$3.00

**Madisound Speaker Components**  
8608 University Green  
Box 4283  
Madison WI 53711  
Fax: (608) 831-3771  
Voice: (608) 831-3433

Offer expires January 31, 1992

# LOW PRICES/CALL US!!

DENON, NAKAMICHI, CARVER, NAD, ADCOM, BOSTON ACOUSTICS, B&K, ONKYO, B&W, ADS, M&K, VELODYNE, SNELL, BOSE & MORE!

FULL WARRANTY • 414-727-0071 • FAST DELIVERY

## 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  
BEL CAP - film/foil polystyrene - axial leads  
WIMA - compact metallized and film/foil polypropylene - axial lead  
SOLLEN - metallized polypropylene - up to 200uf at 400VDC!  
SIEMENS - metallized polypropylene from 51 pf to 0.1uf 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 \$102K series (axial 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; B&B TubeWorks. CARLOS RCA jacks, plugs, hookups wire and shielded cable, interconnect, speaker cable and power cords. WBT TIFFANY EDISON PRICE Music Posts. ALPS, BOURNES Volume and Balance Controls, NEUTRIK XLR plugs. GRAYHILL rotary switches. TEFLON wire (many gauges and colors). ANALOG DEVICES AD877JN, AD847JN, PEARL Tube Coolers Iso-Sockets. CAE (Curtis Audio Engineering) DANIEL PreAmp kits (R&I 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 1991 PRODUCT CATALOGUE!



760 PACIFIC ROAD, UNIT #19, OAKVILLE, ONTARIO, CANADA L6L 6M5  
TEL (416) 847-3245 FAX (416) 847-5471

## FOR SALE

Preamps: Onkyo P-306RS \$219.95, carver C-2 \$249.95, Parasound P/FET 900 \$259.95, Tandberg TCA3018A \$749.95; INT. Amps: Rotel RA-840BX4 \$199.95, Harmon Kardon PM-655 \$375.00, Toshiba XB1000 \$519.95. CD Players: Mission DAD7000 \$249.95, DBX DX-3 \$199.95; Speakers: DCM TF500 \$349.95, wharfedale 505-2 \$249.95, Vandersteen 1 \$399.95, Genesis 66 \$449.95, Allison AL-115 \$299.95, Magnepan SMGA \$399.95; Misc: Bozak CM10-2 Mixer \$199.95, DBX 500XR Switcher \$139.95, Onkyo T-9090 Tuner \$419.95, Soundcraftsmen AE 2000 EQ Analyzer \$549.95, TEAC A-3340S 4-channel Deck \$449.95. Bank cards, Amex, trades welcome. 7 day money back trial period. 10:00am - 9:00pm Mon-Sat. (800) 777-9590, Fax: (419) 331-7807. HART AUDIO.

DEMO SALE — Speakers: TDL Monitor \$3300, TDL Studio 2 \$1400, Hartley Concertmaster \$2600, Essence Amythest 30 \$1400. Electronics: Jeff Rowland model 5 \$4200, Pulsar 2040 Video Projector \$3800. Esoteric Sound Systems 516-689-7444.

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.  
—Audio Advertiser for over a Decade—

CALL US  
FOR QUALITY AUDIO  
AT THE LOWEST PRICES  
WITH FAST SERVICE,  
EVEN ON ESOTERIC ITEMS

SOUND ADVICE . . . without the price



(914) 666-0550  
PO Box 673  
Bedford Hills, New York 10507-0673

## FOR SALE

CUSTOM AUDIO FURNITURE. ANY DESIGN. CONTEMPORARY OR PERIOD REPRODUCTIONS. DOMESTIC AND EXOTIC MATERIALS. HIGH LEVEL WORKMANSHIP. PACIFIC RIM WOODWORKS. (604) 442-5651.

CAR/HOME/VIDEO for: DENON, SONY, INFINITY, AUDIO CONTROL, VELODYNE, CWD, COUSTIC, BAZOOKA, KICKER, ADVENT & PRECISION POWER. Full line authorized dealer. Call (800) 321-0685 for prices and orders. (301) 729-3711 for info and consultations. C&C Audio/Video 11am-9pm Mon-Sat EST.

### HIGH END AT DEALER COST!!!

STARVIN' (LITERALLY) HI-FI SALESMAN HOPES TO MAKE ENDS MEET BY SELLING HIS INVENTORY AT CLOSE-OUT PRICING. SOME PRICES ACTUAL DEALER COST! I CAN'T MENTION ALL OF MY LINES HERE, BUT I CAN TELL YOU THAT ALL MEITNER AND MELIOR PRODUCTS ARE SELLING FOR MY COST OR BELOW! ALL SYSTEMDEK TABLES ARE BEING BLOWN OUT MY DOORS, ALONG WITH TWENTY OTHER LINES! LET'S GET TOGETHER TOLL-FREE 800-438-6040.

For music listeners only. The finest in music production. Custom design and installation is our specialty, with twenty years experience. Audiophile's, 3881 Timber Lane, Verona, WI 53593. (608) 833-6883, fax: (608) 829-2686. Buy monthly newsletter subscription, \$5 per year.

BANG & OLUFSEN—B&W—CARVER—KEF—ADCOM—NAKAMICHI—a/d/s—REVOX—DENON—HARMON/KARDON—CELESTION—POLK—INFINITY—KLIPSCH—BEST PRICES! MANUFACTURERS U.S.A. WARRANTIES. AMERISOUND SALES INC. (904) 262-4000.

## COMPACT DISCS

### DISCOUNT COMPACT DISCS

Telarc \$11.99/cd; Chesky \$10.99/cd; DMP, Reference & Sheffield \$11.99/cd! Hundreds of other labels at low prices. Send SASE for catalog or your order with Visa / MC / Disc / Check + \$4 shipping to: THE ACME COMPACT DISC COMPANY, P.O. BOX 7004, EVANSTON, IL 60204.

MOBILE FIDELITY ULTRADISCS, including limited edition Pink Floyd The Wall, Sheffield Lab, GRP. We'll beat any price! Visa Mastercard, SALCO, INC. 1-800-582-1166.

CD SHIELD REVOLUTIONARY PERMANENT scratch proof protection for CD's works while they play! Helps to increase reflectivity and stability which improves sound quality. Cost: 2 (a \$7.00, 6 (a \$19.50, 12 (a \$36.00 + \$3 s&h. Sendcheck/m.o. Last Chance A.V. Dept. A-9, 39 Wilson Avenue, York, PA 17404. (717) 845-3510.

YES WE'LL PUT YOUR NAME ON CD'S! Order NOW! Adhesive labels customized with your circularly imprinted name. Personalize 30 disks for \$6. Check payable: LASERITE Company, 144 Fairport Village Landing, Suite 255, Fairport, NY 14450.

## WANTED TO BUY

HI-FI SUPPLIES—PAYS CASH FOR LEVINSON, ARC, C.J., KRELL, SPECTRAL, ROWLAND & THRESHOLD. (212) 219-3352, 7 DAYS 10AM-6PM (NY).

David Yo Always Paying Top: Studer, Squerra, M-Levinson, McIntosh, Marantz, C.J., ARC, Quad, Leak, Western Electric equipment. Vintage speaker systems, units, from W.E., Tannoy, JBL, Altec, Jensen, RCA. Tel: 818 701-5633, P.O. Box 802, Northridge, Ca. 91328-0802

TOP PAYING FOR MCINTOSH, MARANTZ TUBE AMP McIntosh Solid state, Western, JBL, Altec, Tannoy, EV, Jensen, Speakers & Horn, EMT Turntable, Ortolon Arm, Temma- (516) 935-2605, (516) 496-2973.

AMERICAN ENTHUSIAST STILL OVERPAYING FOR VINTAGE & HI-END EQUIPMENT. SEE MY BIG AD OCTOBER 1991 ISSUE. N.Y.S.I. 718-377-7282: M-F, 1-6 P.M.

## The Consumate Preamp



JEFF ROWLAND  
DESIGN GROUP

Discover Fullfillment  
through Technology  
at Esoteric Sound



High End Components For The Audio Perfectionist

AKG K1000 • ALTEC LANSING • APOGEE • CLEMENTS • COUNTERPOINT • ESOTERIC • HARTLEY • IBL • LENICON • MELOS • PROCEED • ROTEL • JEFF ROWLAND • SHAHINIAN • SUMO • TDL • VAC • WADIA

Esoteric

SOUND SYSTEMS LTD.  
CONVENTRY COMMONS Rte 347  
STONY BROOK, N.Y. 11790  
516 689-7444

## WANTED TO BUY

WANT — JBL Hartsfield, EV Patrician, Barzilay Record Cabinets with Tambour Doors, Singles OK, McIntosh, Marantz & other tube equipment. Larry Dupon, 2638 W. Albion, Chicago, IL 60645. (312) 338-1042, evenings.

ALWAYS PAYING TOP PRICE: IT'S WORTH IT CALLING ME!! ALTEC, JBL, EV, JENSEN, TANNAY, WESTERN, OLD EQUIPMENT, MCINTOSH SOLID STATE, MARANTZ, M. LEVINSON, THRESHOLD, HENRY CHANG, 115 SOUTH NICHOLSON, M.P., CA 91754. (818)307-7372.

WANTED: WESTERN ELECTRIC, JBL, MARANTZ OLD EQUIPMENT. SUNLIGHT ENGINEERING COMPANY: 213-320-7020, 22130 SOUTH VERMONT AVENUE, #A, TORRANCE, CA 90502.

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.

## RECORDS

RECORD COLLECTORS SUPPLIES, REPLACEMENT JACKETS, INNER SLEEVES, 78 RPM SLEEVES, OPERA BOXES, LASER DISK BOXES, ETC. FREE CATALOG. CABCO PRODUCTS, BOX 8212, ROOM 662, COLUMBUS, OHIO 43201.

BITTY GRITTY & RECORD DOCTOR UPGRADE!: Boost turning power & cut cleaning time with the remarkable Gliding Platter™. See October Audio & order today! Just \$14 PPD. Check MO: KAB ELECTRO-ACOUSTICS, Box 2922A, Plainfield, NJ, 07062-0922. (908) 754-1479.

NEW RELEASES, CDs, CASSETTES, SINGLES, VIDEOS, RECORDS, LASERDISKS, PICTURE DISKS, OVERSTOCKS, CATALOGS \$1.00, NERT, P.O. BOX 268-A, LAWRENCE, MA 01842-0468.

## AUDIOPHILE RECORDS

AUDIOPHILE RECORD WAREHOUSE! Out-Of-Print Direct-To-Disc, Half-Speed, Qualex II & Import Pressings Great selection of In-Print Records & CDs. Quantity Discounts! Call for Free Catalog, Elusive Disc, 5346 N. Guilford Ave. Indianapolis, IN. 46220 (317) 255-3446.

SEALED & MINT USED AUDIOPHILE RECORDS—Mobile Fidelity, UHQ's, Nautlius, CBS Half-Speed Mastersounds, A&M & MCA Half-Speeds, Japanese imports & more. Call Steve (516) 681-4494.

## INVENTIONS WANTED

ALLIED LICENSING INC. helps inventors with product exposure and presentation. How can we help you? Call us for free information 1-800-8-INVENT.

INVENTIONS / NEW PRODUCTS / IDEAS WANTED: Call TFCI for free information & Inventors Newsletter, 1-800-468-7200, 24 hours/day—USA, CANADA.

## BUSINESS OPPORTUNITIES

LET THE GOVERNMENT FINANCE your new or existing small business. Grants/loans to \$500,000. Free recorded message: 707-448-0270. (KF1)

## RETAIL MART

MUSIC'S JOY—LIFE'S HAPPINESS. Arwa, Aural Symphonics, B&K, Cardas, Kimber, Merrill, MFA, Flotel and much more. AEOLIAN, Danville, VA. (804) 792-6946.

## CAR STEREO

DO IT YOURSELF INSTALLATION GUIDE. COMPLETE WIRING DIAGRAMS & INSTRUCTIONS FOR ANY CAR COMPONENT INSTALLATION. SEND \$14.95 TO AUTO JUNCTION, P.O. BOX 592, HELENA, AR 72342.

"STEREO WORLD" is your discount sound source with super deals on the following car and home stereo lines: Panasonic, JVC, Sony, Pyle, Alphasonik, Onon, Pioneer, Sherwood, Hi-Fonics, Blaupunkt, MTX, Earthquake, Kenwood, Scosche EFX, Autotek, JBL, GNS Amps, Excalibur 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. 10am-6pm Mon-Fri. Visa/MC; COD accepted. P.O. Box 596, Monroe, NY 10950 (914) 782-6044.

AUDIOPHILE  
CDs & LPs  
AND ACCESSORIES

Your #1 Source

Mobile Fidelity · Reference Recording · Wilson · Sheffield Lab · Chesky · Proprius · Harmonia Mundi · Opus 3 · Wazlerly · Dorian · Chandos · East Wind · ATR Mastercut · Linn Recut · RCA Living Stereo · Mercury Living Presence · Lyrita · Nautlius · Klavier · Telarc · Delos · plus many more in and out of print recordings!

CALL  
TODAY!

ACOUSTIC SOUNDS

P.O. BOX 2043 · SALINA, KS 67402-2043  
1-913-825-8509 · FAX: 1-913-825-0156



1-800-525-1630

Catalog \$3 in USA  
\$5 elsewhere —  
refundable with order

## MISCELLANEOUS

TERMPAPER assistance. 19,278 papers available! 306-page catalog—rush \$2.00. Research, 11322 Idaho, #206AD, Los Angeles 90025 TOLL FREE HOTLINE: (800) 351-0222 (California: 213-477-8226).

## PUBLICATIONS

MOVIESOUND NEWSLETTER. The state of film audio tracks in theaters and at home. Send \$2 for two sample issues. PO Box 7304, Suite 269A, No. Hollywood, CA 91603

Is the best test for component musicality a non-musical test? HF... says yes, and tells you why and how to do it. In the first issue of:

THE MUSICAL TRUTH™...

the new, bimonthly personal newsletter of affordable high end audio. Send \$12 check for 6 issues to:

TMT, P.O. Box 723-SR  
Farmington, CT 06034-0723

MUSICAL DESIGN

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

Two Patterson Plaza • St. Louis, Mo. 63031 • 314-831-5802

## Monstrous Savings On Monster Cable Cartridges

Monster Cable has just appointed Audio Advisor the exclusive world-wide distributor of their highly rated Monster Cable moving coil (0.3mV output) cartridges.



Save 50% off the old retail prices.

Critics loved these cartridges at twice the price. Anthony H. Cordesman declared in *Stereophile* Vol. 10, No. 5 August, 1987: "No cartridge I have heard at any price is convincingly better in terms of overall performance." The Alpi Genesis 1000-II was \$800, now only \$399.95

Far at least once in your life...

...you deserve a great cartridge. Good as the AG1000-II is, Monster's Sigma Genesis 2000 is even better. The SG-2000 is smoother, more open, more detailed and dynamic. And it's the only one of the world's great cartridges you can get at 50% off its former retail price. The SG-2000 was \$1,200, now \$599.95

Not sold in stores—not at these prices!

All cartridges are new with full factory warranty. Add \$5.95 shipping in US, \$9.95 in Canada or \$19.95 to ship elsewhere in the world. Hurry, only so many hand-built cartridges can be produced. Order now, avoid a wait!

Master Card / Visa / Amex / Discover

1-800-942-0220



225 Oakes SW Grand Rapids, MI 49503  
(616) 451-3868 • FAX (616) 451-0709

## CABLE ENHANCER™ effectively burns in audio interconnect and speaker cables in only 48 hours. The improvement is revolutionary!

A typical customer response: "I just called to tell you that your Cable Enhancer really works! My soundstage is a whole new ball game. And the top end is wide open now. I can clearly hear higher octaves than before. Your Cable Enhancer will be a compulsory tool for high end audiophiles!"

"The differences...amount to a full grade point on a ten point scale. Duo-Tech has a real winner in the CE 1000 Cable Enhancer."

—Ian Joel  
Positive Feedback Magazine

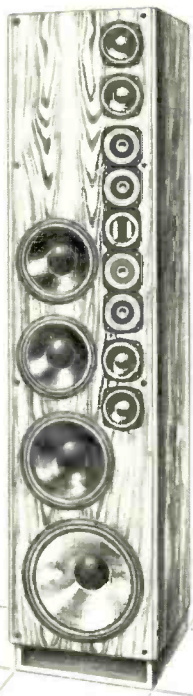
"The improvement was so clear I could tell the differences from memory. I'm totally convinced of Cable Enhancer's capability."

—Leo Fung  
Audiophile Magazine, July 28, 1991

At \$1790<sup>00</sup> (plus \$45<sup>00</sup> shipping & handling) the CABLE ENHANCER is priced like a tweak, yet delivers many times its cost in improved sound system performance.

DUO-TECH CORPORATION • 37396 Ruben Lane, Bldg. F • Sandy, OR 97055  
Phone (503) 668-3295 FAX (503) 668-3298 VISA & MC Accepted

# LOWEST LOUDSPEAKER DISTORTION



The VMPS Super Tower III, 78 x 19 x 18", 280#, \$4300/pr kit, \$5200/pr assem in lt. oak, dk oak, and black

The VMPS Super Tower III is a very large, floor-standing, high efficiency speaker exhibiting the widest bandwidth, lowest distortion, and greatest dynamic range of any production system regardless of price.

The STIII incorporates numerous design advancements including double-thick front baffle, antifriction round vertical cabinet edges, flush-mounted drivers, Soundcoat cabinet damping, spaceage Woven Carbon Fiber mids, multigauge Teflon solid core internal wiring, all Wondercap crossovers, and more. Bass extension (-3dB at 17Hz/1W drive), THD (no more than 0.25%/1W), sensitivity 94dB/1W/1m) and a neutral tonal balance combine to produce sound quality described as "magnificent" and "splendid" by leading reviewers (see *The Absolute Sound*, Sep/Oct 91 issue).

Hear VMPS speakers and John Curt's Vendetta Research electronics (such as the new **SCP2C** phono preamp, \$2495) at the dealers below, or write for brochures and test reports on our **Tower II Special Edition** (\$1376/pr kit, \$1776/pr assem), our three highly acclaimed **Subwoofers** (\$259-\$599ea), **OSO Series** bookshelf speakers, and luxury options available for most models. Prices include free shipping in 48 states and kits are supplied with fully assembled cabinets.

## 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; Par Troy Sound, Parsippany NJ; Sounds Incredible, Brookfield CT; Dynamic Sound, Washington DC; Essential Audio, Winchester VA; Hifi Farm, Beckley WV; American Audio, Greenville SC; Arthur Morgan, Lake Mary FL; Sound Audio, Charlotte NC; Audio by Caruso, Miami FL; Audio by Gil Morrison, Detroit MI; Audio Specialists, South Bend IN; Audio Connection, Terre Haute, IN; Shadow Creek Ltd, Minneapolis MN; Concert Sound, San Antonio TX; Parker Enterprises, Garland TX; Stereoworks, Houston TX; Encore Audio, Lees Summit MO; Lookout Electronics, Longview WA; Posh Audio, Lake Oswego OR; The Sound Room, Vancouver BC Can; Sounds Deluxe, Clarendon Hills IL; Golden Ear, Chico CA; Exclusively Entertainment, San Diego, CA; Audio Haven, Upland CA; Sounds Unique, San Jose CA; Private Line Home Entertainment, Stockton CA; Ultimate Sound, San Francisco CA; Itone Audio, El Sobrante CA.

495 SHIPPING ANY SIZE ORDER. DETAILS BELOW 1-800-245-6000

TDK	DENON	FUJI	PANASONIC	MAXELL
MAX-80 3.48	DAT120 8.49	DAT120 8.49	SL705 137.95	MAX-100 3.48
MAX-110 2.99	HDM-100 3.44	HSE 100 16.00	ROY100 69.95	MAX-90 2.99
MAX-80 2.29	HDM-80 3.29	DR90 80	ROY2 27.95	MAX-110 2.99
SAR-100 2.49	HDM-100 2.99	OCTAVE 80	RUI350 214.95	MAX-100 2.99
BAZ-80 1.99	HDM-80 2.79	OCTAVE 90	RUI3410 47.95	MAX-90 1.99
SA-100 2.79	EMERG 8.99	KE-4-30 90	RUI350 214.95	MAX-80 1.99
SA-80 1.99	ELECTRONICS	KE-4-60 100	AT-7 PROCEED	CALL
SA-60 1.99	CALL	KE-4-90 110	SONY PORTABLE	CALL
C70 80				
T120 2.99				
SONY				
DAT120 18.49				
MTL-80 3.99				
LXPRD-80 2.59				
SR-100 2.79				
T120 2.49				

WWW. MAXELL DAT 120 IS 99 SONY METAL MASTER 90 IS 99 SRD 1 IS MAX LR 90 IS 99

DISC VISA MC NO EXTRA CHARGE

We Will Beat Any Price of the Total Order including All Shipping & Handling Charges by 1% if Shipping to a Business Address. Shipping is a Residence at \$ 8.95 for 1-20 Tapes, \$ 9.95 for 21 or More. C.O.D. Fee 3.75 per Package All Taxes Here. US Mails Parcell Post Ship Call

TAPE WORLD 220 SPRING ST. BOX 281 BUTLER, PA 15005-0281  
DAT RECORDERS JVC 685 CO. OTHER HIGH END CALL



## STORADISC™

Fine furniture-quality CD storage systems with angled shelves & non-slip surface that holds a single CD upright. Solid hardwoods & textured finishes. 360 & 576 capacity shown. Smaller sizes available. Write or call 1-800-848-9811.

Davidson-Whitehall Company  
555 Whitehall Street Atlanta, Georgia 30303

## SERVICES

Audio Repairs and Restorations by Clif Ramsey, former Senior Service Technician at McIntosh and Ron Olsen, Electrical Engineer, 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.



## BLANK TAPES

1800' AMPEX REELS USED ONCE—SAMPLE: \$3.00. NEW MAXELL REELS CASSETTES. TDK AR 100: \$1.49, SA 90: \$1.79. AUDIO TAPES, BOX 9584-A, ALEXANDRIA, VA 22304. (703) 370-5555. VISA/MC. FREE LIST.

## HELP WANTED

High End Audio Sales Manager Monster Cable, the dynamic leader in audio accessories and consumer electronics is currently seeking qualified applicants for High End Audio Sales Manager. Basic function: To develop sales strategies to maintain and increase current share of high end audio division. We seek a dynamic sales professional to further our growth and expansion. You'll be responsible for motivating and developing independent sales representatives, maintaining good relationships with distributors and customers, interfacing with management and otherwise leading the high end audio sales effort. The ideal candidate will have a proven high end professional sales management background with a minimum of 5 years prior experience. BS/BA degree in marketing preferred. Some travel may be required. Monster Cable seeks those rare individuals who can combine technical expertise with a dedication to customer satisfaction. Bring your management experience to the leader in audio accessories. We offer a competitive benefit package together with a salary commensurate with ability. Please mail your resume and salary history/requirements to: Human Resources (Dept. WLB) Monster Cable Products, Inc., 274 Watis Way, So. San Francisco, CA 94080.

## MAIL ORDER

ABARGAIN: STAX SIGN/LAMBDA \$1,395; PRO/LAMBDA(#3) \$749; PRO/LAMBDA(#1) \$459; SIGN/LAMBDA SRD/7 \$599; GRACE F9ERUBY \$199; DENON 103D \$199; FR1MK3F \$169; ALL UNUSED (212) 966-1355.

THE BEST DISC AND TAPE STORAGE SYSTEM IN AMERICA. Stackable, portable oak units hold all recording formats. FREE Mailorder Brochure (please mention Audio). Per Madison Design: (415) 928-4509. P.O. Box 330101, San Francisco, CA 94133.

## MOVIES/FILMS/VIDEOS

FAMILY NATURISM. Lifestyle photography. Unique documentary videos: European family resorts, recreation, contests. Color catalog \$3.00. NATFAM(AU), BOX 838, VENICE, CA 90294.

CALIFORNIA NUDE BEACHES 1-8: Nudist Beauty Contest 1-4; 2 hrs. \$30 each. \$2 catalog. 213-519-8840. T & A Video, 904 Silver Spur Rd, Suite 401, Rolling Hills Estates, CA 90274.

## The Amrita-Summit Towers...

"A \$5,000 pair of speakers for \$2,000." —Larry Rosine ROSINE AUDIO, Skokie, IL



AMRITA AUDIO ■ P.O. Box 770, Fairfield, Iowa 52556 ■ (800) 4-AMRITA

# The most important opinion IS YOURS...

*"I shall say, however, that when listening to the SA-1000/100 at low volume, in the early hours of the morning when everything is quiet, these components produce the best sound I have heard in my house. Exceptional in every way or from any point of view from which you care to analyze it."*

Jorge Goncalves  
Audio, Portugal

*"However compact and reasonably priced the SA-100, it behaved like a behemoth in the Krell league."*

-Ken Kessler  
Hi Fi News & Record Review, England

*"The Counterpoint SA-100 has no negatives. To the contrary, it is always great: the sound is rich and sweet, the voices and instruments are clear and exciting, and the image is superb. Who could ask for more?"*

-Henry See  
UHF, Canada

*The Counterpoint SA100 is the essence of great craftsmanship... its sound is majestic, authoritative, and exciting, with a balance of strength and grace...*

-Ugo Stella  
Stereo Hi Fi, Italy



For More Information



Call 1-800-451-2248



## COUNTERPOINT

NOTHING BETWEEN THE MUSIC AND YOU

2610 Commerce Drive, Vista, CA 92083 • Call toll free 1-800-275-2743 • Fax 619-598-9418  
Enter No. 12 on Reader Service Card

# THE POWER AND THE GLORY!



WHAT DOES IT TAKE TO BUILD A high-end speaker in the digital age?

It's not easy. Today's finest speakers must be able to reproduce not just the subtle detail of music but also its size - be it a grand symphony, intimate jazz or progressive rock. Even few expensive speakers are up to the task.

But, with the STUDIO MONITOR, PARADIGM has done the impossible... captured high-end speaker performance for an almost impossible \$1,899/pair.\*

Designing this fine an audiophile speaker takes a lot of determination and extensive resources - better design execution with better materials.

And premium materials are used throughout. From diecast aluminum chassis, used in all drive units, to the astonishing tweeter with its pure-aluminum-dome, to the midrange with a mineral-filled polypropylene cone and ferrofluid cooling, to bass drivers with mineral-filled polypropylene cones, 1 1/2" voice coils and massive 40 oz. magnets, to advanced enclosure design and seamless dividing networks.

The results are staggering! The STUDIO MONITOR is articulate and transparent, yet also very dynamic!

YOU WON'T FIND PARADIGM everywhere. Speakers this good require the expertise of a qualified audio specialist. So, before you buy any high-end speaker, visit your AUTHORIZED PARADIGM DEALER... and listen to the power and the glory of the STUDIO MONITOR.

FOR MORE  
INFORMATION CALL  
1-800-553-4355  
Ext. 41274 or write:  
AUDIOSTREAM, MPO Box  
2410, Niagara Falls, NY  
14302. In Canada write:  
PARADIGM, 569 Fenmar  
Dr., Weston, ON M9L 2R6.

Sound & Vision

Critic's  
Choice Award

HI-FI  
GRAND PRIX  
AWARD

FROM  
udioVideo

For More Information



Call 1-800-451-2248

# Paradigm®

Enter No. 6 on Reader Service Card

\*MSRP. COPYRIGHT © PARADIGM/BAVAN