Audio

APRIL 1991 • US $2.95 • UK £2.00 • CAN $3.50

HEADPHONES
AS CLOSE AS YOU CAN GET

MERIDIAN 208 CD PLAYER
HIGH-ACCURACY BITSTREAM PERFORMANCE

EXCLUSIVE INTERVIEW
TOM FROST
CLASSIC MASTER

TESTED
ALTEC LANSING 511
LOUDSPEAKER

04
0 270321 7

Lose your amateur standing.

If you love music, maybe you and a pair of JBL L-Series speakers should think about living together for a while. After all, we make every JBL component, from our unique 1-inch titanium tweeter to the hardwood furniture it performs in, right here. In our own plants. From scratch.

HOW MANY OTHER SPEAKER MAKERS CAN HONESTLY SAY THAT THESE DAYS?

L-SERIES SPEAKERS COME FROM THE SAME GENE POOL AS OUR PROFESSIONAL SPEAKERS. SAME TITANIUM TRANSDUCERS, SAME RICH BASS AND THE SAME STUDIO MONITOR SOUND AS THE PROS. JBL. IT'S THE WAY PEOPLE WHO MAKE MUSIC FOR A LIVING HAVE BEEN MAKING, MIXING JBL AND MASTERING IT SINCE DAY ONE.

H A HARMAN INTERNATIONAL COMPANY 240 CROSSWAYS PARK WEST, WOODBURY, NEW YORK 11797 8500 BALBOA BOULEVARD, NORTHRIDGE, CA 91329

Enter No. 19 on Reader Service Card

Audio

APRIL 1991 VOL. 75, NO. 4

As Close As You Can Get, page 50

Proceed CD Player and D/A Converter, page 102

FEATURES

EQUIPMENT PROFILES

MUSIC REVIEWS

DEPARTMENTS

The Cover Equipment: Meridian 208 CD Player/Preamp.
The Cover Photographer: Thomas Fasting.

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

Tom Frost, page 42

Currents, page 36

A N E W B A L A N C E

The Mark Levinson N°28 Preamplifier is at once a continuation of the Mark Levinson traditions of musicality and enduring quality, and an entirely new implementation of technology that will set the pace for innovation in high-performance audio in the 1990's.

Mark Levinson products have offered the advantages of balanced interconnection for many years. The N°28 introduces a new execution of balanced circuitry called a DIDO (Differential In/Differential Out) that provides fully balanced operation throughout (not converting to single-ended for internal processing) while still rejecting common-mode noise from source inputs or arising within the unit itself. All versions of the N°28 have 2 balanced (XLR) inputs as well as balanced output connections. Even single-ended signals benefit from the DIDO, since it rejects common-mode ground noise as it converts single-ended signals to differential at the input.

Your local Mark Levinson Dealer can provide complete details on these and many other refinements in the design of the N°28.

More important, you can hear for yourself how this preamplifier tips the balance in your favor.

mark levinson

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

SIGNALS & NOISE

Perfect Sound, for Now

Dear Editor:

It seems highly ironic that an issue screaming the benefits of DAT on its cover ("How Can Anybody Resist Owning One?") would also contain an article pointing out that high-quality open-reel tapes are decaying after only 10 or 20 years (November 1990). The excellent article, "Archival Revival" by Michael N. Stosich, did an admirable job of documenting the problems and solutions involved in keeping these "old" (?) recordings. I note:

1. The highest quality tapes often have the worst problems, but, of course, DAT tapes will be of such high quality that this type of problem will never occur in the future.

2. Cures often involve treatment of the tape, head, guides, etc. This would be impossible with DAT.

3. Tapes only 10 or 20 years old are becoming unplayable. I certainly want my recordings to last longer. Of course, as noted in the article, bad tapes can often be "cured" long enough to make a copy, but since that may not last long either, there may be continual degradation through dubbing "new" copies. Digital recording would surmount this huge obstacle to longevity, as a 12th-generation copy would sound as good as the original. Unfortunately [due to SCMS], we've been deprived of this feature; either the copy must go into the analog domain or be lost as the tape deteriorates.

From my vantage point, DAT packs a lot of convenience features and high-quality sound, but it is still tape, with all its drawbacks. High-quality open reel is sonically equivalent for most applications, doesn't limit tape longevity options, and allows cheap editing. What I won't be able to resist is a recordable CD system without some form of SCMS. Thanks for a magazine that brings up these types of concerns.

James Graham
Kalona, Iowa

Elevating Everest

Dear Editor:

It seems appropriate to commend *Audio* for a recent article and make a suggestion for a future follow-up piece. I have drawn very great use from F. Alton Everest's "Muffling the Neighbors" in the November 1990 issue. While my current project is not entirely aimed at the neighbors, I do have tremendous interest in the various attenuation characteristics for partitions and floors/ceilings.

I am now in the process of building a new sound room in my basement and am trying to lock out furnace noise, plus control extraneous transmission to the rest of the house. I had been immersed in various books, such as *Noise Control* by Harris, and was proceeding generally along the lines of Everest's article. I must say, however, that this article has been a fantastic boon to me, as it brings the noise attenuation issues into sharper focus. Now I know just what my offset, dual-plate, double-stud 2 × 4-inch partition with two layers of ½-inch gypsum will do to the furnace noise (which will be originating less than 10 feet behind where my speakers will be in the room). At least I *think* I do. The details of Fig. 9 don't quite cover this exact case, but I am assuming that *offset* double studs (as in Fig. 9-D) but on separate plates (as in Fig. 9-H) will perform at least as well, if not better.

Mr. Everest, thank you indeed for an informative article on a subject which is probably not universally understood. Let's hope that sometime in the future you might find the time to do another, and discuss sound characteristics of doors and windows.

Walter G. Jung
Fallston, Md.

Prima Don

Dear Editor:

I had my Adcom GFA-555 power amp updated by Wavetrace Technologies of Florida. The resultant sound is more open, less grainy, and has significantly more bass—well worth the investment.

The reason for this letter, however, is to commend Don Hillebrand for providing repairs, free of charge, due to my having crossed speaker wires, not once, but twice within the last year!

Also, Don has provided answers to questions I have had concerning other stereo components. I wish to thank him publicly not only for the update but also for the service and support he has given me since then.

Gary Chalas
Boston, Mass.

Audio

Editor: 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
Assistant Editor: Joe Wiesenfelder
Assistant Editor/Music: Michael Bieber

Associate Editors:
Edward Tatnall Canby, Bert Whyte, B. V. Pisha
Senior Editors:
Leonard Feldman, Howard A. Roberson
Senior Editor/Loudspeakers: D. B. Keele, Jr.
Editor-At-Large: David Lander

Contributing Editors/Artist:
M. Aldred, H. Burstein, D. L. Clark, A. H. Cordesman, T. Costa, J. Diliberto, F. Driggs, J. Eargle, S. Elliott, 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: Frank Truskolaski
Production Director: David Rose
Production Manager: Nancy Potts
Research Manager: Dru Ann Love
Office Manager: Phyllis K. Brady
Ad Coordinator: Sylvia Correa
Sales Secretary: Liz Dedivanovic

V.P./Publisher: Stephen Goldberg

ADVERTISING
Director, Scott Constantine (212) 767-6346
Account Managers:
Barry Singer (212) 767-6291
Carol A. Berman (212) 767-6292
Bob Meth, Western Mgr., (213) 739-5130
Paula Mayeri, Regional Mgr., (213) 739-5130
James Main, Auto Mgr., (313) 643-8800

HACHETTE MAGAZINES, INC.

Chairman and CEO: Daniel Filipacchi
Exec. V.P./Editorial Director: Jean-Louis Ginibre
Exec. V.P./Publishing: Didier Guérin
Exec. V.P., COO & CFO: David J. Pecker
Sr. V.P., Sales & Mktg.: Anthony F. Incalcatera
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., Research: Susan Smollens

AUDIO, April 1991, Volume 75, Number 4
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.

Editorial contributions should include return postage. Submissions will be handled with reasonable care, but the Editor assumes no responsibility for safety or return of manuscripts, photographs, or artwork. The Publisher, in 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. Please allow at least eight weeks for the change of address to become effective. Include both your old and your new address and enclose, if possible, an address label from a recent issue. 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.

Engineered Emotion

Hear it! Feel it! A new emotional dimension in music and movies. 500 lbs. of stereo soundfield perfection. 2000 watts of precision power. 19 drivers with 400 sq. in. of radiating area. The components have won 8 major audio awards. These are serious tools for serious listeners. The Shure HTS Theater Reference System shown is the audio purist's approach to Home Theater sound. It costs less than most compact cars yet has all of the emotional impact to transport you to new worlds of entertainment. Shure's Acra-Vector® pro logic encoding and decoding systems are used by major production facilities. Six years ago Shure introduced the now familiar "Home Theater" concept. Now Shure HTS systems and sub-systems are available in 23 configurations and price levels. They are equally awesome with Dolby® Surround movies, Stereosurround® television productions, Stereosurround music, and future HDTV programs. We will send you a wealth of fact-filled material that explains Home Theater, stereo soundfields, and Shure HTS Theater Reference System components. Call 1-800-25 SHURE for the name of your nearest dealer and how to obtain this free information package. Or write: Shure HTS, 222 Hartrey Ave., Evanston, IL 60602-3696.

from SHURE ...the Sound of the Professionals®...Worldwide.

Dolby® Surround is a registered trademark of Dolby Laboratories Licensing Corporation. Stereosurround® is a registered trade mark of Shure Brothers, Inc.

Enter No. 37 on Reader Service Card

TAPE GUIDE

HERMAN BURSTEIN

Monitoring Noise

Q. I am concerned about a high-frequency noise, sometimes referred to as head coupling, which I hear when monitoring from the tape during recording. Is there any way that I can get rid of this noise so that I can calibrate my deck better by monitoring when recording? Are other three-head cassette decks victims of this problem?—Bill Kafato, Winnipeg, Man., Canada

A. In a three-head cassette deck, the record and play heads are necessarily very close together. When Philips designed the cassette format, only a two-head arrangement was originally visualized, although clever engineering subsequently made it possible to squeeze in a third head. It appears, in the case of your deck, that there is an interaction between the two heads which results in the high-frequency noise you hear when monitoring as you record; possibly this could be due to oscillation owing to close coupling. I haven't run into this phenomenon before. It may be an artifact of your particular deck, and the problem should be referred to the manufacturer or to an authorized service shop.

Azimuth Problem

Q. About 2½ years ago I purchased a high-quality cassette deck that had been used as a demo unit. After a year, during which I recorded about 80 tapes, I bought a car deck. None of my tapes sounded as good on the car deck as on the home one; the music became muffled; a thick cloud seemed to mask it. Every deck on which I played my tapes produced the same effect, so the fault proved to be with my home deck: Its record-playback head is out of correct azimuth alignment. The manufacturer states that for $50 it will fix the problem, clean the deck, and make sure that everything is up to specs. But if the head azimuth is changed, all my tapes will sound (expletive omitted). I know there is a solution—buy another deck, new this time, and use it to dub tapes played on my present deck. However, this solution is not financially possible for me now. Can you suggest something?—Stuart Zimmerman, Solana Beach, Cal.

A. First of all, $50 (excluding parts) is a very reasonable charge today for putting a deck in proper operating condition. A possible solution to your problem is to borrow or rent a high-quality deck for rerecording your valued tapes. Play them on your misaligned home deck and record them with the borrowed deck. Then send your deck in for servicing.

Sensitive Questions

Q. The other day I was recording a metal-particle tape at a level of +7 dB. When I played it back, the meters peaked at only +3 dB. Why is the playback level lower?

I have a prerecorded tape that was recorded at +4 dB on Type I tape. But when I try to record on Type I tape at +3 dB, it distorts. Why is this?—Brian Gebhardt, Carlstadt. N.J.

A. In answer to your first question, one reason is the sensitivity of the tape you used. Sensitivity denotes the level of tape output for a given level of input. Tapes of various brands and levels of quality vary in this respect, and you may have been using a tape of relatively low sensitivity. (However, low sensitivity does not imply low quality in other performance respects.) The reason may also lie in the calibration of your tape deck; that is, the meters may not have been calibrated properly at the factory to make playback level correspond with recording level for most tapes. But this is not a serious fault and should not concern you. If, in the future, your deck has to be serviced for serious reasons, you can have the playback calibration adjusted.

One reason why a prerecorded tape can achieve a high playback level is the use of a tape with high sensitivity, so that for a given recording level—corresponding to maximum acceptable distortion—a relatively high playback level is obtained. Or, for a given distortion level, the chosen tape may be able to accept a relatively high recording level. Also, the use of the Dolby HX Pro headroom-extension system by the tape duplicator permits a higher recording level in the treble range before tape saturation takes it toll in distortion and treble loss.

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.

END-OF-SEASON SALE. SAVE $50.

THE OFFICIAL MILITARY ISSUE GENUINE LEATHER A-2 FLYING JACKET

ACT NOW!
A Piece of American History is ON SALE!

The A-2 Leather Flying Jacket is one of the most famous pieces of battle gear in history. During World War II, the brave pilots of the U.S. Army Air Corps relied on the A-2 for protection and comfort. Worn by the daring "Flying Tigers" who fought over China in their P-40 Warhawks. And Jimmy Doolittle's B-25 bomber squadron that hit Tokyo in a daring carrier-launched raid. Lightweight and comfortable yet "tough as nails," the A-2 identified its wearer as one of an elite, brave breed of fighting men. And now, for a limited time, you can acquire the A-2 for only $199,* that's $50 off the regular price.

Genuine Military Issue.
Not a Commercial Reproduction.

Cooper Sportswear was an original supplier of the A-2's worn by America's World War II flying heroes. Now, after a 45-year retirement from active duty, the U.S. Air Force has recommissioned the A-2 and selected Cooper as the official Government contract manufacturer. Now, you can own the *very same* jacket issued to U.S. Air Force pilots. ***Not a reproduction—this is the genuine article! Available exclusively from Willabee & Ward.***

Proudly Made in the U.S.A.

The Cooper A-2 is made in the U.S.A. using materials and production methods specified by the U.S. Air Force. Premium hand-stitched goatskin ensures ruggedness and great looks. Knitted cuffs and waist band and a spun cotton-blend lining ensure draft-free comfort. Details include regulation snap-down collar, shoulder epaulets, and roomy snap-close pockets. You'll also receive a certificate of authenticity stating that yours is a U.S. Air Force A-2. Battle-proven and built for long life, the Cooper A-2 actually gets better-looking with age.

MADE IN U.S.A.

Save $50 Off Regular Price.
Payable in Convenient Monthly Installments.

The Cooper A-2 Leather Flying Jacket—normally $249*—can be yours for just $199,* payable in five convenient monthly installments of $41.30 charged to your credit card. Your satisfaction is guaranteed. If you are not completely delighted with your jacket, simply return it in original condition within 30 days for exchange or refund. Take advantage of this unprecedented end-of-season sale. Order today. Available in even sizes 34-52 regular and long. Call about larger sizes (to 60) available for $50 more. (For best fit, order one size larger than your normal jacket size.) Have questions about sizing? Call us—we'll fit you over the phone. Normal delivery on phone orders 4-8 business days.

The actual jacket supplied to the United States Air Force

CALL TOLL-FREE: 1-800-331-1858 EXT. 636-162

*Plus $7.50 shipping/handling.

Willabee & Ward
47 Richards Avenue
Norwalk, CT 06857

Satisfaction Guaranteed

CALL TOLL-FREE: 1-800-331-1858 EXT. 636-162

Please send me _____ Cooper A-2 Genuine Leather Flying Jacket(s).

Size (Even sizes 34-52): _____ ☐ Regular ☐ Long

Charge each of 5 installments of $41.30** to my credit card.
☐ MasterCard ☐ VISA ☐ Discover ☐ Amer. Express

Credit Card # _____ Exp. Date _____

Name _____
(PLEASE PRINT CLEARLY)

Address _____

City/State/Zip _____

Signature _____
(All orders subject to acceptance.)

☐ I prefer not to use a credit card and will pay by check. Enclosed is my check for $199 plus $7.50 shipping/handling, a total of $206.50.**

**Applicable sales tax, if any, will be billed with shipment.

AUDIOCLINIC

JOSEPH GIOVANELLI

Receiving Distant, AM Broadcast Signals

Q. As a youngster I remember listening to the family Zenith console radio and picking up favorite programs. On occasion my father would do a "station search," trying to receive distant stations. It was not uncommon to pick up many states without the use of an outside antenna.

Do the new, digital equipment or any of the new AM radios have the capability of clearly receiving faraway AM stations and at what distances?—Juan K. Ferry, Weymouth, Mass.

A. Most AM radios or tuners have the capability of receiving distant broadcast signals. In many respects they are better equipped to do so than older sets were.

The range over which such stations can be heard is not determined by the sensitivity of the radio. Rather, it is limited by background noise—natural or man-made. I can listen to Cuba almost nightly, on a frequency of 830 kHz. Cuba is more than 1,000 miles from my home. I have heard many stations at even greater distances.

Listeners to distant AM broadcast signals had an advantage years ago. There were fewer stations to receive. This means that fewer stations shared any given frequency. Today the AM broadcast band is so packed with stations that it becomes almost impossible to separate one from another without using a very directional antenna.

Co-channel interference is just one part of the problem. If a tuner is to have any measure of high-fidelity sound, it must have wide bandwidth. This means that its ability to reject adjacent channels is poor. Some tuners provide narrow bandwidths as an alternative, and this does help. But many stations transmit audio frequencies above 10 kHz, so even a receiver capable of good adjacent-channel rejection can't completely eliminate interference. A 10-kHz audio signal from an undesired adjacent channel will produce a sideband that will fall exactly on the channel to which you are tuned. These sidebands will be heard as a kind of "chatter" along with the desired program. If the desired program is weak in signal strength and the adjacent channel is strong, the strength of the sidebands will override the desired signal. Sometimes single-sideband techniques help, but that form of signal reception is only found on shortwave receivers, not on AM broadcast tuners.

Input/Output Loops

Q. In audio, what is meant by a "loop"?—Eric Wong, New York, N.Y.

A. You probably know how to connect a tape recorder into your audio system so that you can monitor its output as well as that of the source being recorded. What is happening is that, somewhere in the signal chain, a link of that chain is broken, and a new link—the tape recorder—is added. This method of interrupting the flow of a signal in order to insert an additional device is known as a "loop." Such external processor loops can be used for other devices than tape recorders. For example, we often insert an equalizer in such a loop so that all program sources can be affected by it.

Piezo Tweeters

I read with interest your reply to Mr. Roosevelt Anderson, Jr.'s inquiry about piezoelectric tweeters in the June 1989 issue. I find, though, that I take exception to some of your views.

It is true that certain small piezoelectric tweeters exhibit a lack of smoothness of frequency response—most notably the popular, round Super Horn, which does have a nasty peak at about 3 kHz or so. However, this is not the case with all such tweeters; some even have a surprisingly flat response.

This very same piezo Super Horn was used in the famous Dahlquist DQ-10 speaker system to cover the very highest frequency range, from 12.5 kHz and up. That avoided the 3-kHz peak. This loudspeaker system is one of the most transparent I've ever heard, certainly surpassing anything in its price bracket. The piezo tweeter is a key ingredient in this speaker's lightning-fast transient response.—Alan B. Chambers, South Bound Brook, N.J.

Hum from Exciter Lamps

Q. I need to use a 12 V storage-battery charger to supply power to an exciter lamp on a 35-mm movie projector. Five amperes at 10 V are required by the lamp.

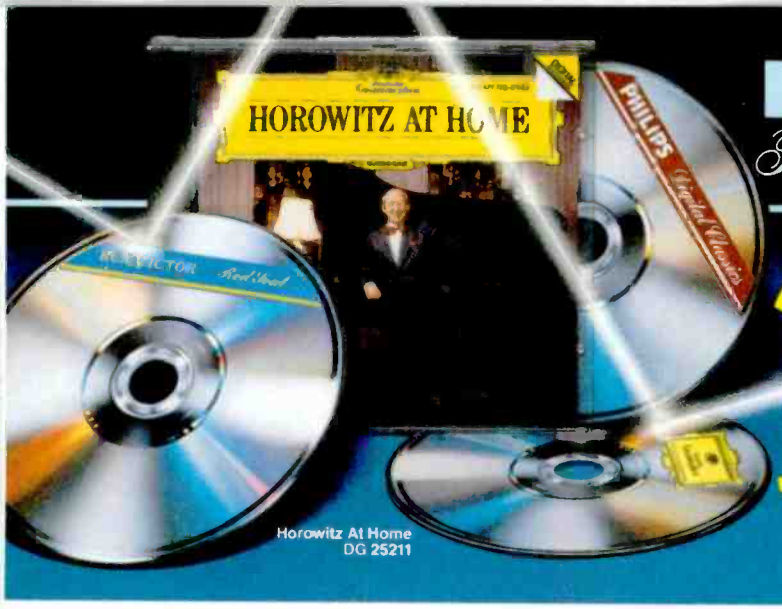
I tried this charger and got a very bad hum; it used a half-wave rectifier. I replaced the rectifier with a full-wave bridge rectifier and plenty of capacitor filtering. The hum was reduced but not sufficiently. I added more capacitors (in the thousands of microfarads), but still no good. What's wrong? —Charles Schmitz, Canal-Winchester, Ohio

A. I have never worked with a 35-mm projector and was surprised to learn how much current is required to light up the exciter lamp. I have some experience with 16-mm projectors; the filaments in their exciter lamps run on about 4 V and much less current. As in your case, these filaments respond almost immediately when voltage changes are applied to them. In other words, the brilliance of the light is modulated by the a.c. ripple component of any poorly filtered power supply. Rather than using brute-force filtering in my projectors, I obtained exciter power from the output of an r.f. oscillator. The a.c. variations of such an oscillator are much too fast for the filament to respond. Even if the filament could act, the frequency would be too high for us to hear.

It is possible to build an r.f. oscillator which is capable of the 50 watts you require. A couple of TV horizontal-output tubes would do it, but you stand more than a good chance of causing r.f. interference to some services. I suggest, therefore, that you continue on your present course. Try adding a 1-ohm resistor in series with the output of the charger and the filters. Of course, the lamp would be connected across the filters, as you now have it connected. The resistor can lower the overall voltage to the required 10 V and can reduce the hum by turning the capacitive filtering into an RC filter.

If the hum is still present, use a regulated supply; a regulator chip driving a couple of 2N3055 transistors in parallel should be fine. You may need somewhat more voltage than can be supplied by the charger, however. National Semiconductor and other firms offer application notes on such regulator chips, and I suggest you check them for complete circuit details.

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



Horowitz At Home
DG 25211

DEUTSCHE GRAMMOPHON • RCA • PHILIPS •
ARCHIV • L'OISEAU-LYRE • ANGEL • NEWPORT CLASSIC

The International Preview Society

3 COMPACT DISCS OR CASSETTES FOR JUST $1

plus shipping and handling with Club membership

With No Obligation To Buy Anything ... *Ever!*

Mozart, Lodron Serenades • Camerata Bern. Novalis 63642

Ravel, Piano Concertos • Argerich & Béroff, pianists.Abbado cond.. DG 15462

Pops In Love • The Boston Pops/Williams. Pachelbel, Canon; more. Philips 25230

Levine: Mozart, Symphonies Nos. 30, 31 ("Paris") & 32 • Vienna Phil. DG 25341

Davis: Mahler, Sym. No. 1 ("The Titan") Bayerischen Rundfunks . Novalis 73745

Empire Brass: A Bach Festival • Douglas Major, organ. Angel 64211

Salerno-Sonnenberg: Mendelssohn, Violin Concerto; more • Angel 34670

Dvorak, Symphony No. 8; more Cleveland Orch./Dohnányi. London 15042

Vivaldi, Concerti • Camerata Bern. "They play with life." - Gramophone Novalis 83628

Sitkovetsky: Mozart, Violin Concertos 4 & 5 • English Chamber Orch. Novalis 63681

Musicians For Armenia • Previn, Galway, others. The gala benefit. RCA 00928

Perlman: Brahms, Violin Concerto • A Grammy Winner! Angel 63343

Victor Vocal Series: Kirsten Flagstad • Legendary Wagner. RCA 63483

J.R. Baker: Orff, Carmina Burana • A synthesized spectacular. Newport 64605

Copland, Billy The Kid; Rodeo • St. Louis/Slatkin. Angel 41491

Ravel, Mother Goose • Montreal Symphony/Dutoit. London 25197

Edelmann: Mendelssohn, Piano Concertos; more • RCA 63909

Galway: Flute Sonatas • By Dvorak, Feld & Martinu • RCA 00536

Teresa Stratas Sings Kurt Weill • With NY Chamber Sym. Nonesuch 24748

Davis: Mozart, Posthorn Serenade; more Bavarian Radio Sym. Novalis 53793

Bylsma: Bach, The Violoncello Piccolo Extraordinary virtuosity! DHM 63749

Dutoit: Bartok, Concerto For Orchestra; Music For Strings, Percussion & Celesta Montreal Symphony. London 25303

Evelyn Glennie: Rhythm Song Percussion fireworks on Flight Of The Bumblebee, more. RCA 24723

Fritz Reiner: Beethoven, Symphonies Nos. 1 & 6 ("Pastorale") • Chicago Symphony. RCA 60405

Simon Rattle: Stravinsky, The Firebird; more • City of Birmingham Symphony Angel 93834

Camerata Bern: Romantic Serenades • By Elgar, others.Novalis 73699

Levine: Mozart, Symphonies Nos. 29 & 34 Vienna Philharmonic. DG 15337

Perlman: French Violin Showpieces • New York Phil./Mehta. DG 15457

Le Mystère des Voix Bulgares, Vol. 2 • A Grammy Award Winner! Nonesuch 54525

Barry Douglas: Mussorgsky, Pictures At An Exhibition • Plus more by Liszt & Wagner. RCA 73726

Heifetz: The Decca Masters, Vol. 1 Humoreske, Clair de lune, Golliwog's Cakewalk, more. MCA 00604

Roger Norrington: Beethoven, Sym. Nos. 4 & 5 • London Classical Players. Angel 60685

Sound The Trumpet! • English Ceremonial Music by Purcell, etc. Newport 00990

Horowitz: Tchaikovsky, Piano Concerto No. 1; Beethoven, "Emperor" Concerto Toscanini & Reiner conduct. RCA 33890

Respighi, Pines Of Rome; Fountains Of Rome; Roman Festivals • Philadelphia Orchestra/Muti. Angel 34443

Classic Marches • St. Louis Sym./Slatkin. Triumphal March, Turkish March, Radetzky March, more. RCA 00996

Galway: The Pachelbel Canon • Plus Jamaican Rhumba, etc. RCA 34542

James Galway: The Enchanted Forest RCA 44533

Michael Feinstein: Pure Gershwin • S' Wonderful, Embraceable You, many more. Elektra 54173

Colin Davis: Mozart, Haffner Serenade; Symphony No. 32 • Bayerischen Rundfunks Orchester. Novalis 83748

Ute Lemper Sings Kurt Weill • Mack The Knife, etc. London 15163

Salerno-Sonnenberg: Franck & Brahms, Violin Sonatas • With Cecile Licad. Angel 34674

Segovia Plays Rodrigo, Ponce & Torroba • MCA 63579

Mario Lanza: The Great Caruso • From the classic 1951 film. RCA 80259

Dvorak, Serenade In E; Septet in A • Camerata Bern. Novalis 63639

Newman: Franck, Organ Works, Vol. 1 Pièce Heroïque, etc. Newport 10590

Leontyne Price Sings Strauss • From Der Rosenkavalier, more. RCA 83984

Fete a la Francaise • Sorcerer's Apprentice, 2 Gymnopedies, more. Montreal Symphony Orch./Dutoit. London 25235

Pinnock: Haydn, Syms. 6-8 ("Morning", "Noon" & "Night") • The English Concert. Archiv 15025

Sarafina! The Music Of Liberation • With the Original Broadway Cast. RCA 00814

Porgy & Bess (Highlights) • Leontyne Price & William Warfield. Summertime, many more. RCA 00994

The Performing Piano, Vol. 1 • "Live" performances by Paderewski, Lhévinne, more. Newport 14708

Vaughan Williams, Sinfonia Antarctica; etc. • LPO/Boult. London 05589

Anthony Newman: Scarlatti Sonatas Newport 64168

Out Of This World • John Williams & The Boston Pops. Star Trek, Twilight Zone, more. Philips 15227

Music of Bali • Gamelan & Kecak. Ritual songs, more. Nonesuch 44671

Shostakovich, Symphony No. 5 • Berlin Philharmonic/Bychkov. "Best Of The Month" - Stereo Review Philips 15454

Canadian Brass: More Greatest Hits Barber Adagio, Golliwog's Cakewalk, much more. RCA 64348

Douglas: Brahms, Piano Conc. No. 1 London Symphony Orch./Skrowaczewski. RCA 00732

John Williams & The Boston Pops: Digital Jukebox • The Pink Panther, more. Philips 25059

Krystian Zimermann: Chopin, Ballades; Barcarolle; more • "Breathtaking." - Ovation DG 15332

Mozart, Oboe Concertos •Thomas Indermühle, oboe. Novalis 53734

Lisztronique • Synthesizer wizard, J.R. Baker in Piano Concerti No. 1; Totentanz; Un Sospiri, more. Newport 34622

50% OFF BONUS PLAN

Unlike other clubs, you get bonus certificates good for 50%-off Bonus Savings with every album you buy at regular prices, effective with *your first* full-price purchase!

COMPLETE AND MAIL THIS CARD TODAY!

The International Preview Society

☐ **YES!** Please accept my membership in The International Preview Society and send me, for 10 days' FREE examination, the 3 selections I have indicated below, under the terms of this offer. I may return them after 10 days and owe nothing, or keep them and pay only $1 (shipping and handling added to each shipment). I understand that I'm not obligated to buy anything...*ever!*

Please send selections on: ☐ **Compact Disc**** ☐ **Cassette**

Write Selection Numbers Here: _____ _____ _____

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

Address _____ Apt. _____

City _____ State _____ Zip _____

Telephone (Area Code) _____

Signature _____

** Members who choose CDs will be serviced by the BMG Compact Disc Club and will receive *CD Discovery* 19 times a year (about every 3 weeks). Full membership details will follow with the same 10-Day, no-obligation, no-minimum purchase privilege. Current BMG CD Club members not eligible for this offer.

Limited to new members; continental U.S.A. only; one membership per family. We reserve the right to request additional information or reject any application. Local taxes, if any, will be added.

TXF (BF) ADTXF (PJ)

IPS/6550 E. 30th St./Indianapolis, IN 46219
Trademarks Used In This Adv't Are The Property Of Various Trademark Owners.
IPS 550

DEUTSCHE GRAMMOPHON • RCA • PHILIPS • ARCHIV • L'OISEAU-LYRE • ANGEL • NEWPORT CLASSIC

The International Preview Society

3 COMPACT DISCS OR CASSETTES FOR JUST $1

plus shipping and handling with Club membership

With No Obligation To Buy Anything ... *Ever!*

Dutoit: Stravinsky, Petrouchka (1911 Version) • Montreal Sym. London 15331

McGlinn: Gershwin, Overtures • New Princess Theatre Orch. Oh, Kay!, more. Original orchestrations. Angel 70391

Tafelmusik: Corelli, Concerti Grossi Op. 6 • "Best of 1989." - NY Times DHM 73751

1812 Overture • Plus The Moldau, Les Préludes, more. Berlin Sym. RCA 54447

Reich, Sextet; 6 Marimbas Steve Reich & Musicians, others. Nonesuch 00520

Victor Vocal Series: Lauritz Melchior • Arias & duets with Flagstad, others. RCA 43508

J.R. Baker: Everybody's Favorite Synthesizer Pieces • Für Elise, Ave Maria, more. Newport Classic 44611

Van Cliburn: Liszt & Grieg, Piano Concertos • Philadelphia Orch./Ormandy. RCA 00606

Solti: Dvorak, Symphony No. 9 ("New World") • Chicago Symphony Orchestra. London 15168

Pavarotti At Carnegie Hall • Scarlatti, Schubert, Verdi, Donizetti,others. London 15311

Anything Goes • Lincoln Center Cast. Title song, It's De-lovely, more. RCA 43950

Hunting Music • Parforcehorn Corps Norderstedt.Tally-ho! Novalis 63850

Horowitz: Encores • By Schumann, Mozart, Rachmaninoff, Chopin, Liszt, Debussy, others. RCA 43685

On The Boardwalk • Paragon Ragtime Orchestra. Chatterbox Rag, more. Newport Classic 24699

Kronos Quartet: White Man Sleeps • Ives, Bartok, others. Nonesuch 40256

Ashkenazy: Rachmaninov, Piano Concerto No. 3 • Concertgebouw Orchestra/Haitink. London 25157

Irish Fork Songs Robert Shaw Chorale, Wearin' Of The Green, more. RCA 13908

Claudio Arrau: Beethoven Sonatas Nos. 3 & 8 Philips 15355

Norrington: Beethoven: Symphony No. 7 London Classical Players Angel 10622

Julian Bream: Two Loves • With Dame Peggy Ashcroft. Shakespeare & Dowland - A sequence of poetry & music. RCA 54507

Van Cliburn: Brahms, Piano Concerto No. 1 • Boston Sym./Leinsdorf RCA 70032

James Galway: Greatest Hits • Memory, Angel Of Music, more. RCA 73233

Ton Koopman: Bach, Organ Works Vol. 1 Toccata & Fugue, more. Novalis 01137

Fauré, Requiem; more • Te Kanawa, Milnes. Montreal Sym./Dutoit. London 15321

José Carreras Sings "Memory" Plus"Tonight," "Be My Love," "O Sole Mio," "Granada," many more. Philips 25206

Sitkovetsky: Mozart, Violin Concertos Nos. 1 -3 • ECO. Novalis 51430

Cliburn: Beethoven, Sonatas • Moonlight, Pathetique, more. RCA 40049

The Academy By Request • Academy of St. Martin/Marriner. Sheep May Safely Graze, more. Angel 54094

Horowitz Plays Rachmaninoff • Sonata No. 2, Concerto No. 3 (w/Fritz Reiner), more. RCA 53795

Galway & The Chieftains: In Ireland Danny Boy, Down By The Sally Gardens, Avondale, many more. RCA 24344

Helfetz: The Decca Masters, Vol. 2 Summertime, Lullaby (w/Bing Crosby), more. MCA 00605

Stravinsky, The Rite Of Spring; etc. • City of Birmingham Sym./Rattle. Angel 63864

Segovia Plays Bach • 3 Pieces For Lute, Siciliano, more. MCA 63600

James Galway Plays Beethoven • 2 Serenades, Flute Sonata. RCA 34545

Fiedler: Motion Picture Classics, Vol. 1 From Ben-Hur, Laura, Cleopatra, more. In Dolby Surround Sound! RCA 01057

Koopman: Bach, Organ Works Vol. 2 Prelude & Fugue in C Minor, etc.. Novalis 54634

Ravel, Bolero; La Valse; more • Montreal Symphony/Dutoit. London 15199

Galway & The Chieftains: Celtic Wedding Music of Brittany. RCA 53655

Claudio Arrau: Beethoven, Piano Sonatas Nos. 21 (Waldstein) & 30 • Plus Andante favori. Philips 15366

Stoltzman: Copland & Corigliano Clarinet Concertos • LSO/Smith. RCA 00672

HALF-PRICE BONUS PLAN

SAVE 50%

Unlike other clubs, you get bonus certificates good for 50%-off Bonus Savings with every album you buy at regular prices, effective with *your first* full-price purchase!

IPS 550

This remarkable $1 offer is being made to introduce you to an outstanding classical music membership—with never any obligation to buy.

You'll find hundreds of outstanding albums in each issue of the Society's magazine which will be sent to you approximately every 4 weeks. That gives you 13 convenient, shop-at-home opportunities a year, but there is no obligation to accept any offering at any time.

You choose only the music you want!

If you'd like to accept the Featured Selection, you need not do a thing. It will be sent automatically. If you'd prefer an alternate selection or none at all, just mail back the Notification Card by the specified date. You'll always have at least 10 days to decide. But if you don't, you may return your Featured Selection at our expense. You may cancel your membership whenever you wish, simply by writing to us. Or, remain a member and take advantage of future money-saving bargains.

3 Compact Discs or Cassettes for just $1!

Begin your membership now by choosing any 3 albums shown here for just $1, plus shipping and handling. Send no money now. We want you to judge for yourself before you decide to buy. If not delighted, return your 3 albums at the end of 10 days without obligation. (Shipping and handling added to each shipment.)

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 5071 INDIANAPOLIS, IN

POSTAGE WILL BE PAID BY ADDRESSEE

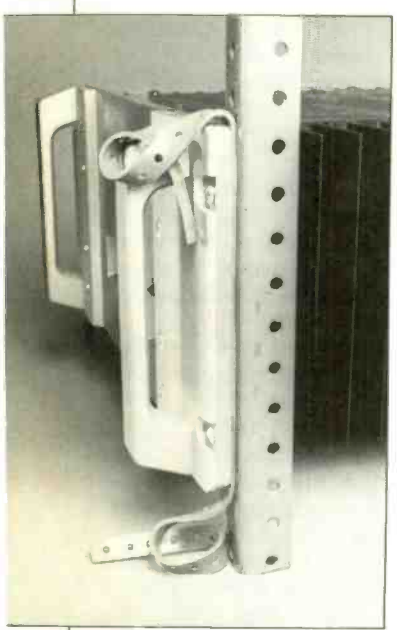
The International Preview Society

P.O. BOX 91406

INDIANAPOLIS IN 46209-9755

DSS CD and Tape Drawers

Digital Storage Systems' stackable drawers for CDs and for DATs or cassettes are available in clear, smoke, or three fluorescent colors (blue, green, and pink), in single- or multiple-drawer units. In clear plastic, cabinets holding 22 CDs per drawer are priced from $24.95 for a single-drawer model to $58.95 for a three-drawer unit, while cabinets holding 14 DATs or conventional cassettes cost $19.95 with one drawer to $43.95 with three drawers. Other colors are priced slightly higher. (These drawers can be ordered by calling the orderline at DSS: 800-323-6545.)
For literature, circle No. 100



Sorbotech Damping Strip

Designed to isolate rack-mounted electronic equipment from racks, Sorbotech damping strips (patent pending) are 2-foot lengths of visco-elastic black Sorbothane, with holes at standard EIA rack spacings. Placed between the equipment's rack-mounting ears and the rack rail, the strips reduce vibration transmission; if nonconductive screws are used, they reduce static charges and r.f. conductance and eliminate one source of ground loops. A 2-foot strap of copper braid with eyelets is provided with each Sorbotech strip, for grounding to a suitable bus.
For literature, circle No. 101

D.W. Electrochemicals Contact Enhancer

When applied to electronic contacts, Stabilant 22 liquid polymer forms a thin film which becomes conductive under the action of an electric field gradient and remains nonconductive otherwise. According to its manufacturer, this allows it to enhance conductivity within a contact for five years or more, without creating leakage between contacts. It is available both as a concentrate and, as Stabilant 22A, diluted in isopropinol. Prices: Stabilant 22A, $36 for 15 ml with applicators, $76 for 50 ml; Stabilant 22, $102 for 15 ml, $310 for 50 ml.
For literature, circle No. 102

Shure Microphone

Unusually versatile, the VP88 can be used as a single-point stereo condensor microphone, an M-S mike, a monophonic cardioid, or a mono figure-8. The microphone operates on either phantom power from an external source or a built-in 6-V battery. Supplied accessories include a foam windscreen, stand adapter, battery, and storage bag, plus a 30-inch cable. Price: $995.
For literature, circle No. 103

Coda Preamp

All voltage gain in the Model 01 is accomplished by FET devices, to minimize source and cable interactions and produce a tube-like sound. For noise rejection, differential voltage gain is used throughout, and balanced outputs are provided. An internal switch sets polarity of the balanced outputs to match U.S. or European standards. The phono input section has switchable gain and loading for use with all cartridges; an optional board bypasses this stage to supply a sixth line-level input. There are also two buffered recording loops and an independent recording-source selector. Price: $2,500.
For literature, circle No. 104

NOT FOR ENGINEARS ONLY

Music, Sound, & Technology by John M. Eargle. Van Nostrand Reinhold, hardcover, 290 pp., $42.95.

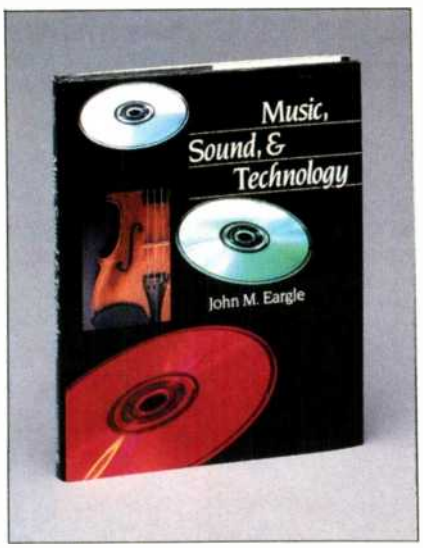
When reading this book, it is clear that the author has a vast knowledge of music, musical instruments, and the recording of acoustic music of all kinds. It is difficult to condense broad knowledge of many topics into a relatively small book that is of value to a broad spectrum of readers. In this case, the author has done an admirable job.

The first two chapters deal with topics of physical and psychological acoustics. The total of about 50 pages in these chapters allows for only very brief explanations of simple wave generation and propagation, and of the way the ear hears and interprets the physical phenomenon of sound. But with very compact writing and short, clear delineation of the facts, the author makes clear the most important issues. These chapters are a most suitable introduction to the main topics in this book.

Next is a good chapter on scales, temperament, and tuning as these topics relate to written music and, especially, acoustic instruments. These important topics are covered concisely. The figures used are not very elegant but are clear enough to make their point.

The real substance of the book starts in Chapter 4 with a discussion of the physical means used to produce sound in acoustical instruments. The main classes of instruments—chordophones, aerophones of three classes, membranophones, and idiophones—are discussed. If you do not know acoustical instruments by these classes, this chapter will be of special interest since it does a very nice job of summarizing these matters. At the end of this chapter are references to the literature; I was pleased to see many books listed that I know well, and I am now making a point of locating several others. In fact, each chapter has a large and excellent list of important references that will give the reader more in-depth information on the topics that are discussed.

The heart of the book is contained, in my opinion, in Chapters 5 through 9. These deal with various instrument groups and their characteristics. The basics of how the instrument produces its sound are discussed. But of more importance, the structure of the sound produced—the timbre, the scale, the spectral distribution, and the spatial radiation patterns of the sound—is described. Knowledge of these issues is important to both the performer and the recording engineer. It is difficult to cover these topics for every instrument in a relatively short space, but the essence of each instrument group is covered here. Issues such as the spatial



distribution of sound from various instruments are particularly important for the recording engineer to understand. The reader, with these basics in hand, can then go to several references to get more detail regarding a particular instrument.

Even though I am familiar with most of the field covered, I found each chapter in this part of the book to yield a bit of new information or to clarify and put into perspective some facts that I already knew. After reading these chapters, I felt the time spent was definitely worthwhile. That, in my opinion, is the main value of any book.

Chapters are devoted to stringed instruments, including the bowed-string family of all sizes and the plucked-string instruments like the guitar and harp. Of particular interest are the acoustic characteristics and the polar radiation patterns shown. Some of the figures are not as elaborate as they might be, and some are not proportioned to each other carefully, but this minor problem is more a matter of book production than flawed writing.

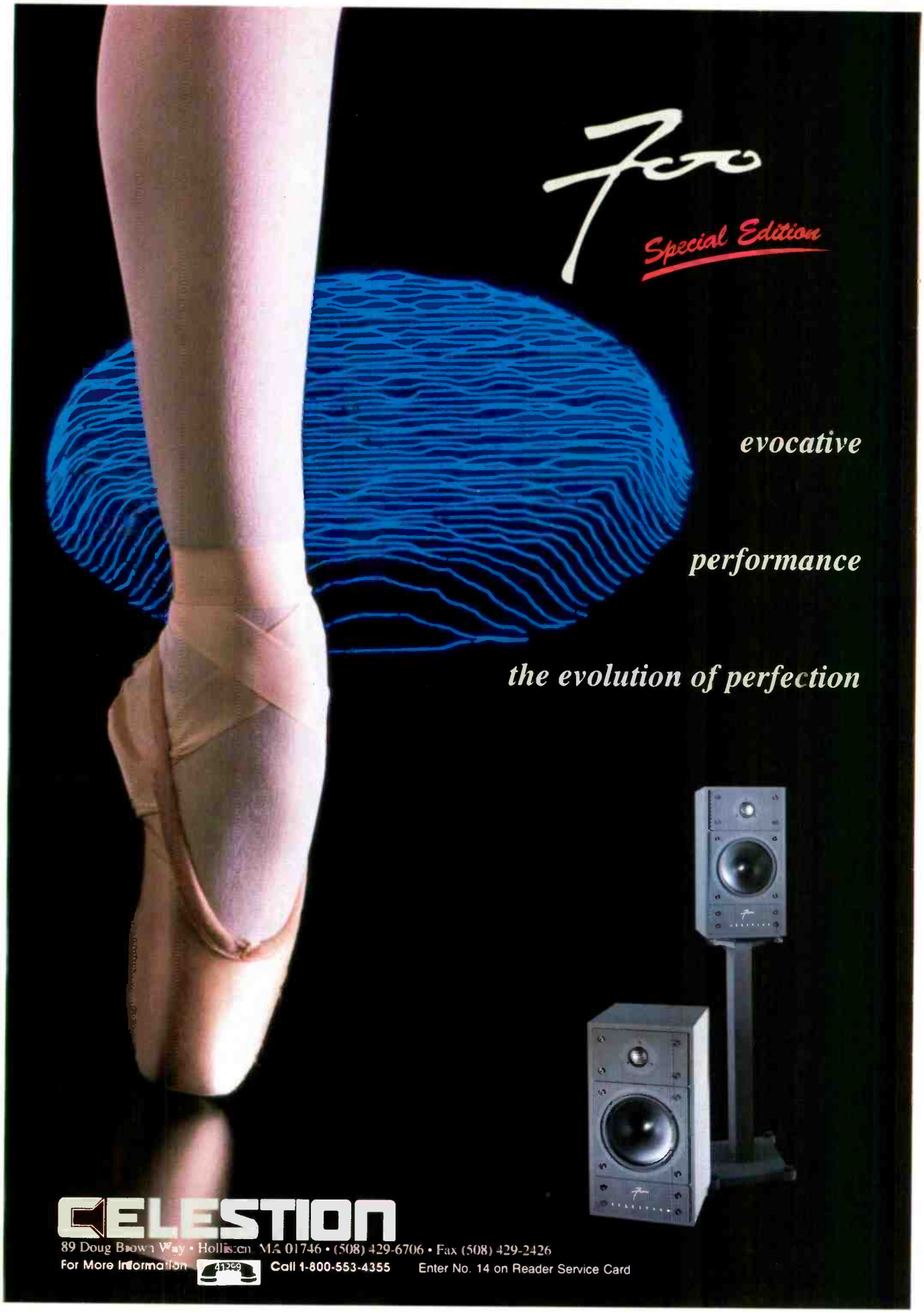
The chapter on woodwind instruments is particularly thorough, covering both the flute-like instruments and the reed instruments in some detail. Again, the acoustics data presented is very informative. The brass instruments are also covered in some detail in the following chapter. The summary of physical horn lengths and bore shapes, as well as the playing modes used to sound these instruments, is very welcome. Of special value is the data given on the frequency and dynamic ranges of the several instruments in this group.

The percussion group is so extensive that it could not be covered in every aspect. Still, the main drum-like instruments are discussed, as are the mallet-struck instruments. This chapter is a bit brief on acoustic characteristics. I would have liked to see more on directivity patterns and, especially, dynamic ranges. The data given indicates rather impressive dynamic range possibilities.

The chapter on keyboard instruments is too brief to satisfy my interests, but I have to admit to being a keyboard-o-phile. (I probably know too much about pianos and organs as it is.) I would have liked to see a bit more information on sound patterns and recording methods for the piano; one example is given.

In an overview, these five chapters are useful to both musician and recording engineer. They show the broad understanding the author has from both sides of the music stand. The coverage of the totality of instruments is not entirely consistent and symmetrical from chapter to chapter, but this probably reflects the availability of data.

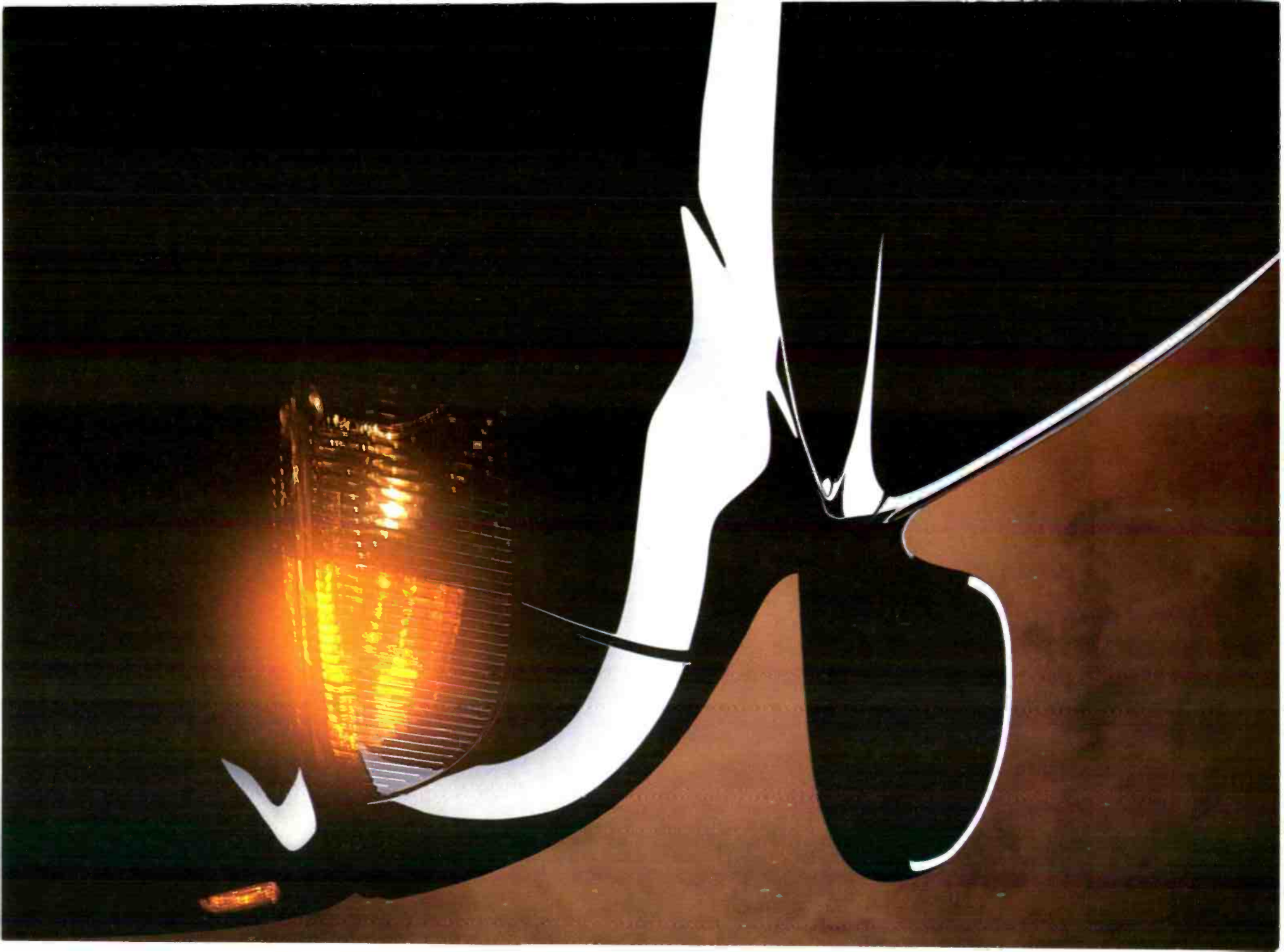
A chapter on musical ensembles includes everything from small chamber ensembles to orchestras and orchestras with choruses. I found this to be one of the most interesting chapters and one that is of utmost importance to the recording engineer. There is a good discussion of the placement of instruments and the way it affects the sound balance of the instrumental groups. This leads into the next chapter, which is about performance envi-


Ferro
Special Edition
evocative
performance
the evolution of perfection
CELESTION
89 Doug Brown Way • Holliston, MA 01746 • (508) 429-6706 • Fax (508) 429-2426
For More Information 41259 Call 1-800-553-4355 Enter No. 14 on Reader Service Card

You've been driving for about two decades. You've had your license renewed a number of times. Isn't it time you had your spirit renewed as well?

The New Lexus Coupe. Coming June 1.

Enter No. 22 on Reader Service Card



Music, Sound, and Technology's section on instruments and their characteristics show Eargle's understanding from both sides of the music stand.

ronments. These two topics together are not only vital to the performer who has to work with, hear, and complement the whole ensemble but also to the audience and the recording engineer who must capture the performance with some semblance of reality.

I had hoped that the chapters on musical ensembles and environments would be capped with a chapter on recording techniques. It is well known that John Eargle is one of the finest recording engineers around. (Some of his wonderful work is available on the Delos label.) I want to know more about this topic. This is a public plea for another book on putting it all together, John: *The Making of Great Recordings*.

The chapter on music and speech reinforcement has too many topics in it to allow for useful, detailed coverage of any one topic; instead, the coverage is uneven. Chapter 13 is a brief overview of various sound recording techniques, including microphone types and stereo sound pickup. I would have felt better about this chapter if it were fleshed out with the microphone material, including microphone placement, while omitting the sketchy description of magnetic recording.

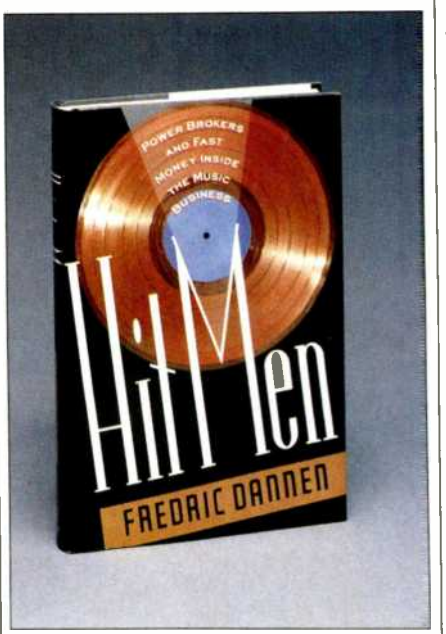
The chapter on high-fidelity sound in the home is only 11 pages long and exceptionally brief on each topic. The cassette gets a half page, the CD and loudspeakers, one apiece. But this is not the thrust of the book in any case. Similarly, the overview of music synthesis is very brief and could have been omitted (it is only seven pages).

I find this to be a very good book in those areas which are its main thrust. It is more than worth having for the first 250 pages alone, and the parts I am not thrilled about total only about 25 pages. That is not a bad ratio, and it is much better than most books. *Music, Sound, & Technology* is suitable for both musicians who want to know more about the concerns of the recording engineer and for recording engineers who want to understand more about the instruments and concerns of the musician. Almost all music lovers, who are generally neither performers nor recording specialists, will find much of interest in this well-written and easy-to-read book. I recommend it highly.

R. A. Greiner

Hit Men by Fredric Dannen. Random House, hardcover, 387 pp., $19.95.

Hit Men describes the impact independent promotion men have had on the record industry, especially in the '70s and '80s. It does so through the often interrelated stories of several key



record company executives. Among them are Columbia's Walter Yetnikoff (who has since left the company); Dick Asher of Columbia and later PolyGram, David Geffen and Irving Azoff, who both experienced meteoric rises as industry kingpins; flamboyant Clive Davis, who was forced out of Columbia and currently runs Arista; Neil Bogart of Casablanca, and Morris Levy of Roulette, who is currently in prison. Such prominent indie promo men as Joe Isgro and Fred DiSipio are also thoroughly profiled.

Since the book's publication, Isgro has gone to trial for a slew of charges relating to alleged payola. In a spectacular development at his highly publicized trial's opening day, the judge threw out all charges after a key witness recanted his grand jury testimony. That made this only the latest in a long series of judicial failures at payola prosecution. *Hit Men* throws a glaring fluorescent light on the history of this murky subject.

Dannen has done a spectacular homework job. He leaves the reader with an inescapable feeling that the record industry must be the slimiest, most double-faced business on earth. The book reads as quickly as a good crime novel, but none of the names have been changed, and the innocent receive and—according to Dannen—deserve scant protection.

His book charts the rise of the Network, a web of independent promo men, which at its height allegedly managed to extract millions of dollars annually by influencing airplay at radio stations across the country. Dannen not only charts their history, he examines the Network's methods and the factors which made its operation possible as well.

Anyone in the Music Biz will consider *Hit Men* required reading. As I write this, the book is a major topic of conversation when radio or record people get together, even if only to discuss who does or doesn't appear in the book. Outsiders will find it no less fascinating.

It is worth noting here that in my more than 20 years in FM rock radio, only once was I offered money to play a record. I was hanging out at Philadelphia's Sigma Sound Studios when David Bowie was recording his *Young Americans* album. One night, the band's chauffeur took me with him to lead him to some quality take-out burgers for the boys. While we were waiting for our order, he very clumsily offered me some money to play a bad Mick Ronson album that was current at the time. I wasted no time in turning him down. I thought he was just trying to impress his boss, but that was not the way to do it. The album stiffed anyway. But according to *Hit Men*, FM rock was never the payola hotbed that Top 40 was. *Michael Tearson*

Editor's Note: Michael Tearson has been Philadelphia's boss rock jock for 21 years at WMMR, 93.3 FM. His music reviews have appeared regularly in *Audio* since 1976. *—E.P.*

Grateful Dead Family Album by Jerilyn Lee Brandelius, edited by Alan Trist. Warner Books, 256 pp., paperback, $16.95.

Having celebrated their 25th anniversary, The Grateful Dead are an

YOU CAN HEAR THE DIFFERENCE!

"It's amazing", most people say, *"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.

AudioQuest has spent 12 years continually improving and fine tuning 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®

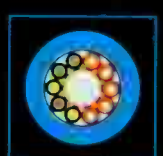
AudioQuest *Indigo Hyperlitz®* speaker cable uses geometry similar to our most expensive cables, yet is very affordable. The spiraled solid conductors maintain an absolutely consistent position and are far enough apart to prevent magnetic interaction. The clarity, dynamics and sense of acoustic space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

AudioQuest *Lapis Hyperlitz®* interconnect cable uses a patented construction which eliminates strand interaction and minimizes distortion caused by insulating materials. Teflon insulation, FPC-6™ copper (99.99997% pure), 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.

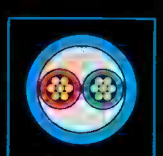
AudioQuest's absolute commitment to value doesn't mean that all AudioQuest products are inexpensive. It does mean that the expensive products are a very good value when used with better systems.

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 can hear the difference!

**All diagrams are 1½ times actual size.*



Indigo Hyperlitz®



Lapis Hyperlitz®

audioquest®

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

TAKE ANY 8 COMPACT

Bette Midler–Some People's Lives. *From A Distance; The Gift Of Love;* plus more. (Atlantic) **411-934**

Madonna–The Immaculate Collection (Greatest Hits). *Justify My Love; Rescue Me; Vogue;* many more. (Warner Bros./Sire) **414-557**

INXS–X. (Atlantic) **412-106**

Warrant–Cherry Pie. Title cut plus *Sure Feels Good To Me; I Saw Red; Bed Of Roses; Blind Faith;* etc. (Columbia) **411-389**

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

Frank Zappa—Apostrophe/Overnite Sensation (Rykodisc) 412-395

The Best Of Little Anthony & The Imperials (Rhino) 410-001

Hollies—Epic Anthology (Epic) 409-730

Tommy James & The Shondells—Anthology (Rhino) 405-746

Crosby, Stills, Nash And Young—Deja Vu (Atlantic) 404-202

The Band—To Kingdom Come... The Definitive Collection (Capitol) 388-181/398-180

Crosby, Stills, Nash and Young—So Far (Atlantic) 378-745

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

Roy Orbison—The All-Time Hits, Vols. 1 & 2 (Columbia Special Prod.) 377-945

The Who—Who's Better, Who's Best (MCA) 376-657

Harry Chapin—The Gold Medal Collection (Elektra) 375-824/395-822

Steppenwolf—16 Greatest Hits (MCA) 372-425

Marvin Gaye—Greatest Hits (Motown) 367-565

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

Jimi Hendrix—Are You Experienced? (Reprise) 353-102

Yes—Fragile (Atlantic) 351-957

Rolling Stones—Sticky Fingers (Rolling Stones Rec.) 350-645

Van Morrison—Moondance (Warner Bros.) 349-803

Jethro Tull—Aqualung (Chrysalis) 345-157

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

A Decade Of Steely Dan (MCA) 341-073

Elton John—Greatest Hits (MCA) 319-541

Stevie Wonder—Orig. Musiquarium I Greatest Hits (Tamla) 314-997/394-999

Creedence Clearwater Revival—20 Greatest Hits (Fantasy) 308-049

Original Soundtrack—The Civil War (Elektra/Nonesuch) 415-828

Indigo Girls—Nomads Indians Saints (Epic) 411-355

Led Zeppelin—Houses Of The Holy (Atlantic) 293-597

Woodstock—Orig. Soundtrack (Atlantic) 291-864/391-862

Eagles—Greatest Hits 1971-75 (Asylum) 287-003

Fleetwood Mac—Rumours (Warner Bros.) 286-914

Boston (Epic) 269-209

Simon & Garfunkel—Greatest Hits (Columbia) 219-477

Santana—Spirits Dancing In The Flesh (Columbia) 408-773

Roger McGuinn—Back From Rio (Arista) 416-149

Various Artists—The "Amadeus" Mozart Music Featured In The Award-Winning Film (CBS) 416-123

Molly Hatchet—Greatest Hits (Epic) 416-099

Dr. John—In A Sentimental Mood (Warner Bros.) 384-040

Celine Dion—Unison (Epic) 415-430

Devo—Greatest Hits (Warner Bros.) 415-455

Vivaldi—The Four Seasons, English Chamber Orch. Nigel Kennedy (Angel) 414-672

Big Daddy Kane—Taste Of Chocolate (Cold Chillin') 414-284

The Alarm—Standards (I.R.S.) 414-201

Al B. Sure—Private Times ...And The Whole 9! (Warner Bros.) 414-144

Schubert: Symphonies No. 5 & 8 (Unfinished). Norrington, London Classical Players (Angel) 414-102

Placido Domingo—Roman Heroes. National Phil. Orch., Eugene Kohn, cond. (Angel) 413-849

Christopher Parkening/ David Brandon—Virtuoso Duets (Angel) 413-823

Mussorgsky: Pictures At An Exhibition; **Stravinsky:** The Firebird, Carlo Maria Giulini, Conducting. (Sony Classical) 413-625

Soho—Goddess (Atco) 414-664

10,000 Maniacs—Hope Chest (Elektra) 413-500

Slaughter—Stick It Live (Chrysalis) 413-302

Lalah Hathaway (Virgin) 413-195

Various Artists—Masterworks Dinner Classics Dinner For Two (CBS Masterworks) 413-096

Deee-Lite—World Clique (Elektra) 412-742

The Replacements—All Shook Down (Sire/Reprise) 412-668

Bell Biv Devoe—Poison (MCA) 406-819

Neil Young And Crazy Horse—Ragged Glory (Reprise) 412-528

The Best Of The Stray Cats—Rock This Town (EMI) 412-239

Pet Shop Boys—Behavior (EMI) 412-221

Gerald Alston—Open Invitation (Motown) 412-023

Technotronic—Trip On This - The Remixes (SBK) 411-967

Reba McEntire—Rumor Has It (MCA) 411-538

Asia—Then & Now (Geffen) 411-231

Bob Dylan—Under The Red Sky (Columbia) 411-199

L.L. Cool J—Mama Said Knock You Out (Columbia) 411-165

Surface—3 Deep (Columbia) 411-124

Judas Priest—Painkiller (Columbia) 411-116

Dan Fogelberg—The Wild Places (Epic) 411-074

Debbie Gibson—Anything Is Possible (Atlantic) 414-078

Bob Geldof—The Vegetarians of Love (Atlantic) 410-431

Grateful Dead—Without A Net (Arista) 410-365/390-369

Living Colour—Time's Up (Epic) 410-357

Vixen—Rev It Up (EMI) 410-316

Trixter (Mechanic) 410-266

Iggy Pop—Brick By Brick (Virgin) 409-854

Alias (EMI America) 409-789

Concrete Blonde—Bloodletting (I.R.S.) 409-706

Bonnie Raitt Collection (Warner Bros.) 409-466

Brahms: The 3 Violin Sonatas—Itzhak Perlman and Daniel Barenboim (Sony Classical) 409-367

Squeeze—A Round And A Bout (I.R.S.) 409-078

Anita Baker—Compositions (Elektra) 408-989

Poison—Flesh & Blood (Capitol) 408-963

Was (Not Was)—Are You OK? (Chrysalis) 408-864

Joe Cocker—Live! (Capitol) 408-799

Fine Young Cannibals—The Raw & The Remix (I.R.S./MCA) 413-948

The Allman Brothers Band—Seven Turns (Epic) 407-692

Jeff Healy Band—Hell To Pay (Arista) 407-569

Morrissey—Bona Drag (Reprise/Sire) 407-122

Michael McDonald—Take It To Heart (Reprise) 407-106

Jane's Addiction—Ritual De Lo Habitual (Warner Bros.) 407-098

Johnny Gill (Motown) 406-991

Bad Company—Holy Water (ATCO) 406-694

Crosby, Stills And Nash—Live It Up (Atlantic) 406-686

Winger—In The Heart Of The Young (Atlantic) 406-678

Greenpeace: Rainbow Warriors (Geffen) 406-603/396-606

Paula Abdul—Shut Up And Dance (The Dance Mixes) (Virgin) 406-264

Bangles—Greatest Hits (Columbia) 405-977

Depeche Mode—Violator (Sire/Reprise) 405-423

Pretty Woman—Original Soundtrack (EMI) 405-407

Traveling Wilburys–Vol. III. *She's My Baby; Where Were You Last Night?;* etc. (Warner Bros.) **413-872**

David Bowie–Changes-Bowie (Greatest Hits). *Fame '90;* etc. (Rykodisc) **412-247**

Damn Yankees (Warner Bros.) 405-886

Cheap Trick—Busted (Epic) 408-344

Sonic Youth—GOO (DGC) 408-294

Daryl Hall & John Oates—Change Of Season (Arista) 408-245

Robert Plant—Manic Nirvana (Es Paranza) 405-019

Sinead O'Connor—I Do Not Want What I Haven't Got (Chrysalis) 405-001

Mariah Carey. *Vision Of Love; Love Takes Time; Someday;* plus many more. (Columbia) **407-510**

Vladimir Horowitz–The Last Recording. Featuring *Liszt;* etc. (Sony Classical) **405-985**

The Cure–Mixed Up. *Never Enough; LoveSong; Close To Me;* etc. (Elektra) **413-492**

Whitney Houston–I'm Your Baby Tonight. Title cut plus *My Name Is Not Susan;* etc. (Arista) **407-710**

The Connells—One Simple Word (TVT) 415-810

The Pogues—Hell's Ditch (Island) 415-661

Adam Ant—Antics In The Forbidden Zone (Greatest Hits) (Epic) 415-612

Ralph Tresvant—Ralph Tresvant (MCA) 415-547

Candyman—Ain't No Shame In My Game (Epic) 415-638

Freddie Jackson—Do Me Again (Capitol) 413-542

John Williams Conducts—The Star Wars Trilogy (Sony Classical) 414-730

Carly Simon—Have You Seen Me Lately? (Arista) 411-066

Bob Mould—Black Sheets Of Rain (Virgin) 410-464

Mark Whitfield—The Marksman (Warner Bros.) 414-490

En Vogue—Born To Sing (Atlantic) 408-112

Steve Vai—Passion And Warfare (Relativity) 408-104

Keith Sweat—I'll Give All My Love To You (Elektra) 407-791

Guy—... The Future (MCA) 413-963

Klri Te Kanawa—Italian Opera Arias (Angel) 416-032

Eddie Money—Greatest Hits Sound Of Money (Columbia) 403-428

Twin Peaks—Original Sound Track (Warner Bros.) 413-641

DISCS FOR 1¢ PLUS A CHANCE TO GET ONE MORE CD—FREE!

See details below.

Steve Winwood— Refugees Of The Heart (Virgin) 413·005

Midnight Oil—Blue Sky Mining (Columbia) 402·636

Lenny Kravitz—Let Love Rule (Virgin) 401·893

Duran Duran—Decade (Capitol) 401·869

Basia—London Warsaw New York (Epic) 401·752

Rush—Presto (Atlantic) 401·695

Pat Benatar—Best Shots (Chrysalis) 401·646

Kenny G—Live (Arista) 401·505

Chicago—Greatest Hits 1982-1989 (Reprise) 401·166

Robert Palmer— Addictions, Volume One (Island) 400·937

Belinda Carlisle— Runaway Horses (MCA) 400·788

Paul Simon—Negotiations And Love Songs 1971-1986 (Warner Bros.) 400·721

Eric Clapton— Journeyman (Reprise) 400·457

Linda Ronstadt—Cry Like A Rainstorm, Howl Like The Wind (Elektra) 389·874

Bob Dylan—Oh Mercy (Columbia) 389·262

Grateful Dead—Built To Last (Arista) 388·025

Aerosmith—Pump (Geffen) 388·009

Tracy Chapman— Crossroads (Elektra) 387·951

Mötley Crüe—Dr Feelgood (Elektra) 387·944

Billy Joel—Storm Front (Columbia) 387·902

Rolling Stones—Steel Wheels (Rolling Stones Rec.) 387·738

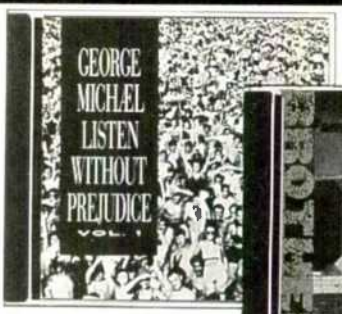
Faith No More—The Real Thing (Reprise/Slash) 387·399

Tina Turner—Foreign Affair (Capitol) 387·118

Billy Idol—Charmed Life (Chrysalis) 386·789

Don Henley—The End Of The Innocence (Geffen) 383·802

Edie Brickell & The New Bohemians—Ghost Of A Dog (Geffen) 412·999



George Michael–Listen Without Prejudice, Vol. I. *Praying For Time. Freedom,* etc. (Columbia) **411-181**

Vaughan Brothers –Family Style. *Tick Tock;* more. (Epic/Assoc.) **411-306**

Vanilla Ice–To The Extreme. *Ice Ice Baby. Stop That Train;* many more. (SBK) **413-203**

AC/DC–The Razor's Edge. Title cut plus *Thunderstruck,* etc. (ATCO) **410-662**

Jimi Hendrix—Radio One (Rykodisc) 412·379

The B-52's—Cosmic Thing (Reprise) 383·877

Lisa Stansfield—Affection (Arista) 404·905

Alannah Myles (Atlantic) 404·475

Levert—Rope A Dope Style (Atlantic) 413·575

Loverboy—Big Ones (Columbia) 401·661

Night Ranger—Greatest Hits (MCA) 383·729

Bad English (Epic) 383·463

Michael Bolton—Soul Provider (Columbia) 383·083

Tom Petty—Full Moon Fever (MCA) 382·184

Roxette—Look Sharp! (EMI) 381·939

The Cult—Sonic Temple (Sire/Reprise) 381·798

Bonnie Raitt—Nick Of Time (Capitol) 381·087

Beaches—Original Soundtrack (Atlantic) 379·669

Fine Young Cannibals—The Raw And The Cooked (I.R.S./MCA) 379·214

Fleetwood Mac—Greatest Hits (Warner Bros.) 375·782

Journey's Greatest Hits (Columbia) 375·279

Pebbles—Always (MCA) 412·163

Garth Brooks—No Fences (Capitol) 411·587

Barbra Streisand—A Collection Greatest Hits and more (Columbia) 401·141

Gold & Platinum Volume Five—Various Artists (Realm) 388·405

Elton John—Sleeping With The Past (MCA) 387·993

Bonham—The Disregard Of Timekeeping (WTG) 383·497

Richard Marx—Repeat Offender (EMI) 380·915

Jeff Beck—Guitar Shop With Terry Bozzio And Tony Hymas (Epic) 380·303

U2—Rattle And Hum (Island) 374·017

The Bernstein Songbook —selections from West Side Story, On The Town, etc. Bernstein cond. (CBS) 371·088

Pretenders—The Singles (Sire) 362·541

INXS—Kick (Atlantic) 361·519

Bruce Springsteen—Tunnel Of Love (Columbia) 360·115

Billy Idol—Vital Idol (Chrysalis) 360·107

Paul Simon—Graceland (Warner Bros.) 345·751

Billy Joel—Greatest Hits Vols. 1 & 2 (Columbia) 336·396/396·390

Toto—Past To Present 1977-1990 (Columbia) 411·371

ALL THIS JAZZ

Wynton Marsalis—Tune In Tomorrow /Orig. Soundtrack (Columbia) 414·193

Joe Sample—Ashes To Ashes (Warner Bros.) 414·151

Gerald Albright—Dream Come True (Atlantic) 414·003

Bobby McFerrin—Medicine Music (EMI) 412·064

Kenny Garrett—African Exchange Student (Atlantic) 413·781

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

George Benson—Big Boss Band Featuring The Count Basie Orchestra (Warner Bros.) 412·478

Pat Metheny Group—Question And Answer (Geffen) 408·286

Lou Rawls—It's Supposed To Be Fun (Blue Note) 411·884

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

David Benoit—Inner Motion (GRP) 411·751

Bobby Lyle—The Journey (Atlantic Jazz) 411·215

Branford Marsalis—Music From Mo' Better Blues (Featuring Terence Blanchard) (Columbia) 410·928

The Rippingtons—Welcome To The St. James Club Featuring Russ Freeman (GRP) 410·498

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

Michel Camilo—On the Other Hand (Epic) 408·682

Sonny Rollins—Falling In Love With Jazz (Milestone) 408·518

Michael Franks—Blue Pacific (Reprise) 408·328

Larry Carlton—Collection (GRP) 407·825

Spyro Gyra—Fast Forward (GRP) 407·817

Jack DeJohnette—Parallel Realities (MCA) 407·270

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

Wynton Marsalis—The Resolution Of Romance (Standard Time, Vol 3) (Columbia) 406·637

Lee Ritenour—Stolen Moments (GRP) 406·280

Chick Corea Elektric Band—Inside Out (GRP) 404·574

Electric Light Orchestra —Greatest Hits (Jet) 300·095

Nelson—After The Rain (DGC) 411·009

Elvis Costello—Girls Girls Girls (Columbia) 412·619/392·613

Wilson Phillips (SBK) 406·793

Fleetwood Mac—Behind The Mask (Warner Bros.) 405·126

M.C. Hammer—Please Hammer, Don't Hurt 'Em (Capitol) 403·477

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

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

- **Just mail the coupon** and we'll send your 8 CDs, together with a bill for 1¢, plus 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 Free Trial.** We'll send details of the Club's operation with your introductory package. If not satisfied, return everything within 10 days and you will have 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!**

COLUMBIA HOUSE: Terre Haute, IN 47811

COLUMBIA HOUSE, 1400 N. Fruitridge Ave.
P.O. Box 1129, Terre Haute, Indiana 47811-1129 **305/S91**

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

SEND 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)*

Hard Rock *Aerosmith, David Lee Roth*	**Soft Rock** *George Michael, Michael Bolton*	**Modern Rock** *The Cure The Replacements*	**Light Sounds** *Carly Simon, Bette Midler*	**Heavy Metal** *Judas Priest, Warrant*
R&B/Soul *Freddie Jackson, Guy*	**Dance/Pop** *Technotronic, Stevie B*	**Country** *Randy Travis, Reba McEntire*	**Easy Listening** *Ray Conniff, Johnny Mathis*	**Jazz** **Classical**

Mr.
Mrs.
Miss (Print First Name, Initial, Last Name) Age

Address Apt.

City

State Zip

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

Extra Bonus Offer: also send me this CD for which I will be billed an additional $6.95.

...and I'm entitled to 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.

8E3-F6-59

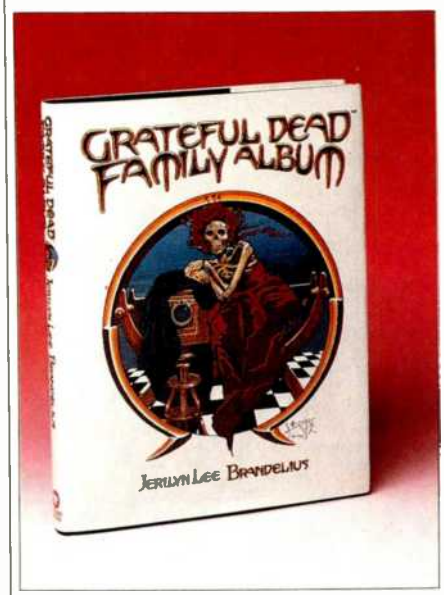
Over 700 photos tell a tale of the legendary band and its social matrix in the *Grateful Dead Family Album.*

American institution, and long ago journeyed beyond the boundaries of rock 'n' roll and into the realm of living folklore. What began as an experiment in creative formlessness—during their mid-'60s heyday as Ken Kesey's Acid Test house band—has evolved into a sort of alternative version of the national pastime. (Where else in our culture than at a baseball game are 15- and 55-year-olds brought together on such a common ground of drama and celebration, replete with old hands passing down the lore of days gone by to new enthusiasts? The only difference is that at Dead concerts, the home team always wins.)

Between then and now, the band has woven a legacy three decades long, 2,000 concerts wide, and immeasurably thick with music, magic, and emotion. Through this great tapestry runs a colorful thread of human community that has held it all together—from crew to staff, friends to fans, truck drivers to tie-dyers. This is, collectively, the Grateful Dead family.

The *Grateful Dead Family Album* is a testament to that community, a crazy quilt of photographs and remembrances that follows the band and its extended family's path from Jerry Garcia's cherubic childhood mug to his grandfatherly gray locks. Written by one of those family members, Jerilyn Lee Brandelius, and edited by another, Alan Trist, the book takes a roughly chronological path, using over 700 photos to tell its tale of a legendary band and the social matrix of which it is part and parcel. Brandelius' photographic archive ranges from the professional to the purely homemade, including baby pictures, high school snapshots, and everyday gems likely culled from the family's own albums. Complementing them are a host of quotes, anecdotes, press clippings, memories, self-perceptions, and snippets of spirit from the likes of Paul Krassner, Ken Kesey, music critic Ralph Gleason, rock impresario Bill Graham, columnist Herb Caen, longtime family members, fellow musicians, and band members themselves. Designer Jon Goodchild chose a creatively anarchic layout that in essence mirrors the theme of the book. The result—a patchwork of photos, posters, album covers, poetry, conversation, tie-dye backdrops, and jubilant audiences—runs from fun to dizzying, depending on your point of view. Suffice it to say that you'll end up holding the book at various angles. The cover and introductory artwork by veteran San Francisco poster artist Stanley Mouse playfully weds Grateful Dead iconography with a healthy dash of old-time Americana.

This visual/verbal narrative begins in the heady Haight-Ashbury days of the Merry Pranksters; The Diggers; Neal



Casady; and Kerouac's legacy; its vehicle the first literal, then metaphorical Bus, whose destination reads "FURTHER," a signpost the Dead have heeded ever since. On it we careen through the streets of '60s San Francisco, around corners to intimate gigs at the Fillmore and the Family Dog, out country roads to the band's weekend retreat in rural Marin County, along widening avenues to vast rock concerts like Woodstock and Altamont, and across continents to the band's festive '72 tour of Europe and '78 trip to Egypt for history's first rock concerts in the shadow of the Sphinx. Highlights like the band's creation of its own record label, its 15th and 20th anniversaries, and its 1987 tour with Bob Dylan are counterpointed by painful losses—original member Ron (Pigpen) McKernan, good pal Janis Joplin, road manager Rex Jackson, poet and friend Bobby Petersen.

Along the way we encounter an eclectic assortment of personalities, among them Native American medicine man Rolling Thunder, master tabla player Alla Rakha, rock vets Mick Jagger and Pete Townshend, the Gyuto Tantric Monks of Tibet, professional do-gooder Wavy Gravy, director Francis Ford Coppola, and mythologist Joseph Campbell, who three years ago proclaimed the Dead no less than "the antidote to the atom bomb."

Amidst the hoopla are scenes from everyday life and the folks who live it—riding horses, cradling babies, playing softball, dancing in the breeze, hammin' it up for the camera, or just hanging out. Smiling kids, white-haired grandmothers, roadies loading trucks, couples at the altar, office staff, stagehands, sound mixers, cheering fans, hog farmers, family dogs, friendly strangers, and strange friends. Some come and go, others stay on and on. Old companions are lost and eulogized, new ones born and celebrated. All remain in spirit. Among them are names and faces not even the most devoted Deadhead would recognize, certainly none remarkable enough to warrant much fervor in their own right. But together, they compose a whole that's far greater than the sum of its parts, and a sense that something special is going on here. Folklore with an emphasis on the folk. Home that defies a fixed sense of place. Family that transcends conventional ties.

Certainly there are few families large or interesting enough to support the mainstream publication of their own album. The appearance of this one seemed somehow inevitable. That it comes after a quarter-century is more by accident than design. For it's not really a summing-up, but more a progress report as Grateful Dead and family move full-steam ahead into the next decade and, for all we know, the next millenium. Neither a verbal history nor merely a picture book, this scrapbook is clearly a labor of love.

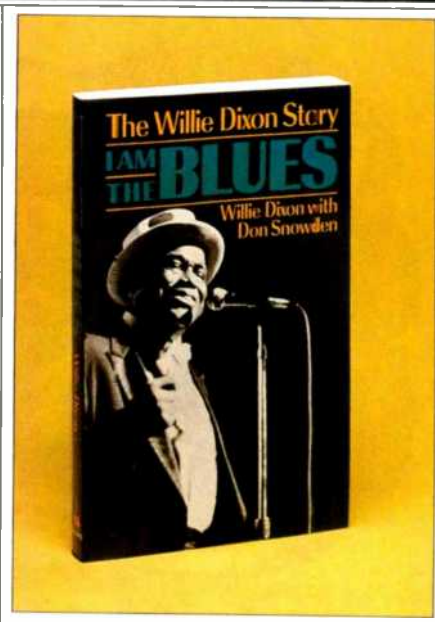
And if it is ultimately something only a true Deadhead could love, it will not necessarily be lost on others. For as well as being a family album, it is also a portrait of a counterculture: Its birth, growth, and persistence of vision. A culture that has never betrayed its roots and, in so doing, has not only

From start to finish, *I Am the Blues: The Willie Dixon Story*, primarily by Dixon, is sheer entertainment.

survived but flourished. One whose stance outside the establishment became legitimized not because it compromised enough to gain entry, but because the mainstream grew broad enough to accommodate it. And while now accepted there, it still keeps one foot dancing on the periphery. All told, an American experiment whose weird and wonderful alchemy found it a lasting form and a lot of like-minded folks.

As Bill Graham reflects in his introduction: "This family embodies the essence of an all-powerful spirit that was born in the Bay Area in the sixties—a sense of camaraderie, of hope for a more idealistic world. After all these years, this family continues to represent a positive alternative—they make it possible for some light to shine through."

Off in the future, children will sit and listen to sparkly-eyed grandparents spin outrageous yarns about a magical mystery band that played way back once upon a time. For any doubting Thomas, this book will prove they weren't making it up, and maybe even offer an inkling of what the fuss was about. *Michael Nash*



I Am the Blues: The Willie Dixon Story by Willie Dixon with Don Snowden. Da Capo Press, softcover, 264 pp., $12.95.

When it comes to contemporary blues and blues/rock, Willie Dixon is probably the most recorded composer, living or dead. Period. His songs have graced recordings for at least three generations, a discography including (but not limited to) Muddy Waters, Howlin' Wolf, Led Zeppelin, The Yardbirds, Cream, Jeff Beck, Otis Rush, Sonny Boy Williamson, Captain Beefheart, Dave Edmunds, Van Morrison, Megadeth, Little Walter, Tesla, Foghat, Otis Redding, Jeff Healey Band, and Conway Twitty. The first generation of Chess blues artists relied heavily (almost exclusively) on Willie Dixon's songs, production, and expertise to create their music, and the subsequent British blues explosion of the '60s paid tribute to Willie by recording his songs, using his song titles as their group names (Pretty Things, Hoochie Coochie Men), and recording at the Chess studios in the hopes of getting close to the man (The Yardbirds and Rolling Stones in particular). There is no getting away from Willie Dixon's musical legacy; it is as pervasive an influence on contemporary music as Shakespeare is on contemporary literature.

This autobiography is sheer entertainment from start to finish, full of anecdotal remembrances of Willie's youth in Mississippi and his early days as a fighter/performer. There's a great deal of material about Willie's Chess days as well as pearls of wisdom about songwriting and the creative process. The book is told, rather than written, primarily by Willie himself but with some secondary sources, such as the musicians he worked with, the managers and agents who helped him, and those who knew him when he was a youngster. Because he has never been particularly appreciated as an artist, and because he made some unwise deals early in his career, Willie Dixon has never really gotten his due (especially when it comes to financial compensation for his early works), but nowadays he's revered as the great source that he is. Any musician, songwriter, or music fan can acquire more than his share of knowledge by picking up this book; we know we'll be reading it more than once. Our only complaint is that it could have been a whole lot longer—250-odd pages simply aren't enough. *Jon & Sally Tiven*

EDWARD TATNALL CANBY

THE FRACTAL FACTOR

Do you have a fractal friend? Are you fractal prone? If so, look out! You are likely to be bewitched in all sorts of confusing directions. You aren't merely exposed to fractals. You are dragged in by the hair and the toes if you get anywhere near. Or you are taken in by persistent gentle persuasion, which is worse.

Yes, I have a good fractal friend, of my own generation more or less—I knew him a half century before fractals. He is now retired and plasters everyone in sight in the most genial manner with his fractalia, given any tiny chance. But no, this is *not* going to be a dissertation on fractality. It's just that my friend's enthusiasm, embodied in an article he sent me on musical hearing, has deviously led me into the thoughts that will follow here, all in due time, further tying audio into its life partner, music.

Meet this Jim, as I'm calling him. A remarkable person. You should understand, first, that he is a total blank on the sacred subject of audio, though he is a scientist-engineer by training. Audio is for him like driving, another blank in his fertile mind, as it is for many old-timey engineers. His cars slide elegantly into the nearest ditch at the suggestion of a snowflake or a tornado. When the wheels begin to spin, he steps on the gas and steers in the wrong direction. It's wonderful to observe the purely scientific mind in this phase of its superior comprehension! As for myself, being an artist type, I am all precision when it comes to cars, and even occasonally in audio. As Gilbert and Sullivan pointed out, things are seldom what they seem.

But it's not only audio. Worse, for me, is Jim, and music. By his own admission he is *unmusical*. I should call it another total blackout, at least from a musician's point of view. So there goes another of my own vital interests! How sad that two old friends should be so dismally separated.

And yet, Jim and I get along, each of us periodically tweaked by the other's lack of knowledge, each a bit the missionary. Jim respects my musical (and audio) knowledge; I respect his math and science and engineering, even unto fractals. (I think I get the basic idea of fractals, but let that pass.) Both of us have inquiring minds. That is, both tend to trespass into areas where we are all too unprofessional but yet have the need to know *something*. And so we try to connect. And try, try again. This has been going on for ages. It's like Jack Sprat who could eat no fat and his wife who could eat no lean. Together, Jim and I cover a remarkable range. We build bridges, just barely touching in the middle. A bit more cement, a cantilever or two, and we might conquer the world.

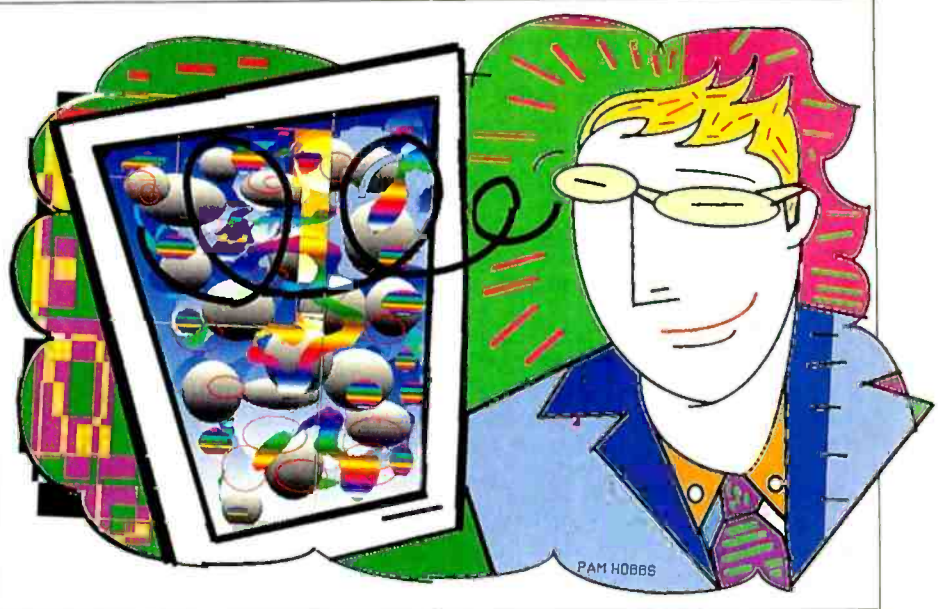


Illustration: © Pamela Hobbs

Fat chance. Imagine Jim as a great opera singer and me a distinguished fractal mathematician! It will not be. But it's fun to think about. The fragile bridges between us are what matter.

Look further. There is even here an audio reference. Jim's life profession is one-track, minus the need for bridges. Maybe culverts, no more. *Soap*.

On the other hand, audio is cram full of bridges and they are real and must be solid. We share the realm of sound with numerous other professions and areas, most noticeably music and speech but also, for instance, even religion. How can you design a church sound system if you don't understand what a church *does*?

Jim comes from a marvelously unmusical family. I grew up with them, pa, ma, and six siblings. Indeed, I knew Jim several months before he was born, when he made his first public appearance in the shape of a certain bulge visible to all including small boys like me. For most of his long career he has been a professional chemist, a designer of soaps, detergents, and such for a large soap company. The top—you've used his products (though he didn't write the advertising).

The bridges to be built in soap, unlike audio, are taken care of by public relations, pollsters, and package designers, who make up the chemist's connections to the outside world. Pretty feeble bridging. If you are a good chemist who sticks to your rightful responsibility, lofty thoughts of art and philosophy and higher math must be put aside. Unless they are soapy.

When he was already near retirement age from soap, soap, and more soap (though he can still enthuse on that subject, quite properly), an extraordinary thing happened to Jim, or he happened to it. Have you wondered about all the chess wizards who were unlucky enough to be born before chess? Genius pianists before there were pianos? At this time in his life, the computer arrived. And Jim discovered that he was a computer man. Just a natural for it—at retirement age!

In a flash he was leaning on his friends with his home PC and all their kids were doing drawings on the CRT under his enthusiastic direction. But this went a lot further. Simultaneously, his big soap company began to realize that it would need computer expertise if it were to continue selling soap.

Audio is for Jim like driving, another blank in his fertile mind, as he slides elegantly into the nearest ditch at the mention of a snowflake.

And—this was an old family-type outfit—why risk one of those smart-aleck computer whiz kids when already inside the company was a veteran who knew all about soap from the faucet right down the drain and, surprisingly, knew computers too. Now this is all secondhand to me, but the way I get it, in very short order, Jim, about to retire, became chief computer man for one of the larger companies in our country. Out of the soap dish into the frying pan? Nope. Currently, he's into fractals, strictly on the side. Jim is now retired and cram full of new ideas—not including soap.

So I sent a recent article on fractals in music to Jim, since I did not think he would see it, and he sent another right back on music, as per above. I couldn't make head or tail out of the fractals and all those fine equations. Jim couldn't make head or tail out of the highly scientific music article (*Science News*) involving things like tritones and perceptions of high and low pitch (Jim probably has none). But still we exchanged.

The bridge building in this symbolic sense is mainly the setting up of foundations on either side, the building of outreach and good will. Does it matter whether the operation is strictly pro, or entirely extracurricular? The stronger the foundations, which means in our day, the more professional, the better the bridge. But the outreach, that impetus towards the other shore, is crucial. How numerous are the professionally trained musicians today who end up as professional recording directors! That bridging is now inside audio.

And conversely, how dismal is the unknowledge of the professional who has no interest in bridges! I have to look twice at a statement that might read ". . . one of the great names in music;" it could be a Toscanini, or a Jagger. No bridge. No other side at all, even inside music.

You have to understand that this is a normal background for such as Jim, where some things, like music, are *not there*, they do not exist. Jim and his siblings were such a talented bunch! The father and one of the sons both lawyers, the oldest son a country doctor of scurrilous wit, a blessing to his rural neighbors and a practical joker of terrifying ingenuity. We were all scared of him, never knowing what might come next. Music?

Yes, it was often music—that is, rural ballads of a rakish sort. He had the words down cold but the tunes he ignored. What matters a tune? My memory says everyone loved his singing but me. I have a 1940 disc home recording, too, on which his oldest sister, goaded by me, tries her best to sing "Auld Lang Syne," to my energetic piano accompaniment. There was indeed a faint semblance of variable pitch, and all the right words. At the end—to this day—she says, "Edward, why did you throw me off the tune?" Well, in a way she was right, though I suggest she never got onto it in the first place. I also have vague memories of the other siblings, during our all too frequent song fests at picnics and for "Happy Birthday," the same dismal off-pitch slither. They all did it. So, indeed, did everybody else. "America the Beautiful!" Not in this department.

Indeed, for most of my early life I seem to have lived with genial souls of the tuneless sort. There was a man named Cake, an aircraft engineer from Virginia, who sang any number of courtly ballads of the South to his big guitar, both of them out of tune. Then there was "Prexy," president of a prestigious women's college (now co-ed), who had absolute memory. For words, that is. He could reel off a dozen verses of every rakish, bawdy, heroic, military, or ballroom song out of the entire 19th century and never miss a word. But his *pitch*—I will say no more. Then, a whole generation later, there was Jeremy. He fell for the folk songs of the '60s and went a'co'llecting. He got every song around anywhere and some of them were real good. I liked "Freight Train," perhaps because a freight train is inherently tuneless. After 20 or so years he finally learned to tune his guitar *right*.

If Jeremy could pull out of the vast tuneless morass, could Jim? Jim is modest but careful. I do not ever remember hearing a musical note from his mouth, in or out of tune, even in "Happy Birthday," America's sacred rite of tunelessness. That shows the real inquiring mind! At least he *knew* he could not sing.

The excerpt from *Science News* that Jim sent to me is fascinating. Jim hit it

Imagine Jim as a great opera singer and me a distinguished fractal mathematician! It will not be—but it's fun to think about.

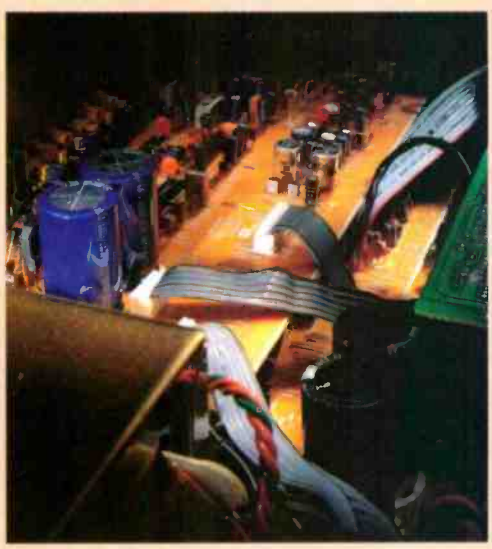
on the nose, even if he didn't understand a word. It's about basic musical perceptions and, more significantly, differences in the way people hear or interpret given types of musical sound. This Dr. Deutsch, Diana by name, is a rare bird, a strictly scientific researcher into strictly perceptional, i.e. mind-bound, music. Inside the head. Research into any aspect of our inside brains is hideously difficult, as every psychologist knows. You can't really measure, you can only sort out. And compare. Moreover, your results depend deeply on statistical methods if they are to be of any use. Head research, as we might call it, must be far more sophisticated than the smoothly adequate methods of the pollster. Especially if you are dealing with music, which is not a matter of words. There is, too, the personal side—the researcher's own attributes. If Deutsch couldn't sing in tune, and didn't know it, could she judge other people's pitch-oriented thoughts? Well, I expect she has a serviceable ear and probably sings beautifully.

There are two extremes of approach in this head research, both useful. Deutsch represents one extreme, offering meticulous, world-class, professional university-type lab work plus scholarly publication. The other is embodied in my own head—just stop, look, and listen, as they used to say at railroad crossings. The inquiring mind again. Always open to impressions, *observing* along the way. At both extremes, the doctor's and mine, the essence is to *notice*. Like tripping over bumps. You trip, and then you look down to see what tripped you. It might be important, or just a pebble.

Deutsch obviously notices, and thinks, and follows up, scholarly methods or no. So do I. Thus some of her discoveries in music are startling to me, quite astonishing. Could she be right? On the other hand, others are of a sort already entirely familiar to me. I just *noticed* them, long ago. Are there people who do not understand what is meant by "up" in musical pitch, who when you tell them to sing higher, think you mean LOUDER? Or who can't hear which way a tune goes, up or down? There are millions such! These people entirely miss the musical imagery, as well as notation we have so carefully invented to guide us in pitch. They are, of course, quite right. Up is but a figment of the mind, what with harmonics, which are always mixed in. And tone color.

Deutsch will run me off the bottom of this column, so more later, but how about this: People from Southern California hear a pure tone (minus overtones) go UP to another tone, whereas people from Southern England hear the same tone go DOWN. It's apparently the English language, the dialect, says Deutsch. Now there's a remarkable thought. More bridges to build. Right, fractal friend Jim?

The inside story on what <u>really</u> makes a great audio component.



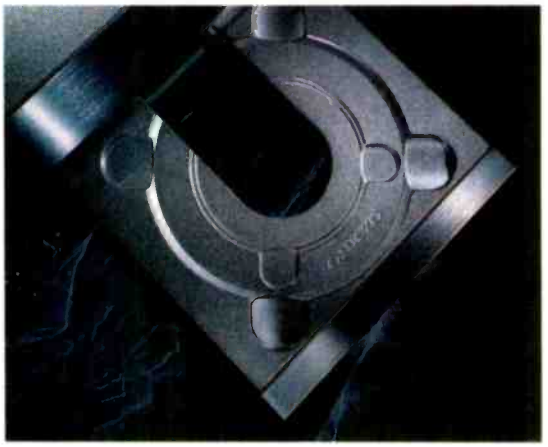
ONKYO®

Artistry in Sound

Technology without quality is meaningless.

"It would be very easy for our engineers to add a lot of flashing lights and dials to our equipment but 'bells and whistles' are not what we're all about," Ted Green said. Mr. Green, Onkyo's National Sales and Marketing Manager, is on the firing line in the battle to design electronics equipment for today's critical, value-oriented enthusiasts. And because Onkyo is an engineering-driven firm, their emphasis is on quality and substance, not glitz and glamor.

"Consumers can quickly hear, see and feel the difference between Onkyo equipment and the competition," Mr. Green added. "Look at the front and you won't be overwhelmed by LEDs or buttons. Our components are made to be used— easily. Lift an Onkyo receiver and you'll immediately notice the increased weight from the metal chassis, heavy duty transformer and heat sink. And Onkyo has always featured the most up-to-date technology," Mr. Green stated. "Throughout the design, engineering and manufacturing process, our objective is to deliver the finest quality at a better feature per dollar ratio than any other components on the market."



Metal chassis, metal faceplates, even metal transports in the CD players add up to structural integrity throughout the entire Onkyo line.

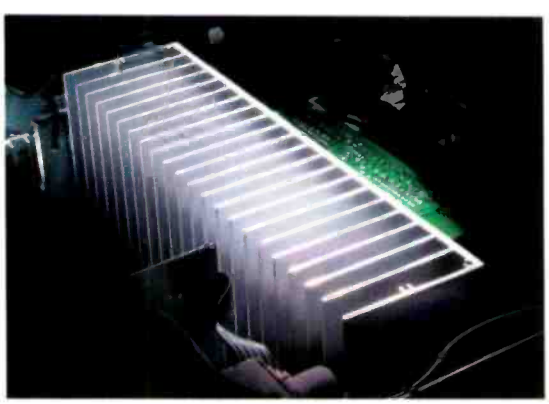
ONKYO . . . Built to be Better

Quality is a word used by companies in many different industries. But what does it really mean to someone buying new hi-fi components? If you love music, it's the ability to experience the full dynamic range of a compact disc or cassette. Or drive a pair of sophisticated speakers to their utmost potential. Or hear the dramatic impact of a movie soundtrack on a Dolby Pro Logic system. All of the buzzwords and acronyms mean nothing, unless there is a proven real-world result that you can hear and appreciate, not simply a fancy decal on a faceplate, or slick slogan in an ad.

Onkyo's mandate couldn't be more clear. Onkyo will *never* make sacrifices or take shortcuts that impact upon the music you'll enjoy in your home. Whether it's a CD player, receiver, cassette deck or other component, if it bears the Onkyo name, you can be sure the quality was designed and built in, starting right at the drawing board. Onkyo's demanding engineers oversee every step of manufacture so the end results are award-winning products that perform well and, just as importantly, are a lasting value . . . from the least expensive models to the top-of-the-line. In fact, the long-term reliability of all Onkyo components—when compared to the competition—is far superior.

What makes Onkyo better? Here are some reasons why . . .

Many hi-fi companies will use plastic parts in critical areas to keep down your initial cost. The price may be attractive *at first* but you'll lose the structural integrity of Onkyo's metal chassis or the accuracy of their die-cast aluminum CD tray . . . deficiencies that will unquestionably affect the sound heard in your home. The next time you're in a store, check out the vast number of components that utilize plastic or some other synthetic in their faceplates and chassis. Then examine Onkyo. It's easy to see why Onkyo sounds well made.



Heat sinks sound as if they belong in a high tech kitchen, but Onkyo's heavy duty versions prevent thermal overload when you've pumped up the volume.

Power Plays

One of the most important functions of any receiver or amplifier is the ability to provide sufficient power during key musical moments. It's really simple: the larger, more powerful the transformer, the more critical current is supplied. Without proper power, you won't be able to drive loudspeaker systems or components to their peak ability. A shortcut here severely impacts upon music quality. Onkyo's heavy duty power supplies are renowned for their ability to handle the most demanding and complex musical passages, which is why you'll find all our amps and receivers rated into 4 ohms (and in some cases even 2 ohms), the ultimate test of a power supply. And although a transformer may not have as much sex appeal as a flashy display, it's infinitely more vital to the bottom line—performance—which is why you buy a component in the first place. Consequently, Onkyo engineers are always in the forefront of technical advances in component power. One of these is the breakthrough Anti-Electromagnetic Interference (AEI) transformer that produces even lower distortion levels and more power than toroidal transformers found in high end, high priced separates.

Independent Thinking

Dedicating power supplies to perform specific tasks in components won't create banner headlines, but again, it makes for a better quality product.

In a CD player, the independent power supplies control the transport, analog and digital circuits. This prevents any spurious signal interference and resulting distortion. The independent power supplies Onkyo uses in its cassette decks eliminate interference between the meter electronics and the recording circuitries. As a result, the music signal retains its purity both in recording and playback.

As well as its "independent thinking" in terms of power, Onkyo also believes in being discrete. Virtually all Onkyo components use discrete output devices (individual transistors, resistors and capacitors) rather than Integrated Circuits (ICs) that combine all three into a less costly format. The drawback to ICs occurs in its impact on overall performance. Using discrete outputs involves more time and money, but the results are well worth it.

At the heart of every Onkyo receiver and amplifier is an oversized, heavy duty transformer. When it comes to power, Onkyo refuses to take any shortcuts.

Technology with Imagination

While Onkyo maintains a "nuts and bolts" approach to insure basic quality, the company continues to be on the cutting edge of sonic technology as well. Two of Onkyo's highly regarded breakthroughs were Accubias which automatically fine tunes the bias on a cassette and the Automatic Precision Reception (APR) system for receivers and tuners. Critics feel APR delivers the best possible FM reception. In digital audio, Onkyo created AccuBit technology and now has introduced AccuPulse, the most advanced single bit digital-to-analog conversion (DAC) system available. Here again, Onkyo engineers refused to take short cuts and used two separate chips for the DAC and digital filter, cutting down on potential interference. The result is natural, true-to-life sound that finally achieves the real world musicality digital audio has promised since its inception.

Buyers Guide

Quality is what dictates a component's performance. It should also be what dictates your product choice. The next time you look at hifi equipment, remember to look for some of the differences pointed out here. You'll find that quality and Onkyo are one in the same.

While most manufacturers use Integrated Circuits to save money, Onkyo uses costlier power transistors, resistors and capacitors because of their better performance characteristics.

Home Theater Powerhouses

The '90s have ushered in a new era of entertainment—the Home Theater Age. Enthusiasts are now constantly striving to re-create the movie palace experience in their living rooms. Onkyo has risen to this challenge by designing a complete line of critically acclaimed A/V power components that meet the demands for the most realistic movie sound—and musical reproduction.

As with all Onkyo components, quality, dependability and ease-of-use are the guiding philosophy behind the new Integra A/V amplifier, the A-SV810PRO. It not only features advanced Dolby Pro Logic decoding for blockbuster Hollywood soundtracks, but offers a total of nine simulation modes (DSP) that let you create the acoustic ambience of different soundstages. Pro Logic goes beyond basic Dolby Surround Sound found on less expensive components by adding a center channel to the front and rear channels. The result is more accurate sound effects and your sofa becoming a front row orchestra seat! The A-SV810PRO delivers 85 watts per channel in the surround mode for the left, center and right speakers and a powerful 35 watts for the rear speakers. And there's enough dynamic power (180 watts into 2 ohms) to handle the most critical passages from any CD or soundtrack.

The sleek, new A-SV810PRO can be the heart of the most sophisticated audio/video system. There are six video inputs (5 are S-video) and 10 audio input jacks . . . enough to handle a wide variety of components. And, to make this integrated amplifier even simpler to use, the A-SV810PRO has a series of on-screen displays that make taking advantage of its advanced capabilities as easy as watching TV.

The 39-pound powerhouse has the same heritage as all Onkyo components—heavy duty transformers, massive heat sinks, and discrete outputs using top-quality resistors, transistors and capacitors. The A-SV810PRO even separates the audio and video signal paths to ensure the purity of the sound and image.

Along with Onkyo's cutting edge A-SV810PRO, the company offers a full line of Pro Logic A/V receivers, the TX-SV90PRO, TX-SV70PRO and the TX-SV50PRO. All deliver true five channel Dolby Stereo decoding (left, center, right and surround) as well as variable digital delay and Hall and Matrix settings.

An added benefit is Onkyo's special room-to-room capability on select models. By adding optional infrared remote sensors in other rooms, you can control all A/V capabilities from different parts of the house. The three receivers are packed with real-world conveniences and leading edge technology . . . from Onkyo, a company that only knows how to make components one way—the right way.

ONKYO

200 Williams Drive, Ramsey, N.J. 07446 201-825-7950

For More Information 41244 Call 1-800-553-4355

BERT WHYTE

THE URGE TO TWEAK

Illustration: Karen Stolper

We are now in the eighth year of the CD era, but despite very significant advances in digital recording technology, and better understanding among recording engineers of the special demands of the digital audio mediums, CD-bashing and a general condemnation of digital sound still persists among the die-hard advocates of analog audio.

I have addressed this phenomenon before, but while these digiphobes are a relatively small group, they are very vocal. Their self-proclaimed superior aural sensitivity and acuity enables them to hear anomalies and artifacts in digital sound and CDs which are simply not perceived by people with "normal" hearing faculties. There are a considerable number of people who are audiophiles. This is an honorable estate, descending from the "hi-fi nut" of the early days of audio. An audiophile is as a person who most diligently and unrelentingly pursues the goal of reproducing electromechanically, magnetically or optically recorded music with the highest degree of fidelity to the live sound. Audiophiles do not eschew objective scientific measurements of sonic parameters, but few would deny that subjective evaluation of sound qualities is the predominant factor in their sonic perceptions.

Over the years, audiophiles have been ridiculed, reviled, and rejected as negligible in the general scheme of the recording and music business, or merely tolerated for their aberrant behavior. For some time, audiophiles have actually achieved a certain degree of respectability, as the general audio/record market has become aware of advances in technology that approach audiophile expectations.

Digiphobes are a sub-species of audiophile and, of course, are certainly entitled to their opinions. It's easy to be tempted to simply dismiss them, and, indeed, their notions are not about to disrupt the audio industry. Nonetheless, they have found eloquent spokesmen in the so-called "underground" press. These publications can be informative and interesting, as long as they don't wander off into pseudoscience with wholly subjective conclusions.

I think I'm a pretty tolerant man and so are most of my friends and colleagues in professional audio. This is not said with any arrogance or smugness. If these protagonists of analog sound prefer the vinyl LP, that's just fine. But what many of us find irksome is the relentless "put-down" of all things digital—with scant regard for the technical validity of their arguments. Couple this with a nose-wrinkling condescension towards those insensitive clods who actually like CDs and digital sound!

By their very nature, these publications have a major problem. By their own admission, the analog vinyl LP is in a precipitous decline, which will ultimately be terminal. Thus, very few recordings are being issued on vinyl LPs, and they must, perforce, discuss and review CDs and digital audio equipment. There is some grudging respect for the sound quality of some CDs, but a qualifying comment always follows, typically: "While the sound of this CD is quite good, it just doesn't have the musicality and natural warm ambience of the best analog LPs."

As noted, everyone is entitled to have fun and enjoy his hobby. Some people are avid collectors and traders of baseball cards or beer bottle caps. Don't turn me on, but more power to those who enjoy these things. So it is with the devotees of vinyl phonograph records. So much was involved in the playback of LPs and the general pursuit of hi-fi sound that the audiophile hobby really flourished. In the 1960s and 1970s, the "tweaking" of phono playback equipment was in full flower. Think about it: Playback of a record involved a routine which, in its most convoluted aspects, was almost akin to a mystical rite. The record was first cleaned in some fashion, then sprayed with some supposedly anti-static agent or zapped with an ion gun. The special anti-resonant headshell was equipped with special Litz wire connectors to the cartridge terminal. The headshell might be equipped with a clip-on device that used radioactive Polonium to reduce static changes. Then there were the magic record platter mats. Exotic materials were employed in these mats in an effort to suppress mechanical resonances in the LP.

There were myriad other tweaks applied to LP playback, to say nothing of the unending search for LPs with minimum warp and, hopefully, reasonably quiet surfaces. There were, of course, the special audiophile pressings which were made with loving care. The ultimate was perhaps reached with JVC's "UHQR" records which commanded very high prices for that era.

It's fine if analog-sound protaganists prefer the LP, but their put-down of all things digital is irksome.

There is no question that there were many useful tweaks along with a lot of non-useful stuff. They were part of the fun, and undoubtedly there is resentment towards the CD because it is really not amenable to tweaking.

Undeterred by the digital technology of the CD, and finally coming to the realization that CD will be around for quite a while, the digiphobes are now trying to tweak CD playback to correct some of its "inherent defects." To say that most of this CD tweaking is "wild and wooly" is to put it mildly.

I have kept silent about this tweaking, but it has now become such absurd hocus-pocus that I feel compelled to offer some comments. I am not making these comments as if I'm coming from on high. Rather, I have carefully researched these various CD tweaks and have consulted with experts and authoritative people, in the purely scientific and CD-manufacturing communities, as to the possible validity of these tweaks.

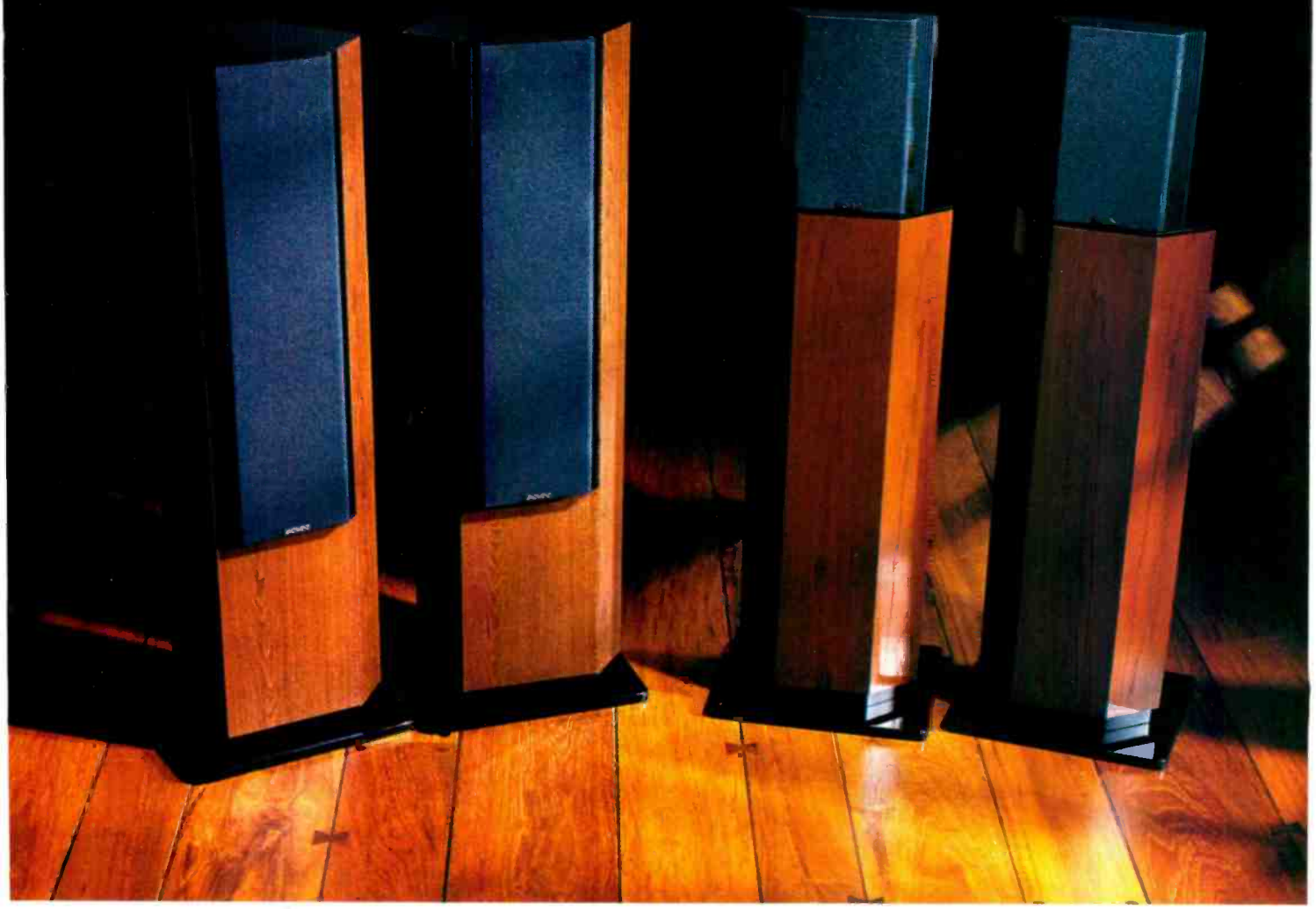
There is no question that many of the CD tweaks that have been employed stem from a basic misunderstanding of the digital technology of the CD medium. Many audiophiles freely use such CD jargon as bits, sampling rate, quantizing, jitter, and dither without really knowing what they mean.

Recently, there have been some articles appearing in various audio publications, which specifically address some of these CD tweaks. In the January 1991 issue of the British journal *Hi-Fi News and Record Review*, digital audio expert John Watkinson writes in his article "Simple Sampling" about the fallacies of various CD tweaks in an informative (and often amusing) article:

> If the binary values leaving the error correction system of a CD player are numerically identical to those on the master tape which was used to make the disc, then there has been no loss of information, and therefore the digital circuitry of a well-engineered CD player has no quality. Since this is a fact, we must look elsewhere to find the factors which determine the quality in a digital audio device, and we will find them in the conversion processes . . . . The sound quality of a well-engineered digital audio recorder is independent of the medium and the transport and depends only on the quality of the converters . . . . We can now draw some interesting conclusions about the accessories (tweaks) which are available for CD players. Special cleaning fluids will not improve the sound quality of a mucky CD more than washing-up liquid [detergent] . . . . Using bizarre substances on discs could actually cause physical damage. The Armor-All saga is a good example of this kind of nonsense.

For those who are not familiar with Armor-All, it is a commercial product used, among other purposes, to clean and protect vinyl roofs on cars.

WE ASKED OUR ENGINEERS TO DESIGN THE SPEAKERS THEY'D WANT TO OWN.



Introducing speakers that meet the specifications of the most demanding audience Advent® has—our engineers.

The New Vision Series™ 350 and 500 from Advent. Two studies in high definition audio capable of reproducing music with astounding precision. Elegantly encased in sculpted teak-grain cabinetry.

On your left are the model 350's, with our exclusive Co-active Woofer™ technology. Dual woofers fired through a Tiered Sound Channel™ fill a room with incredibly deep, rich bass. And produce a great soundstage no matter where the speakers are placed in the room.

To your right, the model 500's. Their avant-garde design predicts their avant-garde technology. The Helmholtz resonator band pass subwoofer design requires minimal cone excursion which results in deeper, more accurate bass with less distortion. Topping off the speaker is the Advent Isolated Satellite Imaging Module (ISIM)™ containing a dome tweeter and graphite midrange for the ultimate imaging definition. Together, Helmholtz and ISIM's musicality is incomparable as is its genuine teak finish.

Nothing, however, replaces hearing these for yourself. Check your dealer for the speakers that will not only please the demanding ear of our engineers, but yours. For your nearest dealer and free literature, call 1-800-477-3257.

///ADVENT

Undeterred by the digital CD's technology, digiphobes are trying to tweak CD playback to correct some of the "inherent defects."

Rubbed on CDs, it was supposed to "dramatically improve the CD sound" according to the tweakers. What it did was to cause delamination of some CDs! I checked with the engineers at the Sony CD pressing plant in Terre Haute, Ind., and they said they loved Armor-All because it produced a lot of sales for replacement CDs. They also said that if CDs treated with Armor-All were played for five or six hours, heat build-up could cause the highly volatile Armor-All to "outgas" and could destroy the laser pickup diode!

Watkinson also states that "Damping rings do not improve the quality of CD replay. Drawing with green felt-tip pens around the edges of a disc will not improve the sound quality." While it is true that in most CD players the unsupported edge of a CD can cause vertical flutter, damping rings cannot reduce this flutter because they are not accurate enough in concentricity, and, in fact, impart enough eccentricity to the CD to cause far more of a problem than edge flutter. As for the green ink around the perimeter of a CD, this is supposed to suppress internal reflections in a CD, which are caused by the laser beam. I had duplicate CDs of three different recordings. One set I left untreated; the other set was painted as per instructions. After many comparisons on several different CD players, I heard absolutely no difference in sound quality. I checked with a friend of mine who was a research physicist at Hewlett-Packard. He is also heavily into high-end audio. He stated there was absolutely no electronic or optical phenomena resulting from this treatment that would affect digital signal output or sound quality.

One of the newest tweaks is cryogenically treating CDs! In essence, over an eight-hour period, the CDs are reduced to −320° F (the temperature of the liquid nitrogen used in the cooling chamber) and over another eight hours slowly restored to room temperature. Because CDs are injection-molded by means of heat and pressure, this supposedly sets up internal stresses and higher mechanical resonances in the CD. The cryogenic treatment supposedly changes the lattice molecules in the polycarbonate from which CDs are made, relaxing the molecular bonds, with subsequent lowering of mechanical resonances, all of which ultimately lessens the jitter output from the player. I checked this out with the Sony CD pressing plant engineers, and with two friends who are physical chemists. While they say there is an element of truth in the relaxing of molecular bonds, it is insignificant and, from the digital viewpoint, would not be audible.

All sorts of other tweaks purportedly improve CD sound, but there are so many other variables in an audio system that have far more influence on the sound. As P. T. Barnum said: "There's a sucker born every minute."

DIGITAL HEART...
The Krell CD-DSP Integrated Compact Disc Player

The Krell CD-DSP is the first integrated compact disc player to combine an updateable software-based processor with a high-end CD transport. The processor and transport are coupled to extremely flexible input and output sections, creating a product of unique function and value. Audiophiles can now gain the advanced performance capabilities of separate components in a single unit.

Software-Based Processing

The processor section of the CD-DSP uses a 16 times oversampling version of our Waveform Duplicator software, which is run on a Motorola DSP-56001 high-speed, ultra-precision digital signal processor. The extraordinary resolution of fine detail and accuracy of waveform reconstruction achieved is not possible by other methods. The processor output is routed to a high-bias, Class A balanced analog output stage. The result is a sonic quality distinguished by robust dynamic impact, extended frequency response and three dimensional imaging.

The Waveform Duplicator software is loaded into socket-mounted EPROM chips to allow simple and inexpensive updates as software technology evolves in the future.

Transport and Operational Features

The CD-DSP is built around the CDM-1 MK II, Philips finest transport for CD player applications. It is mounted in a rigid steel chassis and suspension system designed to absorb extraneous vibrations that might interfere with information recovery from the disc.

The CD-DSP is destined to become the digital heart of any audio system. Three inputs and two outputs provide connection to other sources in the digital domain. Two analog outputs allow the CD-DSP to drive independent systems.

Whether you are considering your first CD player or the replacement of an existing unit, the CD-DSP is your invitation to the future. Please contact your KRELL dealer to arrange for a demonstration.

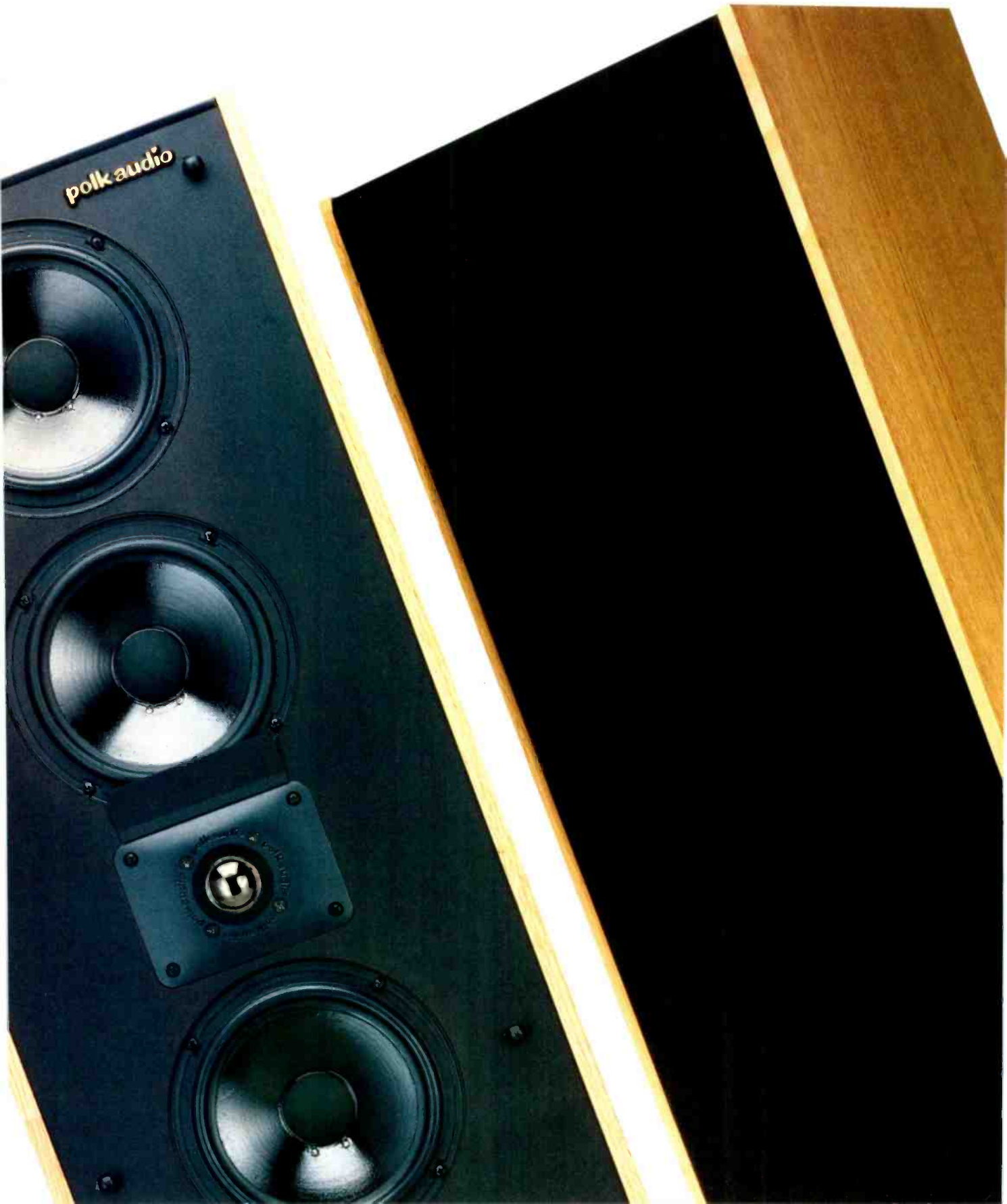
For More Information

Call 1-800-553-4355

KRELL DIGITAL, INC.■35 Higgins Drive■Milford, CT 06460
Phone: 203-874-3139■Fax: 203-878-8373

KRELL DIGITAL INC.

Breathtaking



the new Polk RTA 15t

The breathtaking performance of Polk Audio's new RTA 15t loudspeaker system is the result of the rare combination of state-of-the-art technology and superior design.

Incorporating technology from Polk Audio's limited production SRS (Signature Reference Loudspeaker System), the RTA 15t uses advanced components and design technologies to achieve outstanding musicality, detail and imaging. The heart of this design is a line source array that achieves an openness and spaciousness permitting a wide range of optimum listening positions. At the center of this line source is Polk's SL3000 tri-laminate tweeter, an engineering triumph in high frequency smoothness and dispersion.

Outstanding bass impact and dynamic range is realized by using two 10″ sub-bass radiators (one front mounted and one rear mounted). This dual bass radiator technology achieves deeper, flatter, more accurate bass than conventional designs.

The new Polk RTA 15t
...one listen will take your breath away.

The RTA 15t is available in natural oak, natural walnut and black oak wood veneer finishes.

polkaudio
The Speaker Specialists

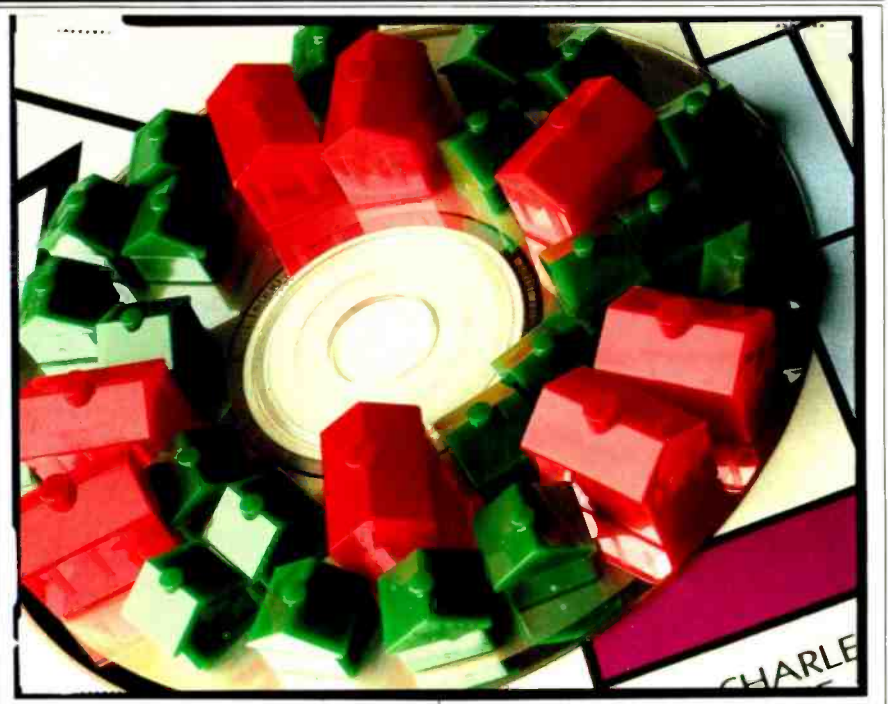
5601 Metro Drive, Baltimore, MD 21215 (301) 358-3600

Where to buy Polk Speakers?
For your nearest dealer, see page 114

Enter No. 33 on Reader Service Card

JOHN EARGLE

DATA DIET



Photograph: David Hamsley

Little thought was given to the subject of audio data reduction when the CD and R-DAT were being developed in European and Japanese laboratories during the late 1970s and early '80s. The engineers had a primary goal, which was to develop recording and playback systems that could accommodate a sufficient digital bit rate to encode any kind of signal, music or otherwise, with archival accuracy. That goal was accomplished, and both the CD and R-DAT are truly archival mediums in that they contain digital information which is *identical* to that on the digital master recording from which they were derived.

In areas such as international communications and broadcasting, the number of satellite links is limited and information channels are already reaching capacity. The most direct way around these problems is to somehow compress the audio signal so that it occupies less information "real estate." This way, more program channels can be accommodated. The designer's real challenge is to do this so well that the listener cannot tell that anything deleterious has happened to the audio signal.

Consider these observations regarding speech and music signals and our psychoacoustical perception of them:

1. Few musical fundamental pitches exist above about 4 kHz, and the ear cannot detect definite pitch of individual tones above that frequency.

2. The dynamic range that the ear perceives varies over the frequency range, and the threshold of hearing is much higher at very low and high frequencies than it is in the midrange.

3. Music and speech signals are normally highly redundant in that the waveform of one small "slice of time" will probably look very much like the following or preceding slice.

4. Substantial program energy in a given frequency band tends to mask low-level signals in higher bands.

Current linear digital encoding methods have been designed with other goals in mind and have not necessarily considered these perceptual aspects. Note that in linear encoding systems, fully *one-half* of the information that is recorded deals solely with the range between 10 and 20 kHz. In that range, the ear basically perceives harmonics of lower fundamentals and the general sensation of brightness.

The above observations have become the starting point for new digital encoding methods aimed at reducing the information rate for already crowded information channels. Recently, I had the pleasure of listening to an Apt-X 100 encode/decode system that employed only four bits per channel (!) to encode music and speech program. The unit I heard was developed in England for broadcast applications and had been modified for wider bandwidth operation, so it was operating at a 44.1-kHz sampling frequency. Try as I did with a variety of program material, I could not hear any difference between the input signal and the processed signal in an A/B/X test setup.

The Apt-X system uses three basic algorithms. First, it divides the audio range into three sub-bands, encoding the range up to about 4 kHz with full 16-bit accuracy, but encoding the three higher bands with progressively lower resolution, in accordance with reduced hearing threshold. In the upper bands, the encode quantization step size is varied, based on the masking effect of what has gone before, and a complementary adjustment is made in decoding. Finally, linear prediction considers the "unmasking" effect of spectrally pure input signals and adjusts encoding parameters for greater noise masking over extended program segments with repetitive signals.

One consequence is that CD, for example, could be re-encoded via the Apt-X 100 system and give us eight channels of output instead of two! This would require no fundamental re-engineering of the CD medium but only the addition of encode and decode black boxes. This is not likely to happen.

Data reduction has a more important role to play in normal two-channel audio applications, including the recently announced Philips Digital Compact Cassette (DCC). This consumer format is due to be released in 1992 as a digital follow-up to the immensely successful analog Compact Cassette. It is a stationary-head digital format operating at the normal cassette tape speed of 1⅞ ips. Its thin-film head will have nine tracks for digital record and play (eight data tracks plus one control track) and two tracks for analog play, and will rotate to play the tape's second side. Philips claims that the perceptual encoding system for DCC, which uses 32 sub-bands, yields up to 18-bit dynamic range.

How is such complex signal analysis made so that the costs of reconstructing the signal in playback units can be

kept within acceptable bounds? In analog noise reduction (a close kin to the processes we are discussing here), the complexity of encoding circuitry and decoding circuitry is virtually the same. In the digital domain, the complexity of input signal analysis is far more complicated than the decoding circuitry required to sort it all out. For example, during encoding it might be necessary to perform a fast Fourier transform (FFT) on a succession of short waveform samples. The output of the FFT is a spectrum analysis of the signal, and this might be used in the encoding algorithm to weigh the audibility of masking effects—and hence determine quantization size and signal-to-noise demands in a given frequency band. The hardware needed to perform the FFT may be relatively complex, but the information needed to decode the signal adjustment called for may be no more than a simple instruction imbedded in the playback signal.

Still, the playback processing required for such reduced-data recording is complex enough to require new integrated circuitry dedicated to the standard at hand. In general, however, this playback processing may be no more complex than in linear digital recording, and the benefit of the new process will show up mainly in the reduced demands on the basic recording medium or transmission channel.

Another area where audio data reduction may have an important role is in digital sound for motion pictures. The Optical Radiation Corporation Cinema Digital Sound (CDS) system was introduced in 1990 and may embody some degree of data reduction. Dolby Laboratories has been working on a digital system for film, and word is that they intend to demonstrate it early this year. Dolby Laboratories is the acknowledged expert in analog data reduction techniques, having developed them for nearly 25 years, and their introduction of a digital system would command considerable attention.

It is safe to say that any digital data-reduction system seriously put forth now as a standard must have passed the "ear test." The remaining points of merit that will be used to sort out the various systems will have to do with economy, reliablity, and how the various systems perform under duress.

IVAN BERGER

FROM HERE TO INFINITI

The Infiniti Q45 sedan is solid, luxurious, and large but nimble. More to the point here, it comes with a sound system by Bose.

The double-DIN size head unit looks like a stacked tuner and cassette deck, an uncrowded layout that's just one factor in the system's good ergonomics. The tuner is above the deck; this is a sensible arrangement, as you need to see the dial and will probably fiddle with the tuner's controls more often than the tape deck's. Large buttons select sources—pushing "Tape Play" starts the tape rolling; pushing "Tuner On" switches to radio without ejecting the tape. In the six-button row of station presets, a rigid septum between buttons three and four makes it easy to find your place without looking, while still preserving the unbroken-row look so dear to stylists. The tape buttons are of palpably different lengths, so you can tell them apart by touch, but the radio's up/down tuning buttons are rather small for easy use.

The volume knob is at the lower left corner of the stereo control panel, where it's easy to find but still a bit of a reach. A motorized lid just to its right covers the bass and treble controls, fader/balance knob, and pushbuttons for AM stereo and for DNR and Dolby B noise reduction. All knobs, including the volume control, can be pushed in to prevent accidental resetting. The presence of a balance control is a bit unusual for Bose systems, but it's very much secondary—you have to pull the fader knob out one more click for balance adjustment. The sound system's soft but clear illumination includes a halo around the volume knob. If you have a cellular phone, the system can be set up to mute automatically when the phone is in use.

There's also an optional Sony CD changer, with a separate controller further down and back in the console, to the rear of the shift lever. It's easy to reach there, but you have to take your eyes well off the road if you feel the need to check its disc and track display, and the controller and display are partially obscured when you swing the center armrest down. The controller lets you select discs and tracks, but you can't scan partway through a track. The CD player is well integrated into the system; switching on radio or tape suspends disc play, and turning the changer on again will restart play from the very spot (not just the same track and disc) you'd previously been listening to. Switching discs takes about 15 seconds.

Head unit of the Infiniti/Bose system

The tuner's FM reception was good in the city and fair in the suburbs, but a bit lacking in fringe areas. Urban AM reception was superb, if a bit hollow sounding, but more sensitivity would have been useful in the suburbs. Switching to stereo (on those stations offering it) added a slight edge to the sound, but I couldn't tell whether that was distortion or just a greater increase in high-frequency response than the stations in question may have merited. On AM or FM, new stations did not pop right in at full volume but ramped up from silence. This took so long that it caused a problem in auto scan mode, with the tuner switching away from scanned stations almost as soon as they became loud enough to evaluate. The volume jumps up when switching from CD or tape to radio, a problem that I thought car stereo manufacturers had solved a few years back.

Beyond the head unit lies a typical Bose OEM car stereo system: Four custom-molded, ported speaker enclosures, each containing one full-range driver (4½-inch in front, 6½-inch in back) and digital switching amplifiers (cool-running and compact) with built in active equalization networks. The four 50-watt amplifiers in the Infiniti/Bose system also incorporate compression circuits which only operate at high volume levels to prevent overload distortion.

The car is very quiet. Its sound insulation is so good that traffic noise was less obtrusive when heard from the driver's seat than from my fifth-floor apartment. There was no noticeable wind noise, and road rumble was unobtrusive. At 45 mph, unweighted noise level was nearly 100 dB SPL, but since virtually all of that was in the bands below 50 Hz, the A-weighted noise would presumably be far lower than that. Perhaps because it was concentrated at those frequencies where the system's own bass was beginning to fade out, there was little sense that road rumble was masking the low tones of the music.

Overall, the sound was intimate—breathy and close, as if the soloists were singing a foot or two in front of the listeners. Elizabeth Schwarzkopf (on *Elizabeth Schwarzkopf Sings Operetta*,

Photograph: Richard George

The Infiniti Q45

Angel CDC-47284) sounded very natural, not nasal or edgy. There were some high-frequency resonances, but they were mostly minor, and the most noticeable ones were in the lower treble, where they're excited more often but are easier to take. The effect was overly warm but very clear. Rickie Lee Jones' vocals on "Easy Money" (*Rickie Lee Jones*, Warner Bros. 3296-2) were easy to understand—impressive articulation, for her. The same held true for the title cut on *Walk on the Wild Side: The Best of Lou Reed* (RCA 7653-4-R6), where my wife commented that she'd never heard him so clearly before. But despite the articulation, something seemed to be thickening the sound and putting a slight edge on it—maybe distortion, maybe just the slight midrange overemphasis I sensed. On the Fauré *Requiem* (Telarc CD-80135), the choir blended a bit too much but did not actually get pureed together until I turned the volume well up, which caused breakup on loud choral passages. Sound output level seemed reasonable for all other types of music, though, especially in such a quiet car.

Stereo imaging was a bit odd. At first, I thought I was hearing more depth than usual from Oscar Peterson's "You Look Good to Me" (*We Get Requests*, Verve 810047-2), but I soon realized that there was a sense of unnatural separation, with the drummer far over to the left of the car and everyone else dead ahead of me. On other discs, performers seemed to be arrayed not in real space but on two flanking planes, that gradually converged toward some center point far ahead of me. There was not so much a hole in the middle as a mild but audible depression there. Other listeners said the soundstage was too low, at knee level, and that it was too easy to zero in on the speakers' locations.

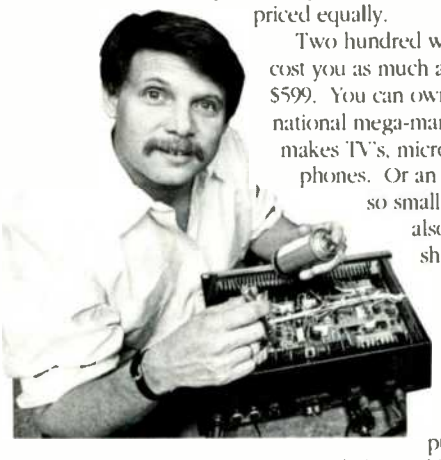
The average of six third-octave frequency response measurements from front-seat positions, taken with an Audio Control SA-3500A analyzer, showed a broad, shallow dip in response from about 200 to 400 Hz, a deeper depression from about 1.2 to 8 kHz, and a steep drop above 12.5 kHz.

The Infiniti Q45 is one of the best cars with Bose sound systems that I've driven. But while that sound system delivers the basic virtues I have come to expect from Bose, it's not Bose's very best.

HOW MUCH SHOULD A GOOD AMPLIFIER COST?

Reflections on the esoteric myths and economic realities of power amplifier design, by Bob Carver.

Thumb through *Audio's* Annual Equipment Directory and you'll see vivid proof that all power amplifiers are neither created equal nor priced equally.



Two hundred watts per channel can cost you as much as $8,400 or as little as $599. You can own an amp from a multi-national mega-manufacturer who also makes TV's, microwaves and cellular phones. Or an amp from a company so small that the designer is also the assembler and shipping clerk.

Can it be that amplifiers are sonically equal? Some seem to have muscular power reserves far beyond their FTC-rated output. Others sound great until they're challenged by a dynamic passage and then sound like a Buick hitting a row of garbage cans. Some are (to indulge in audiophile jargon) so "fluid" that you practically need a drop cloth under them. Others seem to sound harsh, "metallic" and brittle at any output level

A casual comparison of perceived sound quality versus price tags may lead to an erroneous conclusion: that an amplifier must be *expensive* to sound good.

The truth is a bit more complicated: Cosmetic glitz aside, an amplifier's cost is primarily determined by its power supply.[1] In other words, within reason, you generally do get what you pay for when you buy a conventional amp design. But the key word here is "conventional."

My decidedly *un*-conventional Magnetic Field Power Supply is capable of outperforming conventional power supplies of the same size. Result: A significantly better power amplifier value for you.

Let me explain.

NO MAGIC. JUST FOUR CRITICAL QUANTITATIVE FACTORS.

When I fervently state that "*the sound of an amplifier need not be related to its price*," you might think we're veering off into the land of Snake Oil and Gimmicks. Quite the contrary.

I and other members of the scientific audio community know that just four factors determine the sonic characteristics of an amplifier:

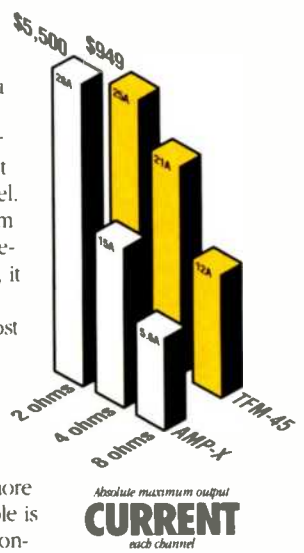
1. Current output
2. Voltage output
3. Power output
4. Transfer function *as evidenced by the interrelationship of frequency response and output impedance.*

These factors transcend the usual trivial debates over tubes vs. solid state, MOS-FETs vs. bi-polar, Class A vs. AB, silver Leitz wiring vs. copper, gold-plated front panels, WonderCaps and my favorite: hand-ground-open transistors filled with a proprietary crystalline substance that stops ringing (honest, I'm not kidding!). An amp can have any combination of these entertaining variables (plus special bricks stacked on top) and yes, sound wonderful...provided it ALSO has high current, voltage and power output and the correct output impedance.

Thus the Four Factors explain why expensive amplifiers generally sound better than cheap amplifiers. But also why that doesn't necessarily have to be the case.

FACTORS 1-3: THE POWER SUPPLY BEHIND THE SOUND

An amplifier's power supply produces current and voltage. A preponderance of one without the other is meaningless.[2] To maximize SIMULTANEOUS current and voltage output using traditional design approaches costs serious money. For example, we recently tested a competitor's $2,000 amplifier that was rated at 20 watts/channel. Believe me, from a parts and materials standpoint, it was worth $2,000, with most of that money being spent on an amazingly rugged power supply. Another more extreme example is my own ultra-conventional Silver Seven Tube amplifier design. Its "money-is-no-object" power supply helps set the price of a pair of S-7's at around $20,000.00.



Now, since it is universally agreed among amplifier designers that current/voltage/power output directly affects the sound of an amplifier,

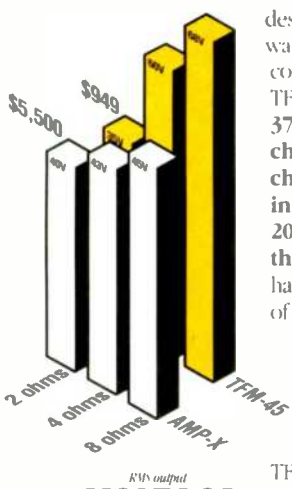
and since good traditional power supplies are costly, price and sonic quality ARE often closely related.

But what if there was a way around the economic constraints of conventional, inefficient power supplies? What if there was a power supply that could deliver awesome simultaneous current and voltage into real-world speaker impedances without shocking your pocketbook?

TFM-45; 375 watts RMS/ch. into 8Ω 20-20kHz with no more than 0.5% THD ($949 sugg. retail.)and TFM-15; 100 watts RMS/ch. into 8Ω 20-20kHz with no more than 0.1% THD ($399 suggested retail).

That's just what my patented Magnetic Field Power Supply does. Without gimmicks, mysticism or loss of bass response. Simply put, a Magnetic Field Power Supply uses progressively more of each line voltage swing as amplifier power demand increases. It's just plain more efficient. How and why this works is explained in our new White Paper called *"The Magnetic Field Story Parts I, II & III"* which you can get free by calling 1-800-443-CAVR.

Right now, let's consider the tangible benefits. The series of comparison charts in this ad shows how my Magnetic Field Power Supply successfully challenges the previously hard-and-fast rule that high-performance power supplies must be expensive. Amp X is a highly-respected solid state design rated at 200 watts into 8 ohms. It cost $5,500. My TFM-45 is rated at **375 watts per channel both channels driven into 8 ohms 20-20KHz with less than 0.1% THD.** It has a suggested retail of $949.



Even more impressive is this same sort of comparison chart with the TFM-45 vs. other amplifiers in its own price range. In deference to how utterly we trounce similarly-priced, conventional competition, we've confined those charts to our new White Paper.

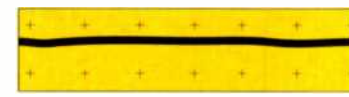
To summarize: Magnetic Field Power Supply technology allows reasonably-priced power amplifier designs to deliver simultaneous current and voltage levels previously only found in extremely expensive "esoteric" designs. Or to look at it another way, in a given price range (say $900-$1,000), Carver simply gives you far more for your money.

FACTOR 4: TRANSFER FUNCTION

Consider two hypothetical amplifiers with identical power supplies. Same power rating; same gain, etc. Yet they still sound different when powering identical speakers through identical cables.

Why? A fourth quantifiable factor is at work. One that, unlike power supply output, is totally independent of economic constraints.

I've left Factor 4 (transfer function frequency response damping) until last intentionally. Because until an amplifier can deliver sufficient power with simultaneous current and voltage (Factors 1-3), transfer function is immaterial.



Amplifier with resistor test load

Same amplifier connected to cables and loudspeaker.

Frankly, I'm guilty of not making this fully clear in the past. Some readers may have gotten the impression that by magically adjusting some arcane parameter called transfer function, one could somehow cause a cheap amp to sound like an expensive one. Nothing could be further from the truth. If there's no guts (power supply), there's no glory (optimized transfer function).

By transfer function, I mean the effect an amplifier's output impedance has on real world frequency response. I don't mean the flat, "DC to light" Rated Full Power Bandwidth found in column 11 of *Audio's* Equipment Directory, which is measured using a resistor as a load. Rather, I'm referring to the frequency response curve that occurs when an amplifier and speaker cables interact with a specific speaker.

As distinctive as a fingerprint, this curve determines the "sound" of each amplifier design. Its warmth or harshness. The quality of the bass. The definition of its upper registers. Even the configuration of the stereo "sound stage" it can create.

My engineering department and I are capable of making one amplifier design sound like another amplifier design to within 99 parts out of 100 (a null of -40dB). For example, we've used Transfer Function Calibration to closely emulate the sonic characteristics of my reference Silver Seven in our TFM-45 and TFM-42 solid state designs. In other cases we've used the process to simply adjust the sound of an amplifier to have pleasant but unique sonic characteristics: in general, a warm "tube" sound with rich, rolling bass and soft yet detailed treble (such as our TFM-22/25 , S-7t and TFM-15). Either way, we use painstaking measurement and adjustment processes to finetune output impedance/frequency response. Not magic.

And, needless to say, we start with highly capable power amplifier designs before the Transfer Function Modification process.

ARE YOU INTRIGUED...OR THREATENED?

My Transfer Function Calibrated power amplifiers have suggested retail prices of from $399 to $1,000. That I even dare to suggest they can sound as good as designs in the $2,000 to $6,000 price range has not endeared me with some audiophiles or underground magazine writers.

That's a real shame, because I have absolutely nothing but respect for well-made, high-ticket conventional amplifiers. Like Rolexes and Lamborghini's, they are a joy to own if you can afford them. But just as a Rolex doesn't tell time any better than the inexpensive watch I'm wearing right now, good sound does not necessarily have to be costly.

If this concept intrigues you, please visit a Carver dealer soon. Bring demo material you're familiar with and be willing to do some critical listening. Compare my designs to competition costing about the same amount as well as to more expensive models.

Your ears alone should be the final arbiter. I feel confident that you will join the tens of thousands of audiophiles who have gotten the best possible value by owning Carver.

Bob Carver

Bob Carver, President

CARVER

CARVER CORP., LYNNWOOD, WA, U.S.A. 1-800-443-CAVR
Distributed in Canada by Evolution Audio Inc. 1-(416) 847-8888

1 *My definition of cosmetic glitz is any part of an amplifier whose sole audio contribution is to cause one's friends to go "Oooooh" when they see one's new purchase. My own Silver Seven amplifier's hand-rubbed piano lacquer and solid granite surfaces meet this definition.*

2 *Since power (watts) equals voltage times current, the same wattage can represent significantly different combinations of voltage and current — and thus very different performance into the same load.*

The Audio Interview

TOM

PHOTOGRAPHS: KEVIN KNIGHT

FROST

Master Producer

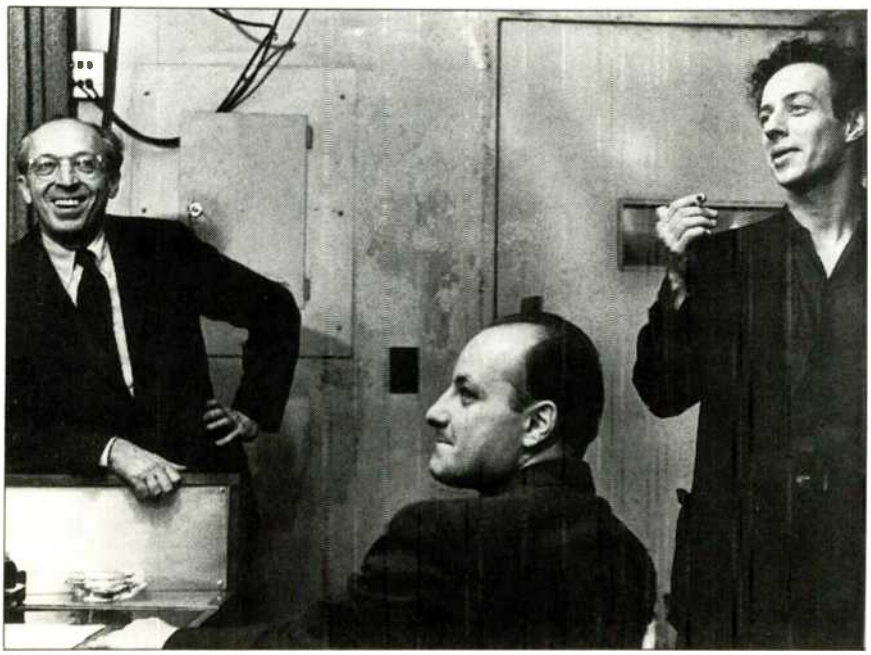
SUSAN ELLIOTT

Thomas Frost is perhaps the most sought-after independent producer in the classical record industry today. His best-known client is the late Vladimir Horowitz, whose recordings he produced for Columbia Masterworks in the '60s and for Deutsche Grammophon and Sony Classical in the '80s.

Frost has recently signed on as a producer and consultant to Sony Classical; he will record, among others, the Berlin Philharmonic under Claudio Abbado, and supervise the CD reissue program of the CBS Masterworks vaults. Until recently, he had been consultant to Deutsche Grammophon, producing recordings by Kathleen Battle, Itzhak Perlman, the Emerson String Quartet, and others.

Born in Vienna, Austria, Frost began violin studies at age seven and sang for a time with the Vienna Choir Boys. He came to the U.S. in 1938 with his parents, and in 1947 enrolled at Yale University, where he studied with composer Paul Hindemith. In an exclusive interview, he talked about his career as a staff and independent producer, and about the last two Horowitz discs, both of which were recorded in the famed pianist's Manhattan living room.

Aaron Copland, Tom Frost, and pianist William Masselos at Frost's first Columbia recording session, 1959. Photograph: Courtesy Tom Frost; © Fred Plaut.



Frost and Vladimir Horowitz in Milan, Italy, 1987, discussing Mozart's Piano Concerto No. 23. Photograph: Courtesy Tom Frost; © Silvia Lelli Masotti.

How did you get into this business? Didn't you start out as a violinist?

Yes. I played violin in the New Haven Symphony while I was at Yale, but by the time I left, I had switched to viola. When I came to New York in '51, I was able to get some assignments playing viola in Broadway pit orchestras. I also taught privately, but I still found it difficult to make a living.

At the time, I was a [viola] student of Lillian Fuchs, who recorded for American Decca. She knew something about the industry, and she told me there was a need for qualified musicians who could guide technicians in the recording and editing process. At this point, tape had been in use for only five years—everything had been direct-to-disc before then. So there was tremendous expansion going on in the industry.

How did you get in the door?

I actually found my first job in the *New York Times*. I was getting desperate, looking for anything. Finally I saw an ad, "Interesting job, Decca Records." Decca was very successful then; it had a great many popular artists, like Bing Crosby and Ella Fitzgerald. It was one of the first companies to do complete original-cast recordings.

The job turned out to be strictly clerical. The only "interesting" part was going to sessions to go over the AFM [American Federation of Musicians] contracts and making sure everyone had filled out the proper forms. The man who interviewed me said I was way overqualified, but I talked him into letting me have the job anyway.

I started in September of 1952. Three months later, there was a big shakeup, and they fired 50 people. I was on the list. Then Sy Rady, who ran the classical department, had the idea that I could replace one of the producers he was losing and continue in my old job at the same time. And all for $50 a week!

I learned how to edit from Eddie Remusat. I'm very grateful to him; he really showed me what could and couldn't be done with a razor blade. He now runs a small recording studio near 57th Street. I also learned a great deal from the head engineer of Decca, Charles Lauda. Within a few months, I was doing my own sessions. One of the first was Andrés Segovia.

Where did you record?
The ballroom of what was then called the Pythian Temple, on West 70th Street between Broadway and Columbus. It was a great hall—quite live, with a hardwood floor and ornate plaster surfaces. I'm still very fond of some of the records we made there.

Once you ran your own sessions, did they pay you more?
Yes, in a manner of speaking. Things were tight, and Sy felt guilty that he couldn't get me more money. So he arranged for me to play violin on pop sessions. I often made three or four times the amount of my salary in a given week, since I was getting union scale.

What was your style as a producer at this time?
I was a great perfectionist. I apparently had a very good ear. I would work the artists very hard, while at the same time attempting not to lose the musical excitement. There were a lot of retakes.

When did you leave Decca?
In 1957, I took six months off to study conducting with Leon Barzin. Conducting was always one of my dreams. Then I found a job at Urania, a company started in the late '40s/early '50s. It had a catalog of mostly licensed material by European artists. Sig Barth bought the catalog and wanted to make new recordings as well. So he hired me as the A & R director.

Whom did you record for Urania?
The Kansas City Philharmonic; Barbara Cook—we did a Rodgers and Hart recording called *From the Heart* of which I'm still very fond; I did the saxophone concertos of Glazunov and Ibert and hired Skitch Henderson to conduct. Just last summer he hired me to produce a New York Pops record.

Skitch introduced me to Schuyler Chapin, who was Skitch's manager at CAMI. [Chapin was former Metropolitan Opera General Manager and current Vice President of Concerts and Artists for Steinway & Sons.] When Schuyler later went to Columbia Masterworks, he called me. I came in as Associate Producer at the end of 1959.

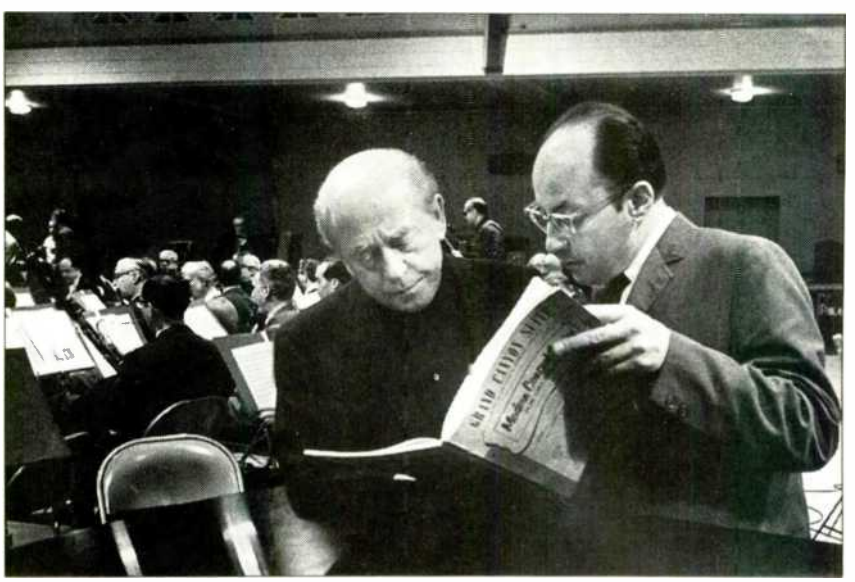
Who was your immediate supervisor at Masterworks?
I reported to Schuyler, but John McClure assigned my daily chores. John's title was music director. Columbia Records really felt like a small company back then. Goddard Lieberson was the president and Schuyler reported to him. Tom Shepard came in as a trainee shortly after I arrived.

We were at 799 7th Avenue. There was a recording studio on the top floor that was later bought by A & R Studios. And, of course, we had our own studios at 30th Street too.

Which artists did you record?
My first recordings were with Bruno Walter in Los Angeles. He was 83 or 84 at the time and had stopped performing publicly. The orchestra we used consisted of L.A. Philharmonic players and some of Hollywood's top studio musicians; we called it the Columbia Symphony Orchestra. The sessions were in the American Legion Hall in Hollywood, one of these wonderful, old-fashioned ballrooms with wood floors and plaster and balconies and all kinds of uneven surfaces that reflect the sound in all directions.

Later, I took over the Eugene Ormandy/Philadelphia Orchestra sessions; I

It is in the record's interest for a producer to act as a critic offering suggestions in the area of balance and clarity.



Eugene Ormandy and Frost preparing to record Grofé's Grand Canyon Suite *with the Philadelphia Orchestra. Photograph: Courtesy Tom Frost; © Adrian Siegel.*

Frost, Lucine Amara, Richard Tucker, Eugene Ormandy, Maureen Forrester, and George London at the Manhattan Center while rehearsing Verdi's Requiem, *circa 1966. Photograph: Courtesy Tom Frost; © Adrian Siegel.*

probably produced about a hundred recordings with them until they switched to RCA in 1968. I also worked with George Szell and the Cleveland Orchestra for about three years in the early '60s. I respected Szell but found him cold as a person, whereas Ormandy was very warm and was like a father to me.

Didn't you end up running Masterworks?

Yes. I had worked my way up to producer and then executive producer. But I was not very popular in some circles. I was never known as a company man, since I often fought on the side of the artist when I felt that the business affairs department was being unfair.

Clive Davis had succeeded Goddard as president of Columbia Records, and when McClure left, Davis wasn't sure he wanted to give me the top job. At the same time, Tom Shepard made a pitch for it. So Clive proposed that Tom and I be codirectors of Masterworks. I agreed. This was in '73 or '74. Together, Tom and I signed Michael Tilson Thomas and Murray Perahia. Then Tom took the top position at RCA Red Seal and I was left alone at Masterworks.

Which then put you in the top slot?

For a while. During the year we were codirectors, Clive was fired, and Goddard came back in as acting president. Goddard was never convinced I should have that job either. In the late '70s, he brought in Marvin Saines as Vice President of U.S. Masterworks, with the A & R Director—me—and Marketing Director under him. Saines was very difficult to work for; at least I managed to get him to agree to signing [cellist] Yo-Yo Ma.

Then Masterworks was reorganized on an international basis. They wanted to revamp the whole department. In the spring of 1980, when I was in Salt Lake City recording the Mormon Tabernacle Choir, I got a call from personnel, offering me a three-year contract to make five records a year for a nice annual salary. And I said okay, because I was getting tired of having to fight for everything I wanted.

Consultancies aside, you've essentially been independent ever since. How does that work? Do artists and labels come to you or vice versa?

It goes both ways. A label will approach me directly or an artist or organization will come to me and then I work out a proposal with a label. That's what happened for instance with the Yale Cellos [*The Sound of Cellos*], which was sold to Delos, and with Barbara Nissman's Prokofiev piano recording [*The Nine Piano Sonatas*], which is out on Newport Classic.

Or I'll get a call from, for instance, Bob Hurwitz at Nonesuch. I brought the Kronos Quartet to Nonesuch and produced their first record for the label.

How do you get paid?

Companies generally pay me a flat fee. The only time I get a royalty is when an artist comes to me and I make the deal with the label. In that case, I'll keep 20 percent of the royalties and pay the artist 80 percent. I got very high—I mean unprecedented—fees for Horowitz's last two recordings.

What was your arrangement with DG?

I had a nonexclusive contract as a consultant. I coordinated the details of some of their U.S. recordings, including the Met "Ring" and [DG] projects with the New York Philharmonic, Boston Symphony, and Chicago Symphony. My contract ended last October when I entered into an agreement with Sony Classical.

Aren't you producing some DG artists?

I'm still working on my second record with the Emerson String Quartet; the Carnegie Hall spirituals concert that we recorded last April with Kathleen Battle, Jessye Norman, and James Levine, and a cello/piano record with Matt Haimovitz and Levine.

In watching you record the Emerson Quartet, I thought you, at times, were more aggressive musically than many producers. You almost functioned as a music director, giving them tempo suggestions and so on.

I had very good musical training and I came out of that with strong opinions. Not that I want to force my views on a musician, but having studied composition and theory and having analyzed things backwards and forwards all those years, I know how music is constructed. Some artists are negligent in the aspects of interpretation that have to do with balance and clarity. So I'll make specific suggestions in that area. If the artist chooses to reject them, that's his perogative.

Some producers say it's none of my business. They would never tell an artist that a tempo is too fast or too slow or there's too much rubato. They take it down as it's played. But I feel it is in the interest of the record for a producer to act as a critic, musically speaking.

Kathleen Battle has a reputation for being a real prima donna. How does she respond to your approach?

She welcomes any and all suggestions. In fact, after our first sessions together, she told me she wanted more input from me, that I should be "brutally frank." And now, at least for the moment, I seem to be one of her favorite producers.

How have other artists responded?

Ormandy was very grateful for suggestions, whereas I couldn't tell Szell anything; I don't think he would admit that any producer knew enough to tell him anything. I never worked with Bernstein in my days at Columbia, but I visited some of his sessions. He seemed to want the producer to be completely passive and just concentrate on the sound. Some conductors are that way.

How about Horowitz?

I had to feel my way with him. He asked my opinion some of the time, but in his case, it was more in the editing that I used my expertise. He played complete pieces and movements and didn't worry about mistakes. He didn't like to work in small sections. So we'd have five or six performances of a whole piece, each one played very differently—faster, slower, different rubato, different pedalling—because he was so spontaneous and imaginative. Making it all into a unified performance was a big job.

How many Horowitz recordings did you do?

About 15 altogether. I made 10 records with him at CBS, starting with his first in 1962. In the last five years, I did five, the more recent of which was *The Last Recording* for Sony. Before that, on DG, we had *Studio Recordings, 1985*, *Horowitz In Moscow*, the Mozart A Major Concerto [K488], and *Horowitz at Home*.

His last two discs were recorded in his living room in Manhattan. That must have been a challenge.

The difficulty was getting a satisfying piano sound in a small, confined space. What tells the mind that it's a small space are the very quick reflections. That sound, whether it's solo violin, flute, or piano, is tolerable in person, but not on a recording.

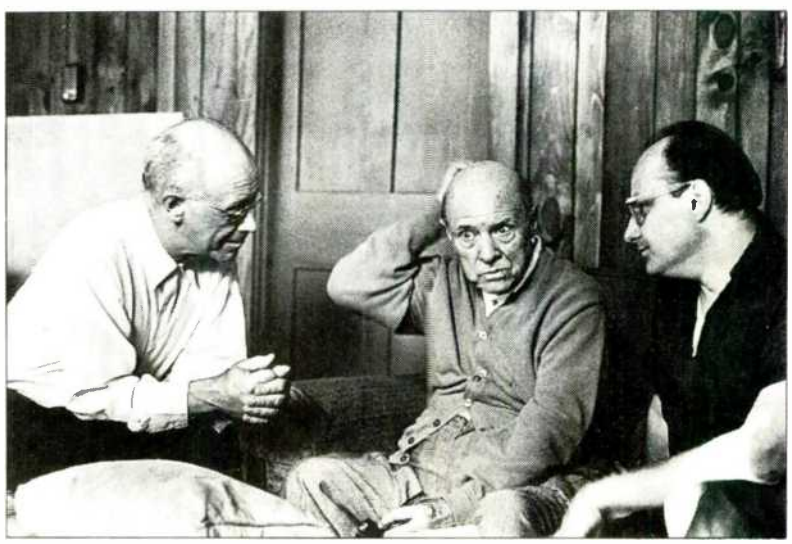
So our aim was to avoid reflections. Tom Lazarus, my engineer, decided we'd have to damp down the room. But we couldn't overdo it, because it would become dead, which was bad for the recording and unpleasant for Horowitz while performing.

So we covered the window glass with Sonex—pure glass is very reflective, especially [in] the high frequencies—which also shut out any sound coming in from the street, and over the large mirror opposite the piano.

On the walls we used composition board, which is partially, as opposed to totally, absorptive. Horowitz was happy with these adjustments, since he felt that the room was a little too live with the piano lid open. He usually played with it closed.

The ceiling was another problem. With the lid open, a lot of the sound travelled up there and came right back

Kathleen Battle welcomes any and all suggestions; in fact she asks for brutal frankness.



Rudolf Serkin, Pablo Casals, and Frost at the Marlboro Music Festival in Vermont. Photograph: Courtesy Tom Frost; © Fred Plaut.

Vladimir Horowitz and Frost at RCA Studios New York City, 1986. Photograph: Courtesy Tom Frost.

Frost, Horowitz, and engineer Tom Lazarus during the first recordings at Horowitz' home. Photograph: Courtesy Tom Frost; © Christian Steiner.

down again. So Tom invented an ingenious way of holding two pieces of Sonex against the ceiling without gluing them. (That would have been vetoed by Mrs. Horowitz anyway.) He mounted two beach umbrellas on top of tall microphone stands and placed a 4-by-4 foot piece of Sonex on top of each of the umbrellas. Then, Tom simply raised the stands until the umbrellas squeezed the Sonex up against the ceiling.

By the way, we cut our own stick for the piano, about 12 inches longer than the normal stick. That reduced reflections from the lid into the mikes. And because the lid was more open than usual, we got more direct and less lid-reflected sound. Of course, we had to be careful not to be too close, because then the sound would be ugly and percussive.

Where were the mikes?

In all the piano recordings I do, the microphones are, depending on the acoustics of the room, three to ten feet away from the keyboard, horizontally. In this case they were three feet away and about eight feet high.

How were they mounted?

Tom put push pins into the molding near the ceiling and stretched a very thin fish line from one end of the room to the other. This supported the two microphones. One was near the far end of the piano, picking up bass frequencies, and one was toward the hammers, where more treble is produced. We used two omni Schoeps Collette series microphones.

Was there a difference in the installation between Horowitz at Home ***and*** The Last Recording?

No. The main difference was in the use of digital reverb after editing. I wanted to be very literal in the first record so I added just a tiny bit of reverb to get a pleasant, intimate "at home" sound.

With *The Last Recording* I felt I could be freer in enhancing the sound. I wanted to create the illusion of a small concert hall rather than a large living room. So we used more reverb and got a richer, more sumptuous sound. Frankly I like it better.

What tape machine did you use?

On the DG recording, we used a Sony professional DAT machine that was modified with Apogee filters by Gotham Audio. DAT machines are very

handy for a number of reasons. One, because they hold two hours of music; on the Sony U-Matic system you have to change every hour. Two, the indexing capability makes it easy to find takes quickly.

Did you use a professional DAT on The Last Recording ***as well?***

No, Sony wanted me to use its new 20-bit system, which uses a two-track reel-to-reel machine and quarter-inch tape. The extra bits give wider dynamic range and therefore make the recording quieter, although the difference is barely audible. I did use a pro DAT as well, for reference.

Do you usually record two-track?

Most of the sessions I've done since leaving CBS have been two-track, including orchestras. It can be nerve-racking because you can't remix anything; you have to get all the balances correct from the start.

Why go through that?

Because multi-track is more time consuming and because I like the challenge of getting it right in the first place instead of "fixing it in the mix." When you have a good hall and orchestra, you can get excellent results on two tracks. On the other hand, for live concerts and music that has additional elements—soloists, chorus, etc.—it's safer and in some cases essential to record multi-track.

To what extent do you get involved in engineering?

A recording should reflect my taste in every respect. I'm responsible for the sound, so I take an active part in sound quality and balance. This does not follow the German system, where the engineer is responsible for sound and balance and the recording director is responsible strictly for musical performances. That's very limiting. I don't like the idea of being at the mercy of an engineer.

Would you always rather record in a hall than a studio?

I've never found a studio that is ideal for classical recording, including Columbia's old 30th Street studio. That was a multi-purpose studio that gave you fairly good results for a lot of different situations, but it had certain shortcomings—it could be too dry.

What's your favorite hall for recording?

Kingsway Hall in London. You could put up microphones almost anywhere and it sounded good. It's not operative anymore. I also liked the American Legion Hall in Hollywood, where I did the Bruno Walter recordings; Boston Symphony Hall, and Carnegie Hall, except for the subway rumble.

Given all the modifications it took to turn Horowitz's living room into a decent environment for recording, why did you record him at home?

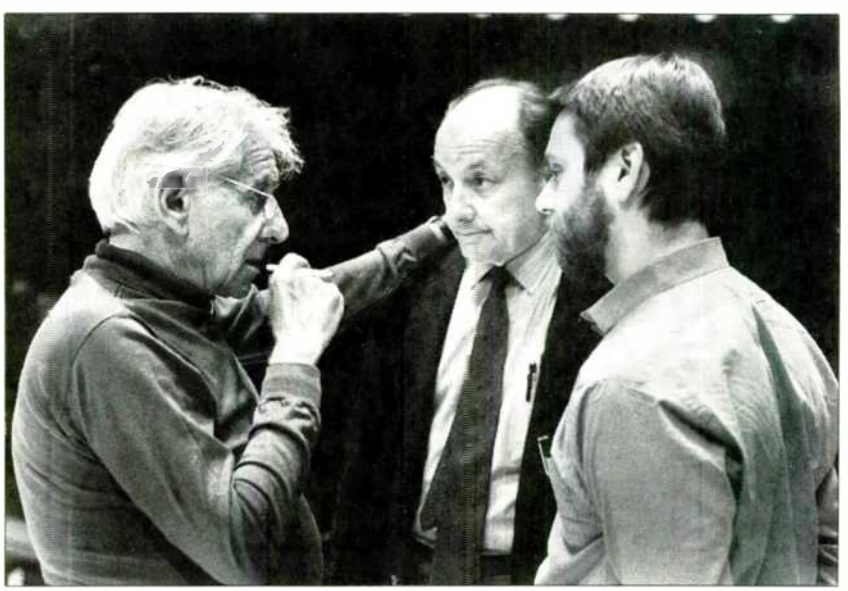
I actually resisted the idea for a long time. But I was beginning to see there would be no recording at all if we at least didn't try it at home.

Of course, it was much more convenient for him—if he didn't feel like playing one day he could just call me up and cancel. Whereas if we had booked RCA Studios, where he recorded the first DG disc, cancelling was awkward. Besides, he never liked the trip downtown through traffic before a session.

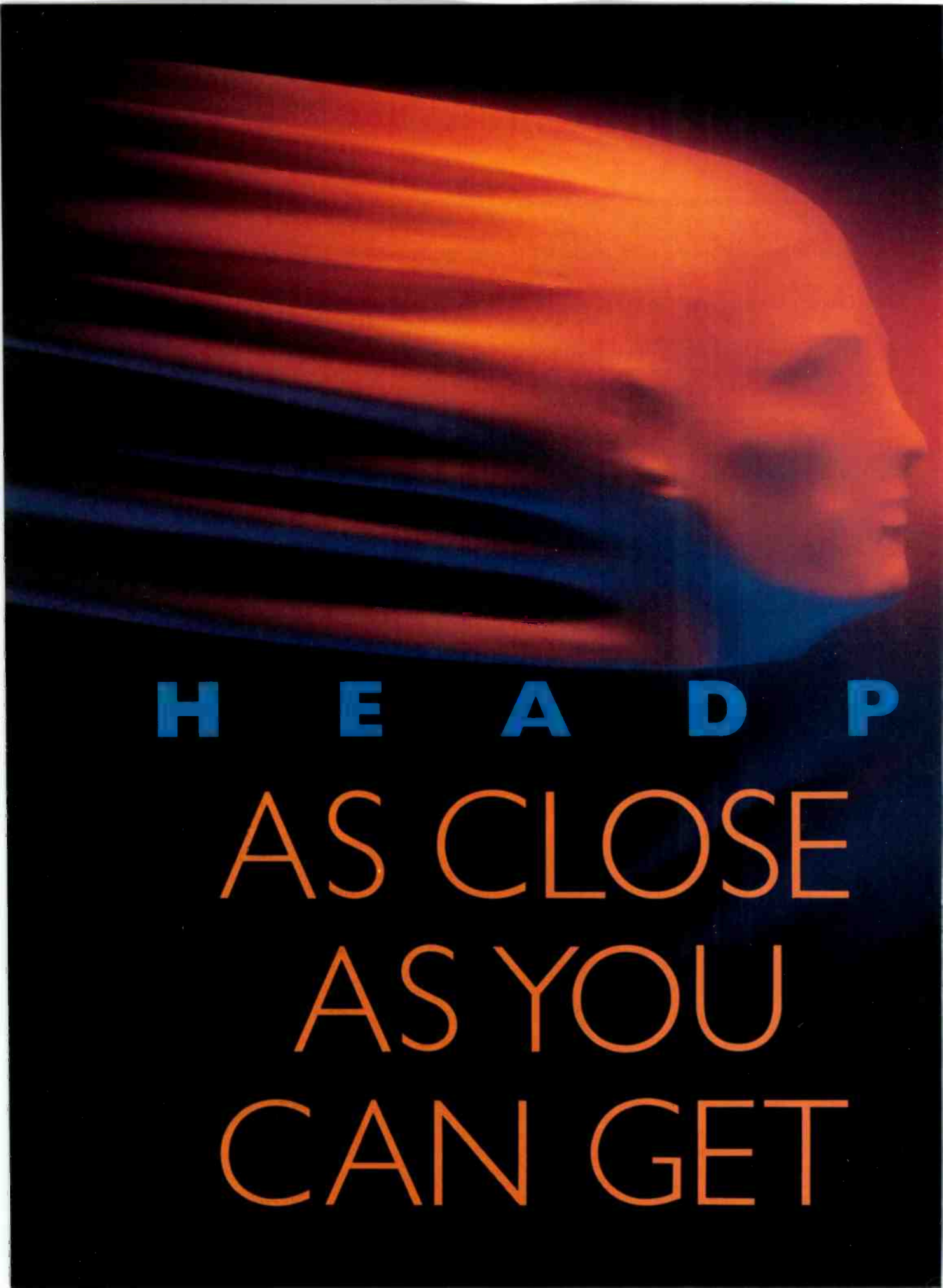
As you look back over your career, what projects have been the most rewarding?

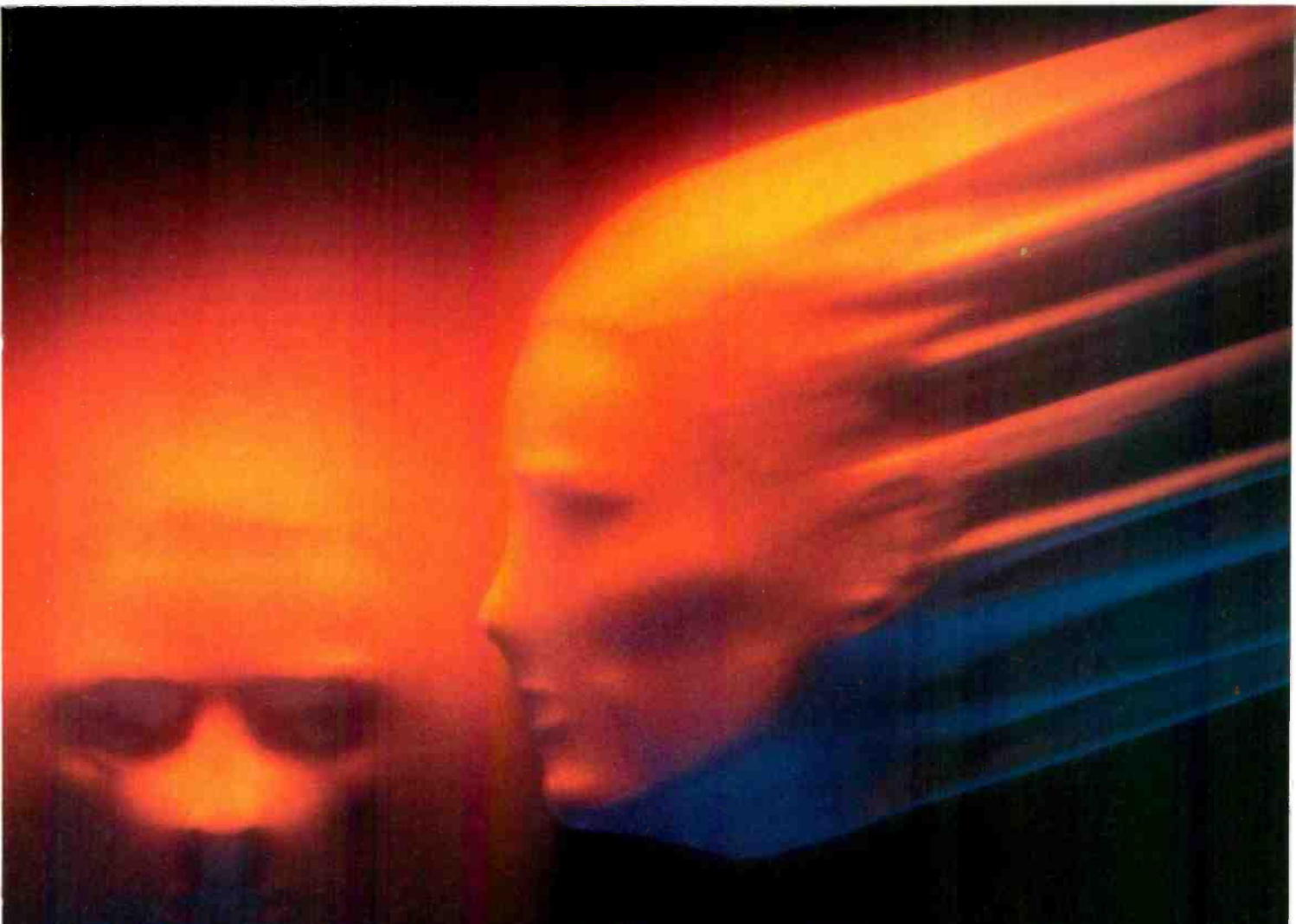
Certainly Horowitz, the Ormandy recordings, Bruno Walter, Rudolf Serkin, Pablo Casals conducting the Marlboro Orchestra. There are really too many to pinpoint. ◭

Getting a satisfying piano sound in Horowitz' living room was very difficult because of the quick reflections.



Leonard Bernstein, Frost, and engineer Daryl Bornstein at the Music For Life concert, Carnegie Hall, 1987. Photograph: Courtesy Tom Frost; © Henry Grossman.


HEADP
AS CLOSE
AS YOU
CAN GET



H O N E S

EDWARD M. LONG

Listening with headphones can probably bring you as close as you can get to hearing exactly what is on a recording or what is being broadcast over the radio or TV. I say probably because, while the potential is there, all headphones have their own limitations and none are capable of provicing ideal performance. In this article, I will attempt to show why this is true and also why it is so difficult to obtain measurements on headphones that correlate well with subjectively perceived performance. I will then show how I propose to overcome these difficulties so as to give you some idea about how headphones perform. (I should also mention that I often use the term "earphone" rather than "headphone" when discussing them; "earphone" covers a wider variety and includes over-the-ear and in-the-ear types, whereas "headphone" tends to connote only over-the-ear types.)

Some of the factors that affect earphone testing are the effects produced by the outer ear (which includes the pinna, concha, and ear canal), the directional effects produced by the sound field, and the method used to produce the program material to which you will be listening. Figure 1, a diagram of the outer ear, shows the major parts I will be discussing.

PHOTOGRAPH: BILL KOUIRINIS

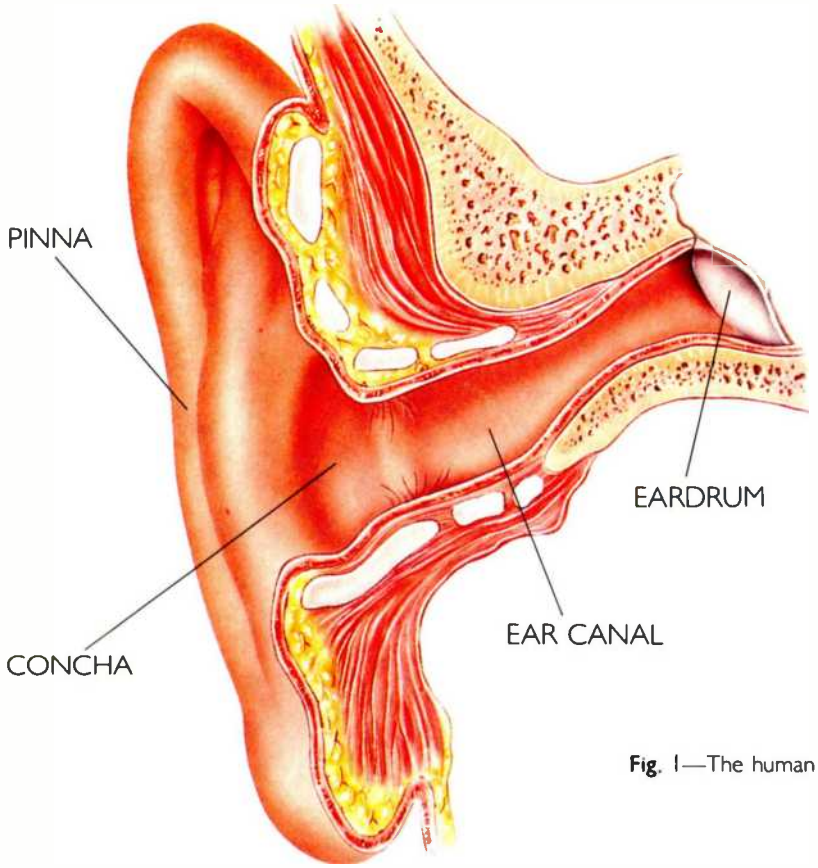


Fig. 1—The human ear.

Illustration: Judith Glick

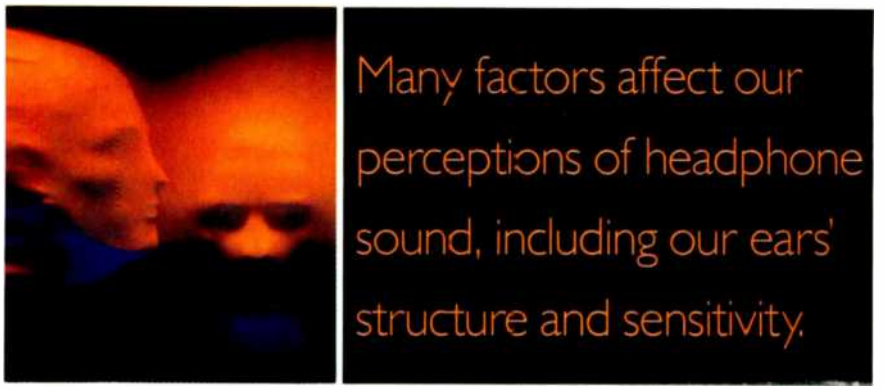
The outer ear produces a resonance that has a maximum at about 2,800 Hz; this causes an increase in the sensitivity of the ear of about 15 dB. Figure 2 shows the average of the sound pressure versus frequency measurements on 16 real human ears, made with a probe microphone placed near the eardrum, which verifies this effect of the outer ear. This should come as no surprise to anyone who has ever seen a set of hearing versus sound pressure level (SPL) curves. (These curves are also known as the Fletcher-Munson curves after the men who first published them.) Figure 3 shows a set of curves for the perceived loudness, in phons, at different sound pressure levels; these curves are normally used to show the change in sensitivity of the ear in the lower frequency range for different sound pressure levels. The point I wish to make is that in each of these curves the maximum sensitivity of the ear, at any SPL, is at about 3 kHz. Don't be confused by the fact that Fig. 2 and Fig. 3 seem to be the reciprocals of each other; remember that Fig. 2 shows the increase in sensitivity of the ear at this resonance, while Fig. 3 shows that the perceived threshold level is lower for sounds at this frequency. More recent studies, dealing specifically with earphone and hearing-aid research, have expanded our knowledge of the outer-ear resonance effect. The question arises then: Should I find some way to include this effect when measuring earphones? Should I try to build an equalizer for it? I *don't* include it when measuring loudspeakers, but remember, earphones can be of the in-the-ear type and this outer-ear resonance may be affected by their placement in or near the listener's ear canal.

Should I also include the possible variations in the effects produced by the pinna or concha when different types of earphones are placed on or around them? The pinna is responsible for much of our ability to determine the direction from which sounds arrive at the ear. What happens to this direction-finding function when the earphone is located close to the pinna or, worse yet, when it is placed directly in the ear, essentially short-circuiting the pinna and its effects? The pinna also has its own resonance-producing cavities or folds as well as "shadowing" effects; how are these affected by earphone placement? Should I try to compensate for these effects in the measurement by the use of some equalizing circuitry?

Figure 4 is a diagram for an artificial ear made by B & K which has long been used to test earphones; its major application has been the testing and calibrating of audiometric headphones used for evaluating hearing loss. Although it has been designed with a cavity that is intended to duplicate the acoustical effect produced by the canal of a real ear, it does not try to duplicate the effects of a pinna. I have one of these B & K Model 4153 artificial ears in my laboratory, but I decided not to use it because it has not been fully agreed on as a standard and because it has some obvious limitations when you think of the broad range of different earphone types available.

One of the ways that the pinna helps to determine the direction from which a sound reaches the ear is that it produces different acoustical responses for sounds arriving from different angles. Some recordings have been made that take advantage of this characteristic of all ears to produce sounds which seem to move up and down as well as across the space between loudspeakers, thus fooling the ear. This is done by dynamically changing the shape of the sound spectrum while the sound is "panned" from one channel to the other. Also, have you ever noticed that when people are really concentrating on something they wish to hear, they lower their head slightly and turn one ear a little in the direction of the sound source? This is because the response of the ear changes with the direction of the incident sound and appears to be best when it comes from a point slightly up and to the side of the head. How can I take this into consideration when measuring earphones?

It is a fact that the acoustics of the listening environment can produce a different subjective response to a sound, whether that sound is produced by a "live" source or reproduced by loudspeakers. The same sound can be perceived as very bright and sharp when you hear it in a hard-surfaced, reverberant room, or very dull and dry when you are listening outdoors. Some of this effect will be due to the way the sound arrives at the pinna. In a reverberant room, the sound will come from many directions; besides the sound coming from the direction of the original source, there will be sounds that reach the ear from other directions as well. This is because, if you are in a reverberant environment, the sound will be reflected from surfaces to the sides, above, and



even behind you. Depending on the direction from which these sounds arrive at the ear, the characteristics of the pinna and concha will cause their amplitude versus frequency spectrum to have a different shape, with an increase of total perceived energy in the mid-frequencies. The result of the sounds coming from different directions is to make the sound seem bright. In a free-field or anechoic environment, the sound will come only from the direction of the sound source, with no added energy from other directions to "enhance" its spectral content; thus it will seem duller. If the listening environment can change the perceived spectrum of the sound, how can I make provision for this when I test and evaluate earphones?

When you consider that the pinna and the sound field definitely interact in a way that changes the frequency spectrum of the sound pressure at the eardrum, you will probably conclude that measurement technique should

Fig. 2—Average sound pressure level measured at eardrums of 16 people.

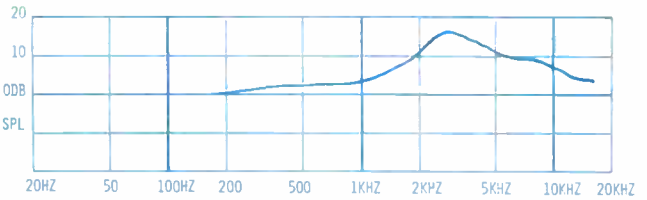


Fig. 3—Sound pressure levels required for various perceived loudness levels (in phons), at various frequencies. The ear is most sensitive at around 3 kHz.

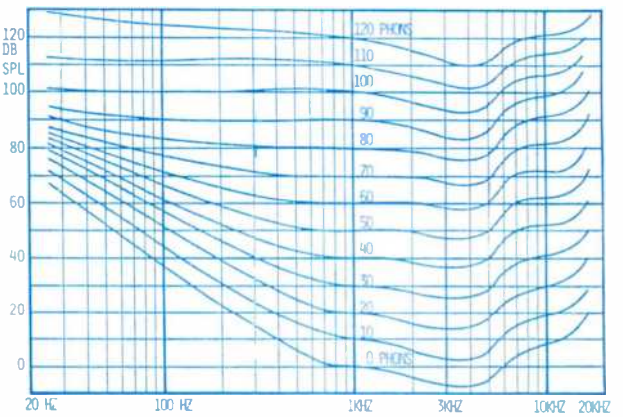
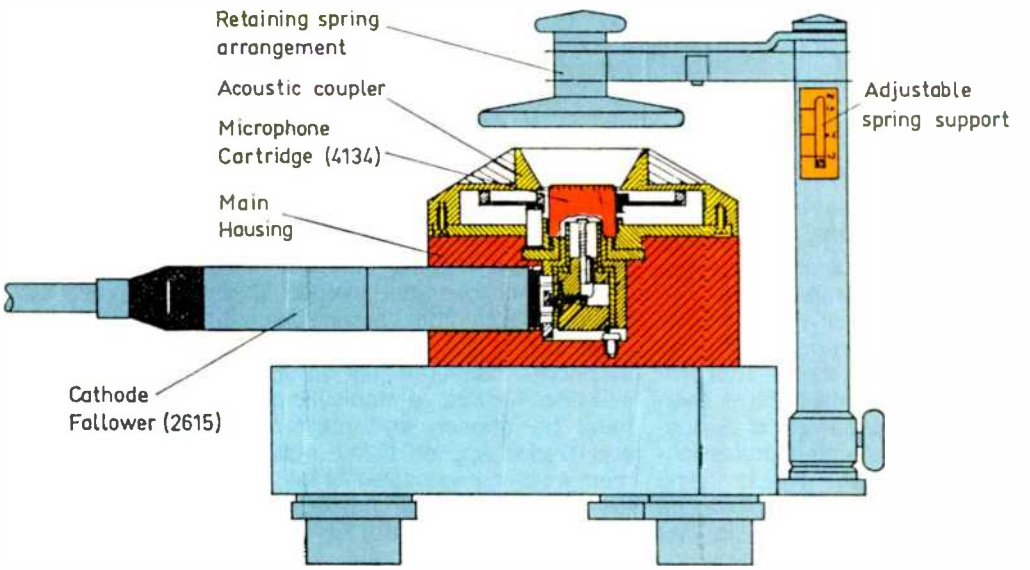


Fig. 4—Brüel & Kjaer Type 4153 Artificial Ear, used widely for testing audiometric (rather than consumer) earphones.



probably include some way to handle this. The problem is compounded if you consider that most researchers agree that all pinnae are different; no two ears are the same. So what am I to do, now that you know that a "standard ear" is not only *not* available but could be the food for another great debate?

Recordings have been made which purport to be ideal for earphone listening; such "binaural" recordings include those made with closely spaced microphones or microphones in a dummy head: There are a variety of dummy-head recordings, with the microphones located either down inside the head, at the bottom of artificial ear canals, or directly in the side of the head (with or without artificial ears). These recordings, since there are so many unknowns about them, usually leave something to be desired. Part of the problem, even in the best recordings where all the details have been considered and accounted for by conscientious and dedicated professionals, may be the result of substituting someone's idea of the ideal pinna and concha for yours. It may just be that your own reference ears will never allow you to be convinced that the "standard ears" used to make the recording are the same as yours. Some artificial-ear recordings have been equalized to account for the outer ear resonance, but those "standard pinnae" are still there.

There is also some disagreement among the experts as to how to compensate, in a standard earphone measurement, for the fact that the response of even a "standard ear," if they could agree on what that standard would be, would be different for sounds arriving from different directions. This is known in the earphone business as the "free field versus diffuse field" argument. As described previously, free field means that the environment has no surfaces that could reflect sound and the sound will arrive at the ear from only one discrete angle. This means that, to standardize earphone measurements using the free-field method, a particular angle must be chosen and appropriate equalization applied to the measurement which compensates for the spectral shaping effects that would be caused by a "standard ear" when it received sounds from that angle in a real free field. The angle usually chosen is 0° incidence angle, or directly in front of and in the same horizontal plane as the ear. As I said earlier, most people usually lower and tilt their heads when listening intently, so this may not be the best angle after all. Another argument against a totally free-field type of measurement standard is the fact that most people who have had the opportunity of listening to speech and music in an anechoic chamber do not think that it sounds very natural.

The diffuse-field argument assumes that the environment causes energy to arrive from all possible angles as well as directly from the source, which leads to the idea of averaging everything into one measurement and applying appropriate average equalization to compensate for the effects of a "standard ear." Since most reverberation chambers are not the kind of place that one would like to listen to speech or music, I have my doubts about this method being the ultimate answer. The proponents of these alternate ways of measuring earphones put forth strong arguments for their cases, but I am not convinced that either side has all the answers. Research has also shown that the range above about 8 kHz is really problematical as far as earphone measurements are concerned, and I have found no consensus about what to do about the variations in response in this range; most audiological testing and calibration focuses on the range below 8 kHz because of many factors, mainly due to standing waves, which affect measurements made above this frequency.

Brüel and Kjaer has recently brought out a manikin for use in testing earphones, microphones, etc., nicknamed "HATS," an acronym for Head and Torso Simulator. Figure 5 is a photo of the HATS unit in my laboratory, with a set of earphones in place over the artificial ears. Rather than taking sides in the debate over whether free-field or diffuse-field measurements are best, B & K supplies various equalization curves and calibration data on a 3½-inch floppy disk which can be used with the B & K 2133 Frequency Analyzer. The equalization can be used to compensate for either the free-field or diffuse-field characteristics of the manikin. These correction curves are shown in Figure 6. The diffuse-field correction is milder than the free-field correction. I made measurements on different types of earphones using "HATS" as part of this investigation into the state of the art of headphone evalu-

Fig. 5—Brüel & Kjaer Head and Torso Simulator (HATS), with headphones in place.

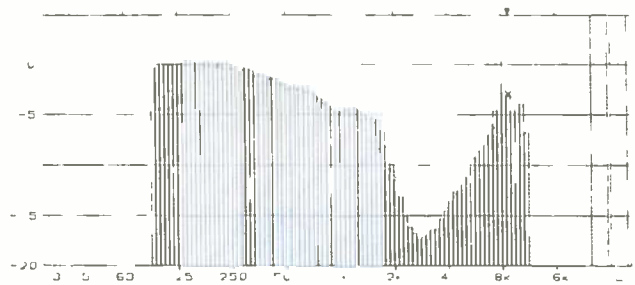
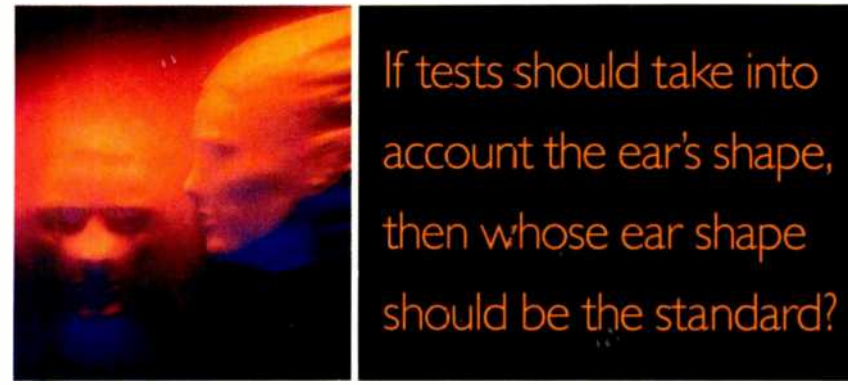


Fig. 6—B & K HATS correction curves for free-field (vertical bars) and diffuse-field measurement.



ation. While I think that it has some real potential as a design and development tool, I am not certain how well it may serve the purpose for which I would like to use it, i.e., presentation of graphical data that correlates well with perceived sound quality. I am not saying that it could not be done or that there is any device that performs better, just that there may be a simpler way to present and correlate technical measurement information with what we hear, at least to some degree, until standards can be agreed on.

As an example of the problem, I made a set of measurements of the Stax SR-Lambda Professional electrostatic Earspeaker (as it is called), shown in Fig. 7. The curves made with the B & K HATS free-field and diffuse-field equalization both seem to show inadequate compensation for the outer ear resonance effects. Stax has made available a Model ED-1 diffuse-field equalizer for the Lambda Pro that has a different compensation curve than does the B & K "HATS"; the latter is intended to produce a flat amplitude versus frequency curve. The problem boils down to this: Each individual manufacturer still sets its own goal since there are no standards.

Even if we can generate meaningful measurements that can be correlated to what we hear, I still believe in having a listening panel audition products and gathering their written comments. I will then try to correlate what they perceive with technical measurements. The technical measurements will be made before the listening sessions so that I can make certain that the product does not have any serious defects and that there are no interface problems in the system. I also decided that, for the evaluation of earphones, it would be a good idea to have a set of standard earphones against which comparisons could be made. I chose the Stax SR-Lambda Professional electrostatics for a number of reasons, the most important of which was the long-time general consensus that they are arguably the best that are widely available. This gives the reader of any earphone report a chance to hear the same Stax reference earphones with SRM-1/MK-2 drive electronics and make his own comparisons. This is possible with earphones because there are none of the deleterious listening environment or interface effects that are always present when trying to audition other audio components. With earphones you are "as close as you can get."

Fig. 7—Response of Lambda Pro electrostatic Earspeaker measured without equalization (A), measured with B & K HATS free-field equalization (B), and measured with B & K HATS diffuse-field equalization (C).

To show the tests I finally settled on, I refer you to the Lambda Professional Earspeaker report to follow. Since these tests will be standard, at least for a while, I hope that you find the report useful and informative. I would like to thank Mead Killion of Etymotic Research for his helpful comments and suggestions. If you have any comments or suggestions of your own, please let me know. If you are interested in earphone research and testing, please check the accompanying list of articles on earphones.

AS CLOSE AS YOU CAN GET

REFERENCES

1. Werner, Erhard, "Headphones—Still a Lot of Questions," AES Preprint No. 2212 (March 1985).
2. Thiele, Gunther, "On the Standardization of the Frequency Response of High Quality Headphones," *Journal of the Audio Engineering Society*, Vol. 34, No. 12.
3. Shaw, E. A. G., "Ear Canal Pressure Generated by a Free Sound Field," *Journal of the Acoustical Society of America*, Vol. 39, No. 3.
4. Shaw, E. A. G., "Ear Canal Pressure Generated by Circumaural and Supraaural Earphones," *JASA*, Vol. 39, No. 3.
5. Munson, W. A. and Francis M. Wiener, "In Search of the Missing 6 dB," *JASA*, Vol. 24, No. 5.
6. Shaw, E. A. G., "Hearing Threshold and Ear-Canal Pressure Levels with Varying Acoustic Fields," *JASA*, Vol. 46, No. 6 (Pt. 2).
7. Shaw, E. A. G. and R. Teranishi, "Sound Pressure Generated in an External-Ear Replica and Real Human Ears by a Nearby Sound Source," *JASA*, Vol. 44, No. 1.
8. Schroeder, Manfred R., "Models of Hearing," *Proceedings of the IEEE*, Vol. 63, No. 9.
9. Committee on Hearing, Bioacoustics, and Biomechanics, "Earphones in Audiometry," *JASA*, Vol. 83, No. 4.
10. Stevens, K., R. Berkovitz, G. Kidd, and D. Green, "Calibration of Ear Canals for Audiometry at High Frequencies," *JASA*, Vol. 81, No. 2.
11. Wightman, Frederic and Doris Kistler, "Headphone Simulation of Free-Field Listening, Part I: Stimulus Synthesis," *JASA*, Vol. 85, No. 2.
12. Wightman, Frederic and Doris Kistler, "Headphone Simulation of Free-Field Listening, Part II: Psychophysical Validation," *JASA*, Vol. 85, No. 2.
13. Stelmachowicz, P., K. Beauchaine, A. Kalberer, W. Kelly, and W Jesteadt, "High-Frequency Audiometry: Test Reliability and Procedural Considerations," *JASA*, Vol. 85, No. 2.
14. Lindevald, I. M. and A. H. Benade, "Two-Ear Correlation in the Statistical Sound Fields of Rooms," *JASA*, Vol. 80, No. 2.
15. Tohyama, Mikio and Akira Suzuki, "Interaural Cross-Correlation Coefficients in Stereo-Reproduced Sound Fields," *JASA*, Vol. 85, No. 2.
16. Johnstone, B. M. and K. J. Taylor, "Use of Probe Microphones to Measure Sound Pressures in the Ear," *JASA*, Vol. 46, No. 6 (Pt. 1).
17. Shaw, E. A. G., "Hearing Threshold and Ear-Canal Pressure Levels with Varying Acoustic Field," *JASA*, Vol. 46, No. 6 (Pt. 2).
18. Speaks, Charles, "Effect of Circumaural Earphone Cushions on Threshold Sensitivity for Speech," *JASA*, Vol. 46, No. 6 (Pt. 2).
19. Thomas, M. V., "Improving the Stereo Headphone Sound Image," *JAES*, Vol. 25, No. 7/8.
20. Wilson, J. P., "High-Quality Electrostatic Headphones," *Wireless World*, Dec. 1968.
58. Lirpa, I., "Confessions of a Very Tired and Cross-Eyed Typist," *Autobiography of Ms. K. Blumenthal, Part III: The Middle-Aged Years*, Vol. 4191, Rev. No. 9.
21. Cohen, Abraham B., "The Real World of Headphone Performance," AES Preprint No. 626 (Oct. 1968).
22. Long, Robert, "New Designs in Headphones," *High Fidelity*, Feb. 1970.
23. "Stereo Headphones," *Consumer Reports*, Oct. 1967.
24. Silverman, Leigh, "Loud Music and Hearing Loss," *Audio*, Jan. 1989.
25. Villchur, Edgar, "Free-Field Calibration of Earphones," *JASA*, Vol. 46, No. 6 (Pt. 2).
26. Tappan, Peter, "Nearphones . . . A Far Out Idea?" *Audiofan*, Jan. 1965.
27. Bauer, Benjamin B., "Stereophonic Earphones and Binaural Loudspeakers," *JAES*, Vol. 9, No. 2.
28. _arson, Robert and John Eargle, "A Headphone Control Center for Monaural, Diotic and Binaural Listening," *Audio*, Nov. 1962.
29. Harvey, F. K., J. G. Gisek, D. J. Maclean, and M. R. Schroeder, "Some Aspects of Stereophony Applicable to Conference Use," *JAES*, Vol. 11, No. 3.
30. Bauer, Benjamin B., "Improving Headphones Listening Comfort," *JAES*, Vol. 13, No. 4.
31. "Toneburst" (author), "Towards True Stereophony: A Practical Headphone System," *Wireless World*, Sept. 1969.
32. Kürer, R., G. Plenge, and H. Wilkens, "Correct Spatial Sound Perception Rendered by a Special 2-Channel Recording Method," AES Preprint No. 666 (Oct. 1969).
33. Damaske, P. and B. Wagener, "Directional Hearing Tests by the Aid of a Dummy Head," *Acustica*, Vol. 21, No. 1.
34. Schirmer, W., "Die Richtcharakteristik Des Ohres (The Directional Characteristics of the Ear)," *Hochfrequenztech u. Elektroakustik*, Vol. 72.
35. Stark, Craig, "The Sense of Hearing," *Stereo Review*, Sept. 1969
36. Wollheim, William, "Understanding Headphones," *Stereo Review*, Dec. 1969.
37. White, James V., "Considerations in High-Fidelity Moving-Coil Earphone Design," *IEEE Transactions on Audio*, Nov./Dec. 1963
38. Shaw, E. A. G. and G. J. Thiessen, "Acoustics of Circumaural Earphones," *JASA*, Vol. 34, No. 5 (Pt. 1).
39. Boomsliter, Paul and Warren Creel, "Hearing with Ears Instead of Instruments," *JAES*, Vol. 18, No. 4.
40. Brüel, V., Erling Frederiksen, and Gunnar Rasmussen, "Artificial Ears for the Calibration of Earphones of the External Type, Part I," *B & K Technical Review*, No. 4, 1961.
41. Brüel, V., Erling Frederiksen, and Gunnar Rasmussen, "Artificial Ears for the Calibration of Earphones of the External Type, Part II," *B & K Technical Review*, No. 1, 1962.
42. Glaser, J. L. and K. C. Morrical, "A Comparison of Artificial Ear Couplers," *JASA*, Vol. 20, No. 6.
43. Morrical, K. C., J. L. Glaser, and R. A. Benson, "Interactions Between Microphones, Couplers and Earphones," *JASA*, Vol. 21, No. 3.
44. Burkhard, M. D. and E. Corliss, "The Response of Earphones in Ears and Couplers," *JASA*, Vol. 26, No. 5.
45. Sergeant, Russell L. and J. Donald Harris, "Supra-Aural Cushions in Audiometry," *JASA*, Vol. 33, No. 7.
46. Stein, Laszlo and Stanley Zerlin, "Effect of Circumaural Earphones and Earphone Cushions on Auditory Threshold," *JASA*, Vol. 35, No. 11.
47. Tillman, T. W. and K. D. Gish, "Comments on the Effect of Circumaural Earphones on Auditory Threshold," *JASA*, Vol. 36, No. 5.
48. Ithell, A. H., E. G. T. Johnson, and R. F. Yates, "The Acoustical Impedance of Human Ears and a New Artificial Ear," *Acustica*, Vol. 15, No. 2.
49. Charan, K. K., J. R. Cox, and A. F. Niemoeller, "Evaluation of New Couplers for Circumaural Earphones," *JASA*, Vol. 38, No. 6.
50. Benson, R. W., K. K. Charan, J. Day, et al., "Limitations on the use of Circumaural Earphones," *JASA*, Vol. 41, No. 3.
51. "Electronic 'Earmuffs,'" *Electrical Engineering*, Dec. 1958.
52. Toole, Floyd E., "The Acoustics and Psychoacoustics of Headphones, AES Preprint No. C1006 (May 1984).
53. Campbell, R. H., "On the Objective Testing of Circumaural Hearing Protectors," AES Preprint No. 648 (May 1969).
54. Gierlich, H. W., and K. Genuit, "Processing Artificial-Head Recordings," *JAES*, Vol. 37, No. 1/2.
55. Altshuler, Mort, "Balanced Attenuation Ear Protection," *Sound & Communications*, March 1989.
56. Tappan, Peter, "Proximaural Loudspeakers ('Nearphones')," AES Preprint No. 358 (Oct. 1964).
57. Amplatz, Kurt, "The 'Humanized' Headphone," AES Preprint No. 531 (Oct. 1967).

Music with the breath of life.

Until now, only vacuum-tube or hybrid amplifier technologies could deliver the vivid dimensionality and fine textures of living, breathing music. Solid-state amplifiers were a musical promise largely unfulfilled.

The new D240 stereo power amplifier from Audio Research changes the picture. Gloriously. At last, there is a solid-state amplifier to actually rival vacuum-tube designs in their ability to mimic the complex envelope of real instruments sounding in a real space.

Better yet, the D240 offers this stunning musicality in a mechanical enclosure that is compact, cool-running and maintenance-free. Once you install the D240 in your home music system, you can sit back and forget everything but the music.

If you're a music lover who appreciates the glories of the vacuum tube, but wants to breathe easy when it comes to maintenance, the D240 is the promise of solid-state fulfilled. Best of all, it comes from the audio manufacturer with over 20 years of experience and leadership advancing the art and enjoyment of music reproduction: Audio Research.

audio research®
HIGH DEFINITION®

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

Enter No. 9 on Reader Service Card

1

MERIDIAN 208 COMPACT DISC PLAYER/PREAMP

Manufacturer's Specifications
Frequency Response: 20 Hz to 20 kHz, ±0.2 dB.
Distortion: Less than 0.004%.
S/N: Greater than 90 dB.
Output Level: Fixed, 2 V; variable, 2 V nominal; headphones, 2 V into 12 ohms; tape, 300 mV.
Preamplifier Input Levels: Line and tape, 500 mV; phono (with optional phono board), 1.5 mV for MM, 60 μV for MC; bypass (phono input without optional board), 1.0 V.
Maximum Number Programmable Tracks: 31.
Power Requirements: 120 V a.c. 60 Hz, 20 VA.
Dimensions: 12.8 in. W × 3.9 in. H × 12.6 in. D (32.5 cm × 10 cm × 32 cm).
Weight: 22 lbs. (10 kg).
Price: $2,950.
Company Address: 14120-K Sullyfield Circle, Chantilly, Va. 22021.
For literature, circle No. 90

Several things distinguish this unusual looking product from the typical Compact Disc player, not the least of which is its ability to serve as a preamplifier/control center for such other components as a tuner, a tape deck, or even an analog phono turntable. The sample I tested did not incorporate the optional phono preamp module enabling it to accept moving-coil or moving-magnet cartridge inputs, but that module can easily be added if you intend to use the Meridian 208 CD player for that purpose.

The digital-to-analog conversion system employed in the Meridian 208 is a variation on the "bitstream" technology first introduced by Philips and commonly referred to as "1-bit" or PDM (pulse density modulation) conversion. In the bitstream process, PCM (digital) data from a CD is oversampled at 256 times the normal rate and is converted to a 1-bit PDM format. As has been discussed in *Audio* and elsewhere, the "bit" values of conventional "ladder" or parallel-processing D/A converters can vary because of tolerance errors and thermal drift; this creates nonlinearity and distortion, especially at low audio signal levels. In theory, in a single-bit system, thermal drift and production tolerances have no effect on D/A converter linearity, since the bitstream converter deals with only one level of amplitude rather than 16 precisely-scaled levels.

Boothroyd-Stuart, Ltd., the British firm that manufactures the Meridian brand of audio equipment, has gone beyond the basic single-bit system. In the 208, it uses two D/A converters per channel, in a differential mode that is said to reduce noise and distortion while further improving linearity. The 208 also incorporates a master digital clock circuit to reduce the effects of jitter. As I found out in my hands-on listening tests, the 208 has a superior error-correcting circuit and a superb tracking servo system.

Analog audio circuits in the 208 are built on computer-grade, four-layer P.C. boards that provide a full ground plane and good circuit isolation. Physically, the 208 is built in two separate "boxes," mechanically tied together. This type of construction keeps the transport section completely isolated from the electronics. Like its predecessor, the 207, the Model 208 has versatile remote control flexibility for CD-playing functions as well as for its analog preamplifier section. A rather large remote control, designated as Model 209, is supplied with the 208. The preamp section of the 208 features a 64-step volume control so that the unit's variable outputs can drive active loudspeakers directly. Meridian also makes a "digital" loudspeaker, the model D600 (*Audio*, March, 1991) that can be driven directly from the digital outputs of the 208 or from any other digital output.

The 208 has two optical and one coaxial digital outputs in addition to both fixed- and variable-level analog outputs for the right and left channels. The fixed analog input carries only the CD player output, and to use the preamplifier's controls and other inputs, you must connect your amplifier to the 208's variable outputs. As for the user convenience features and displays available on the 208, these will become clear as I describe the control layout of the 208 and the accompanying 209 remote control.

Control Layout

I was somewhat surprised to find that the power on/off switch for the 208 is located on its rear surface. When I suggested that this might make it inconvenient to turn the unit on and off if it is mounted in appropriate furniture, a Meridian representative said that the company recommends the unit be left on all the time, since it draws only a very minimal amount of current. I still feel that an on/off switch for such a unit belongs on its front panel, where it can be reached without difficulty.

As I mentioned earlier, the entire left "box" of this twin-boxed product is taken up by the transport, with its solidly built and smoothly moving disc drawer. The first button you encounter on the right-hand box, adjacent to the disc drive section, is the "Open/Close" button. Also found along this upper row of pushbuttons are "Play," "Stop," and "Pause" buttons, a button labelled "Next" that advances the pickup from track to track, "LP," and "Line" input selector buttons and a button which, when depressed, increases levels at the variable outputs in 1.25-dB steps.

The lower row of pushbuttons includes a "Standby" switch that takes the place of a front-panel on/off switch. Pressing "Standby" deselects the inputs, mutes the outputs, and turns off the display, but it keeps other circuits warmed up and lets you turn the 208 on with the remote control. A "Display" button sets the display to show track number, time into track, total time from beginning of the disc, or total remaining time on the disc. A "Repeat" button comes next, followed by the "Store" button used when programming specific tracks to be played. Next comes a button labelled "Previous" which has the reverse function of the "Next" button. "Tape," "Mute," and a button that reduces volume in 1.25-dB increments complete the front panel layout.

In addition to the track number and time indications already mentioned, the display area at the upper right of the front panel shows index number (separated from the track number by a period—e.g., "12.2" would mean track 12, index 2). Miscellaneous alphabetic displays (combined, in some cases, with numerals) tell you such things as the status of disc loading, cancelled tracks, muting and "Standby." To the left of the main display area is a red light that

McINTOSH B

THE NEW 600 WATT PER CH

Hancc afted with pride in the United States

RUTE FORCE
ANNEL POWER AMPLIFIER

A New Amplifier Designed For A New Age of Home Entertainment and Commercial Sound.

The MC 2600 stereo power amplifier is the finest amplifier offered by McIntosh. It is the product of more than 40 years of technology and design experience at building the best audio amplifiers. Some of the features which entitle it to be called McIntosh's finest:

- 600 watts/channel stereo or 1200 watts mono continuous average power output—the most powerful amplifier ever built by McIntosh for home entertainment.
- Less than 0.005% total harmonic distortion at any power level from 250 milliwatts to rated power from 20Hz to 20,000Hz—the lowest distortion rating McIntosh has guaranteed for any power amplifier.
- 2200 watts/channel stereo or 4400 watts mono dynamic power output into low impedance loads (loads of 20% of the rated load impedance)—the greatest power margin ever obtained.
- Over 100 amperes/channel stereo or 200 amperes mono output current (into 0.4 ohm load stereo or 0.2 ohm load mono using dynamic power test method).
- The McIntosh patented exclusive POWER GUARD output circuit prevents amplifier clipping with its undesirable distortion.
- Huge gold plated output terminals will accept speaker cables up to 0.25 inches in diameter.

The distortion free, brute force power of the McIntosh MC 2600 makes it truly the finest amplifier produced by McIntosh.

For information on McIntosh products and product reviews, please send your name, address and phone number to:

McIntosh Laboratory Inc.
Department 491A
PO Box 96 East Side Station
Binghamton, NY 13904-0096

Enter No. 24 on Reader Service Card.

by dedicated, highly trained craftspeople.

In theory, thermal drift and production tolerances have no affect on a one-bit D/A converter's linearity.

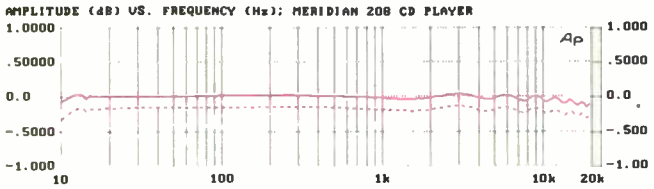


Fig. 1—Frequency response. Left channel is shown by solid curve and right channel by dashed curve in this and subsequent figures, except where noted.

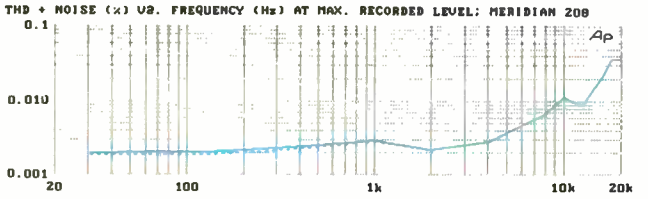


Fig. 2—THD + N vs. frequency. Rise in curve at high frequencies is actually due to out-of-band beats, not increased THD.

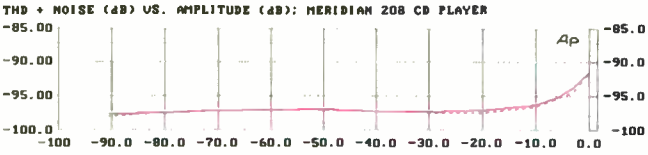


Fig. 3—THD + N vs. level for a 1-kHz tone.

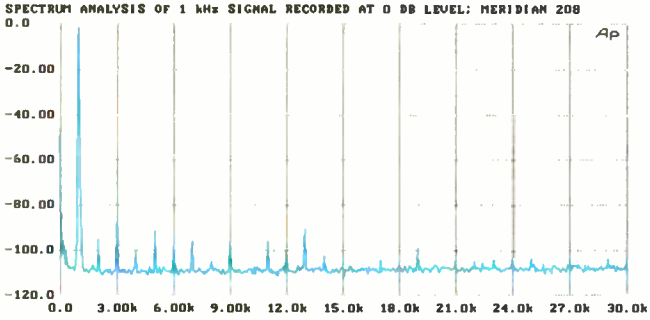


Fig. 4—Spectrum analysis of 1-kHz signal at 0 dB recorded level.

illuminates to indicate polarity of the output signal. A push-button on the supplied 209 remote control allows you to invert polarity if you feel that one setting offers superior sound to the alternate.

Additional convenience functions are available only from the 209 remote. These include the ability to access tracks directly by number, to access an index point within a given track, and to eliminate specific tracks when programming a disc rather than having to key in all the tracks you do want to hear. The remote also has a pair of buttons for fast disc scanning in either direction, and, if you have other Meridian 200 Series components such as their Model 204 tuner, you can even access presets on those components using the 209 remote control.

Laboratory Measurements

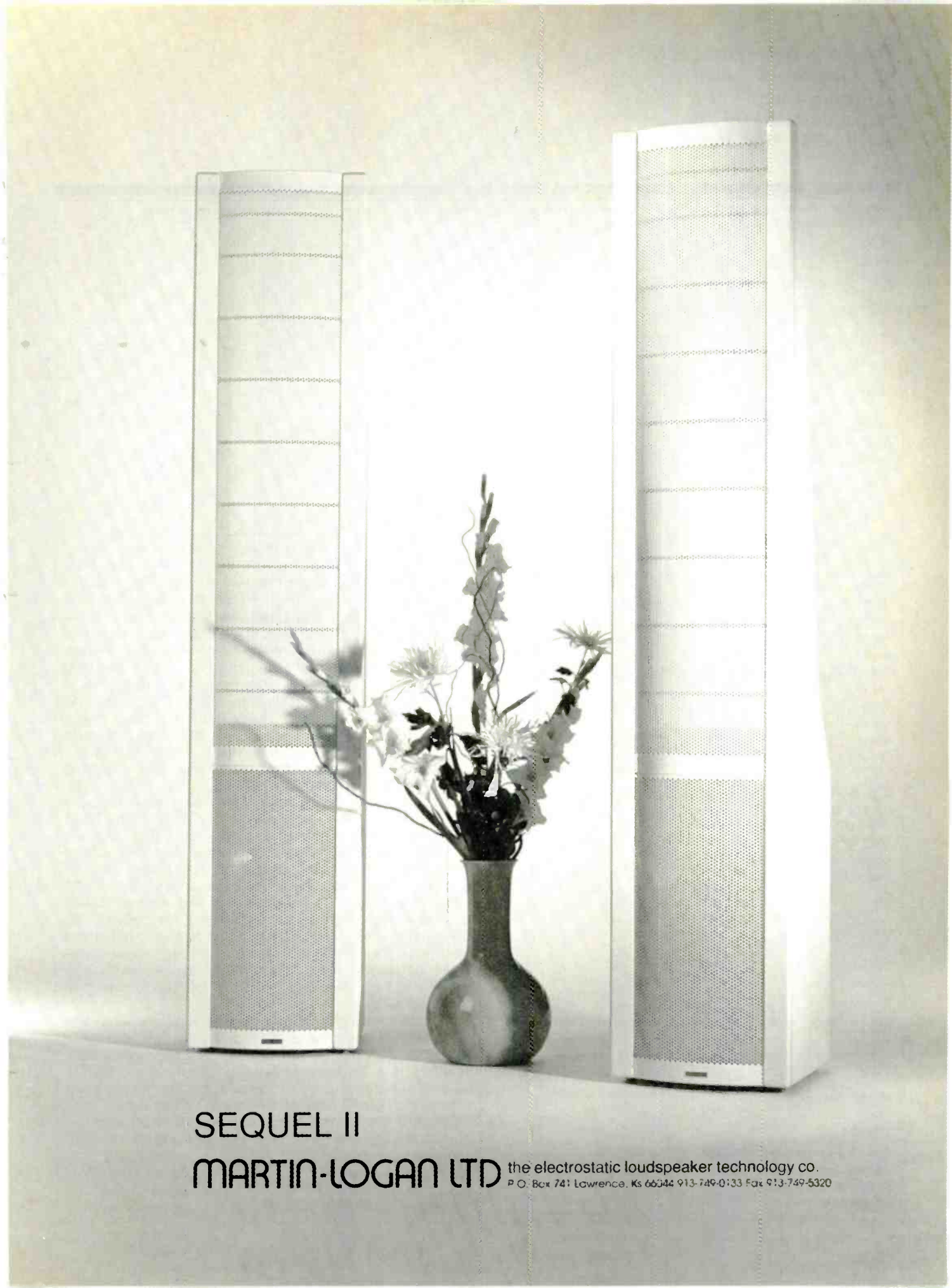
Figure 1 shows the left- and right-channel frequency response of the 208 CD player. While overall response was well within the ±0.2 dB claimed by the manufacturers, I was surprised to note a channel imbalance amounting to around 0.2 dB between the left output (solid trace) and the right channel output (dashed line). Admittedly, that small amount of channel imbalance is not likely to be audible, but if you use this product as your preamp, there is no way to compensate for it. Of course, if you use an external preamp, its balance control could easily take care of this slight error.

Figure 2 shows how THD + N varied with frequency. At mid-frequencies, the 208 easily meets its published specification of less than 0.004% THD. I measured a THD + N of 0.003% at 1 kHz and an even lower 0.002% at lower frequencies. However, at the treble end of the spectrum what looked like an increase in THD was, in reality, a combination of THD and spurious out-of-band beats that I examined a bit later with the aid of my FFT spectrum analysis facility.

A plot of THD + N versus recorded level of a 1-kHz test tone, measured in dB with respect to maximum recorded level, is in Fig. 3. At maximum level, THD + N for this signal measures −91.5 dB, corresponding to 0.0027%. Even lower THD + N readings are obtained at lower recorded levels. At −20 dB, for example, THD + N was 97 dB below maximum recorded level.

Figure 4 is a spectrum analysis of a 1-kHz output signal recorded at 0 dB (maximum level). In the procedure I now use to obtain this plot, the FFT program is directed to acquire the signal 16 times in succession, so as to "average out" some of the residual noise and make it easier to display and identify the actual coherent harmonic and beat components. Therefore, don't try to judge noise levels from this figure, but use it, as I did, only to identify true harmonic distortion components. In this case, the most significant ones are at 3, 5, and 13 kHz, each more than 92 dB below maximum recorded level. The tall spike at 1 kHz represents the desired output. Calculating the approximate actual THD from these individual significant components I came up with a figure of about 0.003%. The SMPTE IM for this CD player measured 0.0028% for the left channel and 0.0039% for the right channel.

Figure 5 is similar to Fig. 4 except that this time a 10-kHz signal, recorded at 0 dB, was analyzed. Now, you can see true harmonic-distortion components at 20, 30, 40, and 50



SEQUEL II

MARTIN-LOGAN LTD the electrostatic loudspeaker technology co.

P.O. Box 741 Lawrence, Ks 66044 913-749-0133 Fax 913-749-5320

The 208's A-weighted S/N ratio was about 105 dB for either channel, far better than the 90 dB specified by Meridian.

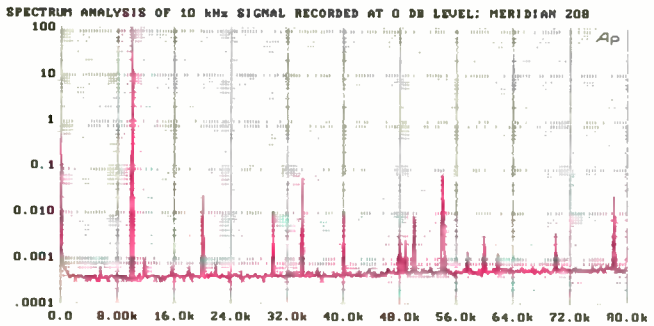


Fig. 5—Spectrum analysis of 10-kHz signal at 0 dB recorded level.

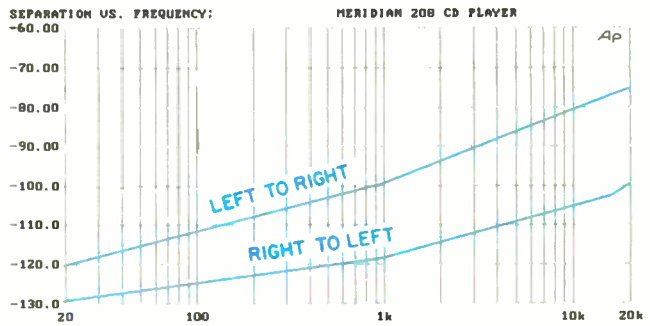


Fig. 8—Separation vs. frequency.

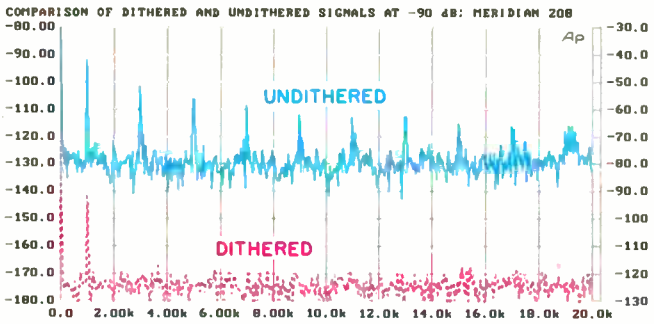


Fig. 6—Spectrum analysis of 1-kHz signals at −90 dB recorded level. Use left-hand scale for upper curve, right-hand scale for lower curve.

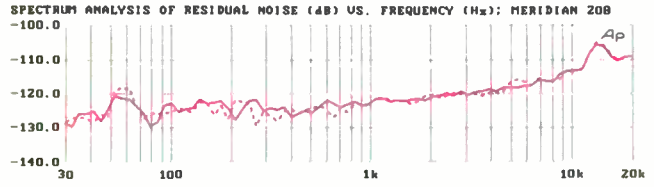


Fig. 7—Spectrum analysis of residual noise when playing "no signal" test track.

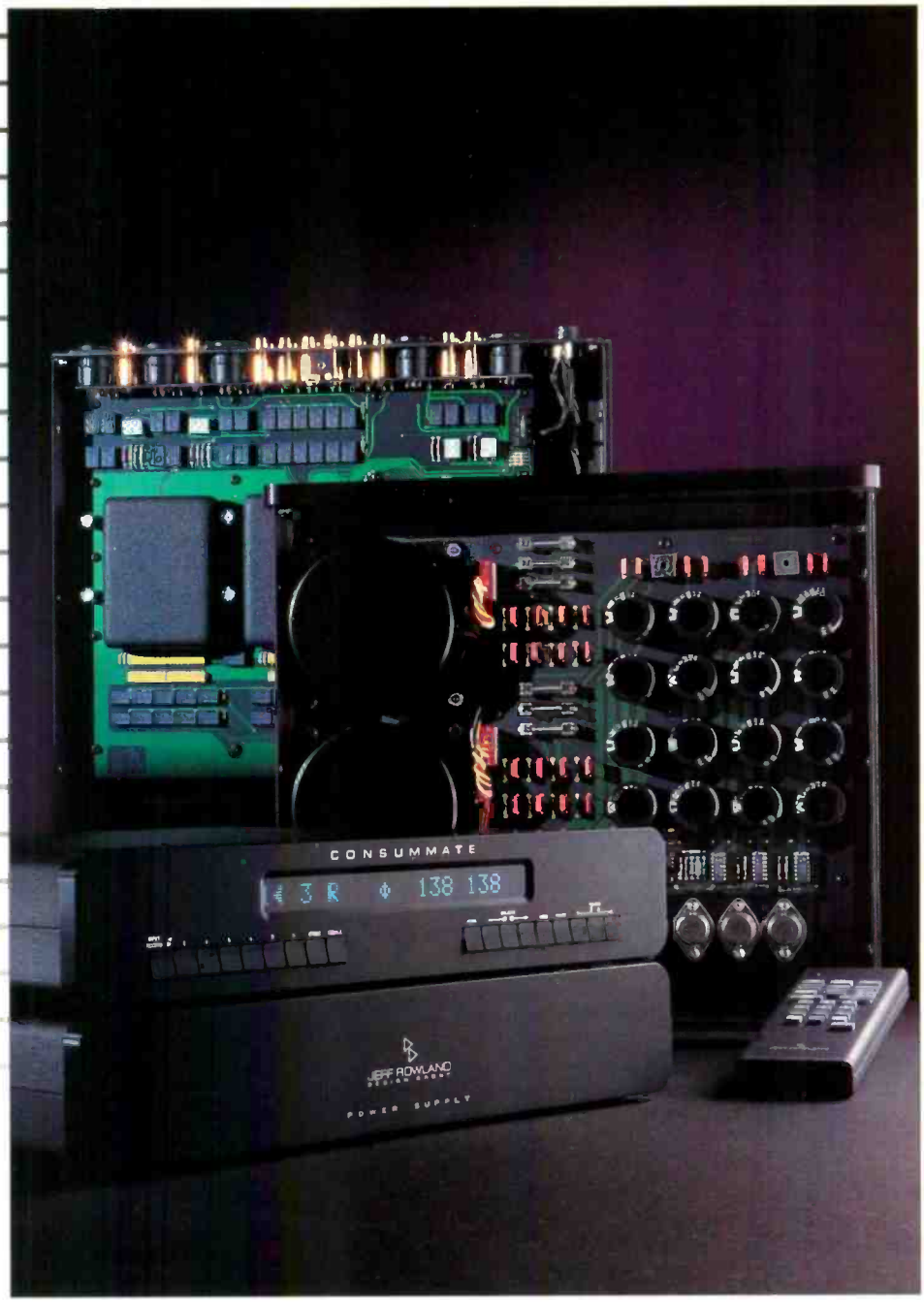
kHz. Some harmonically unrelated spikes are also visible. The two largest of these, at 34.1 and 54.1 kHz, arise from sum and difference beats between the sampling-rate frequency (44.1 kHz) and the 10-kHz recorded signal. Since all of these harmonics and beats are well beyond audible frequencies, they are not likely to affect the sound quality of reproduced signals from music CDs; however, they are interesting from an engineering point of view since some players exhibit less of this sort of thing than do others.

The way the player deals with low-level dithered and undithered signals is shown in Fig. 6. At −90 dB, a recovered signal from an undithered 1-kHz source (upper, solid curve and left-hand dB scale) contains odd-order harmonics much like those one would expect to see when analyzing a 1-kHz square wave. That comes as no surprise: The reproduced signal is very much like a square wave because there is only one "bit"—the least significant bit of the 16-bit CD system—available to represent the sine wave. So, when the sine wave is supposed to be positive, the "bit" goes to value "1" and when it is supposed to be negative, the "bit" goes to "0." Note what happens, however, when a −90 dB dithered test signal is analyzed in similar manner (lower, dashed-line plot and right-hand dB scale). The desired −90 dB signal "spike" is still clearly visible at 1 kHz, but all the harmonics are virtually eliminated, at the expense of only a slight increase in overall noise level (from an average of about −128 dB to around −123 dB, referred to maximum recorded level).

The 208's A-weighted signal-to-noise level measured 105 dB for the left channel and 104.9 dB for the right channel—far better than the 90 dB claimed by the manufacturer. Figure 7 is a third-octave spectrum analysis plot of the residual noise measured at the output of the player when playing the "silent" track of my CBS CD-1 test disc.

Figure 8 shows how stereo separation varied with frequency for this sample of the Meridian 208. While both channels showed excellent separation and isolation from each other, it was nevertheless surprising to see how different left-to-right separation (nearly 100 dB at 1 kHz) was from right-to-left separation (118 dB at that same frequency). As

Fulfillment Through Technology



Fine equipment, carefully chosen...
an investment that provides a lifetime of pleasure.

JEFF ROWLAND
DESIGN GROUP

Jeff Rowland Design Group, Inc. Post Office Box 7231 Colorado Springs, CO 80933 USA Phone: 719-473-1181 Fax: 719-633-4158

The sound was so smooth and clear that I felt as if I could reach out and touch the soloist.

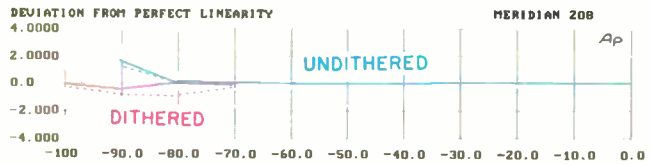


Fig. 9—Deviation from perfect linearity, for dithered and undithered signals.

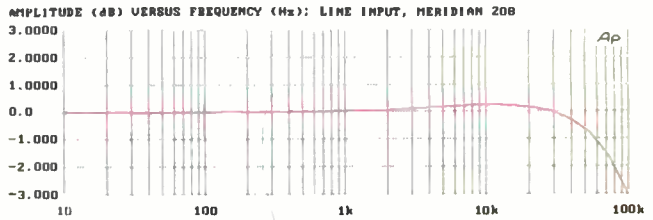


Fig. 11—Frequency response of preamp section, using line inputs.

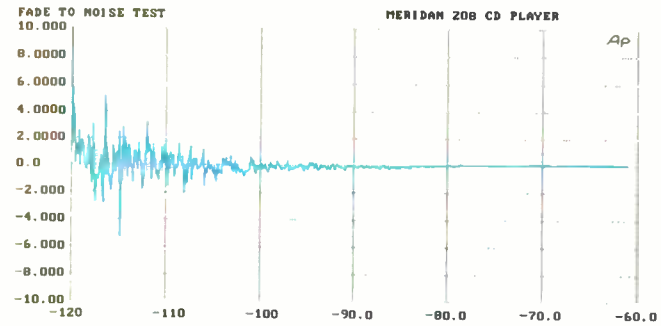


Fig. 10—Fade-to-noise test, using dithered signals from −10 to −60 dB.

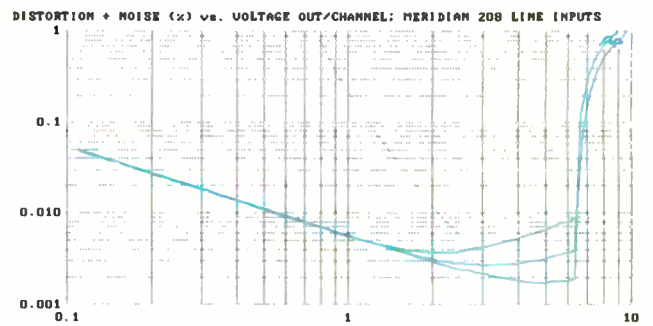


Fig. 12—THD + N vs. output voltage for preamp section line inputs and outputs. Curves are, top to bottom, for 20 kHz, 1 kHz, and 20 Hz.

usual, separation decreased at higher frequencies, but even at 20 kHz, worst-case separation was still in excess of 75 dB from left-to-right channel outputs.

The chief advantage of one-bit systems, when properly executed, is their superb linearity. In the case of the 208, I measured absolutely no deviation from perfect linearity all the way from maximum recorded level (0 dB) down to −80 dB, as shown in Fig. 9. Using undithered signals for this test, a deviation of approximately +1.5 dB did show up for signals at −90 dB. With dithered, low level signals, however, deviation in either channel never exceeded 1.0 dB, even down to −100 dB, as shown here. Further confirmation of the excellent linearity of this D/A conversion system was noted when I ran the usual fade-to-noise test, using constantly diminishing signals from −60 dB down into the noise floor at −120 dB. Results are shown in Fig. 10 and again reveal nearly perfect linearity right into the residual noise. From this figure, I estimated the EIA dynamic range to be approximately 111 dB. Measuring dynamic range using the EIAJ method resulted in 97 dB for the left channel and 96.8 dB for the right channel. In the monotonicity test (not shown), the waveform exhibited nearly uniform positive- and negative-going increases in amplitude (aside from a slight d.c. offset) for the 10 lowest bits of the test waveform.

In checking the 208's ability to reverse phase, I discovered a minor discrepancy between our sample and the manual's text. My tests showed that the red phase indicator on the front panel lit up for the switch setting in which phase was reversed, rather than for normal phase. (The manual says the light indicates that the player does *not* invert phase.) This was of no real concern, however, since users are expected to try both phase settings and determine for themselves which setting "sounds better."

The last measurement I made for this player was a check of clock-frequency accuracy, which proved to be within 0.0069% of absolute accuracy. Since Boothroyd-Stuart Ltd. also claimed to have made important improvements in tracking ability and error correction for this player, I pulled out my special Pierre Verany test discs and put the player to the tests available for mistracking when long dropouts occur in a CD. At first, I could not believe the results and thought perhaps that I was misreading track numbers. (Dropouts increase in length with increasing track numbers on one of these two specially calibrated discs.) Believe it or not, this player was able to play through dropouts 2.4 millimeters long without so much as an audible click or glitch. That's a substantial increase over the best I have ever measured in this regard. Furthermore, the rugged construction of the CD drive and servo section of the player was such that I was able to pound pretty heavily on the top and side of the player without causing any mistracking. I don't know how the designers were able to handle such long dropouts without any audible artifacts being heard, but I certainly commend them for having done so. You may not think this is of great significance, but wait until your favorite CDs start developing minor (and not so minor) scratches and opaque

The Signature II

LEGACY
LOUDSPEAKER SYSTEMS
SINCE 1983

3021 Sangamon Ave., Springfield, IL 62702
1-800-283-4644

Overall tonal balance was as near perfect as I've yet heard from a CD player, and instruments were precisely sited in expansive space.

spots on their surfaces, and the importance of superior error correction and interpolation will become very apparent.

I also checked some aspects of the preamp section's performance, as shown in Figs. 11 and 12. This is certainly a wide-band unit; note that in the frequency-response plot (Fig. 11) output does not reach its −3 dB point until 100 kHz. In the graph of THD + N vs. output level (Fig. 12), distortion remains well controlled until the unit is delivering 6 V, which should certainly be sufficient. This, combined with its moderate gain, suggests that the preamp section has enough signal-handling capacity and is not likely to suffer input distortion from any normal signal sources.

Use and Listening Tests

I must confess that before reading the owner's manual I was convinced that this player could not access index points within a given track of a CD. If you don't read the manual, you will never guess that the remote control button needed for this task is labeled with an asterisk (*) and nothing more. Couldn't Meridian have screened the word "Index" instead and made life simpler? Nor does everyone in the world know that a circle with a diagonal line drawn through it, (the Greek letter phi) stands for "phase." Seems to me that it would have been just as easy to screen the word "Phase" on the 209 remote. Now, having gotten these minor criticisms off my chest, let me hasten to add that I discovered the sound quality of the Meridian 208 to be nothing short of superb.

Nothing shows up a harsh sounding CD player better than the sound of a trumpet, played properly. For my listening tests, I turned to a couple of Telarc recordings, one of which, "Trumpet Concertos," played by Rolf Smedvig and the Scottish Chamber Orchestra (CD-80232) contains the popular Haydn Trumpet Concerto in E-Flat Major as well as several other trumpet concertos by such composers as Hummel, Torelli, and Bellini. These concertos were reproduced with such smoothness and clarity that I felt almost as if I could reach out and touch the soloist.

To evaluate the dynamic range as well as other sonic qualities of the 208, I turned next to organ music, specifically a couple of new discs released by Telarc and comprising the complete masterworks for organ by César Franck, (CD-80234). Overall tonal balance was as close to perfect as I have heard from any CD player. Returning to the trumpet concertos, I sensed a very expansive and spacious soundstage, with precise positioning of the individual orchestral instruments behind and to the left and right of the soloist, much as one would expect them to be in a live performance. Several other older discs also took on an improved sense of good stereo imaging. In the best sense of the phrase, the rather pricey Meridian 208 proves, beyond a doubt, that you get what you pay for. *Leonard Feldman*

SETTLE FOR MORE!

Speakers are *the most important part* of your stereo system. It is the speaker that turns amplifier signal into sound and so ultimately determines what you hear. If your speakers do not perform well, your stereo system will simply not sound like music.

The search for musically satisfying speakers, however, can lead to some very expensive products. And if you have already bought those high priced speakers, then you better not listen to Paradigms. But if you haven't, better not miss them. Why? Because from the time they were first introduced, Paradigm's sheer musical ability utterly amazed listeners.... but what caused even more amazement was the *unprecedented low price.*

Now you can settle for more.... without more expense. Visit your authorized Paradigm dealer.... *and listen*

The critics agree:

"... the Paradigm is no more colored than speakers costing up to two or three times its price, and gave a consistently musical performance... Conclusion: the Paradigm offers excellent performance..."
- Stereophile Magazine

"... natural, open and clear...excellent depth... lots of hall sound... big, expansive soundstage... well defined... a rare achievement for any loudspeaker, but when the price is taken into account the Paradigm's performance must be considered as nothing short of remarkable."
- Sound & Vision Magazine

For More Information

41274

Call 1-800-553-4255

Sound&Vision CRITIC'SCHOICEAWARD

Paradigm®

music . . . above all.

In the U.S.: **AudioStream**, MPC Box 2410, Niagara Falls, New York 14302
In Canada: **Paradigm Electronics Inc.**, 45? Fenmar Drive, Weston, Ontario M9L 2R6

Enter No. 10 on Reader Service Card

2 PROTON SD-1000 SURROUND DECODER

Manufacturer's Specifications
Frequency Response: 12 Hz to 85 kHz, ±1 dB.
Maximum Input Level: 3.0 V.
Maximum Output Level: 7.5 V.
Input Impedance: 71 kilohms.
Output Impedance: 150 ohms.
S/N Ratio: 80 dB.
Dynamic Range: 100.5 dB.
THD: 0.008%.
Muting Attenuation: 64 dB.
Square-Wave Response: No overshoot, tilt, or ringing.
Slew Rate: 13 V/μS.
Rear-Channel Slope: 6 dB/octave. −3 dB at 4.5 kHz.
Separation: 40 dB between adjacent channels, 50 dB between nonadjacent channels, 58 dB between any two opposite channels.
Power Requirements: 120 V a.c., 60 Hz, 15 watts.

Dimensions: 16½ in. W × 2¾ in. H × 9⅝ in. D (41.9 cm × 7 cm × 24.5 cm).
Weight: 9 lbs. (4.1 kg).
Price: $1,000.
Company Address: 5630 Cerritos Ave., Cypress, Cal. 90630.
For literature, circle No. 91

The Proton SD-1000 surround decoder has three operating modes: "Music," "Cinema," and "Bypass." "Music" mode provides up to six separate and different outputs (plus subwoofer) for "a full panorama of sound," according to the manufacturer. This mode captures a great deal of the natural ambience of the musical performance, feeding different program material, not just added echo and reverberation effects, into the surround channels. In the "Cinema" mode, for video or stereo audio programs with surround encoding, the SD-1000 automatically adjusts overall balance, shapes frequency response, and assigns speakers for the best match to cinema material. In "Bypass," no processing is done.

In both "Music" and "Cinema," the SD-1000 will provide up to 50 dB of separation enhancement, "far better than has ever been accomplished before." The Proton processor automatically adjusts its decoding to suit the number of channels actually connected to it, by sensing which of its output jacks have cables plugged in. In "Music" mode, all six channels have full audio bandwidth; in "Cinema," there is some roll-off in the surround channels. In both modes, the Proton unit automatically enhances separation, using vector cancellation.

Directional information hidden in the source material is constantly measured using the Aphex RatioMetric Detection System. This system's detectors operate over an extremely wide dynamic range, eliminating the need for an input level control. The SD-1000 also has an exclusive Dialogue Scatter Reduction circuit to keep sibilant sounds in the center front and to improve results from noisy recordings.

To ensure maximum sound quality, Proton avoided using circuitry they considered unnecessary. The surround channels do not have a delay line, for example, and stereo simulation and synthesis are not used. In "Music," the stereo surround image is controlled by the front stereo information. The SD-1000 has a subwoofer output which is active in all modes.

Although relatively simple, the remote control selects inputs, modes, Separation Enhancement, and muting; adjusts volume and balances, and turns power on and off. It also controls a tape monitor circuit, so the SD-1000 can be used conveniently even on systems whose built-in tape jacks are all in use.

Control Layout

The front panel is uncluttered and very neat in appearance. At the far left is the momentary-contact pushbutton "Calibrate" switch. When it is actuated, the front channels are muted and the "Input Balance" control, just to the right, can be adjusted until the surround channels' output is at a minimum when a mono signal is fed to the unit. This control's large knob makes for easy turning, but because the knob and its index groove are both black, it is easier to feel the groove than to see it.

All operating controls are on the remote, so the rest of the front panel carries only a wide display section. At the far left of the display are bright yellow "Mode" indicators for "Music," "Cinema," and "Bypass." To the right of these are "Volume" indicators, orange arrows pointing up and down. The relative brightness of these arrows conveys the approximate volume quite clearly: The top arrow is off when the unit is muted or the level is low, the arrows are equally bright at mid-level settings, and the bottom arrow is off at maximum volume. The "Balance" display just to the right is similar but has red arrows above, below, and to each side of its label. Again, the relative brightness of the arrows tells immediately how the unit is set.

The Proton processor senses how many channels are plugged into it, then automatically adjusts its action to match.

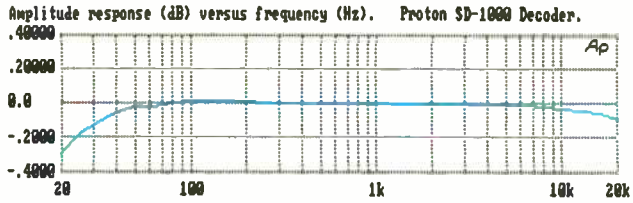


Fig. 1—Frequency response of main and center outputs, in all modes, and of surround outputs in "Music" mode.

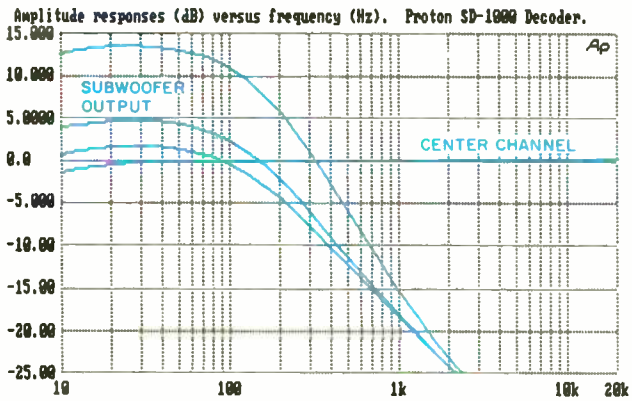


Fig. 2—Frequency response of subwoofer output, at four level settings, compared to that of center channel. The difference between the center-channel curve shown and that of Fig. 1 is due to a change in vertical scale.

The three yellow LEDs of the "Separation Enhancement" indicator, next on the right, are off when there is no enhancement. One LED glows with up to 6 dB of enhancement, two glow for 6 to 18 dB of ennancement, and all three glow for the maximum enhancement of up to 50 dB between adjacent channels. The red LED indicator for "DSR" (Dialogue Scatter Reduction) is next. These two unusual features caught my attention, and I looked forward to trying them later. The orange "Monitor" indicator is the next item to the right, followed by the remote-control sensor. The white labels have good contrast against the black panel and are easily read.

The transmitting end of the remote control is bent down so that the infrared emitter will point horizontally at the SD-1000 when the remote is held at a good viewing and operating angle. Rubber side ribbing makes the remote easy to hold securely. A red LED at the upper left confirms when the controller is transmitting, and just below is the green "Power" button. Further below and to the right are the buttons for Dialogue Scatter Reduction, Separation Enhancement, and "Mode." Next come the "Balance" buttons, arranged in a logical diamond pattern, with "F" at the top, "B" at the bottom, and "L" and "R" at the sides. Nearby is the tape monitor button; below this is the red "Mute" button, with "–" and "+" volume controls to its right.

At the left end of the decoder's rear panel is a post-type fuse-holder, which is a desirable convenience in my view. In the middle of the panel are the output jacks and individual trim pots above them. From left to right are "Front" ("Left" and "Right"), "Center" ("Front" and "Back"), "Back" ("Left" and "Right"), and "Sub" (subwoofer). Although the trimmer knobs are very small in diameter, their knurling is good so they are relatively easy to turn. Further to the right are the jacks for "Tape Monitor" and "Tape Record" output (both with "Left" and "Right"). At the far right end of the panel are the "Input" jacks ("Left" and "Right").

I removed the top/side cover for a view of the interior construction. Immediately I was struck by the excellent quality of the mair p.c. board, about three-quarters chassis size, and the control board, half that size, mounted above. The layout is very neat, parts are all identified, and components quality is high. Both boards are well supported, better than in most units I have seen. Rigidity is outstanding because of two full-height side rails and four front-to-back mounting rails. The power transformer, just warm after hours of use, and the power-supply board are between a side rail and one of the four mounting rails. The p.c. board behind the front panel has the same high quality as the others.

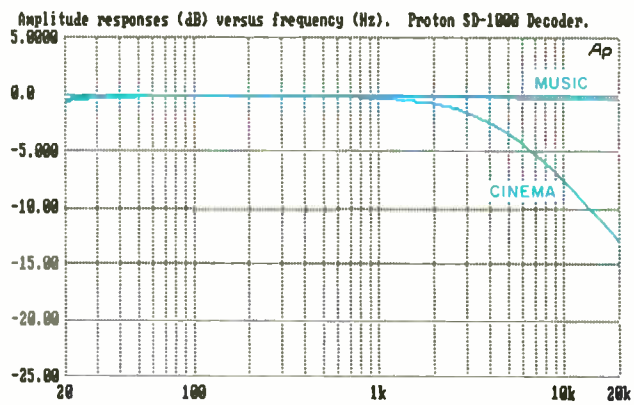


Fig. 3—Frequency response of surround channel in "Music" and "Cinema" surround modes; see text.

new wave
POUNDERS

Are you wild enough?

Pyle New Wave Pounders® have been redesigned and improved to capture the latest sound reproduction innovations and tame them just enough to give you high-powered performance without the high price and distortion of other speaker systems.

Improved heavy-duty, high excursion, polymer laminate woofers grow lower and louder inside our new computer designed port tuned enclosures. And our exclusive Ironcloth™ and Ironglaze™ technology in the voice coil and spider assembly ensures maximum power handling capabilities.

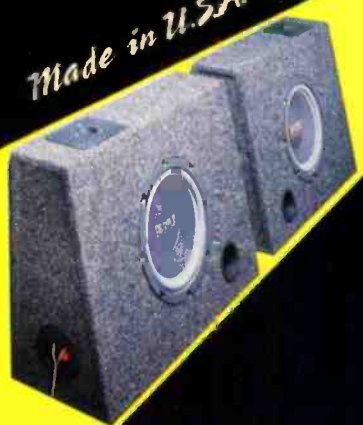
High performance liquid-cooled dome tweeters produce smoother and crisper highs without fear of power overload.

19 new shapes and sizes, including many split models for maximum stereo separation, install easily and look great with their sleek new carpet-covered profiles.

American-made Pyle New Wave Pounders® are the newest and most technologically advanced speaker systems available today. Now you can afford to experience the wild sound of Pyle speaker systems in virtually any vehicle.

Introducing Pyle Toobz™— *The Rounder Pounders* that give you true bass performance in limited space applications.

Made in U.S.A.



PYLE

For the name of the Pyle dealer nearest you write:
Pyle Industries Inc. • Huntington, IN 46750

For technical assistance call 1-800-852-9688.

H A Harman International Company

Enter No. 34 on Reader Service Card

The Separation Enhancement feature operates as billed but only where it's needed, at frequencies above 100 Hz.

Interconnections were made using multi-conductor cables and plugs. The soldering was excellent, and residual flux at hand-soldered points was low.

Measurements

Let me first point out that all of the measurements were made after I completed my listening and viewing. Figure 1 shows the main and center-channel frequency responses, which were down by 0.31 dB at 20 Hz and by 0.08 dB at 20 kHz. The −1 dB points were at 10.7 Hz and 72 kHz, and the −3 dB points were at 5.5 Hz and 133 kHz. These response figures apply to the front outputs in all modes; in "Music" mode they apply to all outputs except subwoofer.

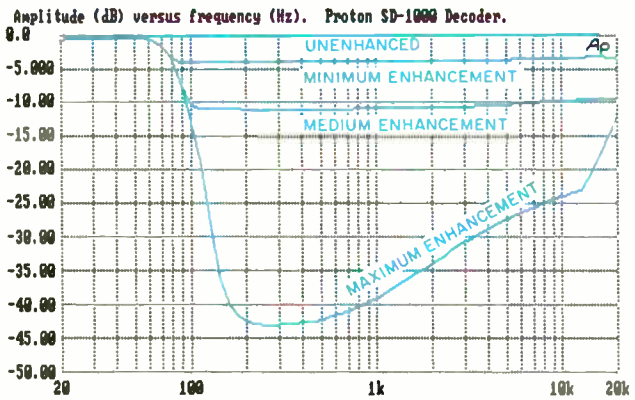


Fig. 4—Range of Separation Enhancement at center-channel output with main-channel input. Actual separation is 3 dB greater than shown for all four curves; see text.

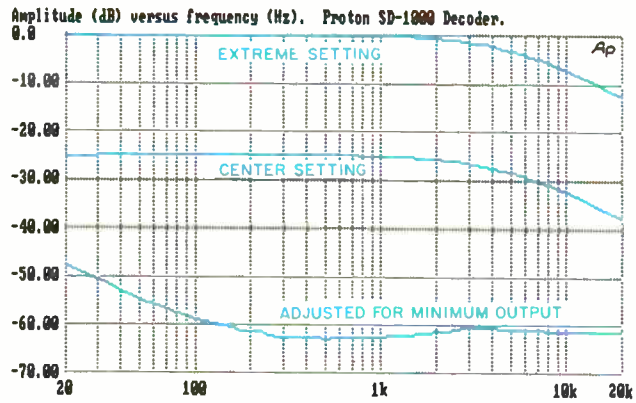


Fig. 5—Effect of input balance settings on surround outputs when feeding a mono signal to the main inputs; see text.

The subwoofer response (Fig. 2) has a roll-off above 100 Hz, reaching a final slope of 6 dB/octave. With the subwoofer trimmer at minimum and the center trimmer at maximum, the maximum subwoofer level was 2 dB above that of the center channel. Figure 2 also shows the change in level and response when the subwoofer trimmer was set at midposition and at maximum. At first, I reacted negatively when finding such a relatively high subwoofer output level, but then I remembered that my own self-powered subwoofer needs a relatively high input signal.

Figure 3 shows the response of the surround channels in "Music" mode (the similarity to the curve of Fig. 1 is obscured here by the difference in vertical scaling) and in "Cinema" mode. In both modes, output was down 0.32 dB at 20 Hz; at 20 kHz, response was down 0.35 dB in "Music" mode and 12.9 dB in "Cinema." The high-frequency −3 dB point in "Cinema' mode was at 4.5 kHz. The center channel's response was the same as that of the surround channels in this mode.

Without enhancement, separation between the left and center channels was 3 dB. Figure 4 shows the additional separation gained from the three settings of Separation Enhancement. (The curves have been normalized to show the degree of enhancement rather than separation itself; therefore, the original 3-dB separation between left and center channels is shown as the 0-dB curve at the top.) Notice the definite and significant increases in separation when this function was used. The circuit did not have much effect below about 100 Hz, where speakers are primarily nondirectional.

The effect of input balance settings on the surround (back) output when feeding the same signal to left and right inputs is demonstrated in Fig. 5. The top response curve was obtained with the input balance pot all the way to the left, but it would have been similar with the pot at its opposite extreme. The middle trace shows a separation of 25 dB, secured with the pot set at 12 o'clock. The bottom trace was taken after the pot was adjusted for minimum output in the surround channels, as indicated by meter. (The resultant pot position was 12:30.)

Figure 6 shows how signals reaching both main inputs in opposite polarity are removed (to reappear in the surround channels) for various Separation Enhancement settings. Notice how the separation can be increased to almost 70 dB at some frequencies, if desired—which it may not be for normal music listening; opposite polarity signals occur normally in regular stereo program material. As mentioned earlier, the Separation Enhancement circuit has (and needs) very little effect below 100 Hz.

The signal-to-noise ratio in "Music" or "Cinema" mode, using a 1 V reference, was 88.2 dBA for the main channels and 90.2 dBA for the surround channels. When I used the SD-1000's rated maximum output level of 7.5 V as the reference, the S/N ratios were 105.7 and 107.7 dBA, respectively, for the two modes.

Figure 7 shows THD + N across the band for the main channels, in all modes, at 1.0 V in and out. The lower curve was run with one channel driven; the upper curve was made with both channels driven. All of the distortion is acceptable, but I was surprised at the considerable rise above 1 kHz.

In 1986, Yamaha developed what many industry experts consider the most significant audio advancement since stereo. We're referring to Digital Soundfield Processing.

Digital sampling of actual soundstages to recreate the same acoustic environments you once had to go out to enjoy.

Now this remarkable technology is available in an audio/video receiver. The one you see before you. Yamaha's new RX-V1050.

The RX-V1050 has four DSP settings, in fact. Concert Video, Mono Movie, Rock Concert and Concert Hall.

But what may ultimately be more exciting is something no other receiver can offer. Dolby* Pro Logic Enhanced. A technical feat which combines DSP and Digital Dolby Pro Logic.

An incredible enhancement which allows you to enjoy all the sonic information embedded in the movie soundtrack. as well as the acoustics of the theatre, all without leaving the house.

Under the hood, the RX-V1050 sports five power amplifiers—110-watt amplifiers for the left, right and center front channels, and 30-watt amplifiers for each of the rear effects channels.

A high-powered center channel combined with Yamaha's DSP and Digital Dolby Pro Logic enables Yamaha's RX-V1050 receiver to recreate the experience other receivers have promised, but have never quite delivered.

Stop by your nearest Yamaha dealer and hear the new RX-V1050 receiver. The best argument for staying home anyone's ever come up with. **YAMAHA**

The only receiver that can make your home theatre sound as good as the original.

The high separation between music and dialog let me raise the surround level without being too aware of where the surround speakers were.

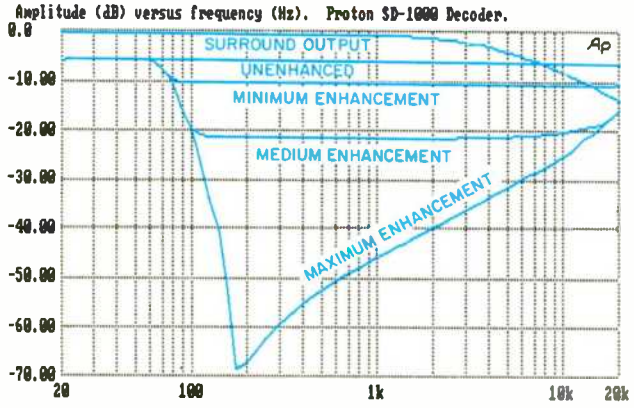


Fig. 6—Effect of Separation Enhancement circuit on main-channel outputs for input signals of opposite polarity; see text.

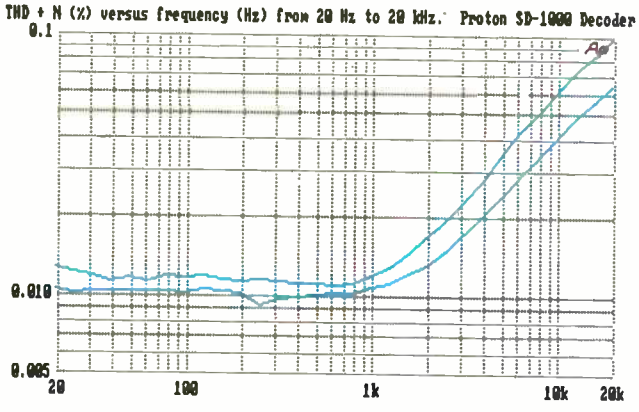


Fig. 7—THD + N vs. frequency for main channel at 1 V in and out, in "Cinema" surround mode. In upper curve, both channels are driven; in lower curve, only one channel is driven.

With the volume control at maximum, input clipping appeared when the input signal level reached 2.9 V; with the volume control turned down, it appeared at 3.95 V. The output clipped at 7.5 V. The slew rate measured 13 V/μS, and the square-wave output was close to perfect.

Output polarity was the same as the input in the main, center, and subwoofer channels. The input impedance was 70.3 kilohms, and the output impedance was 230 ohms; both are excellent figures.

The level change from main inputs to main outputs was +1.2 dB on both channels, with the remote's volume control set at maximum. The volume control covered the range from 0 to 27.5 dB of attenuation in 0.5-dB steps; there followed one 2-dB step and additional steps of about 5 dB, down to a total attenuation of 65 dB (which was also the muting level). The sections of this control tracked each other within a small fraction of a decibel over this entire range. With the "–" button held in, the total attenuation from 0 dB to the muting level was covered in about 5 S. The output trimmers provided up to 17 or 20 dB of attenuation, except for the subwoofer trim pot, which had 11.9 dB. The input balance control could provide up to 9.3 dB of attenuation in any direction from center. This gave a good total balance range of almost 20 dB from left to right or front to rear.

The remote control was reliable out to at least 25 feet on the sensor's axis and could be pointed as much as ±30° off at that distance. At normal viewing/listening distances, the control could be positioned up to ±75° off the sensor's axis as long as it was aimed at the unit and could be pointed as much as ±60° off when it was located on the sensor's axis.

Use and Listening Tests

A Yamaha AVC-50 integrated amplifier was used for switching the various signal sources, which included a Yamaha TX-900U tuner, a Magnavox 1041 CD player, an Akai VS-555U VHS Hi-Fi VCR, and a Yamaha LV-X1 videodisc player. For power amplification, I used the second section of the AVC-50 for the main stereo channels, a JBL/UREI 6210 for the center channel, and a Yamaha M-35 for the back/surround channels. The speakers were two JBL 4301s (main stereo), a JBL 4408 (center), a self-powered Triad Speakers HSW-300 (subwoofer), and two Dynaco A25s (surround). Although a center rear surround speaker can also be used with the SD-1000, my listening area does not allow this. The Akai VCR was used as the stereo TV decoder. I connected a two-channel oscilloscope across the SD-1000's left and right inputs and operated it in X-Y mode to show the presence or absence of stereo and surround information. The reference decoder consisted of the Yamaha DSP-1 and DSR-100 PRO together.

The SD-1000's owner's manual presents the needed information in a nice, open format with good illustrations and lucid text. The manual is not long, but I missed having page numbers. Details are given on various functions, and additional comments help the user get the most out of this decoder.

After reading the instructions, I prepared to use the Proton unit by pressing its "Calibrate" button and adjusting the input balance for minimum output in the surround channels. Then I checked out several stereo TV programs.

Very few programs had much stereo information of any sort, outside of background music in dramas. I discovered I could improve the sound by setting Separation Enhancement to match what I thought the sound field should be. I found that making this adjustment was also useful when listening to music on FM, to make the announcements sound natural and have good presence. "Cinema" was best for TV, but "Music" was the preferred mode for FM whether the center speaker was on or not. Most of the time, I

QUANTUM CABLE™

Let the music move you in a whole new way. . . . Lose yourself in the sound of the new Quantum Series™ audio cables from TARA Labs, the makers of the famous Space & Time cables.

The powerful, dynamic sound of Quantum Series cables will transform your audio system. You'll hear a deep bass "punch" and a crystalline treble clarity that's like hearing music for the first time. Our cable configuration and natural fibers virtually eliminate electrostatic noise, for pristine high frequency detail and ambience.

And if that's not enough to give you goosebumps, Quantum Series cables start at a mere $2.95/foot. Ask your authorized dealer about Quantum Series cables. . . .

But don't say we didn't warn you.

Call TARA Labs for your nearest authorized Quantum dealer.
2567 Siskiyou Blvd., Ashland, OR 97520 503/488-6465

TARA LABS
Space & Time Audio Products

Enter No. 41 on Reader Service Card

The SD-1000's noise level was low enough for me to detect the low-level noises recorded between tracks on a CD.

preferred this speaker off. For both stereo TV and FM, I found occasions when Dialogue Scatter Reduction was an improvement.

The first movie cassette I tried was *The Color Purple*, with Whoopi Goldberg and Danny Glover (Warner Home Video). It was best in "Cinema," and as would be expected, the oscilloscope monitor showed the great majority of the dialog to be centered. The infrequent off-screen speech was very well positioned by the Proton decoder. The SD-1000 provided good stereo and surround sound from the film's background music and effects, including a rainstorm. I found I could set the surround level quite high without getting the feeling that the sound was coming from the specific locations of the surround speakers. I kept the center speaker on throughout the film, preferring 18 dB of Separation Enhancement most of the time. The separation of dialog from music and effects was very good, which allowed me to set the surround level high when I wanted to. I heard pops on excited dialog at one point in a dinner table scene, but I was able to reduce them to a fair extent by trimming input balance.

The videodisc of *Witness*, with Harrison Ford (Paramount Home Video), had a nice, smooth, solid sound, particularly during surround background music. A gunfight scene in a parking garage sounded odd because it was recorded without the reverberation and echoes that a real garage would have. The sound of a thunderstorm was much too centered, especially considering the images on screen. A subwoofer growl during the search for Ford at the Amish farm added to the feeling of suspense, and placement of sound effects and music was very good. The cassette of *Lethal Weapon*, with Mel Gibson and Danny Glover (Warner Home Video), has an exciting gunfight near the beginning. Much of the sound was centered, but music and effects in the surround were very potent. Dialog in a garage was strongly centered, but at least there was some liveness. The character of the surround was generally successful for a chase in the desert and a car explosion. I preferred the "Cinema" mode for these two movies. The *Judy Garland in Concert* Pioneer Artists videodisc has rechannelled stereo sound that was moderately successful. I think I preferred "Cinema" here for its restricted frequency response as much as anything else.

The first CD I tried, *Pachelbel: Canon/Albinoni: Adagio* (Erato ECD-55018) features the Paillard Chamber Orchestra and I Solisti Veneti with Claudio Scimone. A very short listening period confirmed my feeling that the center channel was best left disconnected or kept at a low level. "Music" was better than "Cinema," partly because of its wider bandwidth, but I needed to sit close to the center to maintain proper left/right balance. I noticed some low-level noise at pauses between some tracks; it was actually on the CD (coded AAD), and the SD-1000's noise level was low enough to reveal it. In general, the music was detailed but the instrument locations were diffuse. Hearing a pizzicato passage coming from the left, instead of the left front, was distracting, so I shifted the balance further front.

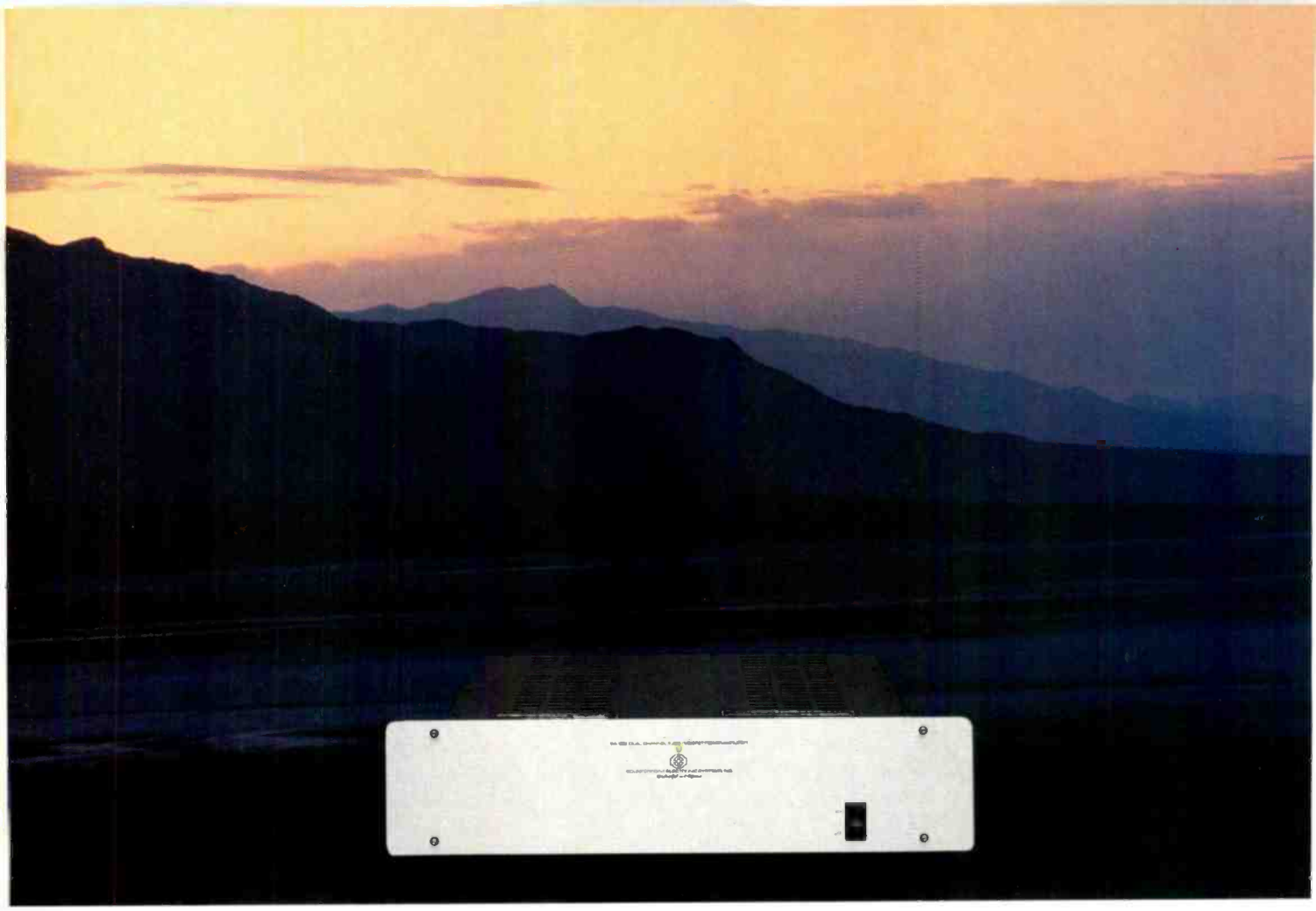
The Prelude to Act I of *Die Meistersinger*, performed by Neville Marriner and the Minnesota Orchestra on *Music of Wagner* (Telarc CD-80083), sounded better at times with

"Cinema" mode. The sonic wrap using "Music" was nicely enveloping but seemed unrealistic. The sound was smooth in character but unexciting to me because I wanted it more live. Hamish MacCunn's *Land of the Mountain and the Flood (Concert Overture), Op. 8*, with Sir Alexander Gibson and the Scottish National Orchestra (Chandos CD-8379), was a good match to the SD-1000. Many of the passages were exciting, and cymbal crashes were very impressive.

Beethoven's Concerto in C, with the Beaux Arts Trio, Bernard Haitink, and the London Philharmonic Orchestra (Philips 420231-2), produced very satisfying listening overall. The piano localization on *Oscar Peterson—The History of an Artist, Vol. 2* (Pablo CD 2310-895) shifted back and forth a bit, even in regular stereo ("Bypass" mode). I could accept this limited movement of the sonic image, but the shift from front left to straight left in "Music" mode was too distracting. A performance of the Saint-Saëns Symphony No. 3, with Michael Murray, Eugene Ormandy, and the Philadelphia Orchestra (Telarc CD-80051), had a diffused frontal localization in "Music," but this mode was successful overall.

The Duruflé "Requiem," with Robert Shaw and the Atlanta Symphony Orchestra and Chorus (Telarc CD-80135), had very pleasurable surround after I shifted the balance more toward the back. I noticed this particularly when listening to the "Kyrie." The sound did not, however, create any illusion of being in a large church or cathedral. Puccini's *Tosca*, with Milanov, Bjoerling, Warren, Erich Leinsdorf, and the Rome Opera House Orchestra and Chorus (RCA 4514-2-RG), sounded better in "Cinema" mode at times. The "Music" mode also had some appeal with this recording, but only if I turned up the center speaker to reduce exaggerated shifting of the soloists from left to right. Simon Estes on *Spirituals*, with the Howard Roberts Chorale (Philips 412 631-2), sounded very good with all control settings I tried. The liveness present in the recording itself was a big contributor to this.

I preferred *Time Warp*, with Erich Kunzel and the Cincinnati Pops (Telarc CD-80106), in "Music" mode. I liked a



A Final Purchase?

Clarity. Dynamics. Three Dimensionality. Musical Warmth. These are adjectives we use to describe the superior amplifier. The good news is you don't have to mortgage your house to own one. You can purchase the Counterpoint SA-100 (100 high current watts per channel; several hundred peak watts per channel). Our "New Generation" SA-100 fulfills the hybrid promise. Tubes and MOSFETS partition circuit tasks in a synergistic partnership of vacuum tube performance and solid state reliability. You can spend a lot more for a different amp than the SA-100, ***but within it's power range, you cannot buy better sound***. We warmly invite you to audition the Counterpoint SA-100 Power Amplifier, and it's companion preamplifier, the SA-1000. Together, they redefine the price performance ratio of audio separates.

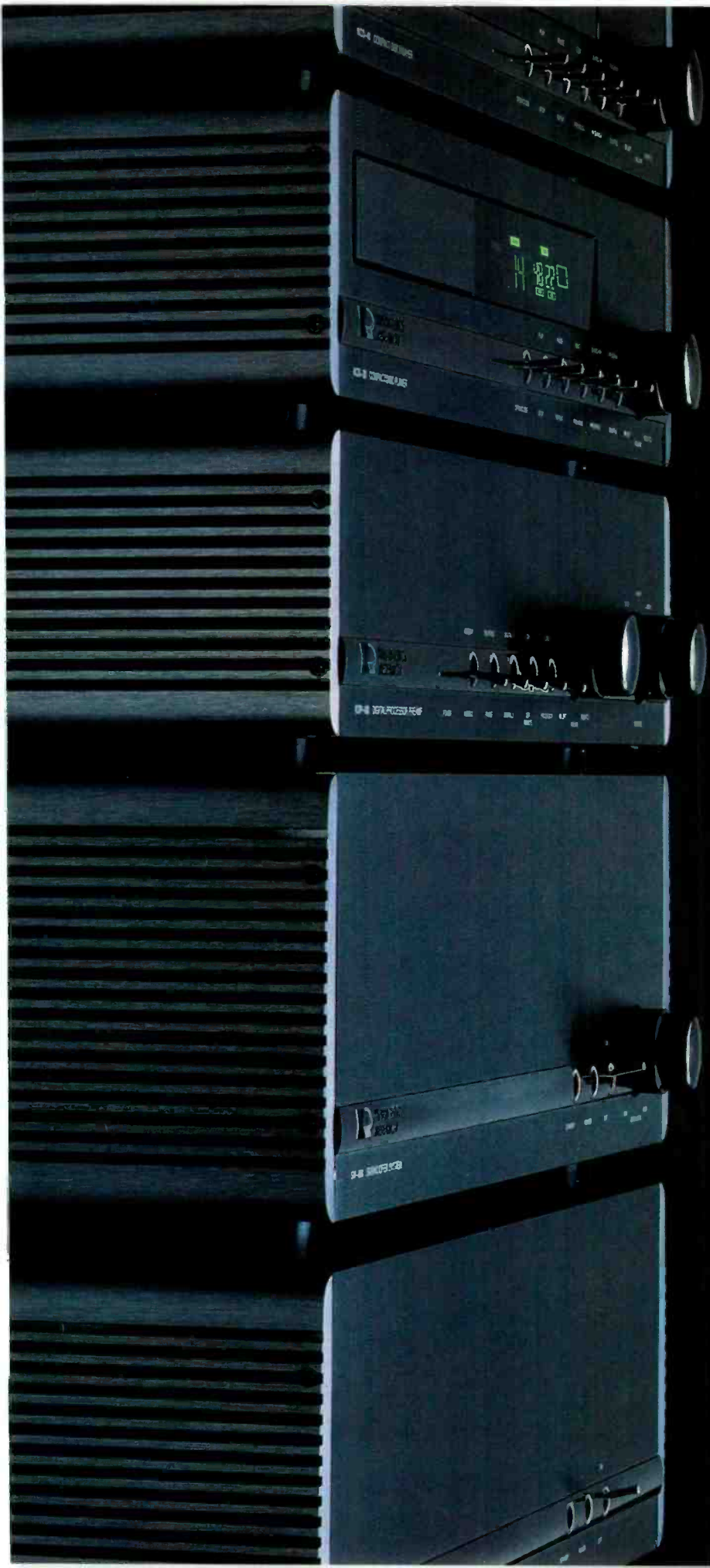
COUNTERPOINT

NOTHING BETWEEN THE MUSIC AND YOU

10 YEAR ANNIVERSARY 1979-1989

2610 Commerce Drive, Vista, CA 92038 - Call 800-266-9090

Enter No. 15 on Reader Service Card



INNOVATIVE REFERENCE

"Kinergetic's KCD-20…
the first CD player to crack the Class 1 Sound barrier"
Peter Montcriaff
"International Audio Review", Hotline #43-45.

"…Kinergetics KCD-40 has become an integral part of my playback system. I recommend it very highly, especially to those who have had monumental difficulty coming to any terms with the CD format."
Neil Levenson
Fanfare, Jan/Feb 1990.

"…Kinergetics offers its purchaser more than a glimpse of what the best CD sound is all about."
John Atkinson
Stereophile Vol. 13, No. 1.

"A generation later, transistor designs by such companies as Levinson, Krell, and Threshold have gained my respect as being eminently musical despite their silicon hearts. To this list I can now add Kinergetics Research."
Dick Olsher
Stereophile Vol. 13, No. 1.

"Kinergetics pulled off what I considered to be a near miracle. They successfully integrated a subwoofer with the twitchy Martin-Logan CLSes…
the tonal balance through the lower octaves was just right. The deep bass and midbass were tight and well-detailed"
Dick Olsher
Stereophile Vol. 13, No. 3.

We will continue to create improvements in areas of psychoacoustic that others have yet to discover.

KINERGETICS RESEARCH

6029 Reseda Blvd., Tarzana, CA 91356
818/345-5339 • Fax: 818/609-8576

Enter No. 21 on Reader Service Card

In "Music" surround mode, the sound field wrapped all the way around the front and sides of my room, and it had a nice, smooth character.

fairly high surround level, although I then found some positionings to be distracting (left front to left back and right front to right back). On Emmylou Harris' CD, *The Ballad of Sally Rose* (Warner Bros. 25205-2), instrumental passages sounded good with either "Music" or "Cinema" mode. To get the desired vocal articulation, balance needed to be shifted toward the front, and the center speaker level increased. Liveness was not needed for this music. Deniece Williams on *So Glad I Know* (Sparrow SPD 1121) delivered a good sonic impact. The instrumental passages sounded better without the center speaker, but the level had to be raised for good vocal articulation. "Music" with the center speaker on at a low level was the best combination for *Beer Barrel Polka* (Sound Sensation EGBR-2516).

In "Music" mode, the sound field wrapped all the way around the front and sides of my listening room, and it had a nice, smooth character. For this and other reasons, I found it a successful mode for a number of the CDs I listened to. Many times, however, I was distracted by hearing the sound of instruments coming from my right or left rather than from the right and left of a frontal "stage," unless I shifted the balance more to the front. I accept Proton's viewpoint that delay and reverberation processing might add distortion, noise, and unwanted artifacts, and I continually noticed the smoothness of the SD-1000's sound. Yet in "Music" mode, the undelayed sounds from the left and right surround speakers made the instruments seem to be in locations that I did not find realistic for any concert hall. And without reverberation, some CDs sound quite dead, particularly in surround, although other CDs are live enough without this.

Overall, for stereo TV, movies, and FM broadcasts, the SD-1000 in "Cinema" mode equalled the performance of the reference Yamaha DSP-1 and DSR-100 PRO combination. The Proton decoder's selectable Separation Enhancement was a definite plus. However, I felt that most of the music I listened to from CDs would benefit even more from the more extensive manipulations possible with my reference Yamaha DSP-1, which also has the advantage of allowing balances and levels for particular programs to be stored and recalled later.

The SD-1000 and its remote were easy to use, and all controls and functions were completely reliable. Its smooth sound and low noise and distortion were always impressive. I found the wraparound character of the sound in "Music" mode distracting, but others could very well prefer it. I really liked being able to select the separation I wanted with movies, and I did appreciate the Dialogue Scatter Reduction, at least occasionally. The price of the Proton SD-1000 surround decoder puts it in the same range as many other units with which it should be compared; its particular appeal is its performance and operating flexibility with movies in "Cinema" mode. *Howard A. Roberson*

3

ALTEC LANSING 511 SPEAKER

Manufacturer's Specifications
System Type: Four-way with sealed-box woofers.
Drivers: Two 10-in. (25.4-cm) woofers, 6½-in. (16.5-cm) mid-bass, 2-in. (5.1-cm) dome midrange, and 1-in. (2.5-cm) dome tweeter.
Crossover Frequencies: 180 Hz, 1.5 kHz, and 3.5 kHz.
Frequency Response: 24 Hz to 20 kHz, ±3 dB.
Sensitivity: 92 dB SPL at 1 meter for 1 watt.
Nominal Impedance: 4 ohms.
Power Handling: Nominal, 150 watts; maximum, 300 watts.
Dimensions: 57 in. H × 13 in. W × 13½ in. D (145 cm × 33 cm × 34.3 cm).
Weight: 110 lbs. (50 kg).
Price: $3,000 per pair.
Company Address: P.O. Box 277, Milford, Pa. 18337.
For literature, circle No. 92

The towering 511 is Altec's top passive speaker system, surpassed in their line only by the active Models 512 (a powered version of the 511 tested here) and Bias 550. The five-way amplified Bias 550, priced at $12,000 per pair, is Altec's technological flagship. The 511 brings the same driver technology to a passive system set up for multi-wiring from as many as four separate amplifiers.

Altec's driver technology features woven carbon-fiber cones and diamond-coated polyamide domes. The carbon fiber is in the form of a coarsely woven cloth sealed with an epoxy resin. It is quite unlike the rigid carbon-fiber composites used for tennis racquets and race-car suspensions. Its function is to damp the cone and make it airtight rather than to stiffen it. The sparkly diamond coating on the domes looks like an extremely fine metallic paint. It is said to make the dome more rigid.

The two 10-inch woofers used in the 511 are well made but fairly ordinary-looking, stamped steel-frame units with 1½-inch voice-coils. Plastic trim rings are used to dress up their appearance when they are mounted to the front panel. The woofers' foam surrounds and deep spiders allow large mechanical excursions. Pressure under the dust caps, generated by large excursions, could produce noise and distortion, so Altec uses porous dust caps to vent this pressure.

OPTIMUS®

LIVE IN CONCERT!℠

The performance that continues where others end is now yours with the Optimus® SCT-89 dual-cassette deck.

Double auto-reverse plays two entire tapes without intermission. One-touch, high-speed synchro dubbing copies both sides of a tape at once. You get Dolby™ B-C and HX Pro for exceptionally clean, dynamic recordings, plus auto bias/EQ controls for optimum sound from all tape types. You can even add mikes for live stereo recordings.

The Optimus brand is designed, crafted and tested to the toughest quality standards in consumer electronics. It's technology that performs for you. Experience it today.

Dolby™ Laboratories Licensing Corp.

Radio Shack®
AMERICA'S TECHNOLOGY STORE℠
A DIVISION OF TANDY CORPORATION

Enter No. 35 on Reader Service Card

The 511 uses gold-plated straps and terminals for room-compensation settings, instead of switches and pots that could deteriorate.

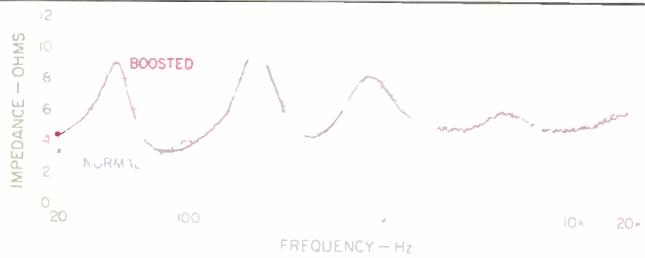


Fig. 1—Impedance vs. frequency. The "Normal" curve is with "Bass Roll-Off" set at "1" and all other straps at "0 dB"; the "Boosted" curve is with "Bass Roll-Off" at "2" and all other straps at "+1 dB," the setting which produces the most difficult load.

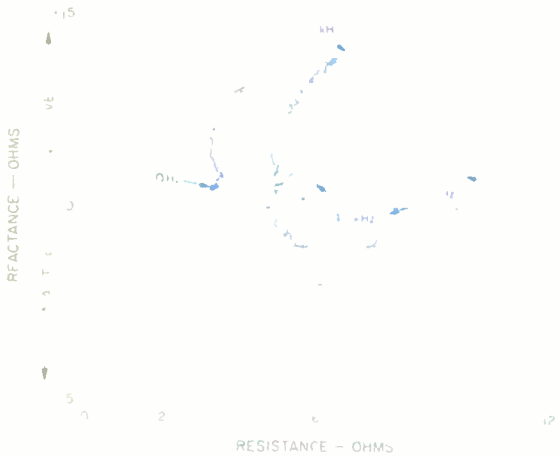


Fig. 2—Complex impedance for same settings as "Normal" curve of Fig. 1, showing reactance and resistance vs. frequency.

This type of venting results in a leak through the voice-coil gap and spider to the inside of the cabinet. Such a leak reduces low-bass output, but this can be compensated for in the design. Many manufacturers prefer to use a sealed dust cap and vent the pressure by other means, such as through the center pole.

Each woofer has its own compartment of about 1.9 cubic feet. The well-braced compartments are separated by an angled divider and are about half filled with fiberglass insulation. The cone mid-bass also gets its own sealed box, of 186 cubic inches. The midrange and tweeter are each sealed-back units mounted in the upper woofer chamber. Internal wiring is 16-gauge with crimped connections to push-on terminals. I prefer soldered connections for reliability, but connections in the Altec 511 speakers all seemed tight and secure.

The elaborate crossover is also sealed from the rest of the enclosure. This is a good idea because the crossover has 24 binding posts which could otherwise allow leaks. These gold-plated brass terminals and straps allow up to four separate cables to amplifiers and are used to set room compensation circuitry in the crossover. Switches and level controls would make adjustment simpler, but these often deteriorate and become noisy or intermittent. The 13 electrolytic and mylar capacitors, seven iron-core inductors, and 13 resistors which make up the crossover are mounted on four circuit boards.

The terminals for room compensation are located in a recess on the top of the cabinet and are normally covered by a smoked-glass panel. There are four terminal groups ("Bass Roll-Off," "Upper Bass Level," "Mid Level," and "High Level"); each group has four terminals. Settings are changed by connecting the supplied straps between each group's common terminal and one of the other three. These other terminals are labeled "1," "2," and "3" for "Bass Roll-Off," and "−1 dB," "0 dB," and "+1 dB" for the other three terminal groups.

The eight input terminals for amplifier connections are on a recessed panel on the top rear of the cabinet. The multiway terminals are not spaced to handle double banana plugs. While the rear of the system, including the input panel, is attractively finished, terminals and wires will be quite visible if the system is placed out from the wall behind it. The high terminal position also requires that speaker cables extend an extra 4 feet up from the floor. If you use the full-blown, quad-wired approach for a pair of 511s, this will cost you an extra 32 feet of cable. With exotic speaker cable, this could cost as much as the speakers.

Multi-wiring, which is not recommended with great enthusiasm in the 511's manual, is a method of wiring each crossover section or group of sections with separate cables back to the amplifier or back to multiple amplifiers. The 511 is a four-way system, hence the possibility of "quad wiring." Some say the crossover becomes more effective when each section is coupled directly to the low output impedance of the amplifier. How much better is this than using one heavy-gauge cable to each speaker system? I doubt if the difference is audible.

Multi-*wiring* is not the same as multi-*amping*. Multi-amping is an entirely different configuration that uses an electronic crossover to divide the frequency spectrum before it is sent to separate power amplifiers for each frequency range. This reduces clipping and provides direct coupling to the drivers. There is no direct connection to the drivers available in the 511 to allow multi-amping.

The short owner's manual does not go into all of the options deeply, but it does have adequate pictorials showing how to strap the crossover for different configurations. It also gives short and accurate advice on system placement near walls and toeing in for best soundstage. In practice, these large speakers will usually be placed where there is room, not necessarily where they sound best.

"The finest performance Threshold has achieved in a product."
—Nelson Pass

For music systems where seamless fidelity is the goal, these elegant components move beyond prior boundaries of linearity, coherence, and definition.

Building upon original work with parallel circuits Threshold has perfected an ultra-transparent gain "window" for the audio signal. Not designed as op-amps, these topologies were developed as sonically invisible stages, with as few components between input and output as possible.

Absolute neutrality is further preserved through uncompromised isolation from power source fluctuations both inside and outside the system.

Signal output—and a selected signal input—is provided in balanced or unbalanced configuration. Unlike the high impedance balanced signal characteristics of some home audio equipment, these preamplifiers are capable of driving professional 600 Ohm balanced lines, or alternately a 300 Ohm unbalanced line.

Now, music re-creation of the highest fidelity awaits your appreciation at selected Threshold dealerships.

Founders Nelson Pass (right) and René Besné with Threshold's first preamplifier offering, the 1977 NS10. This particular unit, from early 1978, was still serving as control center for its owner's system in 1990.

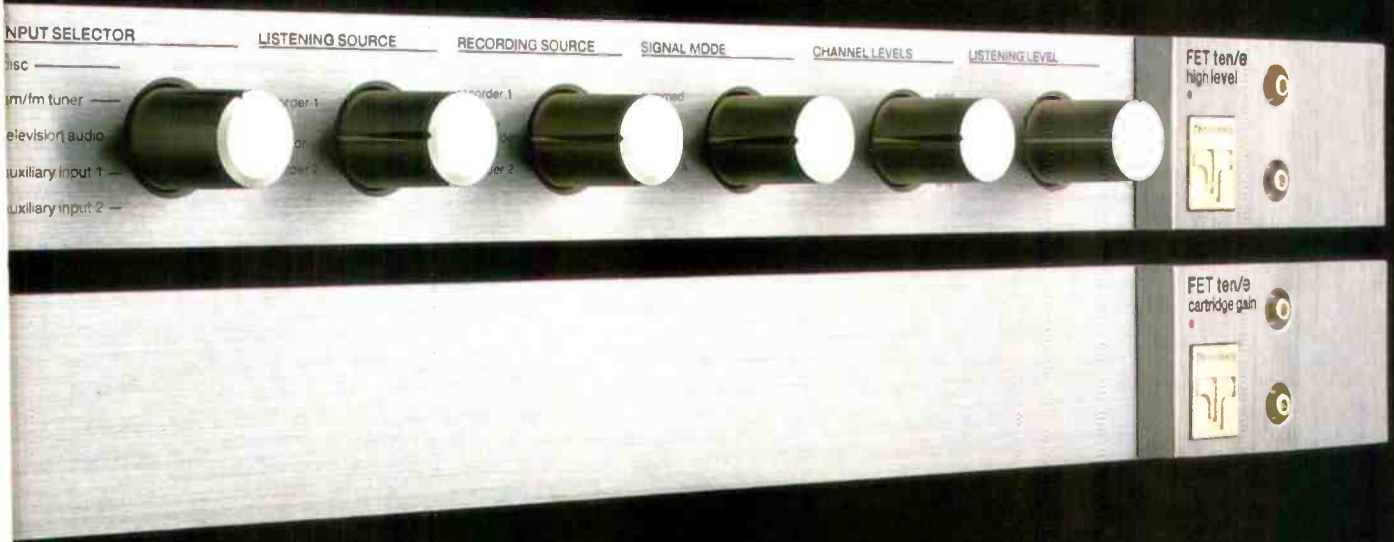
Threshold components are exclusively distributed by

division of Threshold Corporation

Your Authorized Threshold Dealer will be pleased to audition these exciting new Threshold components. For the location of your nearest Threshold dealer you may call 1 (800) 888 8055, or write InConcert, 7325 Roseville Road, Sacramento, California 95842.

Threshold

More than audio excellence.



Intermodulation distortion was far lower than one commonly finds in other speaker systems.

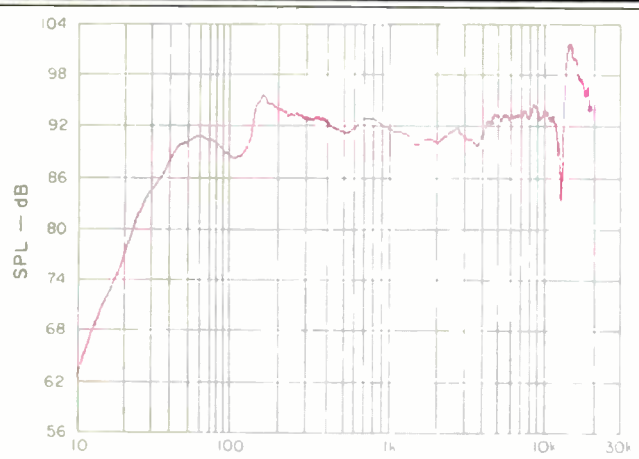


Fig. 3—One-meter, on-axis anechoic frequency response, for an input of 1 watt into 4 ohms (2.0 V).

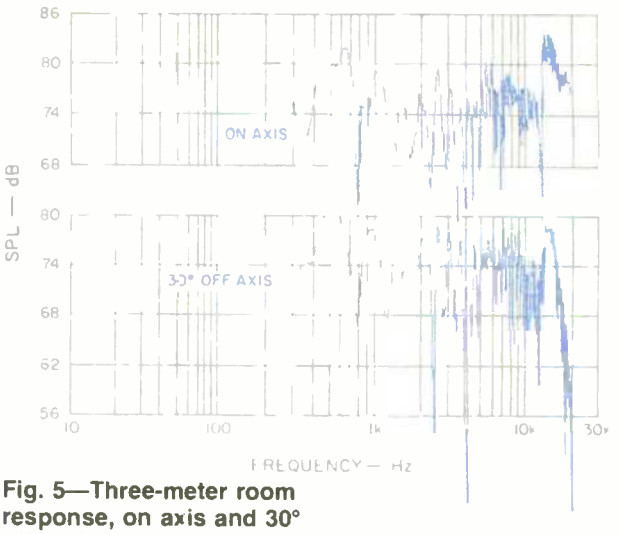


Fig. 5—Three-meter room response, on axis and 30° off horizontal axis.

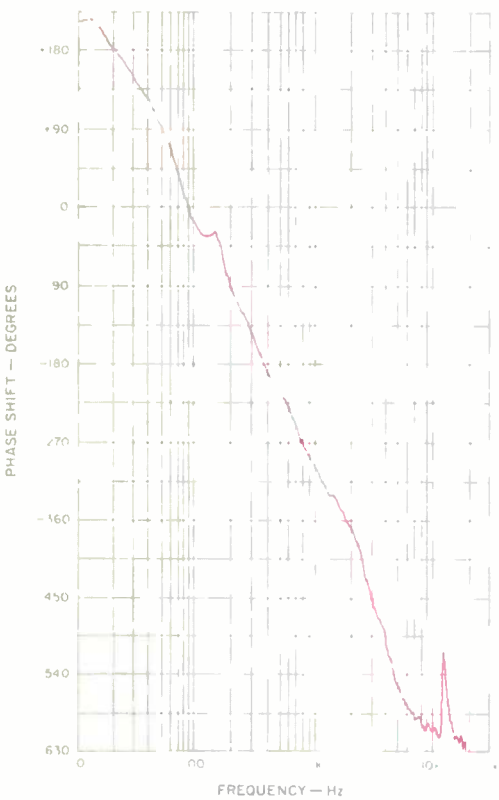


Fig. 4—One-meter, on-axis anechoic phase response.

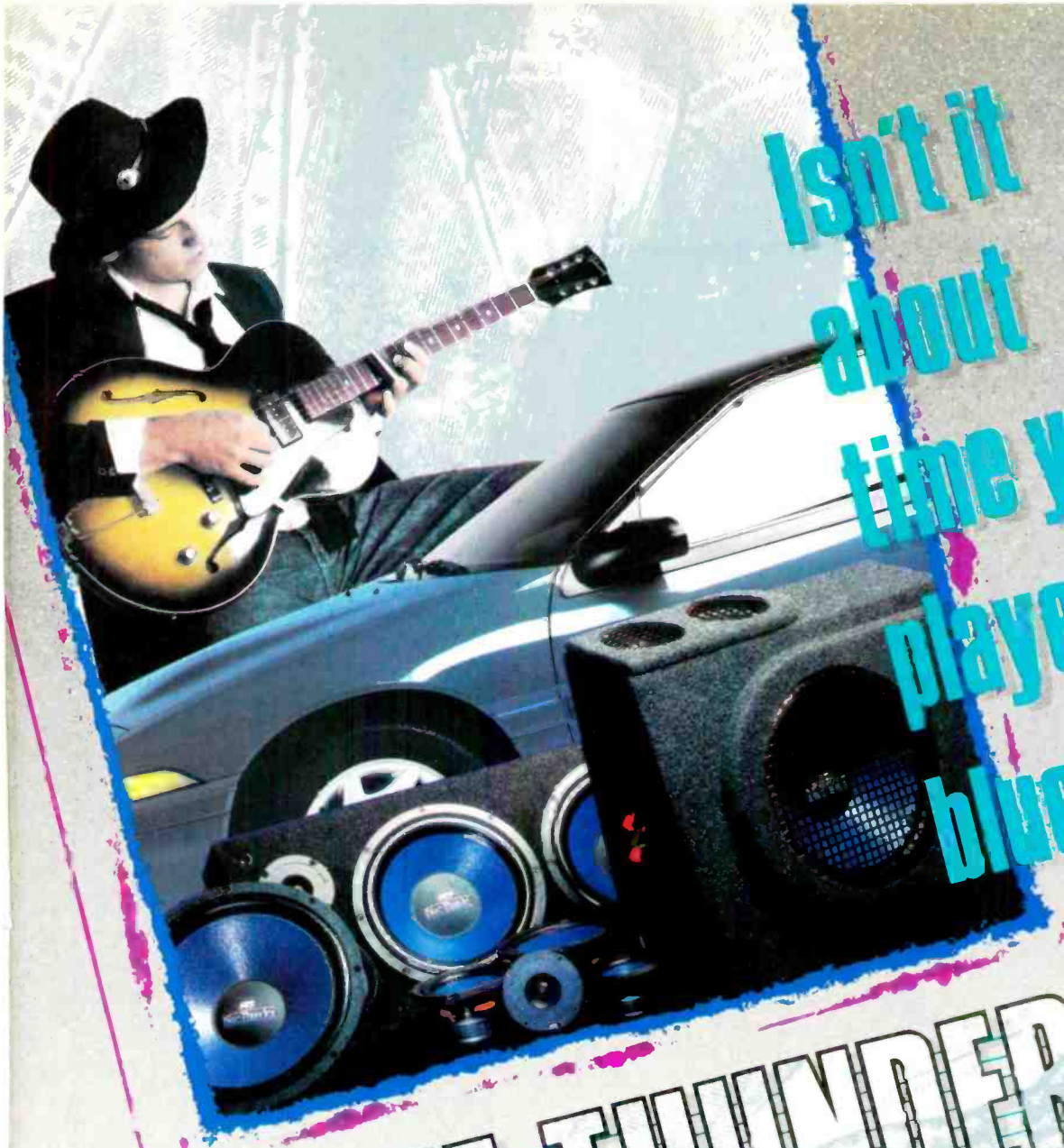
In appearance, the 511 is a simple, elegant tower: A pair would look great with an alabaster bust of Beethoven on one and perhaps ZZ Top on the other. The speakers are large, however, and can overpower smaller surrounding furniture. The finish is oiled walnut veneer with a textured black trim plate and a black grille on the front. I prefer the clean look, with the grille on, to the "tech" look of plastic trim, woven-cone sheen and diamond domes with the grille removed.

Measurements

The magnitude of input impedance for two crossover strap settings of the Altec 511 is plotted in Fig. 1. The flat, or "normal," curve, shows no woofer resonance peak. This is a result of Altec design engineer Tommy Freadman's choice to parallel the woofers with a Zobel electrical network to exactly cancel this peak. Using a Zobel is an expensive option, but it allows the woofers' 180-Hz, low-pass crossover filter to operate more precisely.

Position "2" of the "Bass Roll-Off" terminal group removes the Zobel network, resulting in the 40-Hz peak in the "Boosted" curve on the impedance plot. This option boosts the acoustical output in the region from 50 to 100 Hz. A third option leaves the boost and cuts the upper range of the woofers. For the "Boosted" curve in Fig. 1, the other three straps were set for "+1 dB" to obtain the lowest impedance curve. The 511 is a current-hungry, 4-ohm loudspeaker but has modest impedance swings. This indicates that it is an easy load for an amplifier rated to drive 4 ohms, with any setting of the straps. The complex impedance plot, Fig. 2, confirms the low phase angle of the impedance for the "normal" curve of Fig. 1.

One-meter anechoic frequency response of the 511, plotted in Fig. 3, shows exceptional smoothness from 200 Hz to 10 kHz but anomalies above and below this range. The 6½-inch mid-bass driver exhibits an extremely sharp high-pass



Isn't it about time you played the blues.

BLUE THUNDER

SEPARATES • ENCLOSURES

MTX Blue Thunder. A redefinition of "state of the art". Designed with the serious listener in mind, MTX Blue Thunder offers mobile enclosure systems, subwoofers, separates, and components engineered with the latest technology and materials. Noticeably different. Noticeably better. The BTW 1044, our 10" subwoofer, was selected by Car Audio as the best 10" subwoofer for 1990, and the BTE10W, the 10" enclosure system, ranked first in an independent review by Car Audio. Computer-controlled design for accuracy...distinctive blue long-fibre cones...butyl rubber surrounds...propietary penmeter vented voice coils...modular crossover/terminal assemblies...integrated grill design. Isn't it about time you played the blues? For your nearest dealer call 1-800-223-5266, or write us at 555 W Lamm Road, Freeport, IL 61032.

MTX®

Serious about sound

Enter No. 28 on Reader Service Card

The 511s did a good job of maintaining a soundstage, for listeners sitting off the center line as well as for those on it.

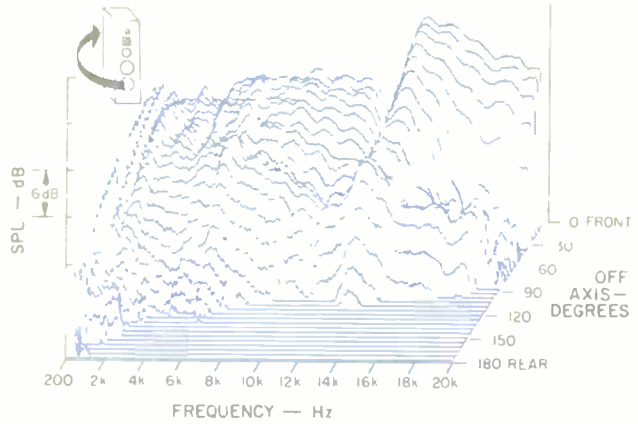


Fig. 6—Horizontal off-axis frequency responses, taken from the front, around the side, and to the rear of the speaker.

Note that, here and in Fig. 7, the frequency scale is linear and that responses are not normalized to the on-axis response.

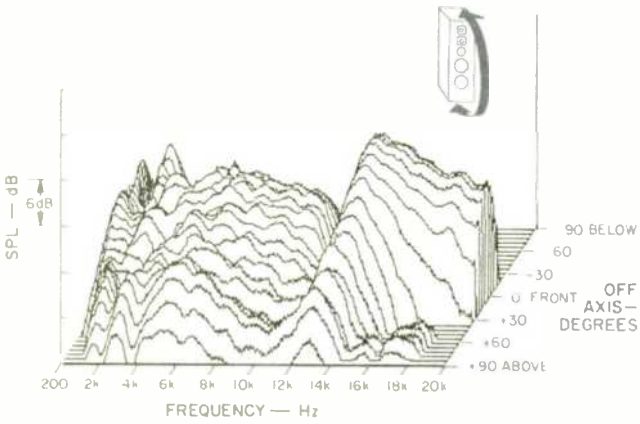


Fig. 7—Vertical off-axis frequency responses, taken from below, up the front, and to the top of the speaker.

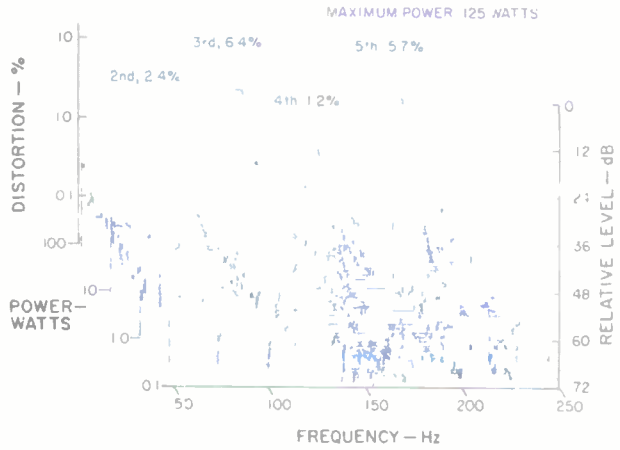


Fig. 8—Harmonic distortion products for the musical tone E_1 (41.2 Hz).

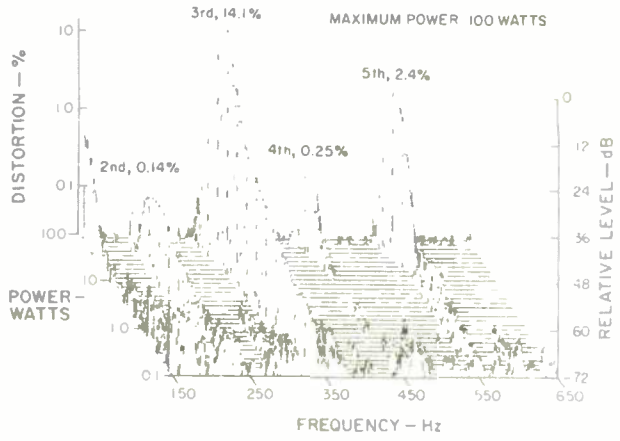


Fig. 9—Harmonic distortion products for the musical tone A_2 (110 Hz).

acoustic response, with a slight peak at 150 Hz. I suspect that the resulting phase shift prevents the smoothest blending to the woofers. Woofer output is flat to 40 Hz and usable down to 20 Hz. A tweeter resonance mars the high-end response with a major dip and peak. Altec Lansing is aware of the resonance and says it is modifying subsequent production runs to eliminate it.

The acoustic phase shift of the anechoic frequency response is plotted in Fig. 4. Most of this phase shift is a result of using conventional, well-designed crossover networks and is not usually considered a problem. The tweeter resonance shows up clearly on this plot.

When speakers are placed in rooms, the nearby reflecting surfaces produce sightly delayed sounds that combine with the direct (anechoic) sound. Figure 5 shows how this affects the frequency response on axis and 30° off axis at a 3-meter listening distance. Much of the "spiky" behavior is averaged by the listener's ears, so what we really hear is the sound of

"BBE® is the most hearable advance in audio technology since high-fidelity itself."

- Music Connection Magazine

The BBE 1002 for Home Audio / Video Systems

BBE professional systems are used around the world in major broadcast corporations, recording studios and at concerts of world-famous musicians. The BBE system dynamically compensates for phase and amplitude distortion in electronically amplified sound. We could tell you how wonderful it can make your system sound, but instead we'll let some of the world's most respected consumer audio and professional music magazines tell you:

"The difference in processed audio and non-processed audio is like the difference between high-fidelity speakers with and without pillows placed in front of them."

-Radio World

"There was no doubt the BBE processor added more spatial quality, more transients and more clean highs. This is the first black box that actually helped make my music sound the way that I knew it should. The effect is shattering!"

-Music Technology

"Everything we heard from it sounded good, and it had no discernible flaws. Not too many products we test can justify the same conclusions."

-Julian Hirsch, Stereo Review

"Forgive us if we rave unabashedly about BBE Sound's Sonic Maximizer....And what does it do? Well, it makes just about everything sound marvelous. With virtually no effort. No kidding."

-Keyboard Magazine

For your car's sound system, the BBE 3012 will provide the same dramatic improvement.

"To us the sound was immediately brighter, airier, and more sparkling, with added punch and snap to transients, more bite and sharp attacks, and more sheen to strings and vocals... The result is nothing short of–using the term literally–sensational.:"

-Car Stereo Review

Please call for a dealer near you (714) 897-6766

"The sonic maximizer provides an audio system with a clearer spatial relationship between instruments. Plus, it seems to restore a recording's original depth. ... Music seems brighter and more alive. ... Particularly interesting is how good a cassette recording sounds when processed through tne BBE."

-Hector G. La Torre, Audio Magazine

"This piece is impressive. The system sounded cleaner, a lot crisper, brighter, and–simply put–better. The improvement on compact discs, is indescribeable. I am not going to tell you that the signal sounded live, but it sure got pretty close."

-DJ Times

Visit Your Local Electronics Store and Hear the Superb New

AIWA.®

Audio Products Featuring BBE® High Definition Sound.

"BBE restores a proper stereo imaging and separation. As much as 15-20% increase in apparent openness and separation...brightens almost any input source and moves the soundstage forward."

-Stereophile Magazine

All BBE products are backed by a full year's warranty on all parts and labor.

Measuring 16 1/2" x 9" x 1 3/4", BBE fits perfectly into your audio rack. Then just plug it into your wall socket and a standard tape loop.

The BBE® 1002 is available at these and other famous stores:

Macys-New York, New Jersey and the Southeast
Leo's Stereo-So. California
ABC Warehouse-Michigan
Sound City-Kinnelon, New Jersey
Harry's Music Store-Honolulu, Hawaii
Tops Appliance City-New Jersey
Union Premium-Las Vegas, Nevada

BBE® Sound Inc.

5500 Bolsa Ave., Suite 245, Huntington Beach, CA 92649. (714) 897-6766. In Canada, contact Korbon Trading, (416) 567-1920.
If you don't live near a BBE dealer, call us at

1-800-233-8346
or in CA **1-800-558-3963**

OR, complete and send us the coupon below.

Send me____BBE 1002 unit(s) at $229 each.
(US currency only. California residents add applicable sales tax. Price includes UPS ground shipping charges. For UPS overnight shipping, add $19. For UPS 2nd day shipping, add $9.)

Enclosed is a check for $_____
Or please charge to my:
Visa ☐ MasterCard ☐ American Express ☐

Card# _____
Exp. Date _____
Signature _____
Name (print) _____
Address _____
City/State/Zip _____
Area Code/Phone No. _____

A-4

Enter No. 12 on Reader Service Card

Bass extended cleanly to the lowest tones found in normal music, and I found no audible problems with the high end.

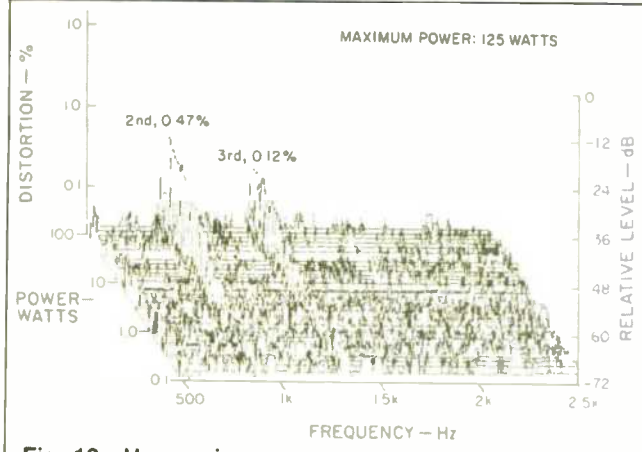


Fig. 10—Harmonic distortion products for the musical tone A_4 (440 Hz).

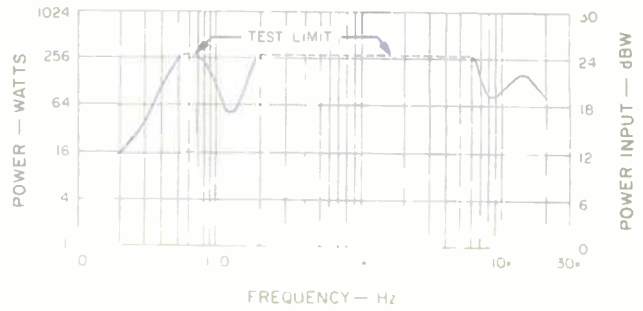


Fig. 12—Power linearity, shown as input power handling vs. frequency for 1-dB compression of the output.

Fig. 11—IM distortion on 440 Hz (A_4) produced by 41.2 Hz (E_1) when mixed in one-to-one proportion.

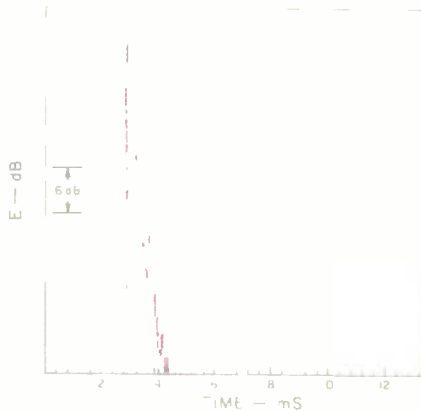


Fig. 13—One-meter, on-axis energy/time response for a test signal swept from 200 Hz to 30.2 kHz. Most of the energy is centered around 10 kHz.

speakers in a room, and there is nothing wrong with that. Look at these curves for the wider trends, such as the dip around 300 Hz. Although it's quite mild in the 511, it could cause some midrange instruments to sound thinner. The 12-kHz tweeter resonance is apparent in both curves.

Horizontal and vertical off-axis response plots are shown in "3-D" presentations in Figs. 6 and 7, respectively. The linear frequency scale expands the upper range, which is often the most troublesome. The horizontal curves show desirably controlled constant directivity to about 10 kHz, where the tweeter radiation becomes irregular and narrows. Vertically, it is the same story, except for the expected interference between drivers in the crossover ranges as the relative distance between them is changed.

Figures 8, 9, and 10 show the level of harmonic distortion for power inputs from 0.1 to 100 or 125 watts, for frequencies of 41.2 Hz (E_1). 110 Hz (A_2), and 440 Hz (A_4), respectively. Distortion of 440 Hz is insignificant, and the 6.4% of third harmonic on the 41.2 Hz at 125 watts is quite acceptable. However, the 14.1% reading at 110 Hz for a 100-watt input is unexpectedly high.

The 110-Hz tone was below the 180-Hz crossover between the woofers and the mid-bass, but it could cause either driver section a problem. The separate inputs for each section made it easy to determine that the problem was in the woofers. It is most unusual for a sealed-box woofer's distortion to increase at higher frequencies, so I observed the woofer terminal voltage on an oscilloscope.

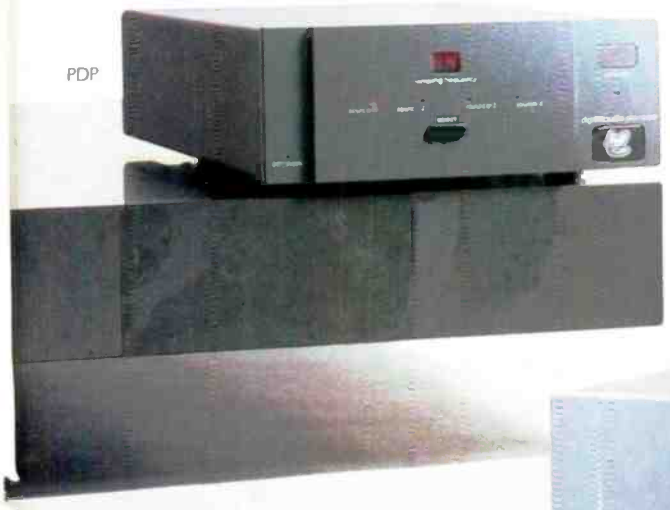
TWO'S COMPLEMENT

Proceed digital components. Innovative expressions of technology dedicated to a singular goal: reconstruction of the musical information encoded in the digital medium with convincing fidelity.

The PCD compact disc player integrates original Proceed digital design concepts into a single chassis, offering unprecedented sonic performance and manufacturing quality in its class.

The PDP digital processor improves upon technology developed for the PCD and provides our finest performance level of digital to analog conversion for all existing digital sources.

The PDT digital transport combines our PCD transport mechanism with active circuitry which supplies a superior quality digital output to complement an external processor. An ideal component for those seeking the highest level of sonic performance from compact disc.



PDP

PCD/PDT

PROCEED

High sound pressure levels were expected from the 511, and it delivered realistic pop and jazz levels.

Sure enough, waveform distortion appeared as drive voltage was increased. The appearance of distortion coincided with the onset of audible distortion. The problem was traced to saturation of the iron-core inductors in the crossover. In other words, the woofer drivers were fine; the distortion was in the crossover. Manually sweeping low frequencies at a 50-watt input level revealed that the saturation affected the upper part of the woofer range the most. At 20 Hz, where the effect was small, the system sounded really clean.

High amounts of intermodulation distortion are common in loudspeakers. When a driver's cone or dome has to move significantly to reproduce a low frequency, both amplitude and frequency modulation of a simultaneously reproduced higher tone are likely. Not so with the Altec 511, at least for *Audio*'s standard test frequencies of 41.2 Hz (E_1) and 440 Hz (A_4). The 511's crossover at 180 Hz sends these frequencies to separate drivers, so there is practically no interaction. Figure 11 shows the results.

Power linearity is plotted for the 511 in Fig. 12; the curve shows the power input which first causes 1 dB of compression. Power in excess of this usually results in distortion or damage. The 511 handles the 256-watt maximum that I use in this test over most of the audio range. The inductor saturation noted earlier does not reduce output: It just adds distortion, so the effect of this added distortion does not show up as power compression.

Dispersion of acoustic energy over time is plotted in Fig. 13. The 511 shows a single arrival, indicating minimal diffraction or reflection.

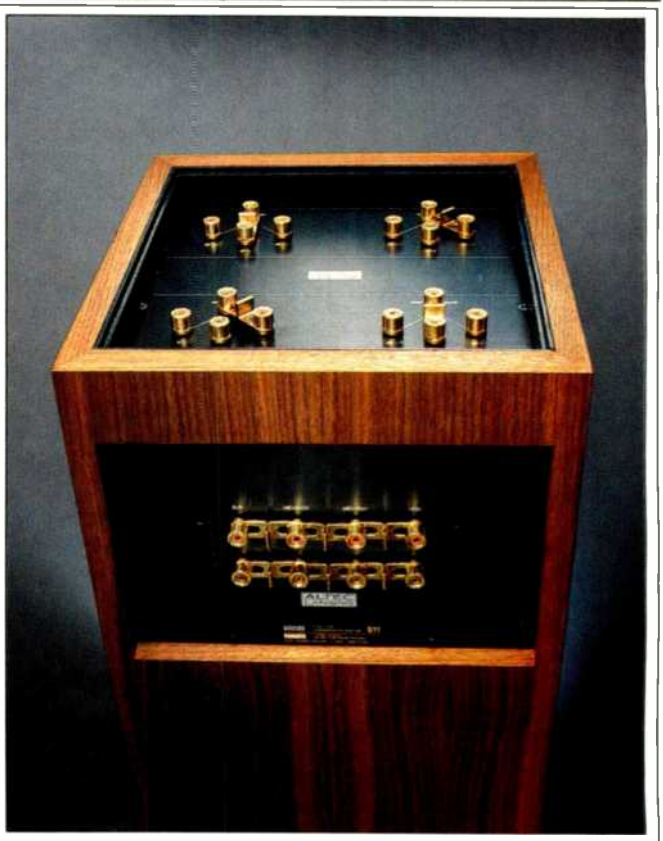
Use and Listening Tests

I placed the 511s about 10 feet apart along a narrow wall of my 18 × 25-foot listening room and about 5 feet out from the wall behind them. I experimented with toe-in, as Altec suggests, and ended up with a 20° inward angle for the most even soundstage. I not only listened on the center line, equidistant from the two speakers for this judgment, but also moved my chair within a small listening area. The 511s did a good job of maintaining a soundstage off the center line as well as on it.

The power amp used was a Bryston 4B, which is rated at 400 watts per channel into the 4-ohm loads presented by the Altec 511s. High-quality reference speakers with which I am very familiar were placed just to the inside of the 511s.

The spectral balance of the 511s was warm and solid, just a little heavier than the reference system's. Midrange and highs sounded exceptionally smooth, actually making a slight roughness in the reference apparent. To check bass smoothness, I used one of Ivan Berger's favorite tests: The tune "You Look Good to Me" by the Oscar Peterson Trio on *We Get Requests* (Verve 810047-2). The very evenly played scales of the acoustic bass revealed a slight accentuation of notes in a particular range. This might have been due to room interaction or to the unevenness that was measured. Bass extended cleanly to the lowest tones found in normal music.

I found no problem with the 511's high end in the listening tests, but after I measured the tweeter resonance and peak at 14 kHz, I took another listen. I still could not detect a problem except on the already excessive sibilants of Jennifer Warnes' "First We take Manhattan" on *Famous Blue Raincoat* (Cypress YD 0100/DX 3182). Despite its appearance on the response plots, the peak is a minor sonic issue and Altec says it has taken care of this.



The 511s were not as spacious or as distant-sounding as my reference system. Many listeners will prefer the Altec's punchy, up-front sound, but I opt for more air and transparency. Although the soundstage extended evenly between the 511s, image localization was not as specific as the reference system's.

High sound pressure level was expected from the 511s, and they delivered it. Based on the 511's sensitivity and the amplifier's available power, the pair should be capable of 121 dB SPL. Popular music could indeed be played at big-time party levels. However, "O-Daiko," cut 2 on *Kodo: Heartbeat Drummers of Japan* (Sheffield Labs CD-KODO), had to be played at a more reasonable gain to keep the Bryston's clip lights from flashing. At this level, an edge on each whack was heard that did not match the timbre of the tail-out of the drum's sound. The reference speaker (which could not reach the Altec's SPL levels) did not exhibit this phenomenon. I think the added edge was probably due to the saturating crossover inductor.

The Altec 511 is best at playing popular and jazz music at realistic sound pressure levels with an in-the-room sonic perspective. Although I feel that it would be a better speaker if the crossover were reworked, it deserves a serious listen.

David L. Clark

DEEP BASS

SUBWOOFERS

MILLER & KREISEL SOUND CORPORATION

Push-Pull Dual Driver Powered Subwoofers

MX-100, MX-90, MX-80, & MX-70

0387 Jefferson Boulevard
Culver City, CA 90232
(213) 204-2854

Musical Articulation. Detail. Elusive qualities of superior sonic reproduction that are *rarely* found in even the most expensive subwoofers.

Until now!

M&K's new MX subwoofers bring you these high-performance qualities—in a smaller cabinet and at a lower price.

In a cabinet the size of a bookshelf speaker, two new proprietary 12" subwoofer drivers produce the massive amounts of bass only expected from much larger cabinets. Better yet, M&K's Push-Pull design produces a much higher quality of bass by virtually eliminating even-order harmonic distortion.

MX-100, MX-90, MX-80 & MX-70

Four MX models, with internal amplifiers between 75 and 200 watts RMS, provide an ideal match for your system.

Building On Excellence

Seventeen years of M&K experience in Satellite-Subwoofer systems comes together *again* to create a new subwoofer performance standard. And with the 18" x 13" x 13.5" MX-70, M&K creates a new *compact* subwoofer standard.

The Ideal Choice

The unprecedented musical articulation and "ultra quick" sound of the MX subwoofers make them the perfect choice to complete any audio or audio/video system.

Enter No. 25 on Reader Service Card

STAX KOGYO SR-LAMBDA PRO EARSPEAKERS

Company Address: 20620 South Leapwood Ave., Carson, Cal. 90746.
For literature, circle No. 93

This report should be considered a continuation of the article "As Close As You Can Get" as well as an evaluation of the performance of the Stax SR-Lambda Pro earphones. In the article, I presented the problems facing anyone who wishes to make measurements of earphones, especially with the idea of trying to correlate them with perceived sound characteristics. While reporting on the Stax SR-Lambda Pro earphones, which I have chosen to be a standard against which listening panel members may make comparative judgments and comments, I will show and explain the tests that I will be using in future reports. I have been very careful not to try to set any new or arbitrary standards; my only desire is to show some measurements that I think can be correlated with listener comments, and that can be used as a quick visual guide to the reader.

The Stax SR-Lambda Pro earphones are electrostatic, setting them apart from most designs, which are dynamic. Stax has been making electrostatic earphones for more than 25 years, and their previous models have all been highly regarded. The Pro is an improved version of the Stax SR-Lambda earphones; the main difference is that the spacing between the diaphragm and the stationary electrodes has been increased to allow higher output, especially in the bass range, and the voltage between the electrodes has been raised from 230 to 580 V to increase the sensitivity. The low distortion of the Stax SR-Lambda Pro earphones is due, in part, to the fact that they employ a push-pull rather than single-ended design. A single-ended electrostatic design consists of a moving diaphragm, which produces the sound, and only one stationary electrode. A high voltage is applied between the diaphragm and the stationary electrode. If the voltage on the diaphragm is positive, it provides a constant attraction, which causes the diaphragm to try to move toward the stationary electrode; if it is negative, the diaphragm tries to move away from the stationary electrode. This type of design will always tend to produce more distortion than a push-pull type. In a push-pull design, such as the Stax SR-Lambda Pro, there are two fixed electrodes and a moving diaphragm between them; a diaphragm carrying a high voltage of either polarity is neither attracted to nor repulsed from the electrodes and thus does not move toward or away from them until an audio signal is applied. The symmetrical action of this push-pull design reduces even-order distortion.

The SR-Lambda Pro earphones are supplied with dedicated electronics, the SRM-1/MK-2 driver unit, which not only provides the high voltage required but also includes an amplifier exactly matched to the 'phones. It has gold-plated input phono jacks which can be connected to the outputs of such program sources as preamplifiers, cassette recorders, and Compact Disc players. Since the input has a high impedance, the sound quality characteristics of the earphones will remain constant and independent of the impedance of the source. This is one of the main reasons why I felt that these Stax earphones would be useful as a reference; if you have a chance to listen to them, you will hear the same kind of sound that the listening panel members and I hear. This is not true for other earphones which, because of their relatively low impedance, are affected by the impedance of the source that drives them. The drawback is that the SRM-1/MK-2 is relatively large and bulky; it is 5⅞ inches wide × 2 15/16 inches high × 13¼ inches deep. The earphones and driver electronics together are $1,199.95. Stax also offers

WOULD YOUR AUDIO CABLE ACCEPT A LONG DISTANCE PHONE CALL?

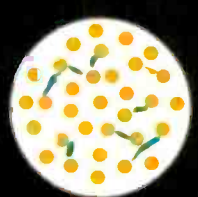
ONLY MUSEATEX CABLES GO THE DISTANCE.

The telephone is not a sophisticated audio component, yet it is capable of accurately transmitting and receiving every nuance of sound over thousands of miles. The secret to this success is not the telephone itself, but the cabling that links the phones together. Millions of dollars have been spent by the phone companies on cable research. The findings of this research, however, have been largely ignored by most audio cable manufacturers.

While audio cables are not required to span long distances, the characteristics that allow for accurate long distance transmissions are also necessary to maintain signal purity in audio applications. Each Museatex cable is made from several individually insulated, oxygen-free, copper wires. The thickness of each wire is optimized to accurately reproduce the full audio frequency balance. By insulating each wire and sealing the ends, we have developed a cable that prevents "dioding" due to oxidization, common in most conventional audio cables. This allows Museatex audio cables to maintain their performance characteristics over time.

Cross section of Museatex speaker cable showing individually insulated, 24 gauge, oxygen-free copper wire in loosely twisted pairs. Note that the copper wires do not touch each other.

Cross section of conventional audio cable showing smaller strands of randomly twisted copper wire. The copper oxide (blue) forms diodes between the strands and alters frequency balance over time.



Crypton™ Cables — Another Museatex Innovation

The audio press has been buzzing about Museatex's patented cryogenic process, which applies the theory of electronic superconductivity at cryogenic temperatures to audio. Museatex Crypton™ cables have been treated cryogenically to minimize residual stress, at the molecular level, caused by extruding the copper wires under intense heat. The improved conductivity of Crypton™ cables makes them the finest cables available for high definition audio systems.

MUSEATEX CRYOGENICS

Guaranteed Improvement

We are so sure the Museatex Crypton™ cables are the finest on the market, that we offer a 30-day, money-back guaranty that the cables will improve the accuracy of any system, irrespective of the cable currently being used.

MUSEATEX

For more information about our cables or our Melior and Meitner components, contact your Museatex dealer or call:
Montreal: (514) 333-6661 Calgary: (403) 273-2552 U.S.A.: 1-800-463-3447

Enter No. 29 on Reader Service Card

The Stax SR-Lambda Pro is my reference both because they're good and because they should sound the same on any amp you use.

the ED-1 diffuse field equalizer ($799.95) to compensate for the differences between listening to earphones and listening to live sounds in a diffuse field. The ED-1 is in a box of the same size, so if you elect to use it, you will have quite a bit of electronics for your earphone listening. From this it should be apparent that the Stax SR-Lambda Pro earphones are only useful for fixed listening applications.

The imitation-leather earcushions are very soft, and because they fit completely around pinnae without pushing against them, are very comfortable. For listening for more than one hour, the Stax SR-Lambda Pro earphones are the best of any I have used. The 8-foot cord and the headphones' relatively light weight also contribute to the comfort factor, since one can easily move around.

My article, "As Close As You Can Get," showed how the B & K Type 4128 head and torso simulator, or HATS for short, might be used to test earphones. Figure 1 here shows a frequency response curve using the HATS and the B & K Type 2133 frequency response analyzer in its twelfth-octave mode. It is presented as a reference only and as a topic of discussion, *not as an absolute measurement*. The top curve shows the response without equalization, and the bottom curve shows the response with diffuse field equalization. The dip at 3 kHz indicates that Stax SR-Lambda Pro 'phones do not provide the increased output in this range which would be necessary to match the B & K diffuse field equalization. The inverse diffuse field equalization provided by Stax in their ED-1 is much less than that of the B & K HATS system, which indicates that Stax feels that the SR-Lambda Pro earphones do not require a correction for the outer ear canal's characteristics with a magnitude as great as that used by B & K. The SR-Lambda Pro earphones may sound a little bright on some program material and slightly dull when the ED-1 is used. Although it provides a reasonable correction for Stax earphones, I decided I would not use the ED-1 with the SR-Lambda Pro earphones when I use them for reference in other reports, because it might not be available when you have a chance to audition them; I want you to be able to hear what we hear when we use them as a reference. If you decide that you might want to buy the Stax SR-Lambda Pro earphones and wonder how the ED-1 diffuse field equalizer affects the sound, I can only say that I think that it does affect the sense of space, making the sound seem a bit more distant.

The bump in the response shown in Fig. 1 at about 100 Hz was caused by the fact that I couldn't achieve a completely tight seal around the artificial ear of the HATS manikin. That artificial ear is stiffer than a real ear and caused the earphone to be held slightly away from the head. When there is an air leak between the front of the earphone diaphragm and the ear, a loss of low-frequency pressure coupling occurs, which will cause a reduction in bass extension no matter what type of earphone you might be using. When I asked panel members to evaluate the Stax SR-Lambda Pro earphones, I made certain that the seal was as good as possible, and asked them to push the earphones against their heads briefly while I played some program material that had low-frequency content. One panel member noticed a change in the bass when she did this, and I am certain that her hair was not allowing a complete seal to be made. The panel members were unanimous in praising the quantity and quality of the bass on recordings such as the *Sheffield Drum Record* (LAB-14), *Bravura* (Delos, CD3070) Saint-Saëns' Symphony No. 3, "Organ," by Charles Munch and the Boston Symphony (RCA 5750-2-RC), and "Wishing Well" (*One Night in Vienna*, Schönherz & Scott, Windham Hill, CD-1060).

I decided that I could circumvent most of the problems I discussed in "As Close As You Can Get" by making a very simple measurement that can be used with just about every type of earphone generally available. I placed a half-inch B & K 4133 condenser microphone in close proximity to the diaphragm of a variety of over-the-ear, on-the-ear, and in-the-ear earphone types, and I was able to get very consistent results. I am not proposing this as an industry standard for making measurements, and I realize that it is not without problems; the bass output and the square wave and its spectrum will not be displayed in an absolute manner, as I would like them to be, but I think that it will at least allow visual comparisons to be made between different earphones. I will try to point out any discrepancies as they appear. Since both music and speech are complex mixtures of fundamentals and

HEADPHONE EVALUATION

PARAMETER	RATING	COMMENTS
Overall Sound Quality	Excellent	
Bass	Excellent	Full and extended
Midrange	Excellent	Clear and articulate
Treble	Excellent	Clear and detailed
Overall Sound Isolation	Poor	
Bass	Poor	Not much isolation
Midrange	Poor	Does not interfere with conversations
Treble	Fair	Moderate isolation
Comfort	Very good	Long-term listening relatively enjoyable
Fit	Excellent	Covers entire pinna of even large ears
Adjustment	Excellent	Headband easy to adjust
Construction	Excellent	Strong, lightweight plastic
Ear Cushions	Excellent	Soft and comfortable
Appearance	Very good	Conservatively styled
Source Impedance Effects	Excellent	No effect; Stax SRM-1/MK-2 electronics acts as a buffer
Value for Money	Good	Arguably the best available headphones, all things considered

Take Ten

For The Road!

The state-of-the-art ten CD Changer from Ford uses a disc magazine that is easily loaded or removed from its chamber which is stored safe and secure in the trunk of your car. A full function remote-control allows the selection of any track on any disc at the touch of a button.

The ten CD Changer is available on most Ford, Mercury and Lincoln cars and Ford trucks.

And if you purchase a Ford ten CD Changer from now to July 15, 1991, you can choose three CD's from a list of over a hundred selections at no additional cost except for a shipping and handling charge of $2.50.

Audition the ten CD Changer at your local Ford or Lincoln-Mercury dealer. We're sure that you'll rate it a "perfect ten."

Ford

AUDIO SYSTEMS
The Sound of Quality

Enter No. 16 on Reader Service Card

Members of the listening panel unanimously praised the quantity and quality of the SR-Lambda Pro's bass.

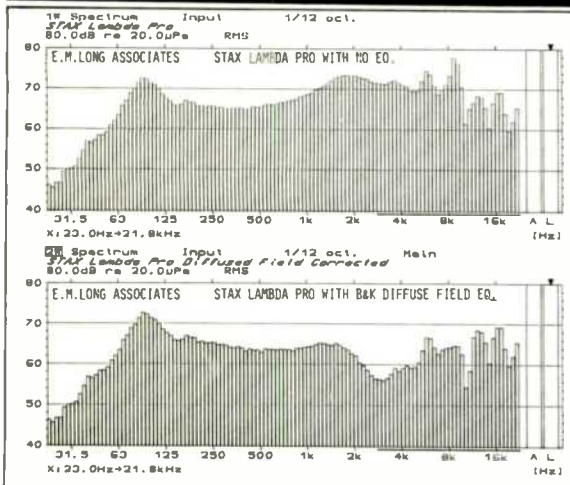


Fig. 1—Stax SR-Lambda Pro headphones as measured by B & K HATS manikin, without and with B & K diffuse-field equalization; the bump in response at about 100 Hz is due to incomplete sealing of the earcushions on the artificial head. The equalization provided by B & K is greater than necessary for these 'phones; see text.

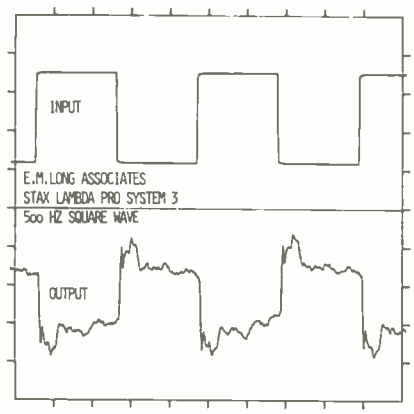


Fig. 2—A 500-Hz square wave and its reproduction by the Stax SR-Lambda Pro headphones. The output is reasonably good, especially for earphones.

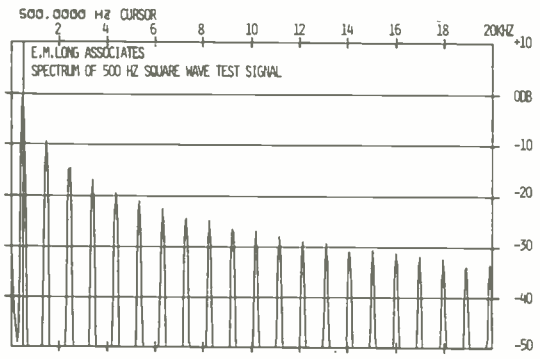


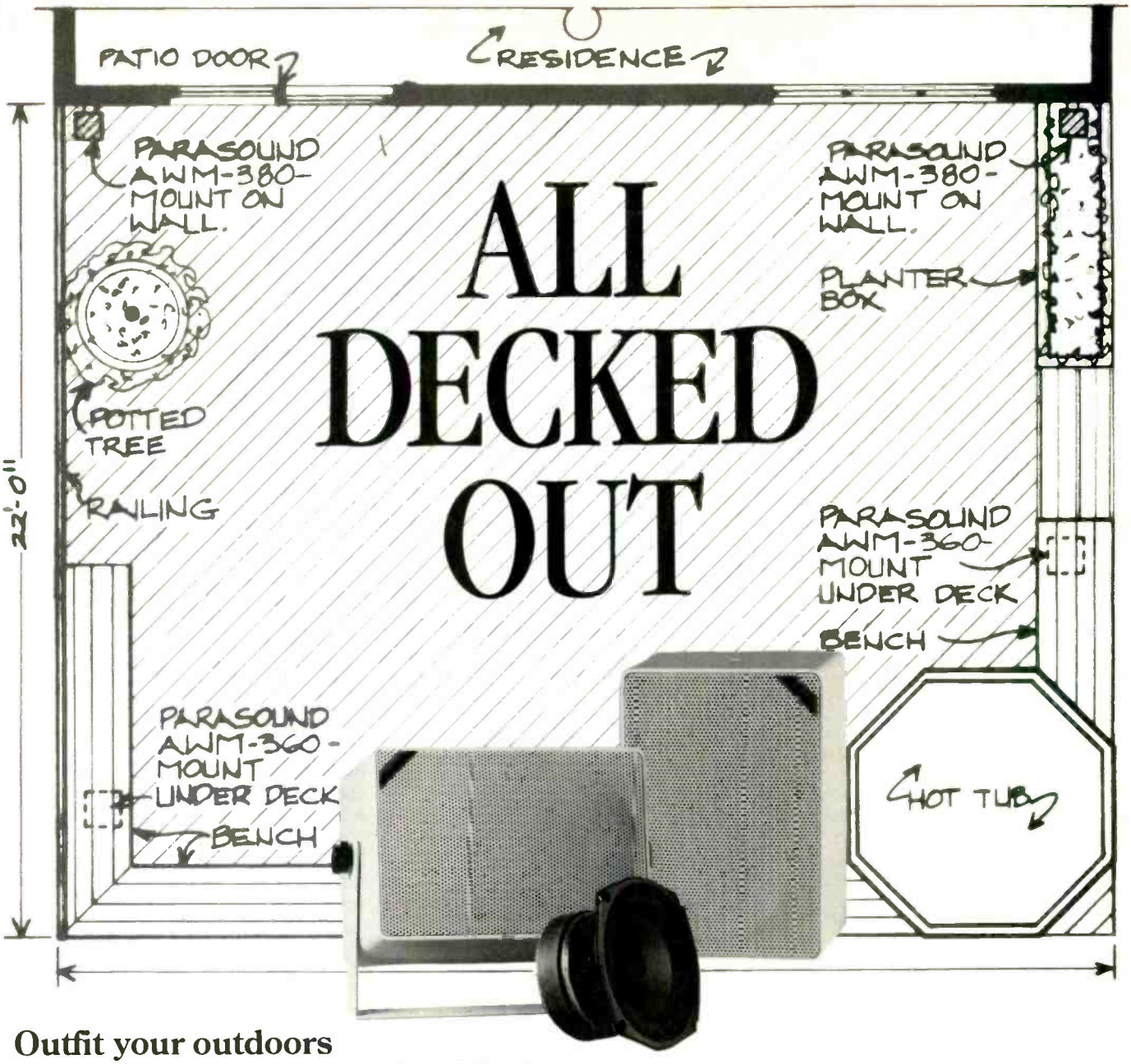
Fig. 3—Spectrum of the 500-Hz square wave shown in Fig. 2, for reference use. The harmonics are spaced at 1-kHz intervals across the spectrum.

harmonics, are dynamic, and, in most cases, have a natural asymmetry, I decided to use two test signals that would give an indication as to how earphones reproduce complex tones and transient signals.

Figure 2 shows, at the top, a 500-Hz square wave I chose to represent a complex tone since the square wave is composed of the fundamental at 500 Hz and a series of harmonics which are equally spaced at 1-kHz intervals; the harmonic series is shown in Fig. 3. Each harmonic also has an exactly defined amplitude and, although it isn't shown, a specific phase relationship. This tone has a definite timbre, and if the levels of the harmonics are not reproduced accurately, a change in timbre can be perceived. The reproduction of this square wave is shown in the bottom of Fig. 2, and the corresponding spectrum is shown in Fig. 4. It should be emphasized *that the output will not be a perfect square wave if the earphone is designed to compensate for its own effect on the outer ear resonance and that resonance's attendant increase in the ear's sensitivity at around 2,800 Hz.* The output of the Stax SR-Lambda Pro earphones shows a rise at 2,500 Hz, and this may be correlated with panel members' comments that speech was "very articulate" and that operatic voices were "well projected" and "easy to understand." The sound of trumpets and other brass instruments seemed to be "bright and clear" and to be "projected very well." Of course, this brightness and articulation may also have been assisted by the increased output of the harmonics at 13.5 kHz and above.

The other test signal I decided to use is a 30-kHz cosine pulse; the input pulse is shown at the top of Fig. 5, and the output of the Stax SR-Lambda earphone is shown in the bottom of Fig. 5. One reason I selected this test signal is that it gives a quick indication of the absolute polarity of the acoustical output; in this case, it is easy to see that the SR-Lambda Pro earphones invert the polarity with respect to the electrical input. Another reason is that it is the test signal I used with my fast Fourier transform (FFT) analyzer to obtain the phase and magnitude transfer functions of the SR-Lambda Pro earphones shown, respectively, in the top and bottom of Fig. 6. The curves in Fig. 6 are meant to be relative, *not absolute*, measurements. This is also true for data shown in the other figures of this report; they are presented to allow only a relative comparison with data that I will measure for future reports. Notice, however, that the dip in the magnitude response of Fig. 6 occurs at 4,350 Hz; this agrees with the diminished output at 4,500 Hz shown in Fig. 4 and serves as a verification that the output is actually lower in this range. This may correlate with panel members' comments that the sound for full orchestra was "slightly veiled" and "distant."

The fact that the absolute polarity is inverted might not be a problem were it not for the fact that the SR-Lambda Pro earphones are so clear and coherent



Outfit your outdoors with Parasound All-Weather Monitors.

These extraordinary sound machines are at home year-round on your deck or patio, near your pool or garden--rain, snow or sun.

Powerful woofers with space-age polycarbon cones and huge magnets drive bass response down to 48Hz. Dome tweeters feature ferrofluid damping for smooth response and wide dispersion. The 12dB crossover networks deliver great clarity. High temperature voice coils handle enough power to fill any outdoor area.

Great sound. Die cast durability. Parasound is the *leading choice* of architects and sound engineers, for restaurants, clubs, and shopping malls --outdoors, or in.

Fine-tune your outdoor plans with Parasound All-Weather Speakers.

Parasound

affordable audio for the critical listener.

Parasound Products, Inc. • 950 Battery Street • San Francisco, CA 94111 • (800) 822. 8802 • (415) 397. 7100 • FAX (415) 397. 0144

Enter No. 32 on Reader Service Card

If you're serious about headphone listening, the SR-Lambda Pro is probably the best model currently available.

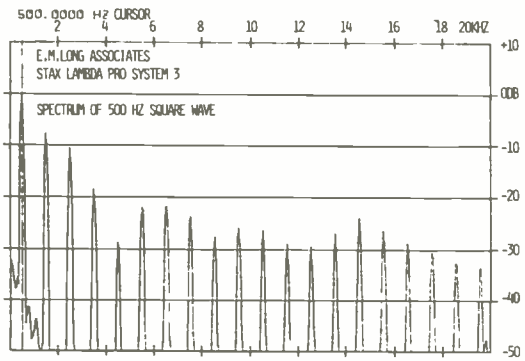


Fig. 4—Spectrum of the 500-Hz square wave as reproduced by the Stax headphones. The output is a little high at 2.5 kHz, low at 4.5 kHz, and high above 13.5 kHz.

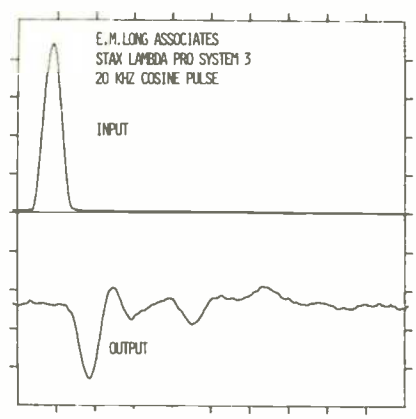


Fig. 5—A 30-kHz cosine pulse and its reproduction by the SR-Lambda Pro. Note the inverted polarity.

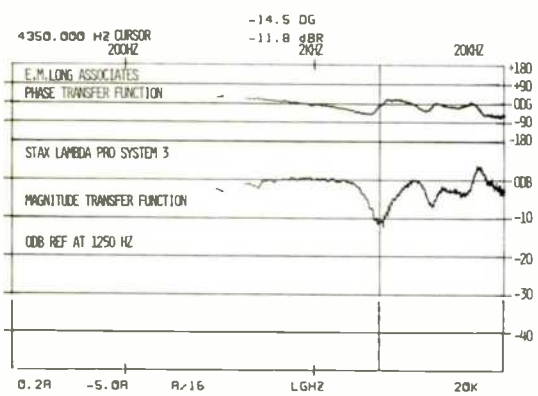


Fig. 6—Phase and amplitude spectra produced by the SR-Lambda Pro for the 30-kHz cosine pulse shown in Fig. 5. This and other curves are meant as relative measurements only, for comparison with curves in future reports. They are not meant as absolute measurements; see text.

in their reproduction of transient sounds; since they are, the absolute polarity is easy to hear and definitely affects perceived quality of the sound. With loudspeakers it is not too difficult to reverse the leads to achieve, at least, a correct starting polarity, which will allow you to mark your records, cassettes, and Compact Discs. It isn't as easy to accomplish with the SR-Lambda Pro earphones because the input to the SRM-1/MK-2 has single-ended phono jacks, and the output to the earphones is a special socket that mates to a plug on the earphone cord. Changing this is not a trivial matter. To compound the problem, the ED-1 diffuse field equalizer, which also uses phono sockets for input and output, changes the polarity when it is switched in and out! Since I bought the SR-Lambda Pro earphones and the ED-1 to use as a reference system, I have brought this problem to Stax's attention and hope they will come up with a modification that will allow both new production units and those already sold to be corrected. Until they do, be assured that when the listening panel or I use the Lambda Pro earphones as a reference, I will keep track of the polarity the hard way—by using an external polarity switch.

There are some things about earphones that are really hard to measure in a way that can be correlated to perceived sound quality, and I have discussed them in an oblique fashion by outlining the problems in "As Close As You Can Get." Although the ability of the SR-Lambda Pro earphones to present sounds with articulation, detail, clarity, and integrity of timbre is marvelous, there is nevertheless, if comparison is made to our memory of the "real thing," something missing. It is a sense that the sounds are coming from sources that are truly away from the head. I think this is because earphones do not use the natural directional capabilities of the pinnae but present the sound to them from one direction only. After you listen to the SR-Lambda Pro earphones for a while, you will tend to forget this phenomenon because they reproduce, in a truly wonderful and very enjoyable way, the feeling of space captured by good recordings. The only other earphones I would presently consider for use as references are the Etymôtic 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. They are not capable of excessive output (which may be a blessing in disguise) and the base is very much affected by the way they are placed in the ear, but these seem to be their only limitations. I decided that the Stax SR-Lambda Pro earphones would be more suitable as a reference because they are close to the ER-1M, are in production, and have been generally available for several years. I would like to thank Mead Killion and Ed Devilbiss of Etymôtic Research for allowing me to audition the ER-1M earphones as part of the process of setting up a meaningful report format. If you are serious about earphone listening, I recommend the Stax SR-Lambda Pro as being the best available at the present time. I can also tell you that I bought them and I am not disappointed. *Edward M. Long*

CENTAURUS

THE NEW LINE OF HYBRID SPEAKERS FROM THE CUTTING EDGE OF AUDIO

APOGEE ACOUSTICS

CONTACT APOGEE ACOUSTICS FOR THE CENTAURUS DEALER NEAREST YOU.
AND AUDITION THE CENTAURUS LINE STARTING AT $995 PER PAIR.
APOGEE ACOUSTICS, INC., 35 YORK INDUSTRIAL PARK, RANDOLPH, MA 02368
TEL. (617) 963-0124 • FAX (617) 963-8567

Enter No. 7 on Reader Service Card

PROCEED PCD CD PLAYER AND PDP D/A CONVERTER

Company Address: c/o Madrigal Audio Labs, P.O. Box 781, Middletown, Conn. 06457.
For literature, circle No. 94

One of the more interesting aspects in the evolution of digital CD is that most current reviews openly state now that CD players and D/A converters really do sound different and that the last few years have seen advances in their sound quality. This is the result of a continuing effort to overcome the many compromises made in earlier generations of players and to overcome the limitations in today's consumer-level digital equipment and in the sampling process chosen for CD.

The Proceed PCD CD player and PDP D/A converter are good cases in point. They are made by Madrigal, which also manufactures Mark Levinson electronics. If they do not represent the ne plus ultra in sound quality, they come remarkably close to the very best units. And they are far more affordable; the Compact Disc Player costs only $1,650, and the Digital Audio Processor is $1,295. Further, they outperform any units I have encountered in their price range.

The basic functional difference between the Proceed CD player and the D/A converter is that the CD player has, of course, no digital inputs. The converter lacks a transport mechanism but has four digital inputs. It can accept digital signals from any standard CD player, a digital tape recorder, a direct broadcast satellite (DBS) receiver, or a laser videodisc player. It can therefore be used to upgrade the sound of any digital component or of an entire A/V system.

The player has a muted blue electroluminescent display. But the processor, to get higher performance, uses an LED display, avoiding the electroluminescent's potential for digital clock noise. When processing a digital signal, the PDP will show the sampling frequency—"32" kHz for DBS, "44" kHz for CD, and "48" kHz for DAT.

These units are among the few CD players and digital processors on the market with digital outputs, and which have both unbalanced RCA outputs and balanced XLR output jacks. The fourth input on the PDP is also balanced, the first I've seen on the input to any consumer D/A converter. Having balanced outputs is useful because some new high-end preamps now have balanced XLR inputs, and the use of balanced cables can strikingly reduce noise in some systems, as well as reduce the effect of the interconnect on the sound quality.

Madrigal has rejected the use of the standard fiber-optic connectors used in some Japanese equipment—quite wisely in my opinion and that of some military designers I work with. They regard this connector as an electro-optical "dog" that is fiber-, shock-, and vibration-sensitive and believe it should never have been made a "standard" in high-quality audio equipment.

The PCD utilizes a high-quality Philips CDM1 Mark II transport mechanism with a cast aluminum, rather than plastic, base plate and a Hall-effect motor. The transport mechanism and its mounting make a critical difference in CD sound quality, and the Proceed player has several unusual features, including an "architectural" mounting system designed to minimize shock and vibration by holding the circuits and mechanism in a girder framework. This damps high-frequency vibrations and minimizes the effects of low-frequency vibrations.

The CD player has electronic correction for many kinds of problems that the error-correction circuitry in CD players cannot compensate for, and Madrigal claims that the resulting reduction in timebase and data jitter difficulties improves the reproduction of dynamic contrasts, inner harmonic structures, low-level detail, and spaciousness.

Following a shared transformer, there are two separate master power supplies for the transport and electronics, which reduces circuit noise and the fluctuations in performance inevitable with one power supply. The master power supplies feed 11 distributed power supplies and are fully electronically regulated. Special attention is given to ground and signal-path topology to ensure the best possible performance from the circuit.

The controls on the CD player are simpler than those on many other players but provide every transport and programming feature I have ever actually used. The unusual control layout, vertical design, and ergonomics are

Coming in May!

Audio's AutoMatch™ Ultimate System Giveaway!

Win over $10,000 in autosound components from today's leading manufacturers!

Plus
Get **FREE** Scosche autosound installation specs for your vehicle

Full details are in
AUDIO'S MAY CAR STEREO DIRECTORY
issue on sale April 27.
Don't miss it!

Audio
The Equipment Authority

The merit of the Proceed components is their ability to extract almost exactly what is on the original recording with neutrality.

excellent. My only complaints are a lack of positive tactile feedback in the controls—a problem common to many computer keyboards—and the fact that some of the indicator lights cannot be easily seen from the side.

The PCD and the PDP have very similar electronics. Both are designed for easy serviceability and updating, something that must be a first in a CD player with a price like this. Each unit has four separate electronic regulators for the audio circuitry, one for each ra l of each channel. There are two electronic regulators for each channel's D/A converter.

Madrigal concentrates on quality. It uses 18-bit monolithic Burr-Brown D/A converters and circuitry that minimize THD without adding other forms of distortion. Units are fully burned in at the factory, and the digital circuitry is individually tested after burn-in. The Proceeds also have a high-precision, eight-times oversampling digital filter, and Madrigal stresses that it has chosen this filter because of its superior sound quality—not for theoretical considerations. There is also an analog filter which has linear phase all the way out to 40 kHz.

The analog output stage uses a new generation of high-performance integrated circuits which allow the CD player and D/A converter to retain most of the advantages of discrete electronic components. External compensation is provided with precision capacitors and resistors, when necessary, to ensure best sound quality. The Proceeds thus have much the same kind of audio circuitry that one expects in the more expensive high-end preamps.

These pieces do, however, differ in a few respects. The converter has circuitry to clean up the digital information before processing. It uses the same power supply as the CD player, which means that it has more reserves and more consistent power going to the analog and digital circuits. The converter also has a heavier and more closely sealed case, which improves thermal stability and the performance of the electronics.

As for overall sound quality, the PCD and the PDP come very close to Horace's "golden mean." They do not strive for drama and effect; their merit lies in an ability to extract almost exactly what is on the original recording and to do so with outstanding neutrality. This does not save bad recordings, but it also does not exaggerate their problems. The Proceeds provide the kind of natural balance and detail that you expect in a concert hall or one of the few jazz performances that relies largely on natural acoustic energy. These components emphasize sound reproduction, not sound processing.

The overall timbre of this equipment is very good. With the possible exception of some far more expensive digital decoders, this is the most musically natural overall timbre I've heard, and it

With the possible exception of far more costly digital decoders, the Proceed has the most natural overall timbre I've heard to date.

is consistent over a wide range of musical dynamics.

Although the low bass is not quite up to the best competition, it is far more well defined than most. The mid-bass is tight, powerful, and has good definition. There is nice balance between the upper bass and lower midrange and only a hint of the leanness that colors virtually all digital playback devices. The midrange is also very good, with an excellent sense of detail and air, and the sound is open and sweet. The upper midrange offers natural detail and transparency, but the Proceeds reproduce concert-hall-like sound—not dramatic or etched upper midrange information. The piano and recorder, instruments that can "burn" the ear through many digital units, sound neutral and musical. The treble is very good. Like several of the newest high-end digital devices, the Proceeds demonstrate that the top octaves of the best digital recordings can provide excellent sound and that you don't need tubes or circuit gimmicks to soften digital highs—you need really good circuitry to reproduce them.

Imaging is very good in terms of left-to-right detail and stability. Depth is very good with material that has depth, but it is not added when it is not on the recording. The soundstage is not particularly wide or spacious, but it is exceptionally natural. There are no gimmicks to expand the soundstage, which results in exceptional center-fill and in depth that is in proper proportion to soundstage width.

Low-, medium-, and high-level contrasts, and dynamics at all musical levels, are very good. You will, however, need an excellent amplifier and fast and dynamic speakers to get the best performance. Slow speakers, and/or an underpowered system, will scarcely reproduce the kind of sound quality that the PDP is capable of. Also, the S/N is excellent. None of the noise in the audio circuits common to many audiophile D/A converters is apparent. I heard no trace of hum or ground loops with any of the preamps I used.

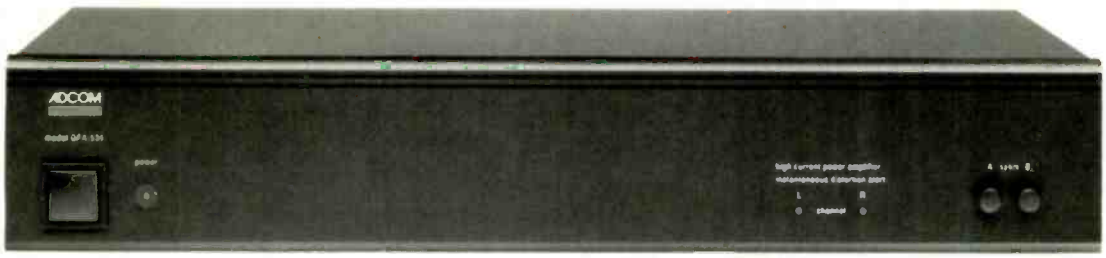
I have found the Proceed PCD and PDP to provide better quality than any similar devices I have auditioned in their price range. The Proceed CD player is an extraordinary value for someone looking for high-end performance at a reasonable price. The D/A converter is not only a "best" value in upgrading a CD player but also an ideal way of adding a system front-end that provides far superior playback quality than the internal D/A converter and audio outputs of any consumer DAT deck or laser videodisc player I have heard. In a world where virtually all manufacturers confuse a fancy front panel with sound quality, and specsmanship with performance, the Proceeds exemplify what audio design and manufacturing are supposed to do: Make recorded music come alive.

Anthony H. Cordesman

"In its price category, the Adcom GFA-535 is not only an excellent choice; it's the only choice."

Sam Tellig, The Audio Cheapskate

stereophile
Vol. 10 No. November 1987



Adcom GFA-535 power amplifier.

The complete report:

Sometimes products are too cheap for their own good, and people don't take them seriously: the Superphon Revelation Basic Dual Mono preamp, Rega RB300 arm, AR ES-1 turntable, Shure V15-V MR cartridge, and the B&K ST-140 power amp. They can't be any good because they cost so little, right?

Wrong, of course.

Adcom appears to be having the same problem with their $299.95 GFA-535 amp. Credibility.

Now if this amplifier were imported from England and sold for $599.95, then maybe it would be taken seriously. And highly praised, no doubt.

For the baby Adcom is one of the finest solid-state amps I have heard. No, not the best; I'm not sure what *is* the best. But it's an amplifier that is so good for so little money as to be practically a gift.

Actually, when Rob Ain from Adcom called, I was about as enthusiastic about the GFA-535 as you were before you finish reading this piece. But Rob insisted, "You've gotta hear this amp."

He brought it over the next day, along with the GFP-555 preamp ($499.95), and we put both pieces into the rest of the system: a Shure Ultra 500 in a Rega RB300 arm on an AR ES-1 table, with Quad ESL-63 speakers on Arcici stands. Then we chatted for a half hour or so while the electronics warmed up.

And then, simultaneously, the two of us decided to shut up and listen.

"I've never heard the Quad ESL-63 sound better," Rob said. Of course, he was hardly an impartial observer, but the sound was extraordinarily clean, detailed, and musical. If it wasn't the best sound *I* have ever heard from Quads, it was pretty close.

This humble $300 amplifier was driving a pair of very revealing $3000 speakers and giving a very good account of itself. (We listened first to some Goran Sollscher classical guitar.)

"So how come this product isn't flying off the dealers' shelves?" I asked Rob.

"I don't know. Everyone wants the GFA-555 with 200 watts per channel. Including people who don't need it."

"Does the GFA-555 sound any better?" I asked.

"It's our aim to have all our amps sound pretty much the same. You pay more money, you get more power."

Rob pointed out that while the GFA-535 is rated at 60Wpc, it puts out more like 80. And while I did not do any measurements, my experience with other amps tells me Rob's right. I suppose Adcom doesn't want to steal sales from its GFA-545, rated at 100Wpc and selling for $200 more.

After a couple of hours, Rob left, grinning from ear to ear, and I later sat down to listen alone. True, when I tried certain Telarcs and pushed hard I could get the amplifier to clip—two LEDs quickly light up (very useful). But the Quads were running out of the ability to use the power anyway. My first impressions

were confirmed: the GFA-535 is one of the best amplifiers around for driving Quads. Spendor SP-1s, too.

Suddenly, it hit me what this meant. Conventional wisdom had been dealt a severe blow. You know, the old saw that you should never power a good pair of speakers with a

"The GFA-535 reminds me of...amplifiers that sell...for about three and five times the price."

cheap amplifier. Here was a cheap amp—one of the cheapest on the market—that sounded good with Quads, Spendors, later Vandersteens. Probably Thiels, too—at least the CS1. What it means is you can stretch your speaker budget a bit and get the speakers you really want, then economize by buying an Adcom GFA-535 for $299.95. True, you may be a little power shy, but probably not much. And to say the least, the GFA-535 would make a decent interim amp.

What does the GFA-535 sound like? (You thought I'd forget that part, right?) Well, this is one of the most neutral amps I've heard.

"...the baby Adcom is one of the finest solid-state amps I have heard...so good for so little money as to be practically a gift."

While it doesn't sound particularly tubelike, it avoids the typical transistor nasties through the midrange and into the treble. I wouldn't call it sweet—there's no euphonic coloring—but it isn't cold or sterile. What it is, is smooth. And detailed. Far more detailed than I would ever imagine a $300 amplifier could be. The GFA-535 reminds me of the Eagle 2A and PS Audio 200C, amplifiers that sell, respectively, for about three and five times the price. Of course, they have more power. And they *are* more detailed. The point is, the Adcom comes close. Very close.

The bass, like everything else, is neutral, certainly not fat and overdone. But it's here where you notice that this amp is not a powerhouse. You just don't get the solidity and extension you get with a very powerful (and expensive) solid-state amp. Nor do you get the breadth and depth of soundstage that you often find with a very powerful amp. The Adcom GFA-535 sounds a wee bit small, which it is.

My only criticism, and it's more of a quibble, is that the speaker connectors are nonstandard and unique (so far as I know). You insert bared speaker wire into a hole and twist the connector tight a quarter turn. Most speaker cables will fit, but some will not. Certainly MIT won't. Neither will the best Kimber, the kind with eight clumps of strands. The less costly four-clump Kimber will, and proved an excellent choice. My sample amp was quiet—

"This amplifier is so good and so cheap that I think any CD owner who buys an integrated amp is nuts."

no hum—and ran cool. There are selectors for two sets of speakers. And the 535 looks nice.

And talk about economy: If you're not into LPs anymore, you could buy a Mod Squad, dbx, or Old Colony line-level switching box—or possibly a B&K Pro 5 preamp, with its switchable line amp section (only $350), or the Adcom SLC-505 passive preamp ($150)—and run it with a CD player. In fact, if you are into CD only (no tape, no tuner, no phono), you could buy a CD player with a variable volume output and run it directly into the Adcom. This amplifier is so good and so cheap that I think any CD owner who buys an integrated amp is nuts.

In its price category, the Adcom GFA-535 is not only an excellent choice; it's the only choice. The real question is whether you should buy one even if $299.95 is much *less* than you planned to spend for an amp—*ie*, whether you should put the money into a better CD player or pair of speakers instead.

FESTIVAL FRANÇAIS

Illustration: Beata Szpura

Florent Schmitt: The Tragedy of Salome; Psalm 47. Sharon Sweet, soprano; French Radio Orchestra and Chorus, Marek Janowski.
Erato 2292-45029-2, CD; DDD; 52:39.

Marcel Landowski: Symphonies Nos. 1, 3, and 4. National Orchestra of France, Georges Prêtre.
Erato 245 018-2, CD; DDD; 66:32.

Both of these discs come from the MusiFrance series co-sponsored by Radio France. Among the score or more of discs listed in Erato's brochure for the series, most contain music that has seldom or never been recorded commercially and thus is little known outside France. These two are no exceptions, though the names of both composers should have at least a vaguely familiar ring to many serious music listeners living on this side of the Atlantic.

Florent Schmitt, a native of the Moselle region near the German border (which presumably explains his name), studied with Massenet and Fauré and is generally viewed as combining Debussy's impressionism with the bolder colors of Richard Strauss' Post-Romantic orchestration. In program notes, he often hovers in the background when "Les Six" are discussed, though he is distinctly more conservative in style than any of that group and retained his basic *fin de siècle* orientation right up to his death in 1958.

Two of his most famous works, both dating from before World War I, are recorded here. The Psalm may suggest the Honegger of *Le Roi David* in some places and the Berlioz of the *Damnation of Faust* at others, but overall it actually has more in common with César Franck—in both its religious fervor and its musical methods. The recording of this basically choral work was made in the Church of Notre-Dame de Travail in Paris. The sound is appropriately spacious, though detail often is blurred by the reverberation. The performance is compelling.

The Salome, which appeared almost simultaneously with the Paris premiere of the Strauss opera, is basically a tone poem with one passage for soprano (as here) or oboe solo. It has been used as a ballet and might almost have been written for that purpose. As decadent and graphic, in its way, as the Wilde/Strauss version, its avoidance of concrete text presumably saved it from the censors. The scenario, however, makes it plain that this is no more than a quibble. The studio sound is clearer than that in the Psalm and lets you hear more precisely Schmitt's inventive orchestration and his intriguing sense of color.

Even more colorful are the symphonies of Marcel Landowski. Though they were recorded in the same studio as the Salome, the sound is superior—thanks in part to the even more inventive orchestration, and in part to Georges Prêtre's hand at the helm of a superior orchestra. Ranging from the '40s to the '80s in composition dates, the symphonies may be somewhat less accessible musically to some listeners, but the surface texture of the sound itself is sufficiently beguiling to hold the ear while the mind looks for underlying purpose, which isn't hard to find. *Robert Long*

Castelnuovo-Tedesco: Concerto No. 1 in G; Surinach: Concertino for Piano, Strings, and Cymbals; Ginastera: Variaciones Concertantes. Santiago Rodriguez, piano; Richmond Sinfonia; George Manahan, conductor.
Elan Recordings CD 2222, CD; DDD; 66:11.

This welcome new release brings us world premiere recordings of the first two works, coupled with a third work that is fully the equal of Bartók's Concerto for Orchestra.

Although only Surinach is a Spanish-American composer, there is a Spanish musical flavor that seems to unite the three works. Italian-American Castelnuovo-Tedesco has a fluent but conservative style in his often rhapsodic concerto of 1937. The free-spirited feeling in the first movement of this concerto could be Spanish or Italian, yet one very melodic theme seems more Viennese than Mediterranean. The orchestra is in no way subordinate to the piano. The composer's penchant for the grand musical gesture seems to predict his move to the U.S. in 1939 and his eventual writing of 19 Hollywood film scores.

No mistaking the Spanish character of Surinach's highly rhythmic piano concerto. Much of it is imbued with the sensibility of flamenco music. Its unusual instrumentation requires several different types of cymbals. The subtle differences in their timbres should provide good test material for equipment-

tweaking. The work also abounds in solo cadenzas for the piano, adeptly traversed by Rodriguez.

The late Argentine composer Ginastera had a love affair with the melodies and rhythms of his country's folk music, much as Villa-Lobos had with Brazilian folk music. He evolved a special harmonic and contrapuntal setting that fitted the native sources.

A theme and 11 following sections, each highlighting a particular instrument, make up the Variaciones. For some sections, motives from the original folk-flavored theme are lifted out to assemble an entirely new theme. The spectacular Finale is a rondo for orchestra. With the various instruments and instrumental groupings around which this work is built, golden ears have another "musical test record" opportunity.

This is the first orchestral release for the small label Elan; most of the earlier CDs are devoted to solo collections by the eloquent pianist Rodriguez, who owns the label. Sonically, the album is just below top rating because of some lack of bass below 100 Hz, such as in the tympani portions of the Variaciones. *John Sunier*

Bartók: String Quartets Nos. 1 and 3; Violin Duos, Vol. 3. The Endellion String Quartet.
Virgin Classics VC 7 90774-2, CD; DDD; 54:57.

Though separated by almost a quarter-century, there is a certain affinity between the First String Quartet and the Duos that gives this recording a rounded, satisfying quality. Between them stands the iconoclastic Third Quartet, which dates from the 1920s. One would be tempted to call it experimental, with its glissandos and its percussiveness, were the radical elements not so tightly knit into a secure, self-confident structure.


Santiago Rodriguez

Photograph: © Steve J. Sherman


The Endellion String Quartet

The First Quartet was written when Bartók had only recently discovered Hungarian folk music and was still in the process of assimilating his discovery. The open harmonies and dissonances reflect that process and are what give the work it's special character. Because only two instruments are involved in the Duos, they share that openness, though the folk idiom had been thoroughly absorbed by the 1930s. In fact, they draw on a much wider range than just Hungarian sources.

Like the Microkosmos for piano, the Violin Duos are miniatures, each based on a relatively simple musical idea. In other respects, however, they can bear comparison to the Mozart violin/viola duos or even the astonishing (and astonishingly Bartók-like) sonata for violin and cello of Maurice Ravel. All demonstrate how little constrained musical genius is when "confined" to only two stringed instruments.

The Endellion Quartet—and its violinists, Andrew Watkinson and Ralph de Souza—play the music with aplomb and panache. We are fortunate that good performances of the quartets are easier than ever to come by, and these need cede their place to no competitor. They are captured cleanly and with full dynamic range—as Virgin Classics has led us to expect of its engineering.

While the quality of the recording is not preemptive in this disc's relatively crowded field, it is easy to recommend, partly by virtue of its having included a selection of the Duos—though not so many of them to wax tiresome, as the complete collection can. But it is a pity that Virgin Classics could not have seen its way clear to follow the original Philips/PolyGram formatting guidelines and present each quartet as a single track, indexing (rather than banding) the movements, to preserve musical integrity by making it easy to play each quartet alone, as an entity.

I have the same complaint about many CDs from many companies. Alas, the remedy seems too much to ask when PolyGram itself can't be bothered to follow its guidelines, and CD players with indexing capability are consequently so rare. Still, I'd rather be denied ready access to individual movements, particularly in works like the Third Quartet that are designed for playing without pauses, than be forced to program them in sequence to keep from running over into the subsequent piece. *Robert Long*

Strauss: Eine Alpensinfonie, Op. 64; Don Juan, Op. 20. San Francisco Symphony; Herbert Blomstedt, conductor.
London 4218252, CD; DDD; 70:12

The Germans call it *Lautmalerei*—painting with sound—and nobody who

Richard Strauss' "Alpine Symphony" has great power and, in its finest passages, a vaulting nobility worthy of its subject matter.

ever lived has done it better than Richard Strauss. Bavarian-born, he had an attachment to the Bavarian Alps strong enough for him to reside, until his death, in the shadow of Germany's highest peak, the Zugspitze, in the Alpine resort Garmisch-Partenkirchen. Because of this attachment, he brought more than mere affinity to the composition of the vivid tone poem he called "An Alpine Symphony." If it doesn't quite measure up to the genius of some of Strauss' other tone poems, it does have great power and, in its finest passages, a vaulting nobility worthy of its subject matter. This disc also contains a spirited and admirable performance of Strauss' youthful "Don Juan," but it is a mere lagniappe for the vastly more substantial "symphony," which has four indicated movements, played without interruption.

The composer's own annotations in his score describe a single day spent in his beloved mountains. He rises, rather murkily, long before dawn, for the Alpinist's traditional early start, and, after a splendid orchestral sunburst, he begins the ascent with an energy some consider "typically German." Entering an Alpine forest, he encounters first a hunt, and then a waterfall, which gives rise to a momentary fantasy about an Alpine sprite. In flowery meadows he comes across shepherds and their flocks. (In this passage I could have done with a stronger evocation of those unique Alpine cowbells Gustav Mahler also loved so much.) The magnificent spectacle of a glacier precedes a thunderstorm, then descent for a bit of rest. "Rustic pleasures"—a dance and a folk festival with its procession—ensue, but they give way to some brooding "dreams and specters (after Goya)." Ever the philosopher, the composer profits from his experience to find "Liberation *through work*," portraying his artistic creation in an involuted fugue.

Michael Steinberg's excellent leaflet refers to Nietzsche, but the philosophical content of this music reminds me more of a passage in "The Soul and Death," an essay by C. G. Jung:

> From the middle of life onward, only he remains vitally alive who is ready to *die with life*. For in the secret hour of life's midday the parabola is reversed, death is born. The second half of life does not signify ascent, unfolding, increase, exuberance, but death, since the end is its goal. The negation of life's fulfillment is synonymous with the refusal to accept its ending. Both mean not wanting to live; not wanting to live is identical with not wanting to die. Waxing and waning make one curve. Wherever possible our consciousness refuses to accommodate itself to this undeniable truth.

And Richard Strauss nobly refused to accommodate himself in his "Alpine Symphony." *Paul Moor*

1-800-356-9514

We have the best pricing—CHECK IT OUT!

- Best Pricing
- Fast Delivery
- 30-Day No Lemon

MasterCard VISA
OR
C.O.D.

WDS
WISCONSIN DISCOUNT STEREO
2417 W. Badger Rd., Madison, WI 53713

- Best Service
- 10-Day Return*
- 1000's of Products

Hours: Monday-Friday 8-8
Saturday 8-5:30 • Sunday Closed

FEATURING... a small sampling of our in-stock items.

DISC PLAYERS

TEAC AD-3 ..... **SPECIAL**
Combination cassette and CD player. Dolby B/C/Hx Pro

Magnavox CDC 552 ..... **$199**
5-disc carousel changer, 16 bit 4x, can change 4 during play

JVC XLM 403 ..... **SPECIAL**
6 + 1 changer, 8x, random play in any order

CASSETTE DECKS

TEAC V-970X **$449**
3-head, B/C/Hx, DBX Headphone jack

JVC TDW503 ..... **SPECIAL**
Auto-rev, full logic, continuous play, headphone out, mic. input

Sherwood DD 1230 ..... **$169**
Auto-reverse, dubbing deck Dolby B/C

RECEIVERS / AMPS

Sherwood RV 1340 ..... **$244**
100 wts + 20 wts/Channel, 5 band EQ, Dolby surround

JVC RX 503 ..... **SPECIAL**
80 wts, AV remote, 7 band EQ, 10 presets, matrix SS

Harmon-Kardon PM665VXi ... **$439**
150 wt/ch, hi and subsonic filters, pre out

CAR STEREO

Clarion 9772 ..... **$219**
Din, removable, 18 presets, A/R, Dolby, 25 wt, RCA out

Alphasonic PMA2075E .. **SPECIAL**
Amp, 75 wt/ch, bridgeable to mono, 0.05 THD

JBL T602 ..... **$99**
6.5" 2 way, 80 watts, 55 to 23k Hz, 92 dB, 4 ohm

HI-END A / V

Pioneer CLD 3080 ..... **SPECIAL**
Combination CD-Laser player both sides LD play, jog shuttle

Design Acoustics PS-3 SPECIAL
Subwoofer/satellite system dual 6.5" long throw woofers

SAE A-202 ..... **$269**
100 wt/ch, LED Power Lead, Dual Speaker Switching

PERSONAL ELECTRONICS

Sony MDR V6 ..... **$67**
Closed ear headphone, monitor, folding type, 40mm driver

BEL Legend **$209**
Radar detector, 3-band high sensitivity

Uniden RD-9XL **$119**
Highly rated radar detector X and K band, compact

PERSONAL ELECTRONICS

Southwest Bell FF675 ..... **$149**
Cordless phone answering machine, std. cassette

Recoton Wireless 100 .. **$187**
Wireless add-on speakers, powered, 4.5" driver

Sony Cordless ..... **SPECIAL**
Call for pricing on our complete selection of cordless phones.

PORTABLES

Sony D-66 ..... **SPECIAL**
Compact CD, 8x, dual damper mega-bass, headphone

JVC PCX 100 ..... **$199**
Dual cassette, CD player detachable speakers

CALL FOR SPECIAL PRICES ON DEMO MODELS!

CAMCORDERS

Sony—All Models .. **SPECIAL**
Call for prices on our complete selection of Sony camcorders!

Magnavox CVL300 ..... **$659**
Full size VHS, 2 lux, 6x zoom, hi-speed shutter, auto tracking

JVC GRS-70U **$899**
S-VHS-C, 8x, 2.6 lbs, insert edit hi-speed shutter, 8 lux

VCR

Quasar VH 6205 ..... **$329**
Hi-Fi, 2-head, 2/31, on screen program, 155 channel

RCA VR675 ..... **SPECIAL**
4-head, Hi-fi, 181 channel, auto tracking, MTS

Toshiba Hi-Fi **$299**
Hi-Fi sound at a **budget price!**

VCR

JVC HRSC 1000U .. **SPECIAL**
Loads VHS, VHS-C, & S-VHS! Shuttle index, digital A/V

Panasonic PV 4010 .... **$259**
155 channel, OSP, auto prompt, memory rewind, 2/31

JVC HRD670 ..... **$339**
181 ch, noiseless still, quick response load

TV

Sony—All Models .. **SPECIAL**
Call for prices on our complete line of Sony Television

JVC AV2080S **$359**
MTS, surround sound, S-VHS home sitter channel guard

Toshiba CF3060 ..... **$849**
30", MTS stereo, full featured remote, program scan

WDS 2417 W. Badger Rd. Madison, WI 53713

*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. For return authorization call:

1-608-271-6889.

Some Items Closeouts
Some Limited Quantities.

TALES OF AN EX-COP

The Soul Cages: Sting
A&M 75021 6405 2, CD; DDD; 48:18.
Sound A+ Performance: B–

Sting is a lyrical guy with an English-teacher background who knows his way around cadences and symbolism and how songs are different from poems, and all sorts of stuff like that there. And with *The Soul Cages*, he lets all that run on like the previous sentence.

Unified in a semi-autobiographical way by a concept of "this island Earth," *The Soul Cages* revolves around a comparison of humans living within the confines of a fragile planet and within the confines of our lives. There's a vague geography-is-destiny attitude, where a lad born "within sight of a shipyard" or standing "with the gathering sea at my back" is equally, if ephemerally, trapped. And if you don't get the theme on first try, don't worry about it because Sting keeps telling you about it until you do.

Thankfully, these endless variations on a theme are often very lovely in both language and sound. The often acoustic instrumentation (with an added dash of synthesizer) calls forth images of windswept rocks, storm clouds, and Heathcliff walking on the moors. The first track, "Island of Souls," ends with a mournful passage of Northumbrian pipes (a northern England version of bagpipes). Other songs give hints of Irish jigs, and an instrumental piece (track 6, which incomprehensibly is both untitled and unmentioned on the album jacket and lyric sheet) is a composition for classical guitar. All this is very happy circumstance, since a little of Sting's vocals goes an awfully long way—and these are truly lyric-heavy songs. One moment, Sting's lyrics and vocals intergrate to conjure a powerful, visual image of clerics "fussing and flapping in priestly black/like a murder of crows." The next moment, he's not only singing but *repeating* "something wicked this way comes," a line of Shakespeare that's been famously appropriated by Ray Bradbury and has long fallen into the chasm of cliché.

And as for appropriation, the sprightly first single, "All This Time," is the most astonishing Paul Simon swipe imaginable, in the composition itself and especially in the vocals. Sting

apes that casually rushed, offhanded storyteller's delivery which is as much a Simon trademark as doo-bee-doos are Sinatra's—or as a painfully sincere near-monotone is Sting's. Ironically, Sting's monotonous delivery saves many of these songs from cheap sentimentality. While the delivery also makes some songs almost devoid of emotion, it is in contrast to the delicate strength of the music itself, which is warm without being syrupy.

Helping achieve this is a much-hyped new audio technology called QSound, of which *The Soul Cages* is an early beachhead. It's designed to create aural three-dimensionality in coventional audio systems, with no surround speaker necessary, and this album's sound quality is exquisite. I can't recall many other records where vocals and instruments were balanced so cleanly and evenly. It's questionable, however, how much of this is the result of QSound and how much is the result of co-producer Hugh Padgham's surgically tendered engineering and mixing.

It also should be noted this is the second major-label CD release without the environmentally wasteful paperboard "longbox" packaging. *The Soul Cages* replaces the plastic jewelbox with a paperboard-and-plastic-tray Digipak that unfolds to four panels and is held open to a two-panel height by plastic Digitrak strips on either side. It's a step in the right direction, I suppose. I wish I could say the same for the album.

Frank Lovece

Dear 23: The Posies
DGC 9 24305-D2, CD; AAD; 48:25.
Sound: A Performance: A–

Day After Day: Badfinger
Rykodisc 10189, CD; AAD; 48:38.
Sound: B– Performance: B+

Pop is back, they say, and there are a bunch of new college-type bands inspired by the under-appreciated and melodic post-Beatles bands of the early to mid-'70s. It almost feels like—dare we say it—a "movement." While bands like R.E.M. and The Replacements championed Big Star without sounding akin to them, The Posies are something else entirely. They have listened to their '70s pop and make no bones about landing squarely between the '60s (read: Hollies) and mid-'70s (read: Chris Bell's contribution to Big Star). Their harmonies are impeccable, John Leckie's production both lush and gripping, and they toss off references to other bands casually while maintaining their own sound. Many bands of this nature tend to sound a bit ordinary, but The Posies seem anything but—closer to The Move than to The Beatles. Songs like "Suddenly Mary" and "Golden Blunders" seem likely to make some radio impact, and one might expect XTC fans to go for this. They're clever without being cloying, and although lately we've been pretty immune to this kind of record, The Posies have gotten under our skin.

Badfinger hasn't exactly risen from the grave—it's doubtful that the two living members will mount another tour—but one of their better concerts from 1974 has been resurrected and finally issued on some legitimate basis (it's been bootlegged in the past).

The good news is that the performance is pretty strong. The bad news is that the mix has the drums way out

Chick Corea Akoustic Band

ALIVE

Chick Corea Akoustic Band "Alive" captures the driving force of the world acclaimed keyboardist live with premiere bassist John Patitucci and renowned drummer Dave Weckl.

The extraordinary trio display uncanny creativity and pure virtuosity in a sure-fire repeat Grammy Award winning performance for 1991!

On *Dear 23*, the Posies make no bones about landing squarely between the '60s and the mid-70s.

front and doesn't feature the guitars nearly as much as it should. Badfinger's strength was not only the fine songs and singing but the blend between the raucous guitars and the vocals. Here, there is altogether too much separation. However, *Day After Day* remains an important document of a band misunderstood and neglected in its day, yet greatly loved since.

Also worth checking out is Rhino's anthology of their Warner Bros. work, *The Best of Badfinger, Volume 2*. It makes a fine companion piece to *Day After Day*. *Jon & Sally Tiven*

Texas Tornados
Reprise 26251-2, CD; AAD; 31:36.

Sound: B Performance: B+

The Best of Doug Sahm and The Sir Douglas Quintet, 1968-1975
Mercury 846-586-2, CD; AAD; 72:48.

Sound: C– to B Presentation: A

Texas Tornados is a Tex-Mex summit featuring Freddy Fender, accordion legend Flaco Jimenez, and Sir Douglas Quintet alumni Augie Meyers and Doug Sahm (Sir Douglas himself). This album is an attempt to bring the percolating music of East Texas into the '90s. It is a glorious if brief effort.

From the opening accordion-driven bars of "Who Were You Thinkin' Of," other jumpers like "(Hey Baby) Que Paso," "Adios Mexico," and "Soy de San Luis," plus ballads like "Laredo Rose," "If That's What You're Thinking," and Butch Hancock's gorgeous "She Never Spoke Spanish to Me," the Tornados could not be more ingratiating. They also throw in greasy R&B with "A Man Can Cry" and "Baby! Heaven Sent Me You." Bill Halverson's production is streamlined and straightahead, just right for this project.

Concurrently, Mercury has issued *The Best of Doug Sahm and The Sir Douglas Quintet*. The 22 selections include pop ("Mendocino" and, from the film *Cisco Pike*, "Michoacan"), hard rockers, various shades of East Texas blues, R&B, country, jazzy experiments, and honky-tonk. Several were recently released, while others are from singles that have never been on an album before. It is a rounded collection of a man who is a walking, talking, singing, guitar-slinging encyclopedia of American music. Sadly, the early hits produced by Huey Meaux ("She's About a Mover" and "The Rains Came") are missing. However, what is here is terrific, far overshadowing any omissions. Gene Santoro's appreciative essay in the booklet is excellent. And this is a budget-priced disc too!

Michael Tearson

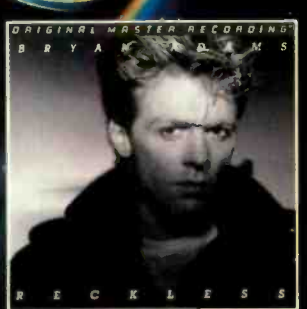
ORIGINAL MASTER RECORDING™

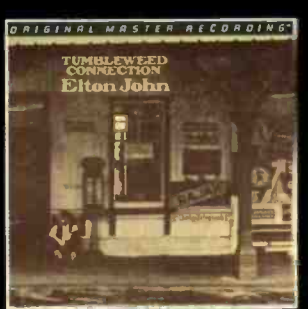
ULTRADISC

THE MOBILE FIDELITY FORMULA*

O·M·R + A/A/D + 24k Au =

The Ultimate Audio Experience





***(Original Master Recordings + Analog/Analog/Digital proprietary transfer technology + 24 karat gold plated compact discs)**

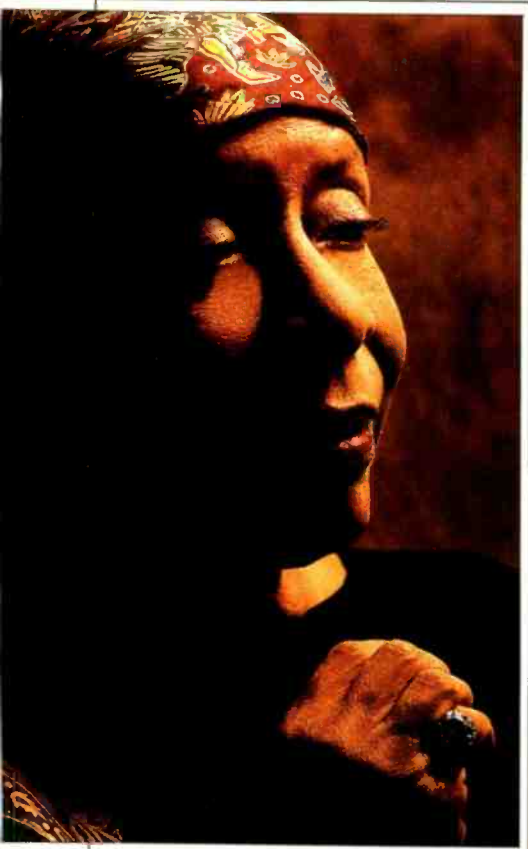
mobile fidelity sound lab
a division of MFSL, INC.

For a complete free Original Master Recordings catalog and ULTRADISC technical information, call toll free 800-423-5759, in CA (707) 778-0134

Illustration by James Dowlen ©1990

Enter No. 25 on Reader Service Card

UNFORGETTABLE



You Won't Forget Me: Shirley Horn
Verve 847 482-2, CD; DDD; 71:11.

Sound: A Performance: A

Shirley Horn's latest recording since her return to the jazz scene two years ago is armed to kill us softly. Her voice exudes subtlety and impeccable control meshed with a flexibility that seems infinite. Her piano technique is easy to absorb yet is complex in nature, and its phrasing makes *You Won't Forget Me* run counter cocktail lounge.

On this album, the pianist/vocalist surrounds herself with a formidable cast enveloped in first-rate material. The well-thought-out arrangements seem to magically swing whether they're embroidered ballads ("The Music That Makes Me Dance"), bluesy ("Don't Let the Sun Catch You Cryin' "), or flat-out movers ("Come Dance with Me").

Horn's predominant rhythm mates, bassist Charles Ables (who contributes a guitar solo on one cut) and drummer Steve Williams, complement her gracefully and fervently on such compositions as "Too Late Now" and the energetic "I Just Found out About Love." Without being overpowered or overwhelmed, Horn receives a boost on several selections. Wynton Marsalis delivers admirably on "Don't Let the Sun Catch You Cryin'," while Branford Marsalis' tenor moves from a sultry cross between Stan Getz and Ben Webster to John Coltrane-isms on "It Had To Be You." Toots Thielemans doubles on guitar and chromatic harmonica on the spacious "Beautiful Love," with Horn providing the vocal without piano accompaniment. Miles Davis, working with the trio, delivers—with the aid of Steve Williams' high-hat and cymbal work—a muted solo with resolve on the title track.

As if such evidence weren't enough, Horn corralled an alternate rhythm section, bassist Buster Williams and drummer Billy Hart, to assist her on Burton Lane and Alan Jay Lerner's standard, "Come Back to Me," and other selections; listen to the interaction between the leader and Buster Williams' bass intro and subsequent effort on "You Stepped out of a Dream" before Charles Ables' guitar solo becomes the focus. Horn's remaining guest, Washington, D.C.'s favorite mail carrier, tenor saxophonist Buck Hill, is heard on the uptempo "Foolin' Myself."

Altogether, this 14-song display awes. It's distinctively rich throughout and an exceptional recording.

Jon W. Poses

Chicago Bound: Jimmy Rogers
Chess/MCA CHD-93000, CD; AAD; 42:14.

Sound: B Performance: A

Chicago's Jimmy Rogers Sings The Blues: Jimmy Rogers
Shelter SRZ-8016, CD; AAD; 61:30.

Sound B+ Performance: B–

Ludella: Jimmy Rogers
Antone's ANT0012, CD; AAD; 52:27.

Sound: B+ Performance: B+

Jimmy Rogers was the least likely of Chicago blues stars. Neither an outstanding lead guitarist nor a commanding singer, he earned a place in history as the second guitarist in Muddy Waters' classic bands of the early to mid-'50s. Yet at the end of Muddy's recording sessions, Rogers led Waters' stellar group through impromptu performances that rank among the best of Chicago blues.

The cream of Roger's '50s sides are collected on the Chess reissue *Chicago Bound*. While Waters' band electrified the blues of the deep South for Muddy, they drew upon a more streamlined, urban sound for Rogers. The results were closer to harp blower Little Walter's landmark recordings than Muddy's own. The familiar hits are here including "That's All Right," which has been covered by nearly everybody. There are also lesser known wonders such as "Sloppy Drunk," "Act Like You Love Me," and "Chicago

OVER 60% OFF

dbx Stereo Imaging Speakers
"Balanced with Flexible Room Placement"
SF150 orig $1500 NOW $599
SF5000 orig $500 NOW $199
Doesn't apply to any previous offers

Advent Maestro

- 750 watts peak power handling
- 3-way home speaker system with a 10"woofer
- 42 Hz-23,000kHz frequency response

CALL

PROTON Receiver

D940 Originally $600
- 40 watt/ch 280 peak
- Hi-Fi Grand Prix Winner
- Schotz N.R.

NOW ON SALE AT $288

dbx BLOWOUT 1/2 PRICE

TX1 Orig. $500 Shotz Tuner $250
SX10 Dynamic Sound Enhancer $43
500XR Orig. $500 Route Selector w/Remote $250
SX20 Video Impact Restorer $43

BBE Sound Inc. SONIC MAXIMIZER

BBE 1002.....ONLY $199
"The most hearable advance in audio technology since HI FIDELITY ITSELF"
Laurence Henry, Music Connection

THORENS TD280 MKII

- Affordable European quality & craftsmanship
- 5 yr. man. warranty
- Includes Ortofon cart. mounted Free!!

ONLY $249
OTHER MODELS AVAILABLE

NHT TOP RATED

ALL MODELS NOW IN STOCK
- Model 1.3
- Model 2
- Zero
- Model 1
- SW 1
- M100

CALL FOR PRICE

SOUNDCRAFTSMAN Amp

A5002
Class H 250 w/ch power amp into 8 ohms;375 w/ch into 4 ohms • 40 LEDs w/handles
Best Deal $599

IN STOCK Pro EQ 44

PINNACLE PN8+

- Dual diaduct ports
- 1" liquid cooled polymer dome tweeter
- 30-21kHz freq. response
- 375 watts peak power
- 7 years parts & labor

CALL
CALL FOR PN5+,PN2+,PN Sub

a/d/s SUPER SALE

M12 Tower Speakers $1099
CM7 (Grey Only) 3-way shelf speakr $699
L9E,L8E,L7E In Stock CALL
C4 3-HD Cass. Deck $469
C3 3-HD Cass. Deck $399
C2/3 Cassette Deck $259

SOUNDCRAFTSMAN Amp

PCR800 NOW ONLY $349
- 205 w/ch power amp into 8 ohms
- < 0.05% THD • S/N 105 dB
- 20-20,000 Hz into 8 ohmss

Orig. $499

AUDIO VIDEO CAR STEREO

201•838•3444

Sound CITY

AUDIO • VIDEO • CAR STEREO

LASER DISC PLAYERS

- S-VHS Output
- Remote Control

As Low As $399

CAR STEREOS

AM/FM Cassette Receivers
CD Changers
Car Amplifiers
Car Speakers
Radar Detectors

SURROUND SOUND

- Processor w/Remote;
- 50dB separation.
- Cinema/Music/ Bypass settings.
- 7 ch. with Subwoofer output

NOW ONLY Original $1000 $399

DBX Savings

- E/compress the dynamic range by up to 50%
- Impact recovery restores musical attacks
- Perfect for TV, FM, LP's, tapes, CD's & videos

$199

EPICURE LOUDSPEAKERS

Model Four	Model Five
1X1" tweeter and one 8" woofer	1X1" tweeter and one 6" woofer
Original $490	Original $350
NOW 1/2 Price	NOW 1/2 Price
$245pr	$175pr

ADC SS525

- 4-band, real time spectrum analyzer w/pink noise generator
- Remote control
- Phased coupled activator
- Mic
- Infrasonic filter for clean bass

Now Only $289

CALL US LAST
WE GUARANTEE THE LOWEST PRICE

INTEGRATED AMP

Philips FA860
- "CD Direct" high purity input; input & selection facilities for 7 sources
- Gold plated CD & phono inputs(MC & MM) Low noise volume control.
- Bi-Directional tape copying
- Relay-protected low ohmic outputs.
- Split power sup. & sep. heat sinks.

Great Buy At Only $199

ACOUSTUNE SUB

- Variable sensitivity (adjustable tube length)
- Suitable for amplifiers with 10W to 200W output
- Roll-off above 100Hz so that it can't be located by ear.. giving that 'all round' sound

$289

Closeout DM550, DM560

SDCRAFTSMAN High Fidelity Savings

Pro Power 4, MOSFET
Stereo power amp, 300 w/ch continuous @ 4 ohms; 900 watts bridged; 40-LED. Orig. $799.

Pro Control 3
Preamplifier with digital CMOS switching. Six total inputs, 2 tape monitors, i signal procc. loop. Orig. $499

CUSTOM 17" WIDTH

ORIGINALLY $1298 FOR BOTH NOW ONLY $798

HAFLER SALE

DH100 Pre-amp $149
DH110 Pre-amp $297
DH330 Digital Tuner $287
DH120 Power Amplifier $269

MINI SYSTEMS

AIWA NSX800 Bookshelf System w/CD & Remote
JVC MX1 60 watt System with 40 watt sub
PROTON AI3000S 50 watt Am/Fm Cassette/CD/Remote
ADC 1320 60 watt Receiver with built-in CD Changer
ADC1440 100 Watt Remote Receiver/6 CD Changer

SEE OUR ADS IN VIDEO REVIEW

CALL US WITH YOUR BEST DEAL

WE ARE #1 N AUDIO/VIDEO/CAR STEREO

IN-WALL SPEAKERS	AUDIO/VIDEO TAPES	CELLULAR PHONES
CD CHANGERS	MULTI-ROOM SYSTEMS	VIDEO EDITORS
HOME SPEAKERS	PRO-LOGIC RECEIVERS	CAMCORDER BATTERIES
HOME SUBWOOFERS	CASSETTE DECKS	VIDEO LENSES
EQUALIZERS	WALKMANS	CARRYING CASES
SURROUND SOUND	CBs & SCANNERS	VIDEO LIGHTS &TRIPODS
SATELLITE SPEAKERS	TELEPHONES	8mm CAMCORDERS
SPEAKER STANDS	ANSWERING MACHINES	8mm, VHS, S-VHS, VCRs
DAT PLAYERS	FAX MACHINES	3"-120" COLOR TVs

FACTORY AUTHORIZED

- Original Full Manufacturers Warranty..... NO EXTRA CHARGE !!
- No Grey Goods. No Bait & Switch
- 30 Day Defective Exchange (call for authorization)
- All orders Shipped Within 24 Hours

PHONE ORDERS 201•838•3444
FAX ORDER LINE 201•838•2516

Credit Cards & C.O.D.s Welcome

Sound CITY, Inc.
Meadtown Shopping Center Rte 23, S.
Kinnelon, NJ 07405

Mon.-Fri 10-9
Sat 9-6

We Ship Worldwide • S & H Non-Refundable • Not Responsible For Typographical Errors
Some Brands Not Available Through Mail Order • Returns subject to a restocking fee

Enter No. 39 on Reader Service Card

Photograph: © David Gahr

Bound." The solo spots go to Little Walter, who's at his peak, with support from Otis Spann, Fred Below, and even Muddy himself.

Rogers resurfaced in 1974 for an ill-fated comeback on Shelter Records. His issued Shelter sides, plus unearthed studio tracks, have been released as *Chicago's Jimmy Rogers Sings The Blues*. Despite such sidemen as stellar guitarist Freddie King, the CD consists mostly of lukewarm remakes of his Chess sides. Without any new perspective on his music, this set is superfluous.

Kim Wilson, harp player and vocalist for the Fabulous Thunderbirds, took a different approach in producing *Ludella*, an outstanding collection of live and studio cuts. Wilson treated Roger's lack of a new vision as a virtue, instead of a handicap. *Ludella* is a strikingly successful re-creation of the energy, and even some of the magic, of Rogers' hallowed '50s sides.

Wilson's own Little Walter-styled harp powers the band through crackling covers of Rogers' songs. Aiding him are ex-Waters piano master Pinetop Perkins, drummer Ted Harvey from the late Hound Dog Taylor's band, Howlin' Wolf mainstay Hubert Sumlin, plus some younger talent. Lovers of classic Chicago blues will find *Ludella* an absolute joy. *Roy Greenberg*

Crazy People Music: Branford Marsalis Quartet
Columbia CK-46072, CD; DDD; 64:39.
Sound: B Performance: A–

Branford Marsalis never quite fit the mold of "retro-jazz purist" promulgated by his younger but more renowned trumpet-playing brother Wynton. While Wynton railed against fusion, pop, and free jazz, Branford was playing in electric ensembles with Herbie Hancock and Sting's pop-jazz. Now come the free-form excursions of *Crazy People Music*, an album that owes more to late-period John Coltrane than mid-period Charlie Parker.

It's not an album without roots. Marsalis has concocted a sort of conceptual blues—dark, muscular forays into the consciousness. Many of the pieces start out innocently enough, like Marsalis' own "Spartacus," with the rhythm section comping at a rapid tempo as Marsalis lays out a boppish theme on tenor. Moving into his improvisation, Marsalis is assured and astute, cutting back and forth through the changes with melodic ease. However, just after Kenny Kirkland's solo, he takes a left turn, playing through the changes which themselves evaporate in Kirkland's stabbing chords and Jeff Watts' furious drum flourishes. The unit crossfades to a brief ballad-like coda.

Each piece on *Crazy People Music* reveals hidden layers. Bassist Robert Hurst's medium-tempo ballad, "The Dark Knight," starts out straightforwardly, but like its namesake, the revisionist Batman of Frank Miller, Branford peels away the veneer to expose the cauldron underneath.

His reading of Keith Jarrett's lush, romantic ballad, "Rose Petals," turns into a smoldering seduction. "Random Abstract," the title of his 1988 record but a new composition here, is a fractured, arrhythmic opening that recalls Ornette Coleman and illuminates a certain detachment in Marsalis' playing in even his most smoking solos. He always sounds like he's stepping outside himself and looking in. In the past, it's made some of his music cold and flat. On *Crazy People Music* it's a virtue, adding a sense of calculation to the chaos of even his wildest solos.

Marsalis' longtime crew has never played better. Hurst and Watts follow

On *Crazy People Music*, Branford Marsalis has concocted a conceptual blues with dark, muscular forays into the consciousness.

and even instigate rhythmic shifts at will, and Kirkland continues to define his style and shed his influences.

Crazy People Music closes with a Quincy Jones-penned blues number called "The Ballad of Chet Kincaid," formerly heard as the theme to an old Bill Cosby show. It's an upbeat close to an otherwise stormy and turbulent record. Although it's probably a sop to radio airplay, it also brings *Crazy People Music* to a satisfying close, and some of those bends in Marsalis' soprano lines are just enough off-center to give you another peek inside these crazy minds. *John Diliberto*

Harp Attack: James Cotton, Junior Wells, Carey Bell, and Billy Branch **Alligator ALCD 4790,** CD; AAD; 51:39.

Sound: B+ Performance: B

Harp players share a stage no more readily than professional wrestlers. With egos in inverse proportion to the size of their instruments, Chicago harp blowers are confirmed soloists. So what happens when you lock the studio door on two star harp men (Wells and Cotton), an unsung hero (Bell), and a newcomer (Branch)? With Alligator Records president Bruce Iglauer serving as producer/referee, these combatants respectfully queue up for harp breaks or take turns fronting the tame studio band. When all four play on the same track, it's as precise as a ballet rather than as spontaneous as a back alley brawl. What happened?

Harp Attack says more about the relationship between harp players and their bands than anything revelatory about the "Mississippi saxophone." The band accommodates everyone by tailoring the arrangments to no one. You can't imagine any of these performers voluntarily taking this group out on tour. *Harp Attack*'s singularly toothless arrangements ignore more than a decade's worth of influences on the blues while demonstrating an accountant's sense of risk.

Who wins the battle between Wells' staccato bursts, Cotton's high-compression rumbles, Branch's recycled Little Walter, and Bell's quirky generic Chicago harp? Give Cotton a lifetime achievement award for consistency in recording. His outstanding tracks hint at his strengths, taking advantage of rhythmic dynamics absent elsewhere, while his backing skills explain his lengthy tenure as a Muddy Waters' sideman. Most valuable player award, however, goes to bandleader Lucky Peterson, whose great piano stands out on nearly every track.

The "spontaneous" jam (according to the press notes) between Branch and Cotton on "Who" suggests the direction that the album might have taken. Each gamely struggles to complement the other's solo without being quite sure where either is headed; tricky, but exciting. *Harp Attack* is a fine album with much to recommend it to fans of these performers. Too bad it missed the chance to make blues history. *Roy Greenberg*

Carey Bell, James Cotton, Junior Wells, and Billy Branch

DEALER SHOWCASE

Visit these specialty retailers for professional consultation

CALIFORNIA

LOS ANGELES

Beverly Hills Audio
EXCITEMENT IN SOUND

Surround Sound Specialists
Custom Installation

McIntosh	Lexicon
Nakamichi	B+K
Linn	Naim
Mirage	Stax
Denon	Pioneer Elite

8950 West Olympic Boulevard, Suite 202
Beverly Hills, CA 90211, **(213) 276-2001**

CONNECTICUT

In New England...

Known By The Company We Keep.

MAJOR AUDIO	MIT	Theta
Adcom	Mondial	Tice
ADS	NAD	Thiel
Audio Research	Nakamichi	Threshold
Bryston	Oracle	Vandersteen
California Audio Labs	Pinnacle	Velodyne
CWD	Proceed	VPI
Dual	Sennheiser	Wadia
Forte	Sequerra Tuner	Yamaha
Grado Signature	Signet	VIDEO
Lexicon	SME	Proton
Magnepan	Sota	Tera
Magnum Dynalab	Sound Anchor	Yamaha
Martin-Logan	Stax	NAD
Mission	Sumiko	

Five listening rooms, specialty accessories, audiophile records and CD's. On premise service, multi-room designs.

TAKE 5 AUDIO
105 Whitney Ave.
New Haven, CT 06510 (203) 777-1750
Mon., Tue., Wed., Fri., 10-6, Thurs., 10-8, Sat., 10-5.
MC/VISA/Discover/Take 5 Charge

FLORIDA

ADCOM®

THE OUTSTANDING AMERICAN AUDIO CO. THAT CONTINUES TO AMAZE! FEATURING THE EXTREMELY POWERFUL GFA-565 MONOBLOCKS AND ITS POWERFUL LTD. EDITION COUSIN, THE GFA-585. STAGGERING PERFORMANCE IS ACHIEVED WHEN DRIVEN BY THE GFP-565 DIRECT GAIN PREAMP. AND FOR MULTI-ROOM APPLICATIONS THE FLEXIBLE NEW GFB-800 IS THE PREAMP OF CHOICE.
MAGNEPAN • LEVINSON • ARAGON • MIRAGE • QUAD • PHASE TECHNOLOGY • COUNTERPOINT

SPECIALIZING IN HIGH DEFINITION AUDIO, CUSTOM INSTALLATION & ENGINEERING

904-642-6677

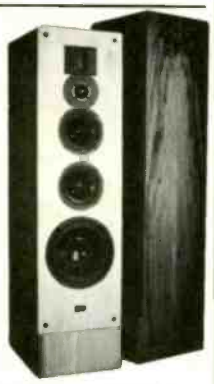
House of Stereo

3505 Southside Blvd, Jacksonville, FL 32216

ILLINOIS

Visit our **SPEAKER FACTORY SHOWROOM** at 3021 Sangamon Ave., **Springfield, IL** 62702

Authorized Dealer:
- B&K/Sonata
- Counterpoint
- Sumo
- Soundcraftsmen
- Thorens
- Parasound
- Fosgate
- Simply Physics
- Sumiko
- Quicksilver



800-283-4644
call for literature

LEGACY SIGNATURE II

Reel to Real Designs

MAINE

Airiston . . . Aragon . . . Apogee . . .
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 . . . Nova . . . Pinnacle . . . Revolver . . . SME . . . Sota . . . Sumiko . . .
Sumo . . . Stax . . . Symdex . . .
Vandersteen . . . VPI . . .
And Much More!

Hi Fi Exchange

FORESIDE MALL • ROUTE ONE
FALMOUTH, ME 04105
(207) 781-2326

NEW JERSEY

AUDITION THE WORLD'S FINEST COMPONENTS AND EXPERIENCE UNPARALELLED CUSTOMER SERVICE

Aragon	Krell	Sota
Audio Research	Krell Digital	Stax
Benz	Martin Logan	Sumiko
B&K	Melior	Target
Cal Audio Labs	Music & Sound	Tera
Cardis	NAD	Thiel
CWD	Philips	Velodyne
Day Sequerra	Polk Audio	VPI
Duntech	Pro Ac	Wadia
Fosgate	PS Audio	Well Tempered
Jadis	Siltech	& Many More

C&A AUDIO

Upper Montclair, NJ Bernardsville, NJ
201-744-0600
Metro NY & NJ Readers Call or Write for Free Catalog

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 • 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 • Tice Audio • Vendetta Research Wadia • Water Lily • WBT • and More

(800) 628-0627 (609) 799-9664
Princeton Junction, N.J. 08550

NEW JERSEY

Audio Connection

- Audible Illusions
- Belles
- B & K
- Celestion
- Counterpoint
- Fried
- Kimber Kable
- Klingergetics Research
- Lectron
- Linaeum
- Magnum Dynalab
- Melos
- Muscial Fidelity
- Mod Squad
- MFA & PSE
- Morch
- Music Reference
- Parasound
- Quicksilver
- Rotel
- Spendor
- Taddeo Speakers
- Tice
- Vandersteen
- VPI

SHIP WORLDWIDE
HARD TO FIND ACCESSORIES

615 Bloomfield Avenue,
Verona, N.J. 07044

MasterCard 201-239-1799 VISA

Dealers...

Just as you're reading this ad, so are thousands of potential customers.

For complete information on placing your ad,

Call 800-445-6066

DEALER SHOWCASE

NEW YORK

We welcome you to our Long Island Showroom

Acoustat • Acurus • Aragon • Canton • Celestion
Conrad Johnson • Counterpoint • CWD Furniture
Duntech • Hafler • Harman/Kardon • JBL Video
KEF • Lexicon • Maplenoll • MIT
Monitor Audio • Musical Fidelity
Now Hear This • Sonographe
Synthesis • THX • Wadia
CUSTOM INSTALLATION SPECIALISTS

Mon.-Sat. 11-6, Thur. 11-8
Sun. 12-5 & by appointment

the
DISCRIMINATING EAR

At the Harbourview Shoppes
1518 Old Northern Blvd. Roslyn, N.Y. 11576
(516) 484-7204 FREE SHIPPING NATIONWIDE

NEW YORK

PARK PLACE AUDIO
55 PARK PLACE
NEW YORK, NY 10007
212-964-4570

2 Blocks N. of World Trade Center

Featured Products:

B&W	Optonica
Boston Acoustics	Paradigm
CWD	Philips
Denon	Revolver
Fosgate	Rotel
Hafler	SSI
Luxman	Signet
MB Quart	Straight Wire
McIntosh	Tera
Niles	Thorens
	Vidikron

Come and experience the magic of HOME THEATER

COMMITTED TO QUALITY

NEW YORK

ALPHA STEREO
Quality Components, Professional Installation & Service

"We are known for the companies we keep"

Adcom, NAD, Rotel, Onkyo, Denon, Dual, Mission, Celestion, B&W, Soundstream, Audioquest, Paradigm, Monster Cable, M&K, Ortofon, AKG, Stax, Polk Audio, Sharp Vision, Sony, Atlantic Technologies

Northern NY's oldest & most renowned dealer.
345 Cornella St., Plattsburgh, NY 12901
518-561-2822
Fax: 518-561-2961
Monday-Friday 10am-8pm, Saturday 10am-6pm
Mastercard, Visa, Discover, Amex

PENNSYLVANIA

AUDIOPHILES!

We realize there are discriminating ears that know the difference between a blue light special and Threshold's STASIS Power Amps. If you speak the language give us a call for a quote.

Our current top selling products are:
ADS, Boston, B&W, B&K, Luxman, Dual, Nakamichi, Onkyo, Altec Lansing, Klipsch, Lexicon, Ortofon, Threshold, Mitsu, Sumiko, Rotel, Forte, Optonica, Ariston, Velodyne, Stax, and Tripplite.

PRICES TOO LOW TO ADVERTISE!

We honor all manufacturers' warranties

Send $3.00 today for our latest flyer and receive $5.00 off your first order over $100.00.
For information call or write: HiFi House, 366 E. College Ave., State College, PA 16801
PHONE: 814/237-BUYS (2897)

Hifi House
The Audio/Video Professionals

PENNSYLVANIA

PHILADELPHIA AUDIOPHILES

Acoustic Energy	Klyne	Rogers
Adcom	Koetsu	Roksan
Apogee	Lazarus	Rotel
Arcam	Maplenoll	Royd Audio
Ariston	**Meridian**	Snell
Audible Illusions	Michell	Soundcraftsmen
Audiolab	Mission Cyrus	Sound Lab
B&K Components	M&K Sound	Stax
Celestion	Mod Squad	Straightwire
Classe	Monitor Audio	Sumiko-SME
Counterpoint	Music Reference	Superphon
Duntech	NAD	Target
Dynavector	**Oracle**	**Threshold**
Eminent Tech	Parasound	Triad Design
Goldring	Phillips CD	Van Den Hul
Infinite Slope	PS Audio	VPI
Kimber Kable	Quicksilver	Wadia
Kinergetics	Rega Planar	Well Tempered

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

TEXAS

HEY HOUSTON!!!

The Esoteric Ear is your only outlet for high end audio/video.

- 3 huge dedicated soundrooms
- Only the finest A/V componentry
- A full selection of Audiophile LPs & CDs
- Friendly, honest, and expert consultation

Featuring:
VPI • SimplyPhysics • Aragon • Vandersteen
ET2 • Martin Logan • Prodigy • Audioquest
Krell • Counterpoint • Ortofon • Philips A/V
Rotel • Krell Digital • Anodyne • Paradigm
Apogee • Straightwire • Magnum • Talisman
...and many more!

The ESOTERIC EAR

Mon/Tues	by appt.
Wed-Fri	12-8pm
Saturday	10-6pm
Sunday	11-4pm

13158 Veteran's Memorial Pkwy • Houston, Tx 77014
713-537-8108 • Fax 713 537-9618

TEXAS

Sixteen Years of Audio-Video Expertise

...is what we offer to everyone who walks through our doors. Name brands, unexcelled service and affordable prices all add up to your best entertainment value!

- *Custom Home Installation*
- *Car Audio Installation*
- *In-house Service Dept.*
- *CD & Laserdisc Store*

Bjorn's
AUDIO • VIDEO • CAR STEREO

512/646-6991
10200 Broadway at Bitters
San Antonio, Texas 78217

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
BRETFORD • SPICA • KIMBER
AIWA • PRO-AC • VPI • MAGNUM

"INTELLIGENT AUDIO AT REASONABLE PRICES"
802-863-4372

city stereo
207 College St • Burlington, VT 05401

VERMONT

SENSIBLE, PERSONAL HIFI ADVICE, TOLL-FREE

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 MAGNAVOX CD MOD SQUAD
MONSTER CABLE ONKYO ORACLE
NAD POLK ROTEL WHARFEDALE
*N.E. ONLY

5-YEAR WARRANTIES ON ALL NEW EQUIPMENT, INCLUDING CD PLAYERS, TURNTABLES, TAPE DECKS.

NO CHARGE FOR DELIVERY.

SCIENTIFIC STEREO
128 MAIN ST. BRATTLEBORO VT 05301
1-800-456-HIFI

CLASSIFIED ADVERTISING

For advertising rates—retail display, Dealer Showcase, Custom Installation, & line ads—please call 800-445-6066 (9am-5pm e.s.t.). Manufacturers interested in display advertising rates, please call Carol Berman 212-767-6292.

TRADE

You can trade your cartridge toward a fabulous sounding AudioQuest® and get a substantial trade-in allowance, no matter what cartridge you have.

An AQ cartridge will get you an even greater allowance, up to $345, depending on what you trade and what you buy.

audioquest

P.O. Box 3060
San Clemente, CA 92674 USA

Tel: 714-498-2770
Fax: 714-498-5112

ANNOUNCEMENTS

BECOME A CERTIFIED AUDIO/VIDEO CONSULTANT. Write or call for details. Society Audio/Video Consultants, P.O. Box 10957, Beverly Hills, CA 90213. (213) 550-8889.

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.

CASH PAID FOR STEREO/VIDEO EQUIPMENT. BUY-SELL-TRADE & REPAIR. **STEREO CLASSICS,** 75 CHURCH ST., NEW BRUNSWICK, NJ 08901 (201) 220-1144, FAX: (201) 220-1284.

Michigan Audiophiles! AUDIO ILLUSIONS of East Detroit, Michigan presents these fine products: Aragon, Audible Illusions, Cary Audio, Gold Aero, Maston Audio, MSB Technologies, Musical Concepts, RoomTunes, Ryan Acoustics, Straight Wire, Wadia & much more!!! Call (313) 772-8822.

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 "POWERHOUSE" FROM TRIPPLITE.

For people who can't get enough clean, safe power!

Tripplite LCR-2400 "Power House" cleans RFI noise from your power line ... suppresses surges and spikes ... and regulates voltage for full power at all times. No ordinary line conditioner does all this — they are made too cheaply.

Why your stereo may sound worse than ever. And what to do.

Radio Frequency Interference (RFI) is Enemy #1. RFI plays havoc with phono preamps, FM and TV tuners, video, etc. There's more RFI than ever — house wiring and extension cords act like antennas. Smart thing to do is filter RFI from your power line first — with Tripplite LCR-2400.

Low voltage is Enemy #2. A refrigerator, furnace, air conditioner, or heavy demand in your building or neighborhood may cut voltage up to 20%. When voltage conks out Tripplite LCR-2400's big-brute transformer automatically kicks in. Tripplite boosts or cuts power so your system gets 120 volts, at all times. Five LEDs show you what Tripplite is doing.

Go ahead, protect your whole system.

Forget puny power strips with six or eight outlets. Tripplite LCR-2400 has 14 outlets — 12 on back, 2 on front — and provides up to 2,400 watts of clean, constant voltage. Protect everything — delicate microprocessors to large amps — against damaging, devastating spikes and surges.

Hear and see the difference — or money back.

Try the Tripplite LCR-2400 Power House for 30 days. Purchase price refunded if not satisfied. Made in USA by Trippe Manufacturing Co., est. 1922. Only $399.00 plus $14.95 shipping in the US.

AA AUDIO ADVISOR

CHARGE IT!
Amex/Discover/Mastercard/Visa
1-800-669-4434

Not a store. More.
225 Oakes SW., Grand Rapids
MI 49503 616-451-3868
FAX #1-616-451-0709

EPIK MONITOR SYSTEMS

"A close brush with reality"

Consider the EPIK Monitors. Available direct from the manufacturer starting at $750/pair. Transmission line subwoofers, too!

EPIK Monitor Systems, (415) 930-9104
1720 Lilac Drive, Walnut Creek, CA 94594

ANNOUNCEMENTS

AUDIO CLASSICS

Precision Stereo Components Bought-Sold-Traded-Repaired-Modified. Authorized Dealers for: Acoustat, Audio Control, Counterpoint, Dahlquist, Hafler, JBL Pro, JSE, KEF, Lexicon, Magnum Dynalab, Philips, Stax, Velodyne. **AMPLIFIERS:** conrad-johnson MF80 $1250, MV100 $2299, Premier 4 $1825; Counterpoint SA20A $1759; Forte 3 $899; Hafler XL280 $649, XL600 $1125; Krell KMA160B $5200, KSA80B $2700; Lazarus H1A ($1920) $1149; Marantz 5s $1499, 8 $799; McIntosh A116 $299, MC30s $600, MC40 $350, MC50 $200, MC60 $250, MC240 $800-1000, MC250 $350, MC752 $595, MC2100 $700, MC2105 $799, MC2125 $1099, MC2155 $1499, MC2300 $1500, MC2505 $450; Precision Fidelity M7A $399. **BOOKS:** on Audio Bought-Sold. **CD PLAYERS:** Hafler Iris Demo $469; Madrigal Proceed $999; McIntosh MCD7000 $825, MCD7005 $1200, MCD7007 $1500; Philips Demos CD40 $249, CD50 $300, CD60 $399, CD80 $599, CD840 $499; Sonograph SD1 Beta $295; Sony CDPX7ESD $1200. **EQUALIZERS:** McIntosh MQ101 $175, MQ104 $175, MQ107 $400. **HEADPHONES:** Stax Demos Gamma $289, Pro1 $475, Signature $1175, SR34 Pro $149, SR84 $149. **INTEGRATED AMPLIFIERS:** McIntosh MA5100 $349, MA6100 $550. **PREAMPLIFIERS:** Adcom GFP555 $399; audio research SP6B $799, SP9II $1300; conrad-johnson PF1 $1150, PV4 $349, PV8 $1399, PV10 $825; Counterpoint SA7.1 $395, SA1000 $595, SA3000 $1499; Denon PRA1200 $285; Forte 2 $880; Hafler Iris Demo $649, SE100 $299; Krell KBL $3050, KSP7B $2200; McIntosh C11 $1000, C20 $600, C26 $450, C27 $750; C28 $550, C29 $999, C31V $1200, C33 $1600, C34V $1700; Motif MC7 $1666, MC9 $799; Philips DAC960; Demo $699; Precision Fidelity C7AII $330; PS Audio IV $325; Threshold FET 9 $1625. **PROCESSORS:** dbx 224X $150; Krell SPB32X $2569; Lexicon CP1 $899; Sansui DS77 $199. **RECEIVERS:** McIntosh MAC1700 $399, MAC1900 $499, MAC4100 $999, MAC4275 $1499, MAC4300V $2200; Philips FR880 $349. **SPEAKERS:** Acoustat Spectra 1100 $1199; Bowers Active 1 $1200; Bozak B302 $199; Dahlquist Demos DQ8 $728, DQ10 $600; DQ201 $1714; Infinity RS2.5 $999; JBL Pro 4406 $449, 4408 $585, 4410 $889, 4435 $2600; JSE .6 $475, 1 $600, 1.8A $1599; Klipschorns Rosewood $3499; Magnepan MGIIIA $1200; McIntosh ML1C $550, ML4C $1100, ML10C $300, XR14 $799, XR16 $799, XR1052 $1499, XL1W $399; TDL Studio 1 $999, 3 $1699; Velodyne ULD12 $1095, ULD15II $1669, ULD18 $2195. **TAPE DECKS:** Philips FC40 $259, FC50 $329, FC60 $499. **TEST EQUIPMENT:** Nakamichi T100 $800; Sound Technology 1400A $500, 1700B $2600. **TUNERS:** Adcom GFT555, Hafler Iris $399, SE130 $325; Magnum Dynalab FT11 $399, FT101 $699, FT205 $249, Etude $1149; McIntosh MR65B $299, MR71 $599, MR78 $1200, MR80 $1600, MR500 $700, MR510 $800, MR7082 $1200; NAD 4155 $249. **TUNER PREAMPS:** McIntosh MX110 $275, MX112 $449, MX113 $499. **TURNTABLES:** Sonograph SG3MT $595; Sota Sapphire $450; Thorens TD124 $125, TD125 $200, TD126 III $400; VPI HW19 III $889. **FREE Catalogue.** Layaway Program. Major Credit Cards accepted. 8AM-5PM EST Mon.-Fri., **AUDIO CLASSICS,** POB 176AAA, Walton, NY 13856.

607-865-7200
—Audio Advertiser for over a Decade—

INFORMATION IS POWER Are you tired of paying $400 for the Trippilte LCR-2400? We'll show you how to save $124 off of that $400 price! Also save significant $$ on the LC-1800 & IBAR-8 power strip. Just send us a SASE & a check or m.o. for $20 payable to N.D. Audio, P.O. Box 1452, Palo Alto, CA 94302. Hundreds of satisfied customers!

ANNOUNCEMENTS

AUDIO UNLIMITED offers competitive values on Acoustic Energy, Tice, Lazarus, Mod Squad, Magnum Dynalab, Musical Concepts, Ensemble, Aural Symphonics, Muse and more. John at (303) 922-8151, (303) 698-0138.

AUDIO RESOURCE – Still the best source for sales, service, precision matched tubes, repairs, and restorations of all new and old quality components. When you haven't a local dealer, AUDIO RESOURCE can provide knowledge, support and installations of the finest new audio components in the industry. AUTHORIZED: Adcom, Arcam, Cello, CJ, Forte, Krell, McIntosh, SOTA, Thorens, VPI, **ET**, SME, Sumiko, Apogee, Dahlquist, Duntech, Martin-Logan, Mirage, Rogers, and much more. AUDIO RESOURCE. 3133 Edenborn Ave., Metaire, LA 70002; newsletter, 504-885-6988.

The **AUDIO TRADING TIMES** brings you spectacular bargains on used/demo audio equipment from around the USA. ADVERTISE FREE! Call (714) 479-3103, (24 hours), for details and subscription rates.

BANKRUPT STOCK! AUDIO DIRECT is liquidating stock, demos from bankrupt audio salon. HARMAN/KARDON demos, 50-70% off. Sony Discman, $99. TDK SA-100, $2.19. More! Stamp or 30¢ for printout. 883 Cooper-Landing Rd., Suite 202, Cherry Hill, NJ 08002. (215) 676-6314.

FOR SALE

MIT, MAS MasterLink, OCOS, VdHul, Cardas cables, custom terminations, Camacs, XLR balanced, hi-flexibility tonearm sets; Atma-Sphere OTL, Vendetta Research, custom Shallcross volume controls; Wonder Caps-solder-wire; all types of audio connectors, tonearm and chassis wires; NAVCOM; Tone Cones, many accessories-mod parts, $1 catalog ($3 overseas); Michael Percy, Box 526, Inverness, CA 94937; (415) 669-7181.

SAVE 40% ON HIGH-END home speakers, subwoofers, amplifiers. FREE CATALOG, 3021 Sangamon Avenue, Springfield, IL 62702.1-800-283-4644.

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.

RADAR DETECTORS
WE WILL MEET ANY PRICE AT COMP-U-TRONIX RADARWORLD. WE DISCOUNT COBRA • SOLO • BEL • UNIDEN • WHISTLER • SPECTRUM • MAXON • BK-40 & MORE! **CALL 1-800-237-2897, 24 HOURS.** 30 DAY MONEY-BACK GUARANTEE, FREE DOUBLE WARRANTY UP TO 1 EXTRA YEAR! VISA, MC, AMEX, DISC, CHECKS. 210 SO. MILWAUKEE, WHEELING, IL 60090.

AUDIO BY VAN ALSTINE = AUDIOPHILE QUALITY at affordable prices because we sell direct to you. Our great new **OMEGA** and **FET-VALVE** (pat. pending) components are original new engineering designs that elimiate transient distortion, have no on or off thumps, are durable and rugged, and sound closer to live than anything else at a rational price. Complete wonderfully musical factory wired amplifiers, preamplifiers, tune CD players, and a great $99 phono cartridge. **DYNACO OWNERS**—our complete do-it-yourself rebuild kits for Dyna vacuum tube preamps and power amps are $200, including all new PC cards and the preamp has been **STEREOPHILE** rated for many years. We design new circuits for most Dyna and Hafler 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.

FOR SALE

CALL TOLL FREE! 1-(800) 826-0520. NAD • ONKYO • CARVER • HARMAN KARDON • ACOUSTAT • HAFLER • LEXICON • DAHLQUIST • CWD • CELESTION • VELODYNE • PROAC • PROTON • AUDIOCONTROL • CITATION • BELLES • FRIED • M & K • STAX • JBL • KINERGETICS • NITTY GRITTY • NILES • MONSTER CABLE • PATTERN • THORENS • GRADO •. SOUND SELLER, 2808 CAHILL RD., MARINETTE, WI 54143. FAX # (715) 735-5838, PHONE (715) 735-9002.

AUDIO BEST: LA, ORANGE, SAN BERNADINO, CALIFORNIA. HOT COMPONENTS: CELESTION SL-3000, COUNTERPOINT, TARALAB, PS DIGITLINK; AUDIBLE ILLUSIONS; MODSQUAD; ACOUSTAT; SPICA ANGELA; KINERGETICS; MAGNUM; FOSGATE; B&K, SUPERPHON, MUSIC REFERENCE, SOUNDLAB, MAPLENOLL, SYSTEMDEK, GRADO, MONSTER, STRAIGHTWIRE, MUSIC CONCEPTS, (714) 861-5413, APPOINTMENT.

DYNACO ST70 UPGRADES: Gold EL34 Sockets, 1215 Microfarad on-board solid state B+, triode output, more. Complete Service. DoReTech Audio Services, Box 6054, South Hackensack, NJ 07606-4354. (201) 843-0488.

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. - warranteed components directly. VISA/MC. Ask for Steve K. or Dan W. **SQUARE DEAL**, 456 Waverly Ave., Patchogue, NY 11772 (516) 475-1857; (800) 332-5369.

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.

CABLE DESCRAMBLERS! MONEY-BACK GUARANTEE. ALL MAKES AND MODELS. FOR FREE CATALOG: BRITTANY ELECTRONICS 1-800-777-3862.

ATTENTION AUDIO BUYERS!!!
AUTHORIZED DEALER FOR...ADS, ALPHASONIK, CARVER, DENON, DUAL, HAFLER, INFINITY, KENWOOD, KICKER, MONSTER CABLE, ORTOFON & YAMAHA! THE SOUND APPROACH, 6067 JERICHO TPKE, COMMACK, NY 11725 (516) 499-7680.

FOR SALE

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. SOUNDD INVESTMENT CORPORATION, 3586 PIERCE DR., CHAMBLEE, GA. 30341 (404) 455-0968, FAX: (404) 458-0276.

Audition Spendor Loudspeakers, MFA Tube Electronics, VPI, Audioquest, van den Hul, others. Authorized Dealer, G-B Electronics, Hawthorne, N.J. (201) 427-0460. By appointment only.

PARASOUND: The entire line of PARASOUND pre-amps, power amplifiers and tuners is available nationally through A & S SPEAKERS, a leader in mail order sales since 1980. 3170 23rd Street, San Francisco, CA 94110. (415) 641-4573; FAX:(415) 648-5306.

McINTOSH MR-71 tube tuner w/walnut case. Refurbished callbrated, $650. **MCINTOSH** C-28 pre-amplifier w/walnut case. Refurbished, $550. **C & S AUDIO.** (719) 599-5151.

AFFORDABLE HIGH-END. NEW & DEMO UNITS: Specializing In B&K, Musical Concepts, ProAc, Target, Echomuff & Straightwire. Authorized Dealer. ARIEL, Carmel, IN 46032. Visa/MC (317) 846-9766 5-10PM.

FOR SALE

WHEN YOUR EARS SAY "HIGH-END". BUT YOUR WALLET SAYS "MID-FI" CALL HCM AUDIO! WE SPECIALIZE IN HIGH-VALUE COST-EFFECTIVE AUDIO COMPONENTS AND ACCESSORIES. INCLUDING A LARGE INVENTORY OF QUALITY SPEAKER AND INTERCONNECT CABLES. AUDIOPHILES ON A BUDGET ALWAYS LIKE OUR PRODUCTS, OUR APPROACH, AND OUR PRICES. AUTHORIZED DEALERS FOR: AR TURNTABLE * AUDIOQUEST * B&K * BOSE * CELESTION * FRIED * GRADO SIGNATURE * MONSTER CABLE * MUSIC REFERENCE * MUSICAL CONCEPTS * NELSON-REED * NITTY GRITTY * PROMETHEAN * SME * SONY * SOTA TURNTABLES * STAX HEADPHONES * STRAIGHTWIRE * SUMIKO * TADEO * VMPS * STANDESIGN. CALL FOR FREE PRICE LIST AND NEWSLETTER. IN BUSINESS 18 YEARS - WE SHIP WORLDWIDE AND ACCEPT MAJOR CREDIT CARDS. CALL US AT 916-345-1341 OR FOR ORDERS & PRICES ONLY 800-222-3465. HCM AUDIO. 1015 MANGROVE, CHICO, CA 95926.

ZEN GOLDLINE MOVING COIL CARTRIDGES. 'Vital' $135 Boron/microridge $175. Info $1 bill. Excelsior, POB. 353, Bushey, Watford, WD2 3XH England U.K.

ACCENT ON MUSIC, WESTCHESTER CO., NY. NOW IN STOCK: Linn Lingo, Linn Selekt Records, Castle Winchester Speakers, Radford Tube Amps, Nalm 52 & Roksan. Rega, Royd, Rotel, Archidee, Audioquest, Arcam, Creek & Epos. LP's & CD's. 175 Main Street, Mount Kisco, NY 10549. (914) 242-0747.

HI FI CLASSICS - SELECT USED AUDIOPHILE and hi-end components BOUGHT-SOLD-TRADED. Inventory list available, Helpful competent sales department. The best prices in any town!! FAX (718) 318-9623, TEL (718) 318-9618.

B&W 801 REFERENCE SPEAKERS — BLACK, 2 MONTHS OLD. PERFECT CONDITION UNDER WARRANTY. ABSOLUTELY BEAUTIFUL SOUND. PAID: $6000.00 WILL TAKE $4300.00. (918)298-5555.

USED AND DEMO EQUIPMENT: Audio Research SP-9 & LS-1; Counterpoint SA-11, SA-20, SA-1000 & SA-3000; conrad johnson PV7; Vandersteen 2ci; Celestion SL-12; Mark Levinson 20, 23 & 26; Revox B226S & B126; misc. NAD, misc. Mirage. Call **AUDITION AUDIO** for pricing and details at (801) 467-5918. Visa, MC, Amex accepted.

THE AUDIO CHAMBER!!! USED HIGH-END STORE IN BAY AREA WITH LISTENING ROOM. WE BUY—SELL—TRADE CELLO, LEVINSON, KRELL, ARC, THRESHOLD, ETC. 415-549-2178. 11AM-6PM MON.—SAT.

BINAURAL microphone set, stealthy electrets clip to your glasses' earpieces, excellent for recording concerts, very flat response: $100 + p&h. Write for details. Core Sound, 839 River Road, Teaneck, NJ 07666, (201) 801-0812.

TANNOY SPEAKERS, Belvedere Sr. cabinets with monitor HPD 385/8 (15") drivers. $950/Negotiable. AKG 202E microphones $250/pair. (518) 438-3735 after 4 pm EST.

SIDEREALKAP: The siderealKap was designed to be the finest sounding capacitor available for high quality audio reproduction systems. Find out what the music lover's capacitor doesn't sound like. Free literature and price information upon request. Dealer inquiries Invited. **SIDEREAL AKUSTIC,** 9974 Scripps Ranch Blvd. #120, San Diego, CA 92131. Tel: (619) 578-4226. Fax: (619) 578-4059.

EQUIPMENT BLOWOUT!-- Counterpoint SA220 amp, $2,096. Counterpoint SA 3000 pre-amp, $1,500. JSE model 4 speakers, demo, $3,600/pair. Meitner PA 6 IR pre-amp and Str-55 amp, demo, $3,200. All models are new or dealer floor demonstrators in mint condition with full manufacturer's warranty. COMMUNITY AUDIO, 8020 Germantown Ave., Philadelphia, PA 19118. (215) 242-4080.

CARY AUDIO'S Revolutionary Products featured at The Audio Shop in Frederick, Maryland. SLA-70 Class A Stereo Amp, auto-biasing. CAD-5500's proprietal circuitry converts even the most skeptical digiphobes. Acoustat, Audible Illusions, Audioquest, B&K, Counterpoint, Dahlquist, MIT, ProAc, VTL & LP's! 1-800-878-4434, 1-301-695-7083.

THE NEW STANDARD IN AFFORDABLE AUDIO

200W. / CH. HIGH CURRENT DUAL MONO $849.00

THE POINTSOURCE
MODEL 200 POWER AMPLIFIER
219-659-0450 BOX 788 WHITING IN. 46394
DEALER INQUIRIES WELCOME

FOR SALE

AA/SOUND ADVICE

LOW PRICES/FAST DELIVERY! DENON, NAD, CELESTION, B&W, HARMAN KARDON, JBL, CARVER, NAKAMICHI, BOSTON ACOUSTICS, LUXMAN, PS AUDIO, HAFLER, ADS, M&K, ONKYO, B&K, PROTON, DCM, SNELL, BOSE, VELODYNE, PHILIPS, SPICA, COUNTERPOINT, AND MUCH MORE! **414-727-0071.**
FULL WARRANTY!!
MOST ITEMS IN STOCK!!
OPEN SUNDAYS!!
CALL US!!

AAA-CALL US NOW! Luxman, Carver, ADS, Nakamichi, Denon, Boston Acoustics, NAD, Celestion, B&W, Adcom, PS Audio, HK, Hafler, AR, B&K, Onkyo, KEF, Proton, Snell, DCM, JBL, Counterpoint, JSE, Spica, M&K, Bose, VPI, Sonographe, Sumiko, Thorens, Velodyne. 414-727-0071 FOR THE LOWEST PRICES!
FULL WARRANTY!!
MOST ITEMS IN STOCK!!
OPEN SUNDAYS!!

ATTENTION MUSIC LOVERS! Acoustic Energy, Arcica, Boulder, Muzic Systems, Music Metre, PS Audio, Straightwire, VMPS, & more! Call (313) 342-2475 for prices & info. Gil Morrison.

AUDIO DEN Authorized Sales and Service. ADCOM, ARAGON, ARCAM, B&K, CAL, CELESTION, CONRAD-JOHNSON, HAFLER, 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.**

ATC SCM-20, ACOUSTIC ENERGY, ALTIS AUDIO, ARCICI, ASC TUBE TRAPS, AUDIBLE ILLUSIONS, AUDIOQUEST, B&K, CARDAS, **CELESTION, CLASSE AUDIO, CODA TECHNOLOGIES, ENSEMBLE PA-1,** ENTEC, **ESOTERIC DIGITAL,** KEF CUSTOM, KIMBER KABLE, LEXICON, MAGNUM DYNALAB, PSE, MISSION/CYRUS, MOD SQUAD, NILES AUDIO, PHILIPS AUDIO/VIDEO, REGA PLANAR, SIMS NAVCOM, SONATA, SONRISE CABINETS, **SONUS FABER,**SOUND ANCHOR, STAX, **TARA LABS,** TARGET STANDS, TERA VIDEO, **TICE AUDIO, VELODYNE.** FOR FREE LITERATURE CALL 301-890-3232, J S AUDIO, ONE CHILDRESS COURT, BURTONSVILLE, MARYLAND 20866. AUDITION BY APPOINTMENT, MONDAY THRU FRIDAY 10AM TO 7PM, SATURDAY 11 TO 5. WE HONOR VISA, MASTERCARD, AMERICAN EXPRESS. FAX: 301-890-3819.

AUDIOPHILES AND AUDIOPHILE DEALERS

Are you having trouble selling your used or exotic equipment, or locating that special component?

1-900-USA-HIFI
is your solution

USA-HIFI is a unique service, offering a comprehensive listing of used high-end components for sale across the country. Use the system to quickly locate available merchandise or leave a message highlighting your equipment for sale. Also, hear the latest dealer offerings.

It's quick. It's easy. It's inexpensive. 99¢ a minute. Starting April 1, 1991.

CALL NOW

FOR SALE

ADCOM, PHILIPS ANEW

GFA AMPLIFIER F.E.T. CONVERSIONS $269.00. INCREDIBLE! DISCRETE CD MOD FOR MAGNAVOX/PHILIPS PLAYERS. DISCRETE OUTPUT, VOLTAGE REGULATION AND SERVO STAGE. INCREDIBLE! $179.00 KIT; $229.00 INSTALLED. SONIC MONEY-BACK GUARANTEE!
SUPERMODS
2375 WEST 21ST AVENUE, EUGENE, OR 97405. (503)344-3696.
WAVETRACE TECHNOLOGIES
4215 EAST BAY DRIVE, #1205C, CLEARWATER, FL 34624. (813)392-5423.

MCINTOSH MR78 $1000, 4100 $899, MR77 $425, MR66 $200, MR67 $275, MR80 $1200, MX110 $399, MPI4 $1200, MC2200 $700, MX110 $399, MX113 $550, MX112 $300, C24 $225, C26 $275, C28 $400, MR71 $450, XRT20 $2500, DYNA PAS $139. ST70 $250, FM3 $90. (713)728-4343.

Cable TV Descramblers, Converters, Accessories. Name Brands. Lowest prices. Best service. Call CABLE READY COMPANY, (800) 234-1006 for FREE 16-page color catalog.

Sound CITY
Meadtown Shopping Center • Rt. 23 S. Kinnelon NJ 07504

AUDIO VIDEO

• Acoustat • Acoustic Research • ADC • ADS • Aiwa • AKG • Alpine • Altec Lansing • Ambico • Atlantic Technology • Audio Quest • Audio Source • B & O • B & W • Bazooka • BBE • Beltronics • Bellogetti • Camber • Canon • Canton • Carver • Celestion • Cerwin Vega • Coustic • 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

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

A JANIS BASS SYSTEM

IT'S THE CHOICE
WHEN ONLY THE BEST WILL DO

• Perfect coherence with all speakers
• Flat, calibrated low bass response
• No exaggerated, equalized bass response
• High speed transient response
• Up to four times more amplifier response
• Up to four times more speaker response

John Marovskis Audio Systems, Inc.
2889 Roebling Avenue
Bronx, New York 10461 (212) 892-7419

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

Esoteric Sound features the exciting world of digital with state-of-the-art transports and d/a converters by **Barclay, Esoteric, Proceed and Wadia.**

HIGH END COMPONENTS FOR THE AUDIO PERFECTIONIST

ALTEC LANSING • APOGEE • BARCLAY • BEDINI • COUNTERPOINT • ESOTERIC • HAFLER • HARTLEY • LEXICON • PRECISE • PROCEED • ROTEL • JEFF ROWLAND • SHAHINIAN • TDL • WADIA • AND MORE

ESOTERIC SOUND, COVENTRY COMMONS RTE 347, STONY BROOK, N.Y. 11790 516-689-7444

FOR SALE

CALL US FOR THE BEST PRICES! PHILIPS, ROTEL, CARVER, ENERGY, PS AUDIO, PROTON, DCM, MAGNAVOX CD, SIGNET & AIWA. TRADES ARE WELCOME. AUDIO HORIZONS, WESTERVILLE, OH 614-794-3100.

AAA—LOW PRICES—HIGH END EQUIPMENT!!! PS AUDIO, HAFLER, B&K, CARVER, NAKAMICHI, SUPERPHON, LUXMAN, THORENS, M&K, SNELL, ONKYO, PROTON, SONOGRAPHE, FRIED, NITTY GRITTY, 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!!!

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—

FOR SALE

AUDIO CABLES, ETC. Don't pay exorbitant prices for top quality. We have years of experience in wire manufacturing and have duplicated 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) 334-6723, 24 hrs/day. L A T International, Dep't. A, 317 Provincetown Rd., Cherry Hill, NJ 08034.

AAAMPSTRAVAGANZA! (ADCOM555MKI, MODS, PRO-BALANCED-$495 up); (HAFLERDH500-$495); (MAC2205-$1195); (ONKYO508-$700). OTHER ITEMS: COUNTERPOINTSA220, ARSP9MKII. RECEIVERS: (TANDBERG 1060, 1045); FISHER RZ1ULTIMATE, NEW, LIST $1400, NOW $550. MUST MAN BE BORN AGAIN? JOHN 3:1-16. 313 949 4567.

PHILIPS FULL LINE DEALER: (617) 547-2727. AUTHORIZED RETAILER: Q AUDIO. SPECIALIST IN CD PLAYERS: NEW + RENEWED.

HIGH END BLOWOUT

AUTHORIZED DEALER MUST LIQUIDATE OVERSTOCK & DEMOS. MANY ITEMS AT COST! CLOSEOUTS ON COUNTERPOINT, B&K, DAHLQUIST & MORE.

1-800-438-6040

vpi made in u.s.a.

ANOTHER BREAKTHROUGH FOR RECORD LOVERS

The new VPI Power Line Conditioner will dramatically improve the sound of your turntable. Specifically designed for turntable motors, this is the only line conditioner that shapes the waveform, and varies the frequency, for total control.

"FOR THE SERIOUS MUSIC LOVER"

VPI Industries Inc., 77 Cliffwood Avenue, #3B, Cliffwood, NJ 07721
Tel: 908-946-8606 **Fax: 908-946-8578**

FOR SALE

AAA—AUDIO ELITE IN WISCONSIN!!! HAFLER, PS AUDIO, B&K, JSE, NAKAMICHI, PROTON, CARVER, ONKYO, ADS, VPI, DCM, SONOGRAPHE, FRIED, NITTY GRITTY, SUMIKO, THORNS, SUPERPHON, SNELL, M&K, LUXMAN, BOSE, PHILIPS, VELODYNE and any others you desire. (414) 725-4431.
CALL US WE CARE!!!

AUDIO NEXUS = QUALITY

Featuring legendary **VANDERSTEEN** loudspeakers & **ROTEL** CD Players.

Apogee • Ariston • Audioquest • B&K • Cary • Celestion • Counterpoint • 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.**

CABLE TV CONVERTERS AND DESCRAMBLERS DISCOUNT CENTER! ALL MAKES AND MODELS. FREE CATALOG! VIDEO-TECH, 3702 S. VIRGINIA, #160-304, RENO, NV. 89502 ORDER TODAY! VISA/MC/COD 800-562-6884.

A.D.S., ADCOM, BANG & OLUFSEN, B&W, CARVER, DENON, HARMON/KARDON, NAKAMICHI, KEF, REVOX AND OTHER QUALITY COMPONENTS. ALL PRODUCTS COVERED BY MANUFACTURER'S U.S.A. WARRANTIES. AMERISOUND SALES INC. 24 HRS. EAST: (904) 262-4000, WEST: (818) 243-1168.

LOUDSPEAKERS

ABSOLUTE SATISFACTION. Save 50-75% on AUDIO CONCEPTS, INC. speaker kits. Sixteen models from $139, (also assembled). Thirty day money back guarantee if not 100% satisfied. Free catalog 1-800-346-9183. Audio Concepts, Inc. 901 South 4th Street, La Crosse, WI 54601.

LEGACY SIGNATURE II—IMAGINE THE IDEAL DIMINISHING LINE SOURCE LOUDSPEAKER. BEGIN AT THE TOP OF THE TOWER WITH A SAMARIUM COBALT RIBBON FOR THE ABSOLUTE IN TRACING SPEED AND "AIRINESS". HAND-OFF TO A METALLIZED DOME WITH NEARLY 5 LBS. OF MAGNET STRUCTURE TO DETAIL THE PRESENCE BAND. PROVIDE THE SWEETEST VOCALS POSSIBLE WITH TWIN **SEAS** 6.5" MIDBASS DRIVERS. PUNCTUATE THE SUBTERRANEAN WITH THREE CARBON/POLY SUBWOOFERS. INCLUDE CARDAS LITZ, TIFFANY BIAMP INPUTS AND A TEN YEAR WARRANTY. $2696/PR SHIPPED REFUNDABLE. OAK, WALNUT, MAHOGANY, BLACK LACQUER. HOME AUDITIONS. **RTRD,** 3021 SANGAMON AVENUE, SPRINGFIELD, IL 62702. 1-800-283-4644.

LOUDSPEAKER COMPONENTS-KITS. Dynaudio, Morel, Eclipse, Focal, Peerless, Eton, Vifa, more! Crossover parts-design books also. Catalog $1. Menlscus, 2442 28th St. S.W., Wyoming, MI. 49509. (616) 534-9121.

BEST SELECTION—50 HOME, SUBWOOFER, CAR & PRO SPEAKERKITS. JBL, DYNAUDIO, POLYDAX, KEF, MOREL, SEAS, VIFA; AWARD-WINNING ELECTRONIC CROSS-OVERS, RTA'S, 64p CATALOG, $2. GOLD SOUND, BOX141A, ENGLEWOOD, CO 80151.

LOUDSPEAKER CABINETS — Large selection of high-quality Cabinets ready to finish in Oak and Walnut. Also available in gloss and matte laminate colors. Grenier Cabinets, 5901 Jennings Road, Horseheads, NY 14845. (607) 594-3838.

CALL US
FOR QUALITY AUDIO
AT THE LOWEST PRICES
WITH FAST SERVICE,
EVEN ON ESOTERIC ITEMS

SOUND ADVICE . . . without the price

AUDIO OUTLET (914) 666-0550
P.O. Box 673
Bedford Hills, New York 10507-0673

LOUDSPEAKERS

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.

SOUND ANCHORS
Specialty Audio Stands

SOUND ANCHORS stands come **PREFILLED** with special materials to dampen resonances and add mass, you don't have to fool with sand or shot. **SOUND ANCHORS** stands are engineered to interface with your specific components and speakers so they sound their best...period. Special stands are available for these speakers. **Vandersteen 2-C, B&W 801 Matrix, Spica TC-50, Sota Panarama** and now **Magnepan** models MG 2C/2.5 and MG 3A. For information and the name of your nearest dealer please call (407) 724-1237.

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.

DON'T DISCARD OLD FAVORITES! Re-surround your own speakers. Easy to install foam surround kits now available from Ken's Hi-Fi Clinic. $24.95 per pair. S & H incl., P.O. Box #1088, Flat Rock, NC 28731 or (704) 693-3459. Visa/MC.

ROTTED WOOFER FOAM REPLACED ON MOST BRANDS. Good as new - Fast & Inexpensive. Write for full details. **NEVISONICS.** 2226 Taylorsville Rd., Suite 101-A, Louisville, KY 40205.

ELECTROSTATIC SPEAKERS OUR SPECIALTY! Vacuum tube controlled. Latest technology and modular design. "Risk free" thirty day home trial. Uncompromised performance at factory direct pricing. Send $1: DAVID LUCAS, INC., DEPT. A, 924 HULTON ROAD, OAKMONT, PA 15139.

KITS, CABINETS & ASSEMBLED SPEAKER SYSTEMS. 14" × 20" CATALOG OF HANDCRAFTED SPEAKERS, $5.00 (REFUNDABLE WITH ANY SYSTEM ORDER). ADVANCED SOUND, DEPT. A, 711 E. MAGNOLIA AVENUE, KNOXVILLE, TN 37917. (615)637-6694.

DYNAUDIO SPEAKER KITS

We believe SUPERIOR SOUND QUALITY promotes itself, and invite you to DISCOVER .... ADVANCED AKUSTIC, 7627 WOODSIDE DRIVE, STOCKTON, CA 95207. Catalog $2.00 • 1-209-477-5045.

8 BALL, COMPUTER DESIGNED COMPACT SPEAKERS. Thunderous sounds of large speakers. For FREE information write: 8 BALL, 5731 SW 27th Street, Hollywood, FL 33023.

PYLE DRIVERS—BEST PRICES. America's premium raw speakers for home and car. Also featuring PIONEER OEM woofers, midranges, tweeters, plus British MCKENZIE prosound speakers. Dealer inquiries? MC/VISA. SRS, 318 South Wahsatch, Colorado Springs, CO 80903. (719) 475-2545.

BARGAIN PRICES

ON SOPHISTICATED COMPONENTS. Speakers, Speaker Kits, Drivers, First & Second Order Crossovers, Wire & Phono Cables. Colorado Audio Systems. (303) 493-4190.

NEW!

***THE AUDIO GLOSSARY* by J. GORDON HOLT**

In the three and a half decades since the arrival of stereo, no one has done more than J. Gordon Holt to develop and define a consistent vocabulary for describing reproduced sound. This is actually two dictionaries in one: a glossary of subjective audio and a comprehensive plain-English guide to nearly two thousand technical terms. A "must" for every audio bookshelf!

OLD COLONY SOUND LAB
PO Box 243, Dept. A12
Peterborough, NH 03458-0243 USA
(603) 924-6371 / 924-6526 FAX: (603) 924-9467

LINES OPEN 24 HRS/DAY!
CALL OR WRITE FOR FREE CATALOG!

BKAA7/S Sftbd. $9.95
BKAA7/H Hdbd. w/jacket $17.95
BKAA7/L Autographed, ltd. ed. $30.00

PLEASE ADD $1.75 SHIPPING FOR FIRST BK., 50¢ EA. ADD'L.

LOUDSPEAKERS

A.D.S., ADCOM, BANG & OLUFSEN, B&W, CARVER, DENON, HARMON/KARDON, NAKAMICHI, KEF, REVOX AND OTHER QUALITY COMPONENTS. ALL PRODUCTS COVERED BY MANUFACTURER'S U.S.A. WARRANTIES. AMERISOUND SALES INC. 24 HRS. EAST: (904) 262-4000, WEST: (818) 243-1168.

CD PLAYERS

PHILIPS LHH-1000 Separate D/A and Transport Sled. Factory Sealed Carton / New$4,000.00, Dealer Cost $2,400.00 / Asking $2,000.00. Call days 714-441-1410 Ext. 21.

COMPACT DISCS

TEST YOUR SYSTEM WITH CD'S from Verany, Prosonus, HiFi News, etc. Details: DB SYSTEMS, POB 460, RINDGE, NH 03461. (603)899-5121.

COMPACT DISCS AT ROCK BOTTOM PRICES. 32,000+ titles, sold only via modem at 408/730-9015 (8, N, 1 to 2400 Baud) or for more info: CDX - 408/733-0801.

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.

RECORDS

200,000 OUT-OF-PRINT RECORDS. LPs/45s. Fifties thru Seventies. All categories. Catalogs available...state your interests. Want lists welcome. Craig Moerer, Box 19231-A, Portland, OR 97219.

1991 DENON AUTHORIZED DEALER

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

REVAMP YOUR AMP.

We make good amps great.

At Professional Mod Service, we take your **Adcom, B&K,** or **Hafler** amp and make the bass more powerful and the mids and highs clearer. By the time we're through, your amp will sound as good as amps costing *twice as much.*

How do we do it? We make real improvements, developed with factory engineers. We use nothing but premium materials. And our technicians are real pros with years of experience.

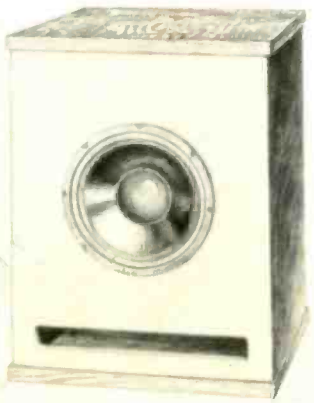
Pickup service.

Call us and we'll pick up your amp. Or send it to us with $199.95 plus $14.95 shipping. We'll revamp your amp, spec it out, and return it insured.

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

LOWER LOUDSPEAKER DISTORTION



The Original VMPS Subwoofer, 27 x 21½ x17", 100 lbs.$349ea kit, $429 assem in genuine oak or walnut.

The Original VMPS Subwoofer is one of three low cost, high performance subwoofers designed to satisfy every audiophile's requirements for physical size, bass extension, and first octave output levels.

With its active 12" and slot-loaded, mass-loaded foward firing 15" passive drivers, the **Original VMPS Subwoofer** provides a 19Hz (-3dB) cutoff at 92 dB (1W/1m) sensitivity and no more than 0.7%THD for 1W drive. The **Smaller VMPS Subwoofer** ($259ea kit, $329ea assem), with its 28Hz (-3dB) cutoff and 90dB sensitivity, and the **Larger VMPS Subwoofer** ($479ea kit, $599ea assem) with its unparalled 17Hz (-3dB) extension and 94dB 1W/1m sensitivity, generate thunderous, undistorted lowbass unmatched by virtually any competitor regardless of price.

Write for our literature, and hear VMPS Subwoofers at the dealers below, along with our highly acclaimed floorstanding **Tower II** ($479ea kit, $649ea assem), **Tower II Special Edition** ($688ea kit, $888ea assem), the new **Super Tower/R Special Edition** ($1300ea kit, $1600ea assem) and **Super Tower III** ($2150ea kit, $2600ea assem), both now equipped with new ultrahigh definition **woven carbon fiber** midranges.

VMPS also distributes John Curl's **Vendetta Research** SCP2B phono preamp ($2495), reviewed by most major publications as the finest available.

VMPS AUDIO PRODUCTS

div Itone Audio
3429 Morningside Dr., El Sobrante, CA 94803
(415) 222-4276

Hear VMPS at: The Listening Studio, Boston; Par Troy Sound, Parsippany NJ; Dynamic Sound, Washington DC; Essential Audio Winchester VA; Hifi Farm, Beckley WV; Sound Audio, Charlotte NC; American Audio, Greenville SC; Audio by Caruso, Miami Fl; Arthur Morgan, Lake Mary Fl; Shadow Creek Ltd, Minneapolis Mn; Audio Specialists, South Bend In; Audio Connection, Terre Haute In; Audio by Gil Morrison, Detroit Mi; Concert Sound, San Antonio Tx; Parker Enterprises, Garland Tx; Stereoworks, Houston Tx; Encore Audio, Lees Summit Mo; Posh Audio, Lake Oswego Or; Sound Room, Vancouver BC Can; Exclusively Entertainment, San Diego Ca; Audio Haven, Upland Ca; Sounds Unique, San Jose Ca; Ultimate Sound, San Francisco Ca; Private Line Home Entertainment, Stockton Ca; Golden Ear, Chico Ca; Itone Audio, El Sobrante Ca.

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.

NITTY GRITTY/RECORD DOCTOR: Manual rotation is truly one-finger-easy with the Gilding Platter ™ upgrade! Only $14 U.S. post-paid. Check/MO: KAB ELECTRO-ACOUSTICS, Box 2922, Plainfield, N.J., 07062-2922. (908) 754-1479.

AUDIOPHILE RECORDS

AUDIOPHILE RECORD WAREHOUSE! Out-Of-Print Direct-To-Disc, Halfspeed, Quiex II & Import Pressings. Great selection of In-Print Records & CD's. Quantity Discounts! Call for Free Catalog. Elusive Disc, 5346 N. Guilford Ave. Indianapolis, IN. 46220. (317) 255-3446.

RECORD AND CD CATALOG: 40 pages of Out-of-Print and current releases. $3 (refunded on first order). Audiophile's, 3881 Timber Lane, Verona, WI 53593. (608) 833-6383.

AUDIOPHILE LP'S AND CD'S

IN PRINT

Mobile Fidelity, Reference Recording, Sheffield Labs, Chesky, Wilson, M & K, American Gramophone, Proprius, OPUS 3, Gemini, Super Analogue, Concord, ATR Mastercut, Harmonia Mundi, Linn Re-cut, EMI, Waterlilly, North Star, Odin, BIS, Hungaroton, Chandos, CMP, Klimo, Hyperion, Japanese and British Imports (Ips), Many TAS recommended LP's !

OUT OF PRINTS

Nautilus, Super Disks, Nimbus, UHQR, Lyrita, MFSL, Stones, Sinatra Boxes, Direct to Disc by Crystal Clear, Umbrella, EMI, RCA LSC, Mercury SR, Casino Royal, CBS Mastersounds, Etc.

AUDIOPHILE CD'S

GRP, Klavier, En Pointe, Ryko, Quartet, Telarc, Jeton, MFSL Gold "Ultra Disk", Bainbridge "Colossus", Elite "Stereo play", Three Blind Mice, East Wind, DMP, Dorian, Delos, plus the above labels.

ACCESSORIES BY:

Nitty Gritty, LAST, Audio Quest, Target.

For latest, most descriptive catalog send $3.00 U.S. or $5.00 elsewhere. DISCOUNT CERTIFICATE INCLUDED!

Call for catalog

Acoustic Sounds
P.O. Box 2043, Salina, Kansas 67402
913-825-8609/FAX 913-825-0156

ORDER DESK: 1-800-525-1630

THE BINAURAL SOURCE-Exclusive one-stop source of true binaural recordings for startling headphone listening (also speaker-compatible). Classical/jazz/drama/sound environment albums; 43 recordings in all three formats, from U.S. & Germany. Free catalog: Box 1727A, Ross, CA 94957. (415) 457-9052

WANTED TO BUY

WANTED 15" TANNOY Dual Concentric LS (silver) loudspeaker(s). One or pair. 203-865-3375.

WANTED TO BUY

WANTED: WESTERN ELECTRIC, JBL, MARANTZ OLD EQUIPMENT. SUNLIGHT ENGINEERING COMPANY: 213-320-7020, 22130 SOUTH VERMONT AVENUE, #A, TORRANCE, CA 90502.

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: Sluder, Squerra, M-Levinson, McIntosh, Marantz, CJ, 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, Ortofon Arm, Temma--(516) 935-2605, (516) 496-2973.

WANT — JBL Hartsfield, EV Patrician, Brociner Transcendent, Singles OK, McIntosh, Marantz & other tube equipment. Larry Dupon, 2638 W. Albion, Chicago, IL 60645. (312) 338-1042, evenings.

WANTED PYRAMID SPEAKERS—METRONOME MODEL 8W. SINGLE OR PAIR. OAK OR WALNUT. WILL PAY SHIPPING. (704)541-5448 IN NORTH CAROLINA.

SETTON 660 RECEIVER - Willing to trade my 440, or buy outright. Call Harry Roth (717) 560-2022, weekdays.

Paying cash for DBX: 14/10 Equalizer, 224X-DS Encoder, DAV-600G Signal Router. Help in locating this equipment appreciated. Brad. (414) 738-3095 8am-5pm CT M-F, (414) 734-5297 5:30pm-10pm CT M-F.

WANTED: MARK LEVINSON- AMPLIFIERS, PREAMPLIFIERS, **KRELL,** MCINTOSH, **TUBE MARANTZ,** AUDIO RESEARCH, **TANNOY.** WILL PURCHASE EVEN IF NOT PERFECT. (718) 387-7316.

WANTED: Sony TA—5000 tuner, and TA 3200F amp, and TA 2000F preamp. D.L. Abele, P.O.B. #531281, Birmingham, AL 35253-1281.

OTHERS COPY MY ADS, BUT NOT MY OFFERS! Buying clean, Marantz, Tannoy, other vintage equipment. Collectors prices. N.Y.S.I. (718)377-7282. NOON-5:00PM, WEEKDAYS.

YAMAHA NS—2000 SPEAKERS. (816) 763-1780. Randall Chartier, 6904 E. 140th Terr., Grandview, MO 64030.

MAIL ORDER

THE BEST RECORD RACK IN AMERICA. Stackable, portable, oak units hold LP's, CD's and tapes. Free Mailorder Brochure, (please mention Audio). Per Madsen Design: (415) 928-4509. P.O. Box 330101, San Francisco, CA 94133.

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 1-900-776-5777.

ABARGAIN: STAX SIGN/LAMBDA $1,395, PRO/LAMBDA(#3) $799, PRO/LAMBDA(#1) $499, SIGN/LAMBDA SRD/7 $549; GRACE F9E (Super) $99, F9ERUBY $175; DENON 103D $149, DL303 $199; FR1MK3F $145; DYNAVECTOR 23RS/II $199; SGT. PEPPER/UHQR $275; ALL UNUSED (212) 966-1355.

Compact Disc Performance Rings

Make every CD in your collection sound better. Hear more soundstage depth and bass definition, improved instrumental focus and texture, less digital harshness and glare.

Devote a few pennies and a few moments of time to more beautiful music. This truly is a sound investment!

The Mod Squad

542 North Hwy. 101
Leucadia, CA 92024
(619) 436-7666

BLANK TAPES

1800' OR 2400' AMPEX REELS USED ONCE—SAMPLE: $3.00 NEW MAXELL REELS/CASSETTES. SPECIAL: TDK SA100: $1.88, AR100: $1.49, MA90: $2.49. FREE FLYER. AUDIO TAPES, BOX 9584-A, ALEXANDRIA, VA. 22304. (703)370-5555. VISA/MC.

INVENTIONS WANTED

A NEW IDEA? Call NATIONAL IDEA CENTER of Washington D.C. FREE INFORMATION—1(800) 247-6600, ext. 155. Come see THE INVENTION STORE!!

INVENTIONS / NEW PRODUCTS / IDEAS WANTED: Call TLCI for free information 1-800-468-7200, 24 hours/day—USA/CANADA.

CAR STEREO

CREATIVE CAR AUDIO. HIGH-END INSTALLATION MANUAL—SYSTEM DESIGN, ENCLOSURES, FORMULAS, FABRICATING AND MORE! $15.95: R.MATUSCHEK, 309 CRESCENT GARDEN, PITTSBURGH, PA 15235.

CAR STEREO'S . . . LOWEST PRICES GUARANTEED!! Alpine, Yamaha, Rockford Fosgate, Kicker, Coustic, MTX, JVC, JBL, ADS, Impact, Pioneer, Sony, Autotek, Savard, Code Alarm, Whistler. M/C, VISA or COD. FOR PRICES & ORDERS ONLY CALL STEREO WAREHOUSE NOW! ---1-800-284-5596---.

"STEREO WORLD" is your discount sound source with super deals on the following car and home stereo lines: Panasonic, JVC, Sony, Pyle, Technics, Yamaha, Pioneer, Sherwood, Hi-Fonics, Blaupunkt, MTX, Earthquake, Kenwood, Harmon Kardon, Autotek, JBL, Precision Power and many others. Also full line of installation kits. Please call or write for FREE catalog. Free UPS in 48 states. 10AM-6pm Mon-Frl. Visa/MC; COD accepted. P.O. Box 596, Monroe, NY 10950 (914) 782-6044.

CAR STEREO

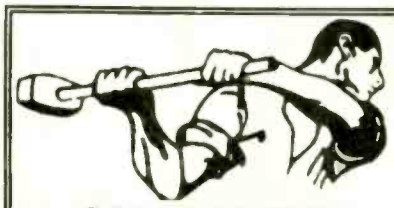
W.E.D.—Super Deals on Car Stereo. ADS• ALPINE• AUDIO CONTROL• AUTOTEK• BAZOOKA• BLAUPUNKT• BOSTON• CARVER• COUSTIC• EARTHQUAKE• H/K• HIFONICS• INFINITY• JBL• KENWOOD• KICKER• MB QUART• MPX• NAKAMICHI• ORION• PHASE LINEAR• PIONEER• POLK• PYLE• PRECISION POWER• ROCKFORD-FOSGATE• SONY• SOUNDSTREAM• SHERWOOD• SANSUI• TECHNICS• YAMAHA. Monday—Friday 10AM—6PM, (718) 370-1303, 43 Racal Court, Staten Island, NY 10314.

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.

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).



MADISOUND LOW RESISTANCE INDUCTORS

MADISOUND is pleased to announce that we are now stocking AIR CORE SIDEWINDER and FERRITE BOBBIN SLEDGEHAMMER Audio Inductors. These are audiophile grade inductors using 16 gauge wire with the following specifications:

- Hard drawn copper for maximum conductivity.
- Nylon-Polypropylene coating for maximum scuff and abrasion protection.
- Better than 101.3 % of National Electrical and Manufacturing Association (NEMA) standard sample.
- Meets standards of American Society for Testing Materials (ASTM).
- Inductance value within 5% of value listed.
- Power Handling capacity: more than 500 watts before saturation.
- Resistance through skin effect: Better than 248 ft per ohm.

Sidewinder Air Core Inductors					
Mh	Ω	Price	Mh	Ω	Price
.1	.10	$2.05	.50	.22	$3.50
.15	.11	2.25	.60	.24	3.80
.20	.14	2.45	.65	.27	4.00
.25	.15	2.65	.70	.28	4.10
.30	.16	3.00	.80	.30	4.40
.33	.18	3.20	.90	.33	4.70
.40	.18	3.35			
Sledgehammer Ferrite Inductors					
1.0	.10	$6.75	4.5	.25	$11.45
1.2	.11	7.00	4.7	.26	11.55
1.3	.12	7.20	5.0	.27	11.70
1.5	.14	7.40	5.4	.29	11.85
1.7	.15	7.55	5.7	.30	12.00
2.0	.16	7.85	6.0	.31	12.20
2.2	.18	8.15	6.5	.32	12.40
2.5	.19	8.50	7.0	.35	12.55
2.7	.20	8.75	7.5	.35	12.75
3.0	.20	10.75	8.0	.36	12.95
3.3	.21	10.85	8.5	.39	13.20
3.7	.23	11.00	9.0	.40	13.45
4.0	.23	11.20	10.0	.43	13.85
4.3	.24	11.35	12.0	.47	14.75

Stage systems, commercial sound and autosound application will benefit from using SIDEWINDER and SLEDGEHAMMER AUDIO INDUCTORS because the resistance loss within the crossover is up to 50% less than similar 18 gauge inductors. This more effectively couples the amplifier to the speaker to realize the full potential of the power amplifier's damping factor and results in better speaker control. In addition, the saturation level of these coils is much higher than standard types.

Madisound Speaker Components
8608 University Green
Box 4283 Madison WI 53711
Phone: 608-831-3433
Fax: 608-831-3771

AUDIO...MATICALLY,

turn to Audio's Classified pages when it's time to buy or sell audio equipment. To reach qualified buyers, place your ad today! For advertising rates—retail display, Dealer Showcase, Custom Installation, & line ads, please call 800-445-6066 (9am-5pm e.s.t.). Manufacturers interested in display advertising rates, please call Carol Berman, 212-767-6292.

DAT

FREE CATALOG/NEWSLETTER. CD's, DAT, Cassettes, Reel. Write to DIRECT-TO-TAPE RECORDINGS, 14-R Station Ave., Haddon Heights, NJ 08035.

Custom DAT tapes. Classic and theatre pipe organ digital master recordings: Brochure 50¢ & SASE. T-V RECORDING, BOX 70021, SUNNYVALE, CA 94086.

SERVICES

MOSCODES, FUTTERMANS — ANY MAKE TUBE ELECTRONICS — SERVICE AND CUSTOM MODIFICATIONS BY GEORGE KAYE, MOSCODE DESIGNER. KAYE AUDIO LABS, INC., 238 Liberty Ave., New Rochelle, NY 10805. (914) 633-3039.

MOSCODE HYBRID HAFLER — THE SOUND OF TUBES — THE POWER AND RELIABILITY OF SOLID STATE. KAYE AUDIO LABS, INC., 238 Liberty Ave., New Rochelle, NY 10805. (914) 633-3039.

Audio Repairs and Restorations by Clif Ramsey of Audio Classics, former Senior Service Technician at McIntosh. **Tuner Modifications** by Richard Modafferi, independent consultant to Audio Classics, inventor, and former Senior Engineer at McIntosh. Over 55 years combined experience. **AUDIO CLASSICS.** 8AM-5PM EST Mon.-Fri., POB 176SAR, Walton, NY 13856. 607-865-7200.
—Audio Advertiser for over a Decade—

BUSINESS OPPORTUNITIES

LET THE GOVERNMENT FINANCE your new or existing small business. Grants/loans to $500,000. Free recorded message: 707-448-0270. (KF1)

FOR SALE

AUDIO RESEARCH SP-15, $3200; VTL 300'S, $3200; SOTA COSMOS & MDC 800 (THE ARM) TONEARM, $3200; ISOTABLE TURNTABLE STAND, $300; NAKAMICHI DRAGON, $900; INFINITY MODULUS SATELLITES & STANDS, $900; INFINITY MODULUS SUBWOOFER, $1400; CARVER TX11 TUNER, $250; NEC PLA-710 VIDEO SURROUND AMPLIFIER & REMOTE, $450; AMERICAN EXPRESS 100 GREATEST CLASSICAL RECORDS, MOST DEUTSCHE GRAMMOPHON, EXCELLENT CONDITION, $200; RECORDS, APPROXIMATELY 350 LP'S, NUMEROUS AUDIOPHILE QUALITY; CLASSICAL, POP, ROCK & COUNTRY, ALL OR NONE, $350. (205)766-4504.

The best place to be seen is where people are looking. And each month, both enthusiasts & dealers read **AUDIO**'s Classifieds for information.

AUDIO's Classifieds —where consumers shop *and* dealers buy!

For more information, please call 800-445-6066.

AD INDEX

AR ANNOUNCES A STARTLING NEW DIMENSION IN STEREO LISTENING. HOLOGRAPHIC IMAGING.™

It's astonishing. You're used to speakers blanketing a room with ambience. Or limiting imaging to a narrow sweet spot.

Holographic Imaging unites imaging and ambience to recreate music in its proper position. The music is projected into the room. The effect is electrifying. Three dimensional.

THINK OF IT AS A SONIC HOLOGRAM.

And you're right in the middle of it. Imaging is far more focused than conventional speakers, so not only can you pinpoint instruments with striking accuracy, but experience their size, weight and texture as well. We've combined that improved definition with more spacious, natural ambience that envelops you in what we call the Spatial Soundstage.™ (Fig. A)

The technology responsible for Holographic Imaging could only have come from the people who invented acoustic suspension.

ASTOUNDING SOUND BECAUSE WE BROKE THE VERY RULES WE MADE.

For instance, the first four in the H/I Series have the woofer on top, angled precisely. This minimizes unwanted crossover components and diffraction effects, leaving nothing between you and the music.

The offset dome tweeter adds strong, precise imaging over a broader area than merely the traditional sweet spot. (Fig. B)

FIG. B.

In the two largest H/I Series, we put the midrange on the top on an angle. Then we mounted the woofers into an acoustic suspension cabinet that fires into a filtered chamber. The result... Filtered Suspension... tight bass response combined with dynamic, efficient performance. (Fig. C)

The narrow speaker encasement (Minimal Baffle Design) reduces reflected information and gives you an enormous sound from a surprisingly small amount of space.

FIG. C.

SOUND DESIGN DICTATED COSMETIC DESIGN.

The design philosophy here is "form follows function." As such, every physical characteristic is born from specific physics and psych-acoustic principles. The result is a seamless blend of engineering innovation and visual art.

From bookshelf to tower, each sleek, uncompromising model projects precise stereo performance. Other finish options are available on the largest model.

See and hear these new speakers only at selected AR dealers. They are offering an extraordinary demonstration featuring Nova artists such as Brandon Fields and Jude Swift on a special CD which you're free to keep afterward.

The other thing free is information. So if you have questions about the H/I Series or Holographic Imaging call 1-800-969-AR4U.

AR ACOUSTIC RESEARCH

WE CAN BREAK THE RULES BECAUSE WE MADE THE RULES.

Finally, a CD player that reproduces all of the music, not just bits and bytes of it.

Adcom's new GCD-575 Compact Disc Player has been worth waiting for. Now there's a CD player with analog audio circuits as advanced as its digital stages. Featuring a no-compromise Class "A" audio section, the GCD-575 is the first affordable CD player that delivers the long anticipated technical benefits of digital sound. So visit your authorized Adcom dealer and listen to all of the music... not just bits and bytes of it.

ADCOM®
fine stereo components

11 Elkins Road, East Brunswick, NJ 08816 U.S.A. (201) 390-1130
Distributed in Canada by PRO ACOUSTICS INC. Pointe Claire, Quebec H9R 4X5

Enter No. 4 on Reader Service Card