

Audio

**DOLBY S-TYPE
NOISE REDUCTION**

JUNE 1990 • US \$2.75 • UK £2.00 • CAN \$2.95

SONY CDP-X77 NEW REFERENCE CD PLAYER

EXCLUSIVE TESTS

ONKYO T-4700 AM/FM TUNER
SUPERB VALUE

PIONEER TZ-9 SPEAKER
CLEAN, AIRY, STRONG

SONY

POWER

ON/OFF

LINE OUT
PHONE LEVEL



INTERVIEW
STEVEN EPSTEIN
PRODUCTIVE PRODUCER

330 TURNPIKE STREET, CANTON MASSACHUSETTS 02021 USA TEL: 617 8212300. HIGH STREET, HOUGHTON REGIS, DUNSTABLE, BEDFORDSHIRE LUS 5QJ ENGLAND

Music in Motion



The company responsible for hi-fidelity sound for your home now offers the premier in car stereo performance

AR for your car



TIMELESS INNOVATION

TELEDYNE ACOUSTIC RESEARCH

Enter No. 1 on Reader Service Card



IT EVEN SOUNDS PICTURE PERFECT.

If true perfection is unattainable, they haven't told our engineers.

Case in point. The Elite® combination LaserDisc™/CD player. It is arguably the finest sight-and-sound machine ever created.

For one thing, it's the only LaserDisc player available with digital time base correction — which delivers a picture with unsurpassed brightness and resolution. And it features extraordinary CD

sound, something you won't find on any VCR.

As a CD player, its specifications would impress even the most ardent audiophile. So no matter how you look at it, the Elite CLD-91 makes perfectly good sense.

For your nearest Elite dealer, call 1-800-421-1404.



© 1989 Pioneer Electronics (USA) Inc., Long Beach, CA

Enter No. 39 on Reader Service Card

Audio

JUNE 1990

VOL. 74, NO. 6



Sony CD Player, page 70



Dolby S-Type NR, page 50

FEATURES

INTRODUCING DOLBY S-TYPE NOISE REDUCTION	K. Gundry and J. Hull	50
A FIRST TEST: DOLBY S-TYPE	Howard A. Roberson	58
THE AUDIO INTERVIEW: STEVEN EPSTEIN	Susan Elliott	60

EQUIPMENT PROFILES

SONY CDP-X77ES CD PLAYER	Leonard Feldman	70
ROCKFORD FOSGATE RF200 PREAMP	Leonard Feldman	78
ROCKFORD FOSGATE RF2000 POWER AMP	Leonard Feldman	79
PIONEER TZ-9 SPEAKER	David L. Clark	90
ONKYO INTEGRA T-4700 TUNER	Leonard Feldman	104

MUSIC REVIEWS

CLASSICAL RECORDINGS	112
ROCK/POP RECORDINGS	120
JAZZ & BLUES	128

DEPARTMENTS

SIGNALS & NOISE	4
AUDIOCLINIC	8
TAPE GUIDE	10
THE BOOKSHELF	14
AUDIO ETC	25
BEHIND THE SCENES	28
CURRENTS	34
SPECTRUM	44

The Cover Equipment: Sony CDP-X77ES CD player.
The Cover Photographer: Bill Kourinis Studio.

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.



Steven Epstein, page 60



Pioneer Speaker, page 90

GET ON WITH IT.



The Proceed CD. An original expression of how technology can fulfill your desire for musical fidelity. Two years of research into the sonic possibilities of the compact disc medium have resulted in a component worth waiting for.

The Proceed CD. The world's most well understood CD player.



PROCEED

Proceed® products are designed and manufactured by **MADRIGAL AUDIO LABORATORIES**
PO Box 781, Middletown, CT 06457 ITT TLX 4942158

Editor: Eugene Pitts III

Art Director: Cathy Cacchione

Technical Editor: Ivan Berger
 Managing Editor: Kay Blumenthal
 Associate Art Director: Linda Zerella
 Assistant Editor: Joe Wiesenfelder
 Editorial Assistant: Michael Bieber

Associate Editor:

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:

Michael Aldred, Herman Burstein, David L. Clark,
 Anthony H. Cordesman, Ted Costa, John Diliberto,
 Frank Driggs, John M. Eargle, Susan Elliott,
 Joseph Giovanelli, Bascom H. King,
 Hector G. La Torre, Edward M. Long,
 Frank Lovece, Jon W. Poses, Jon R. Sank,
 Susan Borey Sherman, Donald Spoto,
 Michael Tearson, Jon & Sally Tiven,
 Paulette Weiss, Michael Wright

Business Services Director: Greg Roperti

Circulation Director: Leon Rosenfield
Production Director: Patti Burns
Production Manager: Nancy Potts
Research Director: Vicki Bimlich
Office Manager: Phyllis K. Brady
Ad Coordinator: Sylvia Correa
Sales Secretary: Liz Dedivanovic

V.P./Publisher: Stephen Goldberg

ADVERTISING

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

DCI EXECUTIVE STAFF

President and CEO: Peter G. Diamandis
 Executive V.P.: Robert F. Spillane
 Sr. V.P., Finance, and CFO: Arthur Sukel
 Sr. V.P., Mfg. & Distribution: Murray M. Romer
 Sr. V.P., Operations: Robert J. Granata
 V.P., Controller: David Pecker
 V.P., General Counsel: Catherine Flickinger

AUDIO, June 1990, Volume 74, Number 6.
 AUDIO (ISSN 0004-752X, Dewey Decimal Number
 621.381 or 778.5) is published monthly by DCI, 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 DCI. ©1990, Diamandis Communications Inc. All
 rights reserved. **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.

Music from Behind the Brain

Dear Editor:

Regarding Edward T. Canby's column in the February 1990 issue, are we taking classical music for granted by treating it as background noise material? So thinks Mr. Canby, who feels Mozart and Beethoven get no respect! I've come to the conclusion that some amount of listening, even if it's back-brain listening, is better than none.

Films, art, music, and books have all benefited from, and been hurt by, cheap editions. This enormous distribution of Western cultural artifacts, afforded through modern technology, has made the artifacts disposable. A thrice-in-a-lifetime chance to hear a symphony is no longer the big deal that it was in the 19th century. A Compact Disc contains two symphonies and over 70 minutes of music, always available at our convenience. Therefore, the music becomes less precious. If your attention isn't completely focused, well—there's always next time.

However, I've found that the music really does register in the back brain. The next play, it usually gets my undivided attention. When I'm distracted, a composer will leave little fragments of his music tinkling in my head, and I've discovered that my inattention has actually enhanced my enjoyment of music! Therefore, full attention at full audio volume, *über alles*, isn't the only way to enjoy recorded music. A little haunting carries a lot of magic.

George Nussbaum
 New York, N.Y.

Sunbelt Show

Dear Editor:

This is to announce that the Atlanta Audio Society, Inc. is sponsoring the two-day Sunbelt Audio Show in Atlanta on Saturday and Sunday, August 18th and 19th, 1990. The show will feature public-entry ticket sales and allow exhibitor retail sales.

Space has been reserved at the Radisson Inn and Conference Center in Atlanta. A minimum of 30 guestroom-sized spaces and 10 large-dimension exhibit spaces will be available for both live-demonstration and static displays. High-end audio/video manufacturers, distributors, dealers, recording companies, and audio/video publishers are invited to participate.

As far as we know, ours is the first audio society to sponsor a show of this scale. Please write to the Sunbelt Audio Show, 1160 Cumberland Rd. N.E., Atlanta, Ga. 30306 or call (404) 876-5659 for further information.

Charles G. Bruce, Jr.
 President, Atlanta Audio Society
 Marietta, Ga.

Direct to What?

Dear Editor:

February 1990's "Spectrum" contained a report on a recent "direct-to-disc" recording session produced by Tam Henderson of Reference Recordings. Mr. Henderson felt that many recording companies complain that their CDs do not sound like the original master. He also suggested that this particular "direct-to-disc" production sounded exactly like the original, since there was, in effect, no original recording to begin with.

Okay so far. However, the reasons why many manufacturers are not pleased with the sound of their Compact Discs are the failure of A/D converters to maintain 16-bit linearity and the imperfections in the analog filters associated with them. Serious audiophiles can certainly attest to this, and have been complaining about it since the first Compact Disc was auditioned. The fact that a "direct-to-disc" session took place in order to bypass an archival (master recording) process does not, in and of itself, guarantee accuracy. An analog-to-digital (A/D) step was still necessary in order for a Compact Disc to have been made of this performance. Whether the Compact Disc was ultimately manufactured as a result of an over-the-air transmission or from an *accurately archived* analog-to-digital recording, I submit that the results would have been identical!

As a publicity stunt, the effort drew attention to the problems associated with the front end of the digital process. As an exercise in solid engineering practices, I would question if the effort was worth it, particularly if there were no corresponding benchmark archival devices available to verify the sound of the original audio feed, as sent by Mr. Johnson to Mr. Harley.

Brad S. Miller
 By The Numbers
 Incline Village, Nev.

There can be no standard of quality without a Reference.



This is especially true in the audio field where everyone, from studio engineers to manufacturers and reviewers, needs a solid benchmark for accurate sound.



Only the KEF Uni-Q driver places the tweeter inside the woofer's voice coil.

For twenty years, the KEF Reference Series has been a standard by which all other loudspeakers have been judged. The latest benchmark for loudspeakers is the KEF Reference Series Model 105/3.

The 105/3's draw upon KEF's ground-breaking research into the interaction

of speakers and room acoustics: coupled-cavity bass loading for deep bass from the smallest possible enclosures; conjugate load matching, which uses amplifier power to its full advantage and KUBE, KEF's proprietary bass equalizer, which produces the bass of cabinets *eight* times as large. The four-way 105/3's are the first Reference Series speakers to use Uni-Q technology.

Uni-Q: the first coincident-source drivers.

KEF Uni-Q is an engineering breakthrough: the first truly coincident-source driver.

Many audiophiles know that an ideal speaker would be a point source; unfortunately, multiple-driver systems often fall far short of this ideal. With Neodymium-Iron-Boron, the most powerful of all magnetic materials, KEF has created a tweeter so small that it can be placed inside the woofer's voice coil. In effect, every Uni-Q driver is a point source.

Moreover, the woofer cone acts as a wave guide for the tweeter and controls its dispersion. The entire frequency range arrives at the listener's ears at exactly the same time, producing seamless sound no matter where the listener sits. Unwanted reflections within the room are actually reduced, and the music you hear is less colored.

If you appreciate music, audition the Reference 105/3's. For any audiophile system, they are "standard" equipment.



The Speaker Engineers.

AKG's K280 Headphones for the Digital Era

Now that you've upgraded your system to include CD technology, your headphones must meet a higher standard.

That's why you need AKG's high output parabolic stereo headphones.

The K280 features a computer-positioned pair of matched transducers in each ear cup to provide transparent, interference-free sound at the center of your ear.

AKG headphones are world-renowned in the professional digital recording industry, as backed by a recent *Billboard* survey* rating AKG headphones the most widely used in U.S. professional recording studios.

AKG's K280 headphones. The standard of quality for the digital era.



Focusing on new technology.
1565 Avenida St., San Leandro, CA 94577
(415) 351-3500

**Billboard's* 1990 International Recording Equipment & Studio Directory, Oct. 1993
© AKG 1990 © Akustische und Kino-Geräte GmbH, Austria

Readers report that both the LP and Prof. Lirpa are dead. But are these reports completely accurate?

On Death and Lying

Dear Editor:

At long last, there is word of Prof. I. Lirpa. I learned from Iyam, a close cousin of his, that Lirpa is dead. Iyam said Lirpa was involved in a head-on collision with his new Vehicular Compact Disc Reproduction System (VCDRS). Also, he told me that we should not grieve for Lirpa because he was dangerous. He was fiendishly clever, as were the devices which he cooked up and you unwittingly published. Now I ask you, why did no one write to say whether or not these concoctions worked? I'll tell you. They were designed to self-destruct, with a large explosion. That's why no one wrote. The fiend!

Also, he had become boring, which is *more* reason not to grieve. But I must warn you: Should you receive a communication from someone who claims to be Lirpa but is not dead, don't believe him. On top of everything else, the man was an impostor and a liar.

Have a nice day.

Ahyim Khid'n
Big Bull, Mont.

Editor's Note: False reports of Prof. I. Lirpa's death are as common as multi-path in New York City and, likewise, should be tuned out. As for your claims of self-destructing equipment, we have always known that Lirpa wanted audiophiles to get a bang out of his products, but such "explosive" allegations are totally unfounded. In fact, I am right now listening to a CD on Lirpa's outstanding VCDRS (reviewed in the April issue), and I have had absolutely no prob!

R.I.P. LP?

Dear Editor:

With regard to the letter from Lloyd E. Townsend, Jr. about the price of records in stores versus the price from clubs and independents (January), the bottom line is: Who cares about the price of records? LPs are dead.

In most places where I shop, the CDs are less than \$10. Trying to pawn off black plastic at any price should be illegal. I have not listened to any of my records in years. Even at \$2 apiece, I don't want them.

C. Engebretsen
Hamilton Square, N.J.

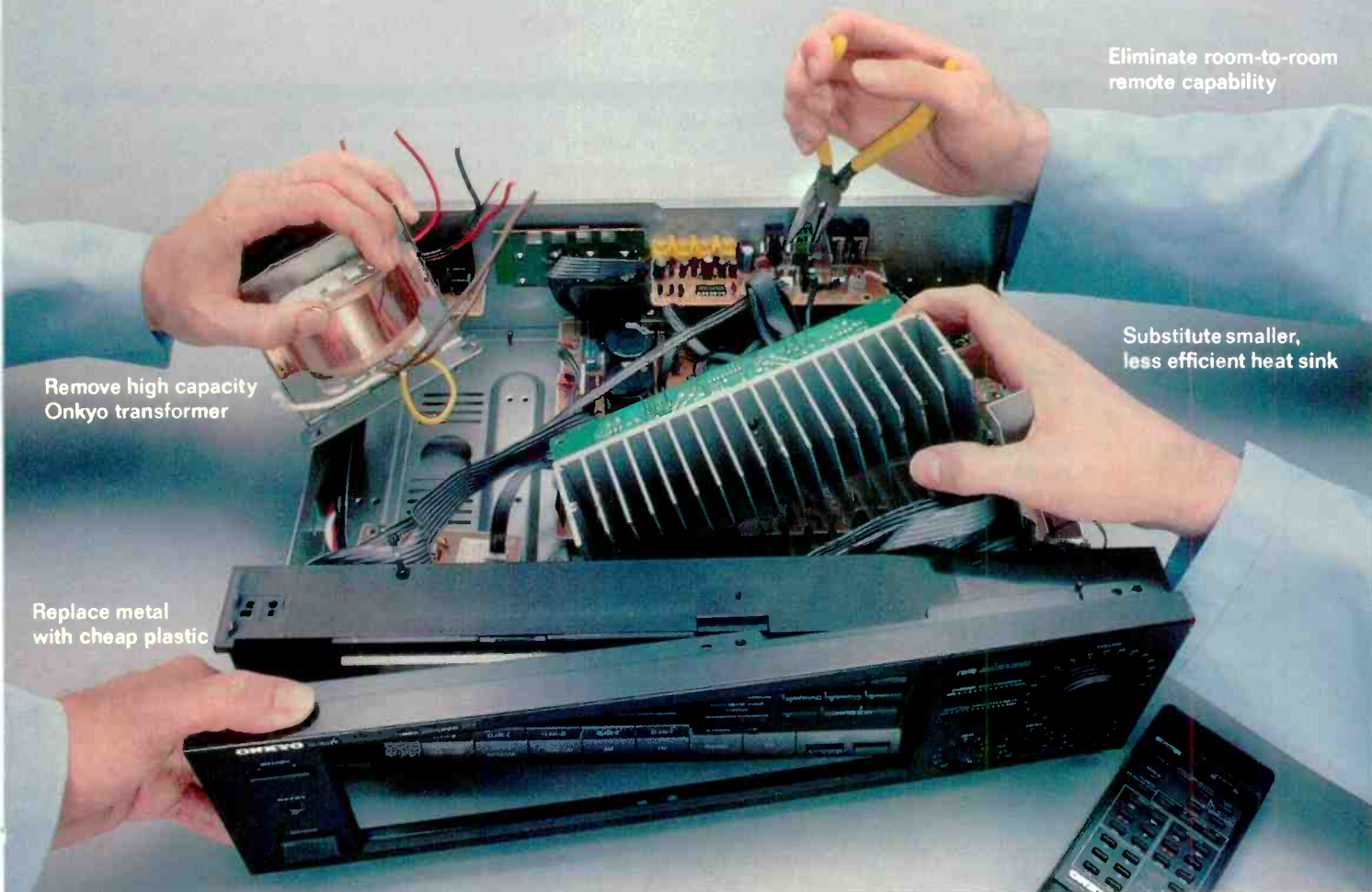
Buy a CD player and you'll need a new music collection...
Buy a new ORTOFON cartridge and you'll have one.



Chances are you have a substantial investment in record albums, many of which will never be available on CD. Replacing your Phono Cartridge with a New Ortofon model will make these recordings sound better than ever before. So before spending hundreds of dollars on CD equipment and recordings, why not invest in something to give new life to your music library? Ortofon cartridge prices start at less than the cost of 3 Compact Discs! For more information, contact:

Ortofon Inc., 122 Dupont Street, Plainview, NY 11803
516-349-9180

How to make an Onkyo receiver as good as its competition.



Remove high capacity Onkyo transformer

Eliminate room-to-room remote capability

Substitute smaller, less efficient heat sink

Replace metal with cheap plastic

If we wanted to make an Onkyo receiver as good as our competition, it wouldn't be too hard.

First, we'd remove our proprietary heavy duty transformer, replacing it with a commonly used smaller version. Unfortunately, this means less current capability, resulting in compromised low impedance performance and compressed musical dynamics. Sonic anemia.

Next, we'd substitute a much lighter, cheaper heat sink. Of course, this greatly increases the chance of thermal overload when the music's cooking, but since we'd already be using a low capacity transformer, the music would only be half baked anyway.

Room-to-room remote capability would have to be

For More Information



Call 1-800-553-4355

sacrificed. After all, if we're not concerned with performance, why should we bother with convenience?

As a finishing touch, faceplates & chassis would be plastic instead of metal. True, that wouldn't give us the same structural integrity. But we'd be cutting so many other corners you'd probably never notice the difference.

Now, we could do all these things to an Onkyo receiver. But then we wouldn't have a component as extraordinary as our new TX-866, with 185 watts per channel of dynamic power, plus the ultimate in room-to-room musical control.

At Onkyo, all our receivers are built to be better. And, that's a difference you can hear—and see.



ONKYO®

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

U.S. DEALER LIST

AUDITION Birmingham, AL	CLASSIC STEREO Kalamazoo, MI
CAMPBELL'S Huntsville, AL	CLASSIC STEREO Grand Rapids, MI
AUDIBLE DIFFERENCE Palo Alto, CA	AUDIO PERFECTION Minneapolis, MN
AUDIO EXCELLENCE San Francisco, CA	SOUNDING BOARD Ridgewood, NJ
CHRISTOPHER HANSEN LTD. Los Angeles, CA	WOODBRIIDGE STEREO Woodbridge, NJ 07095
KEITH YATES AUDIO Sacramento, CA	WOODBRIIDGE STEREO W. Long Branch, NJ
LISTEN UP AUDIO Denver, CO	WOODBRIIDGE STEREO Princeton, NJ
LISTEN UP AUDIO Boulder, CO	AUDIO VISIONS West Babylon, NY
LISTEN UP AUDIO Colorado Springs, CO	LYRIC HI FI New York, NY
TAKE FIVE AUDIO New Haven, CT	LYRIC HI FI New York, NY
SOUND COMPONENTS Coral Gables, FL	LYRIC HI FI White Plains, NY
LEE KRAMER'S HI FI SSS Atlanta, GA	AUDIO ADVICE Raleigh, NC
AUDIO CONSULTANTS Evanston, IL	HOFFMAN'S STEREO Warrensville Hts, OH
AUDIO CONSULTANTS Libertyville, IL	AUDIBLE ELEGANCE Cincinnati, OH
AUDIO CONSULTANTS Hinsdale, IL	AUDIO ENCOUNTERS Dublin, OH
PAUL HEATH AUDIO Chicago, IL	DAVID MANN AUDIO Philadelphia, PA
SOUND PRO Carmel, Ind.	SUMMIT AUDIO/VIDEO Kingston, PA
SOUND PRO Iowa City, IA	ON TOP AUDIO Rio Pedras, PR
WILSON AUDIO New Orleans, LA	SOUNDINGS Middletown, RI
HI FI EXCHANGE Falmouth, ME	AUDIO INSIGHT Dallas, TX
GOODWIN'S Boston, MA	SOUND DIRECTIONS Rutland, VT
MUSIC BOX Wellesley, MA	DEFINITIVE AUDIO Seattle, WA
WALTHAM STEREO Waltham, MA	SPECIALIZED SOUND Madison, WI

JOSEPH GIOVANELLI

Loss of Phono Output

Q. I have a problem with my turntable. Recently, between records, the sound disappeared. When I turned the volume way up, I could hear very faint sound. Does this suggest what the problem may be? The rest of my system works fine. Could the phono button on my receiver be defective? The stylus is new, and the cartridge leads look fine and are snugly connected to their terminals. No, I didn't have the tape monitor button pressed on my receiver.—H. Moski, Branford, Conn.

A. Any number of things could have gone wrong.

If your turntable mutes between records, it is possible that the contacts which short the cartridge output during this time are not reopening. You will have to examine the mechanism to see how the muting is accomplished. A "follower" may have become distorted in some way, preventing it from riding on the cam that normally forces the muting contacts apart during play.

Yes, the phono switch on your receiver could be defective. It's also possible that its contacts could be dirty, but I think this is not the case when both channels have failed at the same time. If dirt were the problem, one channel would probably still play properly, or you might hear distortion rather than silence from one or both channels. Contact cleaning sprays are available for cleaning dirty or oxidized contacts, however.

Perhaps an IC common to both phono-graph channels has failed.

If you can obtain a second receiver/integrated amplifier, connect the turntable to it and see if your records play normally. If they do, you will know that nothing is wrong with the turntable. If you are greeted with silence, the turntable needs repair.

Audio Quality and Wall Plug Polarity

Q. My question concerns some very subtle and yet musically significant changes that I perceive when I reverse the power-line plug of either my tube or my solid-state amplifier. With a certain polarity, the sound quality appears to be better focused and have better depth, imagery, and transparency than when the plug is inserted with the opposite orientation. A few "reversals"

will usually indicate to me which is the preferred one. Is there a scientific explanation of this phenomenon?—John J. Serocki, Rolling Meadows, Ill.

A. I can't imagine why or how reversing the polarity of the wall plug will bring about sonic differences. About all I can suggest is that perhaps there is a slight background hum with the plug polarized in a certain direction; when the plug is reversed, the hum disappears. The hum might not have been noticeable, yet with it gone, you might hear a more open sound. Such a small amount of hum probably could mask some of the subtler elements of the music.

Poor VCR Audio Performance

Q. I recently purchased a receiver which included surround sound as well as phantom stereo. The sound is fantastic! Well, mostly. When I use either the VCR or cable TV, I lose a great deal of highs and deep bass. I tried the phantom mode, and the same thing occurs. Is there any way to obtain the same response from a VCR or from cable as I do from other program sources?—John Tallarico, Staten Island, N.Y.

A. The average VCR tends to be deficient in deep bass. Treble is also a problem, especially when it is operated at low tape speed. A Beta Hi-Fi or VHS Hi-Fi machine will solve these problems so long as the audio on the tapes you play is recorded using the Hi-Fi format rather than the standard, longitudinal track.

All too often, TV sources tend not to have a really wide frequency response. If you record from such sources—even with the best available recorder—the audio performance is likely to be less than fulfilling. If the audio is not acceptable to start with, phantom stereo won't improve it.

Some improvement is possible by using a graphic equalizer. You may, however, begin to hear buzz and hiss if the highs are boosted too much; hum may be a problem at times if bass is boosted significantly. Experiment. **A**

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.

ANNOUNCING THE BRYSTON TWENTY YEAR WARRANTY

For over a quarter-century Bryston has been committed to designing and producing audio products with musical accuracy, reliability and value as our primary focus. It is widely known that Bryston's policy on the warranty of our products has always been extremely generous if ever required. To further enhance our long term commitment Bryston is instituting a 20 year warranty program as of January 1st, 1990. This, as far as we know, is a first in our industry and as such will further demonstrate our continuing dedication to our products and customers.

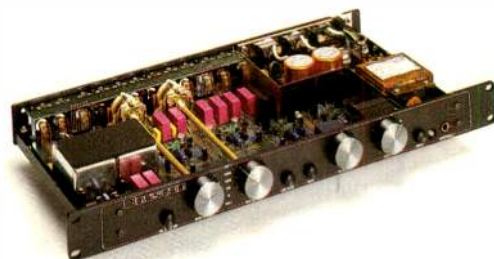
Musical accuracy is reflected throughout all Bryston power amplifiers. This includes the necessity for wide-band transient accuracy, open loop linearity ahead of closed loop



Bryston 10B electronic crossover

specifications, and power supply design as an integral part of the overall sonic and electrical performance of a power amplifier.

We have found that a simple carbon film resistor can contribute more static distortion to a signal than the entire circuitry of the amplifier.



Bryston 12B pre-amplifier

We discovered that some parameters of transistors must be controlled as much as 100 times more closely before their contribution to audible distortion is rendered negligible.

Each of the steps or stages in every Bryston amplifier, from the input section to the output section, without exception, are designed to optimize the musical experience. Bryston takes very seriously the correct functioning and long term reliability of its products.

This new twenty year warranty is also retroactive. It includes all audio products previously manufactured and sold under the Bryston name. This warranty is also fully transferable from first owner to any subsequent owners.

Bryston has always been dedicated to designing and producing audio power amplifiers, crossovers, and pre-amplifiers that deliver uncompromised performance, outstanding reliability and exceptional value. We believe our new 20 year warranty is one more example of our continuing commitment to this ideal.

Bryston Marketing Ltd.
Tel: (416) 746-0300 Fax: (416) 746-0308
Brystonvermont Ltd. Tel: 1-800-223-6159

For More Information



Call 1-800-553-4355

Enter No. 13 on Reader Service Card

BRYSTON

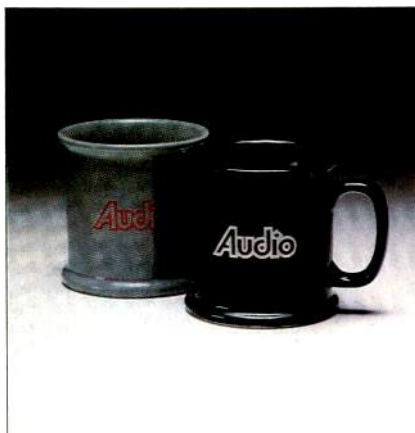
Music to your ears
ARCAM
 AUDIOPHILE PRODUCTS
 BY A&R CAMBRIDGE



Arcam has a 12 year record of building affordable, no nonsense, performance hi-fi products. Arcam Amps, Tuners, CD players & Outboard D to A Converters are famous for design and construction quality that insures great sound and a lifetime of listening pleasure. Elegant in its simplicity, an Arcam in your system is "music to your ears."

Audio Influx Corporation
 IMPORTERS OF AUDIOPHILE PRODUCTS
 P.O. Box 381 Highland Lakes NJ 07422 (201) 764-8956

Enter No. 8 on Reader Service Card



CLASSICAL MUGS

These distinctive 12-ounce English Ironstone mugs with large grip handles boast the logo of your favorite magazine. Available in set of two (black and gray) #65MUGS2 \$16.95 (\$3.00)

To order, call our TOLL FREE lines. We accept Visa, MasterCard and American Express, or send a check plus shipping and handling to AUDIO, P.O. Box #765, Holmes, PA 19043.

ORDER TOLL FREE
 800-345-8112

TAPE GUIDE

HERMAN BURSTEIN

A Tangential Question

Q. Which would you buy to begin a stereo system: A receiver or a separate tuner, preamp, and power amp? (Price is important.)—Eddie Crawford, Tuscaloosa, Ala.

A. While your question is not directly related to tape recording, it is a pivotal question for audiophiles, and I would like to answer it. I vote for a receiver, particularly if price is important. In fact, I might vote for a receiver even if price were a secondary consideration, because good-quality receivers today can pretty much rival the performance of separate components. Another important advantage, in many cases, is that a receiver saves space. Considering that one may need room for a CD player, turntable, cassette deck, and quite possibly other components—particularly signal processors—it may be quite a boon to combine three components into one chassis.

Open Reel vs. Cassette

Q. I am using an old open-reel deck for recording and playing old radio programs. My format is similar to that of other collectors: I tape four mono tracks onto a single reel. I can really pack a lot of shows—12 half-hour programs—onto an 1,800-foot reel at 3¾ ips, and using white-box tape enables me to get by very cheaply.

The point of all this is: By saving a few dollars on tape right now, am I investing time and money in a dead technology? I could record these shows onto cassette in a similar manner—four separate mono tracks—but I worry about not having enough tape to cover a show and being vulnerable to tape dropout. I know my present deck will eventually stop working, and I worry about the availability of open-reel decks, at least in my price range. Will new open-reel decks still be available in 10 years? While my collection is small at this time—about 50 reels—I can see the possibility of eventually having several hundred reels dedicated to old radio shows. What are your views on the question of open reel versus cassette for my expanding library?—Steve Mallon, Chicago, Ill.

A. I am inclined to believe that open-reel decks, including those intended for home use, will be with us for a considerable time—likely beyond 10

years. After all, they provide substantial advantages over cassette decks, such as higher quality (although the difference may be hard to discern when you are dealing with top-flight cassette decks), ease of editing, longer operating time in a single tape direction, better tape motion, and so on.

On the other hand, as you recognize, the prices of "good" open-reel decks are well above those of "good" cassette decks. If we extrapolate into the future, we can expect the price differential to increase. Therefore, I am inclined to advise you to shift to cassettes. While your open-reel deck is still in good repair, you can dub onto cassettes. For \$300 or less, you should be able to get all the quality you need for your purpose, possibly even better than your open-reel deck's.

The disadvantage of cassettes is that you will get much less recording time per tape. If you use C-120 cassettes—which now yield quite satisfactory results, according to a number of readers—you will get two hours per cassette, instead of the six-plus hours that an 1,800-foot open reel provides at 3¾ ips. However, this disadvantage is partly overcome by the fact that a cassette takes up considerably less storage space than does a 7-inch reel.

I am puzzled by your statement about recording four mono tracks onto cassette, however. Possibly an exception exists, but none of the cassette decks I know of permit recording one track at a time. They record two (stereo) tracks in one direction and then two in the other. If a deck could record one track at a time, or if you could modify a deck to do so, you would have a problem: Tracks one and two are very close together, and so are tracks three and four. Hence, you will tend to have adjacent-channel spillover between tracks one and two and between tracks three and four. Such spillover doesn't matter much with stereo—particularly since it occurs mostly at low frequencies—but it would be quite annoying with two unrelated mono tracks. **A**

If you have a problem or question on tape recording, write to Mr. Herman Burstein at AUDIO, 1633 Broadway, New York, N.Y. 10019. All letters are answered. Please enclose a stamped, self-addressed envelope.

S U O N O

THE ULTIMATE COMPONENT FOR THE ULTIMATE SYSTEM.

Cassette sonics redesigned. Redefined. Realizing a perfection in tune with today's advanced audio equipment and today's advanced listener. That's Suono. Innovative cassette technology that is setting the world on its ear. With metal tape performance at its peak—holding more sound, handling more volume, for never before depth, dynamics and clarity. With a revolutionary 3-D domed shell that makes modulation noise a thing of the past and Suono the cassette of the future. The Ultimate component for the ultimate listening experience. That's Suono, the world's most advanced audio cassette.



That's
SUONO
RESHAPING THE FUTURE OF CASSETTES

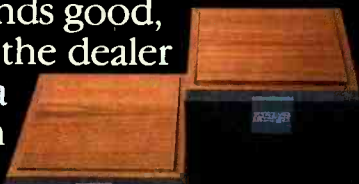
At Altec Lansing, we think it's time you had a hand in what you hear. That's the idea behind the new Altec 511 Tower, the first loudspeaker that gives you total control of amplification, tonal balance and imaging for each midrange, tweeter, upper bass and woofer. The result is a sound system that lets you mold the music precisely to your taste, so everything from Mozart to Motown will sound exactly the way you want it.

Five years in the making, this towering achievement lets the discriminating audiophile choose between single, bi, tri or quad amplification and an impressive range of tonal balance levels, all through a simple control panel. So now, you can tell the philharmonic how to conduct itself.

The remarkable 511 Tower is one of twelve new Altec Lansing speakers, all designed to reproduce sound with unheard-of accuracy.

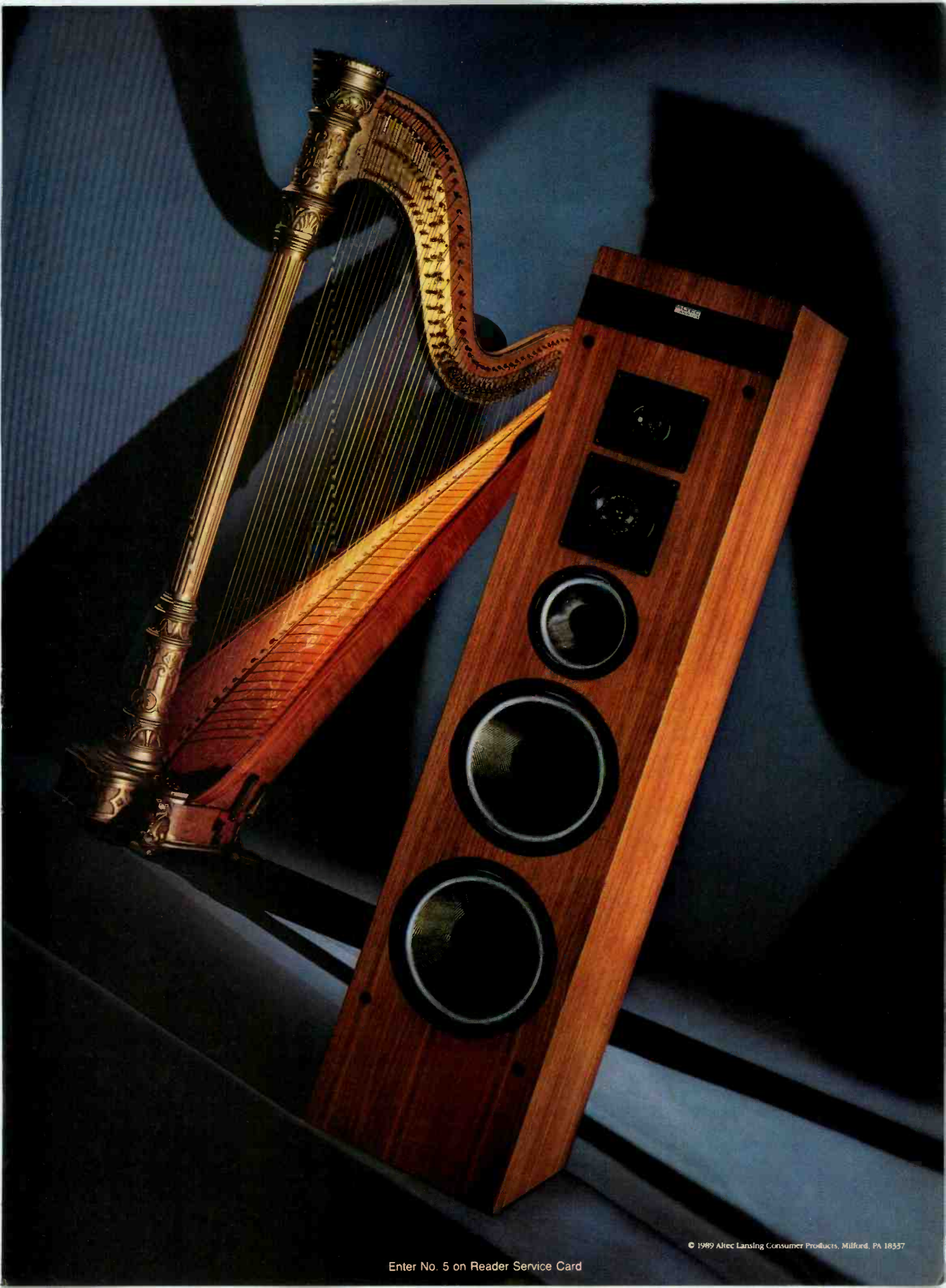
If the new 511 sounds good, call 1-800-Altec 88 for the dealer nearest you. Then take a pair home and tell them what you want to hear.

**AN UNHEARD OF
ADVANCE IN
AUDIO TECHNOLOGY.
SPEAKERS
THAT LISTEN
TO YOU.**



**ALTEC
LANSING**

**LOUDSPEAKERS FOR THE
WELL TRAINED EAR.**



MUSIC, MEISTER

Tonmeister Technology: Recording Environments, Sound Sources and Microphone Techniques by Michael Dickreiter (translated from the German by Stephen Temmer). Temmer Enterprises, 141 pp.; softcover, \$19.95; hardcover, \$34.95. (Available from Temmer Enterprises, 767 Greenwich St., New York, N.Y. 10014.)

For some decades, tonmeister training in Germany has provided the nexus between audio technology and the musical/artistic judgments which make for successful recording and broadcast engineering. Michael Dickreiter is a product of such training and is currently on the staff of the teaching facility of the German Broadcast Systems in Nuremberg. While the complete tonmeister course includes rigorous musical training, it is the technical side of the discipline which is the subject of Dickreiter's book.

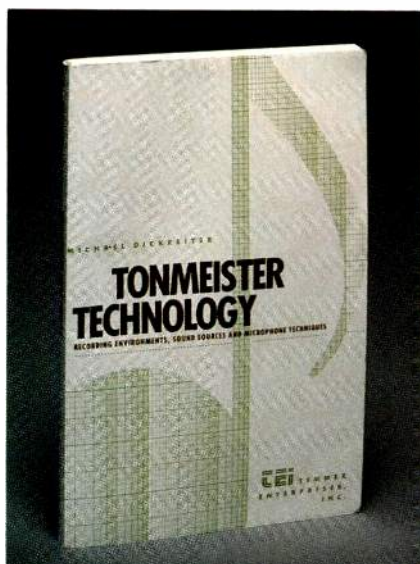
Stephen Temmer is well known to the international audio community, largely through his pursuit of high standards in the studio technologies of disc mastering and microphones. Since his retirement from Gotham Audio, he has taken up a number of projects of personal and technical interest. If his translation of the Dickreiter book is an indication of what is to come, we should all be grateful.

In the author's 1983 preface, he states that the essential aim of this book is to relate recording environment, sound source, and microphone technique as the integral topics they are. Matters of console architecture, recorders, signal processing, and the like are not covered here because they are secondary to the task at hand. The book concentrates on three major areas: The recording environment, sound sources, and microphone pickup. I will cover each of these in detail.

The book begins with the definition and properties of sound waves. The author covers the wide range of wavelengths encountered in acoustics, stressing the wavelength dependence of the acoustical phenomena of absorption, reflection, and diffraction. Sound fields are treated in the broad terms of direct and reverberant components, as well as in the specific psychological terms of sound coloration, spatial impression, and localization.

The acoustical requirements for music are covered in detail, with practical emphasis on reverberation as a function of room size and on the notion of reverberation radius. This last concept is then related to the various directional microphone patterns, noting their capability of altering the effective reverberation radius through their various on-axis and random-incidence sensitivities.

The section on sound sources begins with a discussion of the various kinds of musical ensembles, both large



and small. Such matters as instrumentation, seating plans, and dynamic range are treated; this is followed by a general discussion of steady-state tone analysis, including a useful display of formants (characteristic colors) of the major instrumental groups. Overall frequency and dynamic range properties of the major groups are presented, as are the notions of level, loudness, and the effects of dynamics on instrumental timbre. Dickreiter details the basic acoustics, playing techniques, and radiating characteristics of each major group of instruments. The first two sections account for slightly less than half of *Tonmeister Technology's* content, and of course may be viewed as prerequisites to the book's major technical thrust.

Microphones are analyzed in detail, in terms of operating principles, basic patterns, frequency response, and departures from ideal performance. The

fundamentals of spatial hearing, both in nature and via two loudspeakers, lead naturally to an overview of stereo recording. The basic techniques of coincident (X-Y), spaced (A-B), and artificial-head recording are treated in terms of their fundamental localization (spatial) characteristics, mono compatibility, signal coherence, channel correlation, and general application. Methods of stereo signal monitoring are covered in terms of standard level metering and correlation metering, as well as acoustical monitoring requirements.

Following this introductory section, intensity stereo, in both X-Y and M-S forms, is analyzed in detail. Studio setup methods are presented, and the user is given hints on adjusting the microphones for optimum image width on the "stereo horizon" (stereo soundstage). Graphic material covers each step here, and various X-Y pairs are shown in their equivalent M-S forms and their useful stereo pickup angles. Practical advice is given regarding stereo stage width for various sound sources, and the all-important observation is made that only diffuse (reflected or reverberant) sound should reach the mikes outside the main pickup angle. The author clearly points out the following advantages of M-S over X-Y:

- Remote control of pickup angle. (With X-Y, the microphones themselves have to be physically adjusted.)
- Clarity of mid-stage images due to the fact that those images lie on the main axis of the M microphone. (In X-Y, the mid-stage events are picked up from off-axis directions by both microphones, thus incurring some risk of off-axis coloration for those images.)
- Flexibility in creating a wide range of useful patterns, as required by the recording venue. (In X-Y, each desired pattern requires an actual pair of microphones with that pattern.)

Multi-track recording is discussed as another method of using intensity relationships in creating an array of stereo images via panpots. The ideal requirements set down by the author are:

- Each microphone should essentially pick up sound from one instrument, so that leakage and off-axis coloration are minimized.
- The musicians should be placed in the studio so that louder instruments

Harman Kardon's 3D Bit Stream™ CD Players
THE WORLD SPEAKS OUT!

"NATURAL TIMBRE"

"...natural timbre... transparency...the HD7500 sounds like an ultra-deluxe CD player costing at least twice as much." — N.Y. TIMES, *Hans Fantel* 2/11/90

"REFERENCE SET"

"...Harman Kardon HD7600 is now a full member of our reference set... for testing speakers and amplifiers." — HOLLAND, *HTV Magazine*

"TOP CLASS"

"The HD7500 has firmly placed itself in the distinguished top class." — GERMANY, *Hi Fi Vision*

"ALMIGHTY"

"The HD7600...plain, simple, and natural, with feeling of transparency and accuracy...an almighty player." — JAPAN, *Audio Accessory*



Write for the free, easy-to-understand booklet explaining 3D Bit Stream. Meanwhile, audition the Harman Kardon HD7500 and HD7600. You'll hear for yourself why the whole world is cheering.

harman/kardon

MUSICAL EXPERIENCE

240 Crossways Park West, Woodbury, New York 11797

Enter No. 23 on Reader Service Card



A Harman International Company

Tonmeister Technology is an accessible and valuable book for the lay person as well as the recording engineer.

do not swamp out the softer ones because of proximity; acoustical baffles are helpful here. (At the same time, the maintenance of eye contact between the players is essential.)

- Directional microphones should be used almost exclusively to minimize leakage.

- Mikes should be closely placed—even directly on the instrument—for greater presence.

The author further points out that such techniques are quite useful today because many audio/video productions demand post-processing that cannot easily be envisioned beforehand.

The spaced, or A-B, technique is then discussed. Here, microphones are placed sufficiently far apart so that localization on the stereo stage is highly dependent on timing cues picked up by the microphone pair. The advantages and disadvantages of this method are fully detailed.

Dickreiter then turns to the subject of quasi-coincident microphone arrays (here referred to as "mixed stereo techniques"), in which both amplitude and time differences contribute to stereo localization through spacing of the microphone pair at about ear distance. Both splayed directional microphones and omni microphones with a baffle between them can be used to achieve the desired left/right amplitude differentiation.

For each of these many techniques, the author clearly explains the advantages and the problems, giving the reader a clear idea of when to use a specific technique.

The use of accent microphones (here called "support" microphones) is given a thorough treatment and should be required reading for all audiophiles who damn the idea outright. It is true that a heavy hand on accent microphones can ruin a recording, but if this technique is properly implemented, almost any recording involving large resources can be made better.

Accent microphones are subsidiary to the main pickup array and are intended to contribute to the stereo presentation in the following ways:

- Adding clarity and presence. The main stereo pickup microphones are normally much closer to the front of the orchestra than they are to the middle and back. Thus, there is a chance that the instruments farther away will be picked up with less presence. A properly spaced subsidiary stereo pair, back in the orchestra, will correct this. The job is made easier for the tonmeister if the subsidiary microphones are delayed electronically so that normal timing cues are left intact.

- Correcting subtle balance problems. Many times, and for many reasons, a given player or section may need to be recorded at a higher level for proper musical balance.

- Assisting in localization. Either in stereo pairs or in mono, support microphones can help define image posi-

The Next Generation

The DQ-20

Imagine a speaker system that delivers transparent imaging, accurate dimensionality in width, height and depth, combined with harmonic integrity and dynamic power.

The Dahlquist DQ-10, the original Phased Array dynamic speaker system, became a legend in its own time. This seminal design employed many of the concepts which are still at the leading edge of loudspeaker design. The importance of low diffraction distortion and correct inter-driver time delay were certainly popularized by the DQ-10.

The DQ-10 has been replaced by the DQ-20. Three extraordinary drivers have been combined with advanced enclosure technology to cover a wider range with greater efficiency than was possible with the DQ-10. The same attention to diffraction control and time delay distortion allows the DQ-20 to provide the expanded open window on the soundstage for which Dahlquist is famous.

Clearly superior, the DQ-20 stands as the



ultimate stereo vehicle that will transport you into the realm of pure sound. This incredible achievement lets you surround yourself with the captivating reality of brilliant musical performances and listening pleasure.

It is an experience you will never forget.

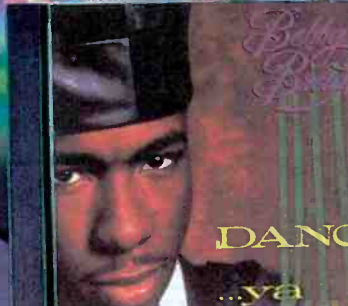
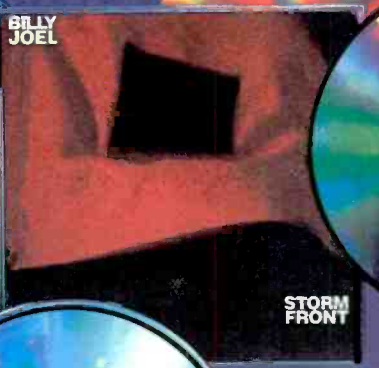
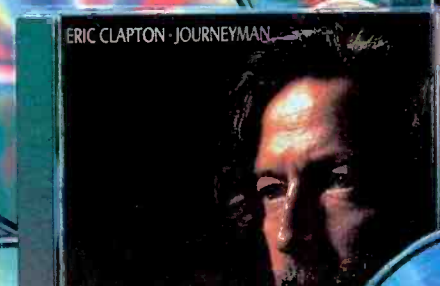
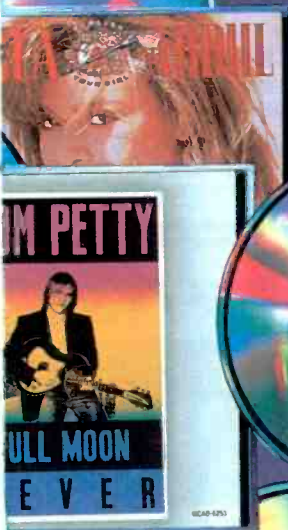
DAHLQUIST
601 Old Willets Path, Hauppauge, NY 11788
(516) 234-5757



Enter No. 16 on Reader Service Card

DISCS, DISCS, DISCS, DISCS! PICK ANY 8 CDs FOR A PENNY

plus shipping/handling with membership. Details on other side.
PLUS A CHANCE TO GET ONE MORE CD—FREE!



Paula Abdul—Forever Your Girl. *Cold Hearted; Straight Up*; more. (Virgin) 374-637

Joey DeFrancesco—Where Were You? (Columbia) 404-939

Blue Oyster Cult—Career Of Evil: The Metal Years (Columbia) 404-871

John Wesley Harding (Sire/Reprise) 404-509

Calloway—All The Way (Solar/Epic) 404-491

Michelle (Ruthless) 404-483

Flashback—Original Soundtrack (WTK) 404-400

D.R.I.—Thrash Zone (Enigma/Metal Blade) 404-012

Earth, Wind & Fire—Heritage (Columbia) 404-004

3rd Bass—The Cactus Album (Def Jam/Columbia) 403-436

The Kinks—UK Live (MCA) 403-303

Queen Latifah—All Hail The Queen (Tommy Boy) 403-287

The Fixx—One Thing Leads To Another (MCA) 402-974

Tom Petty—Full Moon Fever. *Free Fallin'; Love Is A Long Road*; plus many more. (MCA) 382-184

Alannah Miles (Atlantic) 404-475

George Harrison—Best Of Dark Horse 1976-1989 (Dark Horse) 402-594

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

Jim Croce—Jim Croce Live: The Final Tour (Saja) 403-154

Jimi Hendrix—Early Classics (Special Music Co.) 402-677

Alice Cooper—School's Out (Warner Bros.) 402-644

Eagles—Live (Elektra) 400-713/390-716

Joe Cocker—Mad Dogs And Englishmen (A&M) 389-783

Tommy Bolin—The Ultimate... (Geffen) 389-486/399-485

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

The Best Of The Dregs—Divided We Stand (Arista) 386-979

Bo Diddley Is A Gunslinger (Chess) 379-677

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

Jerry Lee Lewis—18 Original Sun Greatest Hits (Rhino) 369-108

The Very Best Of Poco (Epic) 367-623

Milli Vanilli—Girl You Know It's True (Arista) 379-610

k. d. lang And The Reclothes—Absolute Torch & Twang (Sire) 381-624



Eric Clapton—Journeyman. *Bad Love; Pretending; Old Love*; etc. (Warner Bros.) 400-457

Kaoma—World Beat (Epic) 402-800

Marvin Gaye—Greatest Hits (Motown) 367-565

Joni Mitchell—Blue (Reprise) 365-411

Traffic—John Barleycorn Must Die (Island) 364-935

Van Morrison—Astral Weeks (Warner Bros.) 364-901

Little Feat—Dixie Chicken (Warner Bros.) 363-515

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

Aretha Franklin—30 Greatest Hits (Atlantic) 350-793/390-799

Rolling Stones—Exile On Main Street (Rolling Stones Rec.) 350-652

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

Jody Watley—You Wanna Dance With Me? (MCA) 402-610

Billy Joel—Storm Front. *We Didn't Start The Fire*; more. (Columbia) 387-902

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

Best Of Procol Harum (A&M) 344-457

The Byrds—Greatest Hits (Columbia) 342-501

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

A Decade Of Steely Dan (MCA) 341-073

Best Of Kansas* (CBS Assoc.) 327-742

Joe Cocker—Greatest Hits (A&M) 320-911

Motown's 25 #1 Hits (Motown) 319-996/399-998

Elton John—Greatest Hits (MCA) 319-541

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

The Best Of Emerson, Lake & Palmer (Atlantic) 306-969

Barbra Streisand—A Collection: Greatest Hits (Columbia) 401-141

Bobby Brown—Dance... Ya Know It. *On Our Own*; more. (MCA) 402-602

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

XYZ (Enigma) 402-024

David Benoit—Waiting For Spring (GRP) 401-901

Rush—Presto (Atlantic) 401-695

Pat Benatar—Best Shots (Chrysalis) 401-646

Yo-Yo Ma—Great Cello Concertos (CBS Master) 401-604

Best Of The Canadian Brass (CBS Masterworks) 401-596

Best Of The Grateful Dead (Warner Bros.) 291-633

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

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

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

Mötley Crüe—Dr. Feelgood. *Title cut plus Without You; Tr1*; etc. (Elektra) 387-944

The Best Of Luther Vandross—The Best Of Love (Epic) 400-473/390-476

Kenny G Live (Arista) 401-505

Jeffrey Tate—Haydn: Symphonies No. 99 In Flat & 101 In D "The Clock" English Chamber Orchestra (Angel) 402-537

Enrique Batiz—The Afternoon Of A Faun Sym. Orch. Of The State Of Mexico (Musicmasters) 402-255

Benny Goodman—Benny Goodman: Private Collection/ Beethoven, Brahms, & Weber Berkshire Quartet/Leon Pommers, Piano (Musicmasters) 402-214/392-217

Brahms: Violin Concerto; Bruch: Concerto No. 1. Nadja Salamo-Sonnenberg; Edo De Waart and Minnesota Orch. (Angel) 400-135



Son Of "Movies Go To The Opera"—Various Artists (Angel) 404-665

Dave Grusin—The Fabulous Baker Boys Soundtrack (GRP) 402-958

Louis Armstrong—The Best Of The Decca Years - The Singer (Decca) 402-941

Chunky A—Large And In Charge (MCA) 402-875

Oran "Juice" Jones—To Be Immortal (OBCL) 402-784

Gipsy Kings—Mosaïque (Elektra/Musician) 402-727

Livingston Taylor—Life Is Good (Crat) 402-669

Elliot Easton—The Collection (EMI America) 404-863



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 660 TERRE HAUTE, IN

POSTAGE WILL BE PAID BY ADDRESSEE

Columbia House

1400 NORTH FRUITRIDGE AVENUE
TERRE HAUTE, IN 47812-9202





Young MC—Stone Cold Rhym'n': *Bust A Move; Non-Stop*; etc. (Delicious Vinyl) 400-085

Janet Jackson—Rhythm Nation 1814: *Miss You Much*; plus more. (A&M) 388-918

Aerosmith—Pump. Love In An Elevator; *Janie's Got A Gun*; etc. (Geffen) 388-009

The B-52's—Cosmic Thing. Love Shack; *Roam*; plus many more. (Reprise) 383-877

ANY 8 CDs FOR A PENNY AND A CHANCE TO GET ONE MORE CD—FREE!

Mark Knopfler—Last Exit To Brooklyn (Warner Bros.) 389-536
Yousou N' Dour—The Lion (Virgin) 384-362
DJ Jazzy Jeff & Fresh Prince—And In This Corner (Jive/RCA) 400-838
Don McLean—For The Memories Volume 1 & 2 (Gold Castle) 401-224

Taylor Dayne—Can't Fight Fate (Arista) 388-017
Belinda Carlisle—Runaway Horses (MCA) 400-788
Reba McEntire—Live (MCA) 400-739
Joe Satriani—Flying In A Blue Dream (Relativity) 400-655
Lee Ritenour—Color Rit (GRP) 400-051
Dave Grusin—Migration (GRP) 400-044
Nick Lowe—Basher: The Best Of Nick Lowe (Columbia) 400-002
Michel Camilo—On Fire (Epic) 389-999
Earl Klugh—Solo Guitar (Warner Bros.) 389-932
N.R.B.Q.—Wild Weekend (Virgin) 389-882
Randy Travis—No Holdin' Back (Warner Bros.) 389-767

On The Cutting Edge

Toad, The Wet Sprocket—Pale (Columbia) 404-889
The Blue Nile—Hats (A&M) 404-525
Julia Fordham—Porcelain (Virgin) 404-418
They Might Be Giants—Flood (Elektra) 404-376
Paul Carrack—Groove Approved (Chrysalis) 401-257
Kate Bush—The Sensual World (Columbia) 401-232
Erasure—Wild! (Reprise/Sire) 400-820
The Psychedelic Furs—Book Of Days (Columbia) 400-689
The Alarm—Change (I.R.S.) 400-465
Indigo Girls—Strange Fire (Epic) 400-333
Max Q (Atlantic) 400-077
The Residents—The King And Eye (Enigma) 400-036
Laurie Anderson—Strange Angels (Warner Bros.) 389-940
Vitamin Z—Sharp Stone Rain (Geffen) 389-601
Ian McCulloch—Candleland (Sire/Reprise) 389-593

Red Hot Chili Peppers—Mother's Milk (EMI) 389-205
Big Audio Dynamite—Megatop Phoenix (Columbia) 388-215
Camper Van Beethoven—Key Lime Pie (Virgin) 388-074
Squeeze—Frank (A&M) 388-058
Chris Isaak—Heart Shaped World (Reprise) 386-144
Paul Kelly And The Messengers—So Much Water So Close To Home (A&M) 384-321
Bryan Ferry / Roxy Music—Street Life (Reprise) 384-230
Peter Gabriel—Passion (Geffen) 383-810
Lloyd Cole & The Commotions—1984-1989 (Capitol) 383-778
Pixies—Doolittle (Elektra) 382-887
The Cure—Disintegration (Elektra) 382-093
10,000 Maniacs—Blind Man's Zoo (Elektra) 382-077
Indigo Girls (Epic) 381-269
Lou Reed—New York (Sire) 378-216
R.E.M.—Green (Warner Bros.) 375-162
R.E.M.—Eponymous (I.R.S.) 374-777

Terence Trent D'Arby—Neither Fish Nor Flesh (Columbia) 389-726
Bob Dylan—Oh Mercy (Columbia) 389-262
Carpenters—Lovelines (A&M) 388-942
Bad English (Epic) 383-463
Barry White—The Man Is Back! (A&M) 388-843
Lizst: Piano Sonata; 3 Petrarcas Sonnets; more. Vladimir Feltsman, Piano (CBS Master.) 388-538
Rickie Lee Jones—Flying Cowboys (Geffen) 388-199
Yellowjackets—The Spin (MCA) 388-173
Jethro Tull—Rock Island (Chrysalis) 388-157
Neil Young—Freedom (Reprise) 388-132
Lou Gramm—Long Hard Look (Atlantic) 388-108
Tracy Chapman—Crossroads (Elektra) 387-951
Tina Turner—Foreign Affair (Capitol) 387-118

Don Henley—The End Of The Innocence (Geffen) 383-802
Elaine Elias—So Far So Close (Blue Note) 387-530
Dino—24/7 (4th & Broadway/Island) 387-415
24-7 SP4Z—Harder Than You (In Effect/Relativity) 387-373
Jimmy Buffett—Off To See The Lizard (MCA) 387-340
Dave Edmunds—Closer To The Flame (Capitol) 387-126
The Beach Boys—Still Cruisin' (Capitol) 387-092
Joe Cocker—One Night Of Sin (Capitol) 387-084
Whitesnake—Slip Of The Tongue (Geffen) 387-027
Ziggy Marley & The Melody Makers—One Bright Day (Virgin) 386-987
Harry Connick, Jr. When Harry Met Sally—Music From The Motion Picture (Columbia) 386-821
Dvorak: Violin Concerto; Romance; Carnival Over. Midori; Mehta, NY Phil. (CBS Master.) 386-573
Mozart: Symphony No. 41 (Jupiter); Divertimento No. 1, K.136. Muti, Berlin Phil. (Angel) 386-466
Patti LaBelle—Be Yourself (MCA) 386-334
Babyface—Tender Lover (Solar/Epic) 386-177
Marshall Crenshaw—Good Evening (Warner Bros.) 386-110
Bee Gees—One (Warner Bros.) 386-060
Stravinsky: Firebird; Jeu de Cartes. Esa-Pekka Salonen, Philharmonia (CBS Master.) 385-203
Gloria Estefan—Cuts Both Ways (Epic) 382-341

Roxette—Look Sharp! (Parlophone) 381-939
George Benson—Tenderly (Warner Bros.) 384-214
Anderson, Bruford, Wakeman, Howe (Arista) 384-115
Batman—Prince's Original Soundtrack (Warner Bros.) 383-885

Linda Ronstadt—Cry Like A Rainstorm, Howl Like The Wind (Elektra) 389-874
Dr. John—In A Sentimental Mood (Warner Bros.) 384-040
Diana Ross—Working Overtime (Motown) 383-984
Pat Metheny Group—Letter From Home (Geffen) 383-901
Spyro Gyra—Point Of View (MCA) 383-737



Michael Bolton—Soul Provider (Columbia) 383-083

Joan Baez—Speaking Of Dreams (Gold Castle) 401-216

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

Do The Right Thing—Original Sound Track Featuring: Branford Marsalis (Columbia) 401-117



Quincy Jones (Qwest) 389-577

Billy Ocean—Greatest Hits (Jive/RCA) 400-879

The Rippingtons—Kilimanjaro (GRP) 400-853
Melissa Etheridge—Brave And Crazy (Island) 388-090



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

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

Diana Ross—Working Overtime (Motown) 383-984

Pat Metheny Group—Letter From Home (Geffen) 383-901

Spyro Gyra—Point Of View (MCA) 383-737



Basis—London, Warsaw & New York (Epic) 401-752

Bonham—The Disregard Of Timekeeping (WTG) 383-497
Richard Marx—Repeat Offender (EMI) 380-915

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

SEND NO MONEY—JUST MAIL POSTPAID CARD

Columbia House, 1400 N. Fruitridge P.O. Box 1129, Terre Haute, IN 47811-1129

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

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

- | | | | |
|---|---|--|--|
| <input type="checkbox"/> Hard Rock
Eric Clapton,
Joan Jett | <input type="checkbox"/> Soft Rock
Richard Marx,
Paula Abdul | <input type="checkbox"/> Modern Rock
Psychodelic Furs,
Midnight Oil | <input type="checkbox"/> Pop
Barbra Streisand,
Barry Manilow |
| <input type="checkbox"/> Heavy Metal
Motley Crue,
Skid Row | <input type="checkbox"/> Black Music
Luther Vandross,
Regina Belle | <input type="checkbox"/> Easy Listening
Johnny Mathis,
Ray Conniff | <input type="checkbox"/> Country
<input type="checkbox"/> Jazz
<input type="checkbox"/> Classical |

Mr. _____
 Mrs. _____
 Miss _____ Print First Name Initial Last Name

Address _____ Apt. _____

City _____

State _____ Zip _____

Do you have a VCR? (04) Yes No 210/F90
Do you have a credit card? (03) Yes No

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

Send these 8 CDs for 1¢

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

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

9FY/F6

9FZ/59

The age of CD sound is here—and you have a practical way to find the CDs you want. As your introduction to the Club, you can choose any 8 CDs listed in this ad—all 8 are yours for only 1¢, plus shipping and handling. And in exchange, you simply agree to buy 6 more CDs (at regular Club prices) in the next 3 years—and you may cancel your membership anytime after doing so.

How the Club works: About every four weeks (13 times a year) you'll receive the Club's music magazine, which describes the Selection of the Month—plus many exciting alternates, new hits and old favorites from every field of music. In addition, up to six times a year, you may receive offers of Special Selections, usually at a discount off regular Club prices, for a total of up to 19 buying opportunities.

If you wish to receive the Selection of the Month, you need do nothing—it will be shipped automatically. If you prefer an alternate selection, or none at all, fill in the response card always provided and mail it by the date specified. You will always have at least 10 days in which to make your decision. If you ever receive any Selection without having 10 days to decide, you may return it at our expense.

The CDs you order during your membership will be billed at regular Club prices, which currently are \$12.98 to \$15.98—plus shipping and handling. (Multiple-unit sets may be somewhat higher.) After completing your enrollment agreement you may cancel membership at any time; if you decide to continue as a member, you'll be eligible for our bonus plan. It lets you buy one CD at half price for each CD you buy at regular Club prices.

10-Day Free Trial: We'll send details of the Club's operation with your introductory shipment. If you are not satisfied for any reason, return everything within 10 days and you will have no further obligation.

Extra Bonus Offer: As a special offer to new members, take one additional CD right now for only \$6.95. This discount purchase entitles you to choose an extra CD as a bonus FREE. And you'll receive your discounted CD and your bonus CD with your 8 introductory selections—that's 10 CDs in all! Send no money now—just mail the card. © 1990 CBS Records Inc.

COLUMBIA HOUSE: Terre Haute, IN 47811

The section on accent mikes should be required reading for those audiophiles who damn the idea outright.

tions more specifically. The author cautions the user here and suggests that careful rolling off of high frequencies, along with time delay and proper level relationships, may be essential to the process.

Binaural recording is discussed briefly, and its role in conjunction with other recording techniques is underscored. An interesting section follows, in which the author provides guidelines for close pickup of instruments—as in a studio multi-channel context. The basic approach the author takes is not to lay down the law, so to speak, but rather to show a range of possible microphone placements, with descriptions of the sound quality over that range. All of the instrumental groups are covered here.

Speech recording is covered, in terms of microphone pattern choice and correct positioning to avoid popping and adverse reflections from the desk top. Field jobs such as interviews and round-table discussions are also detailed. The last topic in the microphone usage section is the recording of vocal soloists and ensembles.

The final section deals with the important topic of recording aesthetics and with the definition of recording as an art form in its own right. Such matters as setting up the stereo stage, both in terms of stage width and depth, are given a thoughtful discussion as they apply to popular and classical music.

In general, *Tonmeister Technology* is a most accessible book and can be of great value to the lay person as well as to the seasoned recording engineer. It contains just about everything the concerned *Audio* reader is ever likely to want to know about recording. The graphics are detailed but succinct, and there are no equations! I highly recommend this book.

John Eargle

The Encyclopedia of Pop, Rock and Soul (Revised Edition) by Irwin Stambler. St. Martin's Press, 881 pp., hardbound, \$35.

All music dictionaries are not alike, as evidenced by Irwin Stambler's *The Encyclopedia of Pop, Rock and Soul*, originally published in 1974 and now extensively revised and updated.

Instead of giving us the usual short, pithy entries with big color pictures, Stambler approaches his subject like the music reporter he is. Entries unfold in little stories, sprinkled with newspaper quotes and other touches which humanize the artists under discussion. This makes for a very readable style

and a rather hefty volume (881 pages!). Instead of discography lists, which are convenient aids, Stambler organizes each essay around record releases, so basic dates and labels are there, but you have to read or scan the article to find them. Band entries are preceded by a handy listing of person-

STEREO RECEIVERS/TAPE DECKS/EQUALIZERS/HEADPHONES AMPLIFIERS/COMPACT VIDEO RECORDERS/PERSONAL COMPUTERS/SECURITY/VIDEO CASSETTES/45'S/STEREO CASSETTES/BLANK AUDIO CASSETTES/BLANK VIDEO CASSETTES/CAMCORDERS/VIDEO RECORDERS/COMPUTER SOFTWARE/TELEPHONE BUSINESS MACHINES/TYPING MACHINES/HEADPHONES/AMPLIFIERS/COLOR TELEVISIONS/COMPUTERS/BUSINESS MACHINES



Tandberg TPR-3080A
Audiophile FM Receiver
•A receiver that outperforms many separate components •High-current 80 watts/channel •Ultra-sensitive tuner •16-presets •High-tech design

Our Low Price **\$799⁹⁵** (TAN 3080A)

The Bose Acoustimass AM-5
Speaker System
•2 cube speaker arrays provide direct & reflected sound •Acoustimass module gives deep bass •Choose black or white

Our Low Price **\$749⁹⁵** (BOS AM5 color)

ADC SS-525X
Computerized Graphic Equalizer
•Custom tailor your sound •Automatic analyzer equalizes room for precise flat response •12-bands/channel •Mic •Pink noise •Wireless remote

Our Low Price **\$299⁹⁵** (ADC 55525X)

dbx 38X-DS
Dynamic Range Expander
•Increases dynamic range by as much as 50% •Reduces background noise by as much as 20% •Impact restoration adds punch to music

Our Low Price **\$299⁹⁵** (DBX 38XDS)

Teac X-2000M
Open Reel Mastering Deck
•2-track record/play •4-track play •15/7.5 ips tape speeds •dbx noise reduction/expansion •Close-loop dual capstan drive •True VU meters

Our Low Price **\$999⁹⁵** (TEA X2000M)

Shure V15 Type V-MRLE
Limited Edition Audiophile Cartridge
•Hand-picked •Tighter specs •Micro ridge stylus •Dynamic stabilizer •Slide-guard stylus protection •Deluxe wood case & stylus gauge

Our Low Price **\$189⁹⁵** (SHU V15 VMRLE)

Audio Specials

Camber 1.0TI
•2-way speakers, 6" woofer . Pair **\$189**

Camber 3.0TI
•2-way speakers, 8" woofer . Pair **\$279**

Pinnacle PN5+ /Oak
•Compact speakers, viaduct port Pair **\$149⁹⁵**

Bose RoomMate II
•Powered speaker system . Pair **\$299⁹⁵**

Celestion DL10-II
•3-way speakers, high-accuracy Pair **\$600**

Dual CS5000/X3MC
•Turntable with Ortofon moving coil cartridge **\$449⁹⁵**

Audioquest Mat
•Sorbothane record mat **\$34⁹⁵**

Audioquest Feet
•4-shock absorbing feet 4-Pack **\$34⁹⁵**

Teac V-970X
•Cassette deck, 3 head, dbx, Dolby B/C **\$479⁹⁵**

Audio Specials

Teac X-990RX
•Daut 9 cassette deck, auto-reverse **\$499⁹⁵**

NEC PLD-910
•Dolby Pro logic decoder **CALL**

NAD MR13
•13" stereo monitor/TV **\$399⁹⁵**

Toshiba SVF-990
•S-VHS hi-fi recorder, digital editing **CALL**

Pioneer CLD-3070
•CD/CDV Laser disc player **\$899⁹⁵**

Sony CCD-V220
•Pro 8mm camcorder, digital hi-fi **\$1299⁹⁵**

Toshiba SVF-990
•S-VHS hi-fi recorder, jog/shuttle **CALL**

JVC HRS-1000
•S-VHS hi-fi recorder, pro-editing **CALL**

JVC AV-3589S
•35" color monitor, surround sound **CALL**

Audio Specials

Sherwood AM-7040
•Power amp, 200 watts/ch **CALL**

Sherwood AP-7020
•Preamplifier, discrete components **\$249⁹⁵**

Sherwood TD-7010R
•Tuner, quartz, 30-presets **\$149⁹⁵**

dbx 18XDS
•Dynamic range expcnder **\$179⁹⁵**

dbx 120XDS
•Sub-harmonic synthesizer, bass-boost **\$199⁹⁵**

dbx SNRI
•Noise reduction system **\$199⁹⁵**

Audio Source EQ10
•Graphic equalizer/analyzer, with microphone **\$349⁹⁵**

Koss JCK-200
•Wireless headphone system **\$99⁹⁵**

Sony MDR-CD6
•Headphones, lightweight, digital-ready **\$89⁹⁵**

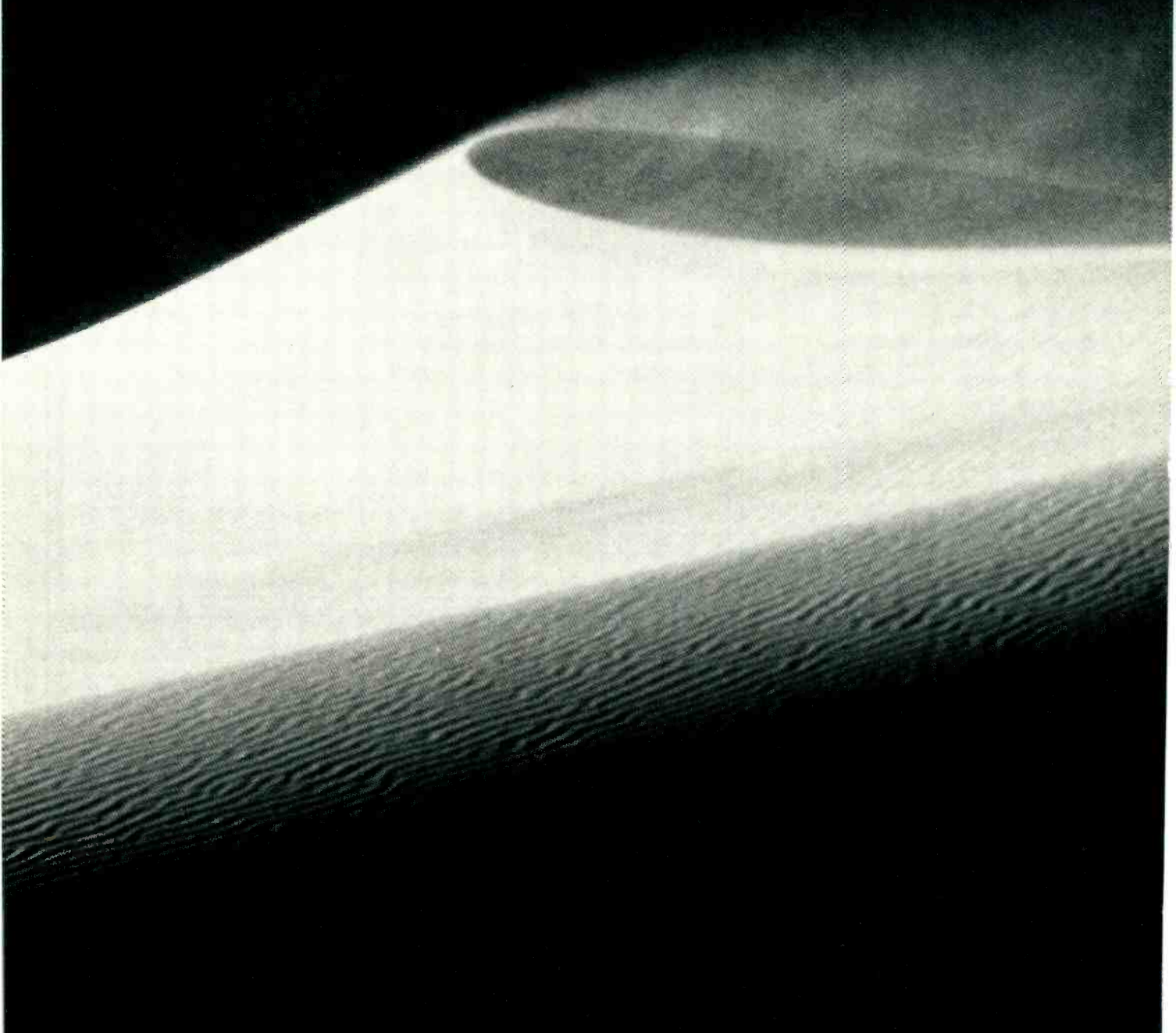
ORDER TOLL-FREE **1-800-221-8180** Outside U.S.A. 1-718-417-3737
 Order by FAX 24 Hours A Day 1-718-497-1791

Mail Order Hours: Monday to Friday 8 AM to 8 PM, Saturday 5 AM to 6 PM, Sunday 10 AM to 6 PM
 TO ORDER BY MAIL: SEND MONEY ORDER, CERTIFIED OR CASHIER'S CHECK, MASTERCARD, VISA, AMERICAN EXPRESS OR DISCOVER CARD (Please include Interbank No., expiration date and signature.) TO: J&R MUSIC WORLD, DEPT. AMO690, 59-50 QUEENS-MIDTOWN EXPRESSWAY, MASPEETH, QUEENS, NY 11378. Personal and business checks must clear our Authorization Center before processing. Shipping, Handling & Insurance Charge is 5% of total Order with a \$4.95 minimum. (Canadian Orders Add 15% Shipping, with a \$9.95 minimum charge.) For shipments by air please double these charges. \$25 MINIMUM ORDER. DO NOT SEND CASH. SORRY, NO C.O.D.'S. NEW YORK RESIDENTS PLEASE ADD SALES TAX. ALL MERCHANDISE BRAND NEW, FACTORY FRESH, AND 100% GUARANTEED. Copyright 1990 J&R Music World

J&R Music World, Dept. AMO690, 59-50 Queens-Midtown Expressway, Maspeth, Queens, NY 11378

Enter No. 25 on Reader Service Card

YOU NEED
AUDIOPHILE COMPONENTS
TO HEAR THIS SOUND.



For More Information



Call 1-800-553-4355

To hear the subtle lingering strains of the wind as it sings, you need a CD player constructed with circuitry and mechanical systems of the highest grade.

Like our *Icon*, *Tercet mk III* and *Aria mk III* audiophile CD players.

We make the most meticulously engineered CD players in the world. While most other CD players contain a high proportion of mass market stock parts, every aspect of our circuitry and mechanical systems is the product of *our own* innovative design and specifications.

Like our disc transports, making us unique among independent manufacturers.

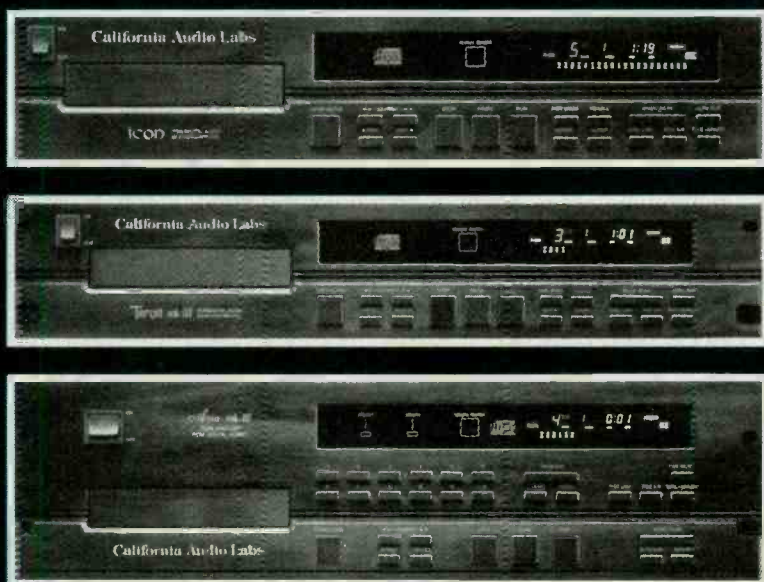
A single-beam laser pickup with a precision ground optical lens, a rarity at any price.

Our superior circuit design and layout isolates both the digital and analog circuits from electrical noise and interference. This is of paramount importance in achieving superior sound quality.

Our obsession with such detail and maximizing performance makes California Audio Labs the most successful high end manufacturer of CD players in the world.

We invite you to listen.

From \$750.00
Call or write for a
brochure today.
Made in USA.



California Audio Labs

15812 Gothard St., Huntington Beach, CA 92647 (714) 841-1140

This *Encyclopedia's* entries unfold as little stories, with touches that humanize the artists they discuss.

nel, including birthplaces and dates, where known. There are about a hundred black-and-white photos, but their inclusion is basically gratuitous; words are the focus here.

Refreshingly, Stambler writes with equal zest about most of his subjects, regardless of musical style. Thus you'll

find the first entries—ABBA, followed by AC/DC—both treated with the respect and enthusiasm they deserve. Representative artists in all major pop styles are included, from Barry Manilow to Donna Summer and ZZ Top. (There's even an entry on Frank Sinatra.) There are, however, some holes.

Heavy metal gets shortest shrift; you'll look in vain for Def Leppard or Metallica, for instance.

Updates to the first edition are considerable, as you might expect. Once in a while, you can detect the throwbacks; Alice Cooper quotations, for example, are mostly from 1971, clearly a pickup from the earlier edition. In other instances, Stambler reflects critical opinions which aren't necessarily current. For example, the essay on Led Zeppelin favors the negative critical view popular in the late '70s, which has been pretty much reversed by now. Generally, Stambler manages to stay clear of "criticism," remaining fairly objective and opinion-free. And actually, the fact that this book was first published in the early '70s and only now updated, some 15 years later, means that many artists who do not appear in a number of the more contemporary encyclopedias are still present (e.g., The Youngbloods).

There are occasional lapses in editorial consistency, especially regarding dates, which too often appear as "late '70s" rather than something more specific. For example, in the essay on The Supremes, Stambler has the members of the group as 15 years old in 1959, winning an audition with Motown's Berry Gordy in 1960, finally getting signed as "high school girls" . . . "in the late 1960s," and cutting their first record in 1960. Though forgivable in a work this monumental, such errors can still be annoying.

Stambler's *Encyclopedia* has several curious appendices, including lists of RIAA gold- and platinum-record award winners, Grammy Award winners, and nominees and winners of music Academy Awards. At the end is an odd bibliography consisting not of other reference books, but mostly of newspaper and magazine articles apparently used by the author.

Irwin Stambler's revised *Encyclopedia of Pop, Rock and Soul* probably won't be the only book on this subject on your bookshelf, but it will be a valuable addition, especially with its wide range of artists, including some of the more obscure groups of rock's rich and colorful past. These virtues, combined with an entertaining style, make the work a good companion to your record collection. *Michael Wright*

IT'S TIME YOU EXPERIENCED



SURROUND SOUND™

DYNAMIC LOGIC™



SYSTEM 4000 II



SYSTEM 3000

SSI, innovators of surround sound technology in the 80's are committed to providing the Ultimate Home Theater Experience in the 90's. Whether you choose the System 3000 with Dolby® Pro Logic or the System 4000 II with SSI's proprietary Dynamic Logic™ you are guaranteed to always be in the center of the action of your favorite movies.

DEALER LISTING

Rogersound Labs-Canoga Park, CA.; FEDCO-Los Angeles, CA.; Listen Up-Denver, CO.; Union Premiums-Las Vegas, NV.; Alltech Electronics-Boise, ID.; Barr Digital-Redmond, WA.; Alamo Electronics-Cincinnati, OH.; Stereo Visions-Columbus, OH.; Jemstone-E.Lansing, MI.; Advanced Audio Design-Sarasota, FL.; Sensuous Sound-Tampa, FL.; The Sound Source-Fairfield, CT.; Square Deal Radio-Patchogue, NY.; Audio King-New York, NY.; Good Vibes-Champagne, IL.; Hawkeye Audio-Iowa City, IO.; Royal Jeweler-Lawrence, MA.; Carolina Alarm-Winston Salem, N.C.; Sound Audio-Charlotte, NC.; Audio Junction-Pittsburg, PA.; Sunrise Electronics-Chambersburg, PA.; Hi-Fi Connection-Marlton, NJ.; Sound Advice-Columbia, SC.;

SSI Products, Inc. 400 South Date Avenue, Alhambra, California 91803 Tel: (818) 282-9419 Fax: (818) 282-9358




** SURROUND SOUND and DYNAMIC LOGIC are trademarks of SSI Products, Inc. Dolby® is a registered trademarks of Dolby Laboratories, Inc.

Enter No. 46 on Reader Service Card

For FM Stereo
Listeners Who
Demand More
Than Background
Music...





For serious music lovers, the quality of FM stereo is often unacceptable except as background music. Adcom's new GFT-555 II tuner confronts these inadequacies, and in most instances, makes it possible for FM broadcasts to sound as good as the transmitted signal allows.

Adcom Offers A Note of Encouragement.

FM performance depends, in part, on where you are located with respect to the broadcast stations. Most tuners perform satisfactorily in suburban areas. But in cities with tall buildings and strong stations crowding the dial, or in rural areas where signals are weak and received from many directions, FM reception quickly deteriorates.

Through design ingenuity and relentless attention to detail, the new Adcom GFT-555 II addresses these problems. By finding the optimum balance of sensitivity, selectivity and low distortion, Adcom once again has created a component that compares sonically to others costing much more.

Ask your Authorized Adcom Dealer for a demonstration of this remarkable new tuner. You'll be encouraged to know that you can now enjoy FM broadcasts more than ever before...and not just for background music.



Shown with the GFP-555 II and the GFA-545



New And Improved

The design of the new GFT-555 II is based on the highly acclaimed Adcom GFT-555. Sonic improvements have been achieved by using upgraded circuitry and the highest quality component parts. The GFT-555 II is now the logical complement to the newest and finest Adcom preamps and power amplifiers.

The Adcom GFT-555 II FM Stereo/AM Tuner

Pure Performance

Adcom designers have done everything possible to reduce noise and distortion (the major enemies of FM reception) to a minimum in the GFT-555 II. Ultimately, it is the fact that everything works so well that makes this tuner a joy to own.

Details You Can Hear

A new low-loss PC board is used to minimize signal degradation. Laboratory-grade component parts, including 1% Roederstein metal-film resistors and metal-film capacitors in critical areas, assure outstanding performance and maintain their quality for longer periods of time.

Buffered output stages using "Class A" linear amplifiers (based on the design of Adcom's high-performance GFP-555 II preamplifier) deliver a dynamic sound quality not previously available in other tuners, regardless of cost. An all new multiplex decoder also significantly improves listening quality.

The Importance Of Compatibility

Its complete compatibility with Adcom equipment (as well as anyone else's) allows the exceptional qualities of the GFT-555 II to be fully realized in your own home music system. (It is

also usable as a tuner source for Adcom's new multi-room/multi-source remote control system.)

A switch-adjustable output with three positions (0.5V, 1V and 2V) permits matching to the input requirements of all preamps and passive control devices (such as Adcom's SLC-505) as well as the

output levels of cassette recorders, CD players, etc.

And, its new, ultra-low output impedance of 100 ohms minimizes

interaction with connecting cables and preamplifiers.

More Sound, Less Money

Adcom consistently delivers superior performance at uninflated prices. Listen to a good FM broadcast on the GFT-555 II and you'll hear why Adcom stereo components consistently receive rave reviews from audiophile publications...satisfying the most knowledgeable music lovers, as well as the perfectionist critics.

Specifications

IHF sensitivity, mono:
11 dBf

Signal strength for -50 dB quieting, mono/stereo:
13.5/36 dBf

Capture ratio: 1.7 dB

Alternate channel selectivity: 75 dB

Separation at 1 kHz: 60 dB
THD/stereo at 1 kHz: 0.1%

Chassis dimensions:
17" x 11 3/8" x 3"

Maximum signal-to-noise ratio, mono/stereo: 80/75 dB

Frequency response:
30 Hz - 15 kHz \pm 0.5 dB

Antenna impedance:
75 or 300 ohms

Weight: 10.5 lbs.

Optional: RM-3 Rack Mount Adaptors; white front panel

ADCOM[®]

details you can hear

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. 2 on Reader Service Card

BOWDLERIZING BEETHOVEN

I do not want to hear another radio ad—ever. But I probably will. How can we avoid what is our own civilization, so irrevocably us?

I passed up the ads here last month. I needed time. After all my talk about our not listening to audio music, imagine a project where I forced myself to pay my most assiduous and direct attention to *this* particular form of audible music! Fun for a while—a very short while. Then I began to feel trapped, engulfed, overwhelmed in utter mediocrity, and in the end, bored silly. Talk about wastelands.

Yes, I continued to take notes, aimed at this worthy column. But my tolerance as a *direct listener* went down at appalling speed. The fact is that out of a thousand typical ads, maybe five or six have anything audibly notable of any sort of all. The rest are just mass-production advertising wallpaper, dismal clones each one of all the others. And this both in words and music. "Hurry, hurry!" I would hear every 8½ minutes. "Now, more than ever"—one of the world's greatest examples of saying nothing at all—is said in one ad or another every two minutes, 24 hours a day. "The Best has just got Better!"—somebody thought that one up around 1877, or maybe 1492. Or 1066? As for the music, right now 90 percent of it is unintelligible sonic mush and the rest is okay stuff, or even high classic, but mangled literally beyond recognition.

How could I go on this way? Over the years, this department has been highly notable for its optimism. Perhaps I was over-enthusiastic when the LP came along, and when the CD first was proposed—so many years back. I've gasped breathlessly at such marvels as photonics—signals conveyed by channeled light—years ago, when the application was strictly for telephone; I hoped, with gusto, that someday the light-wave signal might get into audio. It did. I even enthused over quadraphonic (*that word again?*) in spite of the dismal imperfections and the even more discouraging inter-system rows that resulted in its "total" failure. Not really total, as we now can see in a revived "surround sound." But how, tell me how, can I be enthusiastic about audio in ads, notably those that are all audio, without the aid of pictures, whether video or in print . . . ?



And so I reverted to a much safer, more logical research technique. I let the ads play loud and clear on my table radio (instead of turning them down so I wouldn't have to listen). And then I put my mind firmly, resolutely, *elsewhere*. I stopped direct listening! Instead, I studiously paid no attention at all. I could help myself nobly in this by all sorts of distractions—reading Spinoza or Shakespeare, or *Audio*; imbibing a beer, taking in steak with mushrooms and asparagus. Anything to divert my mind, and that's a pun.

It worked! For, after all, advertising depends on marginal listening (and subsequent buying). *Subliminal* is the fancy word for the process. Non-listening is the way the ads make their sales. You aren't supposed to listen, and you mostly don't. You hear—but you do not *listen*, which implies direct attention. Billions of \$\$\$ of biz has been successfully based on this idea—so how could I presume to listen *directly*?

So I ceased and desisted. And felt a lot better. As I have said, anything in music that is the least bit noticeable, good or bad, gets through to me directly without any effort on my part. These items present themselves to my ear automatically, if perhaps not to yours, and so I need merely to note

them down for future reference, and go on with my Spinoza or beefsteak. This has indeed slowed down my project but at least it enabled me to survive it. That seemed to be important.

Do I hafta tell you all about those individual ads? My pile of notes, couple of inches thick, is at hand. But first (another ad cliché)—a bit of background.

There's nothing basically wrong with a combination of speaking voice and music. It's an idea very much older than radio. These two categories of sound are so intrinsically different that the ears, given half a chance, can listen to both at once and hear the two quite independently. Even on the stage, without audio's aid, it has often been tried. But real practicality had to wait for the loudspeaker, however tiny in a pocket radio or headphones, to remove the distractions of the live presence and bring both sounds together and in equality. For a quarter-century, this was my own technique in my talks on music via radio, fitting my speech carefully to the shape of the music about which I talked, contouring it to fill the quiet spots, allowing loud music to come "up" in its own fashion. If I may say so, I treated music, even the fanciest, with absolute respect for

The hacking up of classics for mere advertising is an intolerable desecration. It is awful, this, and nobody can make me say less.

its own meaning—which, of course, was what I was talking about. It's a good technique when done right and it does not interfere with music's sense, if you know what you are doing.

Early radio advertising was good at it. Music was treated as *music*, a real part of the commercial pitch which gave the whole a then-new and interesting vitality, as compared with mere speech by itself. This discovery added a freshness to radio selling that some of us still remember. That is of course where I got the idea for my radio program on strictly classical music. It could be done there too! I'd do it all over again, with pleasure.

Just to remind you, I think the famous historical example from that epoch was the longtime ad for a well-known soft drink, combining a wonderfully catchy tune and a catchy rhymed message, the first line of which told us that the drink "hit the spot"—a term that has stuck in the language ever since. The second line (definitely not used by the company today) was something about 12 full ounces being a lot. Which it certainly was, for a nickel. Truth in advertising.

The tune that went with those words was a dilly, top-rank and memorable. In no time everybody knew it. No matter that, aside from minor fitting to the new words, it was identical to an old English/Scottish song, vaguely 18th-century and more ballad than folk, called "Do You Ken John Peel" (with his coat so red), a hunting tune about those colorful gentry who rode to the chase. Only the last line of this tune was changed, giving it an appropriate little jazzy twist at the end. After hearing this ad, any huntsman or huntslady, even today, would be glad for those 12 ounces of refreshment! But it was the great American public that heard the tune and enjoyed the product.

In radio, a convention soon grew up that was quite strict for a while. An ad started with a tune, "theme" music, then faded it "under," or down, for the spoken pitch, and then back "up" again for a musical repeat, ABA. On the whole, not bad, and there was extensive musical identification with the product, simply by the ad association. Can't complain! This was legitimate and the music played its useful part in its own way, cooperatively. Thank

heavens we still have a good many such old-fashioned ads around today, after so many years.

Out of this, as I see it, grew the present convention, in billions of examples, that music "under" or behind, below, a voice indicates "advertisement." We discover these shortcuts in most of the media and of course they are useful, getting info over instantaneously and effortlessly. (My favorite zany example at the moment, not in radio, is the marking of traffic lanes with huge letters saying ONLY. Only *what*? Sometimes I really can't figure these out.) On radio, the background of music "under" was a quick, easy way to tell the casual listener (not paying any attention) that an ad was going on.

Conversely, the very absence of music, the speaking voice alone, came to mean that the content was news or some other non-ad material. Of course, the advertising voice very soon took on its own special sound (see last month!) as opposed to the straight information voice; even so, it was quicker to put music behind the ad material, for then you didn't have to listen to find out what was going on—you knew. Your wonderfully absent or subliminal mind automatically tuned to its non-listening mode. Whereas, say, the news, minus music, switched you to a slightly more conscious kind of listening. It all happens by itself, like the Pavlov salivating dog of psychological fame. Fascinating, right? It's a wonderful world.


Unfortunately, not that wonderful in the present instance. The system worked only too well. The more music was relegated to the background as an indicator, the more it lost its own meaning in musical terms. This has been the slow disaster that has turned useful radio music, gradually but implacably, into so much noise. Any old musical noise, whether a quickie on the synthesizer or a grand concerto by a great composer. And what followed inevitably was that as useful noise, music—any music—could be conveniently tailored to fit, sometimes gracefully (it can be done, with a bit of effort), much more often carelessly, even brutally. Now, you see, I have to return to the negative. Nothing could make me enthuse over *this* treatment! It is uncompromisingly awful. And it gets worse every day.

The ultimate disaster, the inevitable one, is the compression circuitry which is heard everywhere a million times a day in present ads that have, er, music (that vague muttering and heaving sound) in the background. I do pity those people who write down, synthesize, or play the minimal music that is right for most ads, only to have even that minimum chewed up and destroyed. But when it comes to our old friend Beethoven and his numerous colleagues, I really get mad. Not that it will do much good.

The hacking up of classics in music for mere advertising convenience is a desecration that is intolerable. I mean, the destruction of the sense of the music, not only the compression until unrecognizable (though my musical ear often catches it) but the arbitrary slicing, the instant cut or fade-out regardless of where the music is in its own words, if you see what I mean. It is awful, this, and nobody can make me say less.

But worst of all—to finish off this dismal subject for the time being—is the use of precisely this sort of hatchet technique by all sorts of worthy cultural organizations. The opera houses, the big symphony orchestras, for instance: The very people who produce the music they are advertising!

And all of this, to return to my very first and biggest point, is contributing everyday to our loss of musical understanding and awareness. The technique of destruction becomes a symptom of our increasing deafness towards much of the present musical language in all its diversity. Definitely, in this situation, audio does not have its best foot forward.

Well, folks, what I need at this point is to pump up my rechargeables, those mental storage batteries that keep my enthusiasm. I'm not going to give you any ads yet. I mean, comment on the same. But with time to recycle (to shift my electrical analogy), I think I can amuse you with a few of them—later. Some were funny, some really good, and a few were plain zany—I couldn't even figure what they were advertising. It happens. And then there's the March of Time. I haven't told *that* story for decades. Sometimes I think the March of Time started the whole thing, back when the talkies were still new. 



STREETWIRES®—THE ONLY CHOICE WHEN PERFORMANCE MATTERS

Whether you are building a car audio system for competition or just want to get the most out of the system in your everyday car, StreetWires® is a must. Only StreetWires® gives you the performance, fit and finish you need for a competition quality installation. Only StreetWires® has the unique advantage of in house product research, innovative design and engineering. And only StreetWires® guarantees superior material selection, 100% quality control and "state of the art" manufacturing. StreetWires® is more than just wires. StreetWires® provides you with all the innovative accessories you need to create a system that will interface better, perform better, look better, and last longer. That's why virtually all competition show cars and car audio manufacturers use StreetWires® in their demonstration vehicles. They know StreetWires® are the best money can buy. Visit your local StreetWires® dealer and make the "StreetWires Connection"... and let your system be the best it can be!

Distributed in Canada by:
LINGAR MARKETING CORP.
2197 Dunwin Drive
Mississauga, Ont. L5L 1X2

STREETWIRES®
by **ESOTERIC AUDIO USA**

RR3 Bx 262, Winder, Georgia 30680. Dealer Inquiries Invited.
Enter No. 17 on Reader Service Card

BERT WHYTE

BOOM-BOOM ROOM



Although most people became familiar with digital audio through the introduction of the Compact Disc in 1982, audiophiles had been listening to analog LP discs cut from digital tape masters since sometime in the '70s. (Of course, the rabid phonophiles were against digital mastering of analog LPs right from its inception.) In those earlier days, the sampling rates of digital tape recordings varied according to the type of digital recorder employed. London/Decca's proprietary digital tape recorder had a sampling rate of 48 kHz, while Telarc used a Soundstream recorder with a sampling rate of 50 kHz. In 1977, I recorded Virgil Fox with an earlier Soundstream recorder operating at 48 kHz; 3M's digital recorder operated at 50 kHz.

Actually, digital recording was being used by Nippon Columbia (Denon) in Japan as early as 1969! This was a 13-bit system with pre-emphasis, using 32-kHz sampling. Since only the analog output of the digital recorders was used for cutting LP lacquer masters, their different sampling rates were of no consequence. The sampling rates of current recorders still vary, but all can be converted to the 44.1-kHz standard for CD mastering.

Today many record companies have either stopped making LPs or are issuing them on a very limited basis. This is especially true for classical music recordings. Moreover, virtually all classical music is now recorded digitally, and more than 40% of pop/rock recordings are now digitally mastered.

The CD has become the highest quality medium for home reproduction of music. However, many people have found that its greatly expanded dynamic range and extended bass may impose extraordinary performance demands on their playback equipment, and that it may also require them to modify their listening habits. To those who listen mainly to pop/rock, whether on modest mass-market rack systems or elaborate and expensive audio components, the enhanced sonic qualities of the CD medium should pose no problems. This is due, of course, to the fact that such music is normally recorded with a very limited dynamic range, even if recorded digitally. It is not uncommon for pop/rock recordings to have a dynamic range of no more than 10 to 12 dB, and few exceed 20 dB. This is true in spite of all the signal-processing equipment available to the recording engineer, which enables him to create elaborate sound effects. In other words, pop/rock CDs usually reach very high output levels, which are sustained throughout playback. Actual playback loudness in the average home listening environment is



a matter of individual preference, although it is dependent on the output capabilities of the audio system.

A factor related to playback loudness levels of pop/rock CDs is their low-frequency content. The widespread use of synthesizers and electronic instruments in these recordings can provide bass of great power that can extend to near-subsonic frequencies. It should also be noted that synthesizers can generate very high levels of high frequencies. The high- and low-frequency energy output of synthesizers is far beyond the capabilities of any acoustic instrument. Thus, although pop/rock CDs usually have restricted dynamic range, they afford consistently high output level and powerful, extended (usually exaggerated) bass response.

It is interesting to consider that a pop/rock CD, even if made from a digital tape master recorded by the most skilled engineer employing state-of-the-art equipment, is still to many a contrived product in spite of its musical values. An audiophile who is willing to spend the money can duplicate the playback system that was used to monitor the recording in the studio. By reasonably approximating the studio control room's acoustics, an audiophile with this duplicate system can precisely and unambiguously reproduce the music as heard by the engineer on the edited tape used for CD production.

In contrast, the truly accurate reproduction of a classical music CD is an exercise in frustration. The goal of fully

Illustration: Shannon Jeffries

P R E S E N T I N G

OUR MOST AFFORDABLE ACOUSTIMASS® SPEAKER SYSTEM

THE BOSE® ACOUSTIMASS-3 SPEAKER SYSTEM

A technological breakthrough exclusively from Bose! Patentec Acoustimass speaker technology is the key to large speaker performance from a package so small, you can hold one in the palm of your hand. When the Acoustimass-5 system was first introduced, Julian Hirsch wrote in *Stereo Review*, "...side by side with speakers costing three to five times as much, the AM-5 consistently produced the more exciting and listenable sound." Now the benefits of this revolutionary technology and much of the performance of the Acoustimass-5 system are available in the Acoustimass-3 system, for approximately half the price.

THE CRITICS SPEAK:

"Bose continues turning the speaker world upside down. It qualifies as one of the handful of companies researching the frontiers of acoustics and speaker design."

Chicago Tribune
Rich Warren

"The results are impressive."

Buffalo News
Tom Krehbiel

"...the Bose speakers are a stunning example of the miracles possible when physics is applied to the audio business."

— *The Oregonian*
Wayne Thompson

CUSTOMERS SPEAK:

"Solid bass and crisp high(s)."

Newton Mapoa
Manhattan Beach, CA

"Small size and great sound."

Scott Schifferly
Maumee, OH

Speaker shown actual size.



System consists of two cube speakers and an easily concealable Acoustimass bass module. Mounting accessories available.

For more information and
the name of your nearest
authorized Bose dealer, call
1-800-444-BOSE

BOSE
Better sound through research.

Even on modest playback gear, rock and pop CDs do not pose listening problems; the wide dynamic range of classical CDs is harder to handle.

reproducing both the dynamic range and the lowest bass fundamentals of organ and orchestra is very difficult to realize. This is true even with the very best, cost-no-object audio components. Any approach to the reality of the concert hall listening experience necessitates an approximation or simulation of the recording hall's acoustics. The monitoring systems used by recording engineers on classical music sessions convey neither the full dynamic range nor the lowest frequencies of the music.

Dynamic range, sound pressure level (SPL), bass response, and signal-to-noise ratio are interrelated. In spite of advertising hyperbole, relatively few loudspeakers have significant response below 40 Hz, and rare indeed is the speaker that is flat down to 30 Hz, let alone 20 Hz—or 16 Hz, the fundamental of a 32-foot organ pipe. To give some indication of the kind of loudspeaker response needed to reproduce the lowest frequencies on classical music CDs, we have invaluable data in a paper, "Subwoofer Performance for Accurate Reproduction of Music," in the June 1988 *Journal of the Audio Engineering Society*. Its authors, Louis Fielder of Dolby Laboratories and consultant Eric Benjamin, did a fairly exhaustive study of classical music CDs containing significant low-frequency energy. They selected 13 CDs and reproduced them through a CD player whose -3 dB cutoff was at 3 Hz. The recordings were analyzed at the moment of maximum low-frequency energy, using a Hewlett-Packard 3561A spectrum analyzer with peak-hold circuits. The authors established the minimum audible low frequencies, based on the threshold of hearing and a maximum peak CD output equivalent to 110 and 120 dB SPL, for each of the 13 selected discs.

The infamous cannon shots on the Telarc CD of Tchaikovsky's "1812 Overture" registered 110 dB SPL at 12.5 Hz and 120 dB SPL at 10 Hz! Does anyone out there have a system that can achieve these figures? Telarc recorded the Dupré Organ Symphony in G Minor in Royal Albert Hall in London. This hall's organ has one of the few 64-foot-pipes in existence, which speaks at 8 Hz! In the initial movement, the first harmonic of this monster (16.5

Hz) is at 110 dB SPL. The sound of real thunder captured in Telarc's "Grand Canyon Suite" registered 120 dB SPL at 15 Hz! Hindemith's Organ Sonata No. 1, on an Argo CD, has a huge, sustained 18-Hz pedal note during the last few seconds of the finale, which registered 110 dB SPL. (I have the recording, so I decided to check this pedal note. I used a GenRad sound level meter set on fast C-weighting, placed 10 feet from Duntech Sovereign loudspeakers. Driving the speakers was a new FM Acoustics 811 amplifier, which delivers nearly 800 watts per channel with a continuous current output of over 80 amperes. When the 18-Hz note was reproduced, the meter registered 106 dB SPL. Believe me, the sound was LOUD and visceral but nonetheless quite clean except for a small amount of Doppler distortion.) *Big Notes* by Flim and The BB's, a dmp CD, was analyzed by Fielder and Benjamin as having a 22-Hz synthesizer note at 110 dB SPL. There was even a 12.5-Hz note at 120 dB SPL! The remainder of the 13 CDs had tones from 22 to 29 Hz at 110 dB SPL.


These are very sobering figures about low-frequency performance at levels which are very hard to achieve and which, needless to say, require gobs of power. Reading the Fielder and Benjamin paper explains why SPLs of 110 and 120 dB are necessary to reproduce really low frequencies. They also point out the influence of typical home listening-room acoustics in the propagation and perception of low frequencies. This paper makes fascinating and informative reading on other aspects of harmonic and intermodulation distortion, phase distortion, and Doppler distortion. Sadly, Fielder and Benjamin conclude by stating, "None of the loudspeakers tested were able to meet [our] distortion and noise criteria over the frequency range of 12 to 100 Hz. A dozen systems were tested and found inadequate."

When he was with Ampex, Louis Fielder presented an AES paper, "Dynamic Range Requirements for Subjective Noise-Free Reproduction of Music." Here again, he is informative and offers significant conclusions. His experiments resulted in a dynamic range requirement of 118 dB for non-amplified live music, 124 dB for ampli-

fied live music, and 106 dB for the high-quality consumer playback system. As you can see, this correlates well with CD's dynamic range of 96 dB, once ambient noise in the playback environment is taken into account.

Now if you live way out in the country, miles from any neighbor and away from main roads, the ambient noise floor might be as low as 15 to 18 dB SPL—if all the motors in your house (pumps, refrigerators, et al.) are turned off. But if you live in a New York City apartment on a busy street, the noise floor is at least 46 dB SPL or maybe even 50 or 55 dB SPL. If you adjust system volume so that the quietest pianissimo on a CD recording is barely audible, then when the music reaches maximum fortissimo, you'll soon learn (and your neighbors will verify) just how loud the music can get!

I've had the experience of having visitors drop in when I'm playing a fortissimo passage on a CD. The first comment they make is, "Good God! Does it have to be that loud?" I tell them to turn down the volume to what they consider a comfortable level. Of course, when they do that, the pianissimo disappear. At low volume settings, you might not even realize that notes such as really pianissimo bass drum strokes were missing unless you were following the music with a score! But I'm afraid there are people who just don't like wide dynamic range.

The 20-bit digital professional recording systems I've reported on will provide 120 dB of dynamic range. However, that must ultimately be reduced to 96 dB, 16 bits' worth, to be processed into a CD. Most audio component systems have difficulties dealing even with the dynamic range and low-frequency content of 16-bit classical music CDs. To fully reproduce those discs requires loudspeakers covering the broadest possible frequency range, an amplifier with plenty of power (and the ability to supply it instantly on fortissimo midrange and, especially, low-frequency passages), and a component system free from buzzes, hums, etc. If true 20-bit recordings were available on some sort of tape format, few listeners or systems, if any, would be able to cope with the playback demands those recordings would impose. 

MISSION ELECTRONICS

From the highly acclaimed, budget priced 761 to the magnificent, semi-active 767, the Mission range of loudspeakers was designed and developed by Henry Azima and his award-winning team. Dedicated to music, they enjoy the finest research facilities in Europe.

Hand-built by British craftsmen and available in real wood veneers, Mission's latest generation of loudspeakers are the culmination of 12 years of achievement in sound reproduction.

Whether your listening environment is large or small, Mission can provide a superior and elegant solution to your musical needs.

In USA: MISSION ELECTRONICS USA INC., 18303 8th AVENUE SOUTH,
SEATTLE, WA 98148, USA. PHONE (604) 432 7727.

In Canada: PACO ELECTRONICS LTD., 20 STEELCASE RD WEST, UNIT 10,
MARKHAM, ONTARIO, L3R 1B2, CANADA. PHONE (416) 473 0740.

For More Information



Call 1-800-553-4355



Enter No. 32 on Reader Service Card

"Model Eleven...Exquisite Sound...Dwarfs Any Portable Stereo...A High Tech Wonder...Thumbs Up"

Doug Simmons—*The Village Voice*

MODEL ELEVEN

BY HENRY KLOSS



Cambridge SoundWorks' Model Eleven is the world's first *transportable* full-range, high performance component system. It consists of a powerful 3-channel amplifier and two "satellite" mid/high-frequency speakers—all packed in a rugged "BassCase"™ that, when empty, serves as the system's subwoofer. Model Eleven's performance, when coupled with your portable CD or tape player,** rivals that of the most expensive component systems. And because we market it directly from our factory, it costs hundreds less than it would in stores.



The drivers used in Model Eleven's two-way satellite speakers are no-compromise, high-performance components—just like you'd expect to find in the finest home speaker systems.

Performance that rivals the best home component systems.

Until now portable music systems were, at best, a compromise. Even the most expensive ones lack the deep bass necessary for full, natural sound. But Model Eleven delivers the all-out performance previously found only in high quality home component systems. Its three speakers are designed to

work *with* a room's acoustics for optimum performance. Remove the satellite speakers, amplifier and your portable CD player from BassCase. Place the satellites where they create a musical "stage" near ear level. Put the BassCase where it reinforces low frequency output—on the floor, even behind furniture. The result is musically accurate



- Fits under airline seats—23 lbs.
- Can be checked as luggage.
- Works on all electrical systems.
- Delivers the full range of music.
- Is backed by a unique 5-year warranty.
- Makes an ideal Father's Day or graduation gift.

Introductory Price: \$599

Valid until July 1, 1990

sound virtually identical to our acclaimed *Ensemble*® speaker system.

Model Eleven can be used virtually anywhere in the world—115- or 230-volt, 50 or 60 Hz AC or 12-volts DC. Because the entire system fits under an airline seat—or can be checked as baggage—you can take it just about anywhere. But Model Eleven's sound is so good, so "big," you may want to keep it home. It's an ideal second (or first) music system for a study, bedroom or kitchen. At \$599† we don't know of any combination of components near its price (transportable or not) that approaches its sound quality.



Henry Kloss created the dominant speaker models of the '50s (AR), '60s (KLH) and '70s (Advent)—as well as our highly acclaimed Ensemble and Ambiance® speakers. While packing a stereo system into a suitcase before a vacation, he realized that an amplifier, a CD player and two small speakers take up the same space required for an acoustic suspension woofer to reproduce really deep bass. That was the inspiration for BassCase, Model Eleven's bass speaker enclosure which doubles as the entire system's carrying case.

"We Know Of No Small Speaker That Surpasses The Overall Sound Of Ambiance" —Stereo Review

Ambiance

BY HENRY KLOSS

Ambiance is an ultra-compact speaker that proves high performance, small size and low cost need not be mutually exclusive. Ambiance is ideal for bedrooms, dens, dorm rooms...or for use as an extension speaker or in surround sound systems. While no speaker of its size can provide the same low bass as our Ensemble and Model Eleven systems, Ambiance has more output in the

40Hz region than any "mini speaker" we've encountered. Stereo Review magazine described Ambiance as "...beautifully balanced, delivering a full-size sound image with not a hint of its origin in two small boxes...very few small speakers we have heard can match the overall sound of Ambiance, and we know of none that surpass it." Available in Nextel or primed for painting for \$109 each †, or in solid oak for \$129 each †—backed by our 30-day money-back guarantee—direct from Cambridge SoundWorks.



Ambiance is an ultra-compact speaker that proves high performance, small size and low cost need not be mutually exclusive.

"Cambridge SoundWorks May Have The Best Value In The World. A Winner."

David Clark—*Audio Magazine*

Ensemble

BY HENRY KLOSS

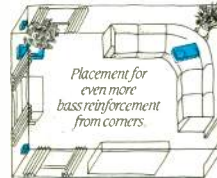
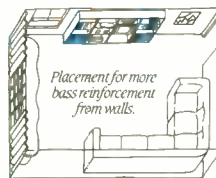
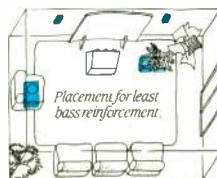
Ensemble is a speaker system that can provide the sound once reserved for the best speakers under laboratory conditions. It virtually disappears in your room. And because we market it directly, it costs hundreds less than it would in stores.

Ensemble consists of four speaker units. Two compact low-frequency speakers reproduce the deep bass, while two small satellite units reproduce the rest of the music, making it possible to reproduce just the right amount of energy in each part of the musical range without turning your listening room into a stereo showroom.

Your listening room works *with* Ensemble, not against it.

No matter how well a speaker performs, at home the listening room takes over. If you put a conventional speaker where the room can help the low bass, it may hinder the upper ranges, or vice-versa. Ensemble, on the other hand, *takes advantage* of your room's acoustics. The ear can't tell where bass comes from, which is why Ensemble's bass units can be tucked out of the way—on the floor, atop bookshelves, or under furni-

ture. The satellites can be hung directly on the wall, or placed on windowsills or shelves. No bulky speaker boxes dominate your living space, yet Ensemble reproduces the deep bass that *no* mini speakers can.



You can put Ensemble's low-frequency units exactly where they should go for superb bass. You can't do this with conventional speakers because you have to be concerned about the upper frequencies coming from the same enclosures as the low ones.

Not all the differences are as obvious as our *two* subwoofers.

Unlike seemingly similar systems, Ensemble uses premium quality components for maximum power handling, individual crossovers that allow several wiring options and cabinets ruggedly constructed for proper acoustic performance. We even gold-plate all the connectors to prevent corrosion.

Unlike satellite systems which use a single large subwoofer, Ensemble features separate compact bass units for each stereo channel. They fit more gracefully into your living environment, and help minimize the effects of the listening room's standing waves.

30-day money-back satisfaction guarantee.

At only \$499†—complete with all hardware and 100' of speaker cable,—Ensemble is *the* value on today's speaker market. *Esquire* magazine describes them by saying, "You get a month to play with the speakers before you either return them or keep them. But you'll keep them." *Stereo Review* said "It's hard to imagine going wrong with Ensemble." For literature, reviews or to order, write us at the address in the coupon, or call 1-800-AKA-HIFI.*

Try Model Eleven...
Or Ensemble...
Or Ambiance...
Risk Free For 30 Days.
Call 1-800-AKA-HIFI*
(800-252-4434)

All Cambridge SoundWorks products are sold only factory direct. This allows you to save hundreds of dollars and audition our products the *right* way—in your home for 30 days, with no risk, no sales person hovering nearby.

Our toll-free number connects you to a Cambridge SoundWorks audio expert. He or she will answer all your questions, send literature and reviews—or take your order (you can use Visa, MasterCard or American Express) and arrange shipment via UPS. Your Cambridge SoundWorks audio expert will continue as your personal contact with us.

*9AM to midnight (ET), seven days a week. In Canada, call 1-800-525-4434. Fax: 617-332-9229. Outside the U.S. or Canada, 617-332-5936.

© 1990 Cambridge SoundWorks. *Ensemble is a registered trademark of Cambridge SoundWorks.™BassCase, Ambiance, Model Eleven and Cambridge SoundWorks are trademarks of Cambridge SoundWorks, Inc. Ensemble review quote reprinted with permission of Audio Magazine. © 1989 Diarrandis Communications.

**CD player not included in Model Eleven system.

CAMBRIDGE SOUNDWORKS

Suite 104UN 154 California St., Newton, Massachusetts 02158

- Send more information and test reports.
- Send Ensemble risk-free for 30 days, for \$499.†
- Send Model Eleven risk-free for 30 days, for \$599.†
- Send ___ (qty.) Ambiance (Nextel), for \$109 ea.†
- Send ___ (qty.) Ambiance (Primed), for \$109 ea.†
- Send ___ (qty.) Ambiance (Oak), for \$129 ea.†

I'm paying by Check MC Visa AmEx

Acct. Number _____ Exp. _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Phone (Area Code) _____ Number _____

FOR IMMEDIATE SERVICE: 1-800-AKA-HIFI.

MA residents add 5% sales tax.

†Plus freight (Ensemble \$8–\$27, Model Eleven \$6–\$16,

Ambiance \$4–\$12). Delivery time usually 2–7 days.

We ship worldwide, including APO & FPO.

DEVOLUTION OF THE SPECIES



The evolution of musical instruments over the centuries has been driven by the demands of virtuoso players who have constantly sought greater facility, better intonation, and more acoustical output from their instruments. The modern concert grand piano, for example, evolved out of efforts to produce an instrument that could withstand the demanding technique of Franz Liszt and the other great pianists who followed him. The high-tension stringing on a cast iron frame of today's instruments produces considerable tone and is a far cry from the simple design of the early pianoforte. Today's highly articulated action is miles ahead in its ability to negotiate repeated notes and rapid scale passages.

In the symphony orchestra, wind and percussion instruments have continued to evolve, even into modern times, as the players have sought greater facility and the capability of playing louder without intonation (pitch) problems.

The oldest section of the orchestra, the strings, often includes highly prized instruments made more than 200 years ago. Early in the 19th century, most of these instruments were re-

built with a steeper neck and fingerboard that could support a higher bridge and, consequently, higher tension stringing (Fig. 1). The curve, or crowning, of the bridge top (not visible in this side view) was also increased so that violinists could play more vigorously without accidentally touching two strings at once. The emergence of the violin as a virtuoso instrument, in the hands of Niccolò Paganini and the like, forced such modifications. The instruments have changed little since then, except for the introduction early in this century of wire-wound strings (and a steel E-string) in place of the original gut strings.

Even the bow underwent a marked change. Baroque bows were shaped in such a way that increased pressure on the string resulted in "wrapping" the hair of the bow around two or more strings, making it difficult to play loudly without sounding the adjacent strings. About 1775, Tourte devised a bow with a reverse curve, which caused the hair of the bow to stiffen with increased pressure on the strings, thus allowing the player a greater range of dynamics. Figure 2 shows the basic differences in profile of the older bow as compared with today's instrument.

For most of this century, the works of the baroque masters, such as Bach, Handel, and Vivaldi, have been played on modern instruments, whether on recordings or in the concert hall. On college campuses, *collegium musicum* groups were often formed for the authentic performance of Renaissance and earlier works, but music of the baroque (1600 to 1750) and classical (1750 to 1825) periods was routinely done on modern instruments.

During the 1960s, the recordings of Nikolaus Harnoncourt and the Vienna Concentus Musicus brought to a large base of listeners a degree of authenticity in baroque music via early instruments and scholarship in performance practice. And as the '70s progressed, the so-called "early music" business took off in a big way. Many record labels embraced it, and the number of conductors and ensembles (at least in name) proliferated. Purely from a recording point of view, these ensembles had the good fortune of benefiting from newer approaches to recording ushered in by the digital era: Direct-to-stereo (two-channel) recording, improved microphones, and the general return to natural perspectives. Most of the groups are European or English, so it was relatively easy for them to identify recording venues appropriate for the program at hand, since the Old World abounds in unspoiled 200-year-old structures.

Record companies have a bonanza here: They have opened up a new branch of music, so to speak. New conductors and players, a fresh look at playing familiar music—this is grist for the record mills at much less than the cost of a major symphony orchestra, and all without the agony of dealing with superstar conductors and soloists, or their agents.

Today, our ears have become so conditioned to the sound of authentic instruments in music of the baroque era that modern instruments seem strangely out of place. No record company today would think seriously about issuing a set of Handel *Concerti Grossi* or Bach *Brandenburg Concerti* using modern instruments, no matter what the reputation or competence of the group and its conductor. The competition on early instruments is simply too great, and the performances often do

THE END OF INTERESIS

"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. 7, No. 1.

"Those audio fanatics who want to be bombarded by jet planes, earthquakes, thunderstorms, and even atomic bombs would probably not like the Kinergetics sound, but if they're searching for music, here is an oasis."

Lewis Lipnick
Stereophile Vol. 10, No. 5.

"...Kinergetics offers its purchaser more than a glimpse of what the best CD sound is all about."

John Atkinson
Stereophile Vol. 13, No. 1.

"...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.

"Kinergetic's KCD-20... the first CD player to crack the Class 1 Sound barrier"

Peter Montcriaff
**"International Audio Review",
Hotline #43-45.**

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: 818-3609-8576



Soundcraftsmen Power Amplifiers...

Perfect Mates for your Receiver, Preamplifier,
or, for our NEW Remote-Control Preamp-Tuner...



Pro-Power Four

DESCRIPTION: The New PRO-POWER amplifiers are especially designed for the extended Dynamic Range requirements of today's Compact Disc players and Hi Fi VCRs. The ULTRA HIGH CURRENT design offers you incredibly high power without sacrificing distortion-free performance, superb reliability, and the utmost in sonic purity. These new amplifiers operate flawlessly under all operating conditions. It is well known that most of today's highly regarded loudspeakers exhibit impedance curves which drop to 1 or 2 ohms at some frequencies, and in conventional amplifiers this results in severe clipping and the triggering of protective circuitry. However, our new PRO-POWER Phase Control amplifiers continue to operate even under those extremely low impedance conditions. Current limiting had been eliminated entirely by the use of the latest POWER MOSFET technology, thus avoiding the sonic degradation typically found when limiting circuitry is employed.

Says Leonard Feldman in his Test Report in AUDIO Magazine, Vol. 71, No.9:

"...it brought out the best in all of the loud speaker systems with which I tried it. I sensed an effortlessness about the musical crescendos reproduced from some of my CD spectaculars..."

"In my view, you can spend five times as much as what this amp costs, but you won't get a better, more reliable, or more musical unit."

FEATURES: MOSFET amplification stages provide the utmost in sonic purity, rivaling that of vacuum tube amplifiers...Precision-Calibrated LED power meters (0-400 watts at 8 ohms)...Speaker switching for two pair of stereo speakers...

SPECIFICATIONS: CONTINUOUS RMS POWER: 205 watts per channel @ 8 ohms, 20Hz-20kHz, 300 watts per channel @ 4 ohms, 20Hz-20kHz, 450 watts per channel @ 2 ohms, 1kHz...THD—less than 0.05%. 19"Wx5¼"Hx12"D, 30 pounds.

Pro-Power One

PRO-POWER ONE: The NEW PRO-POWER ONE amplifier provides all of the performance features of the PRO-POWER FOUR in a smaller, non-rack-mountable chassis.



The PCR800 amplifier is similar to the PRO-POWER ONE, rated at 205 watts per channel @ 8 ohms, but with plain overlay front panel.

Pro-Power Ten 2/3/4 Channel 600-watt Mosfet Amplifier

TWO-CHANNEL MODE

The PRO-POWER TEN, used in this mode, is the ultimate in high current, high power amplifiers, and provides a massive 600 w/p/c @ 8 ohms.

THREE-CHANNEL MODE

This mode provides 205 w/p/c for a stereo pair of satellite speakers for mids and highs, plus 600 watts to guarantee optimum sub-woofer bass performance.

FOUR-CHANNEL MODE

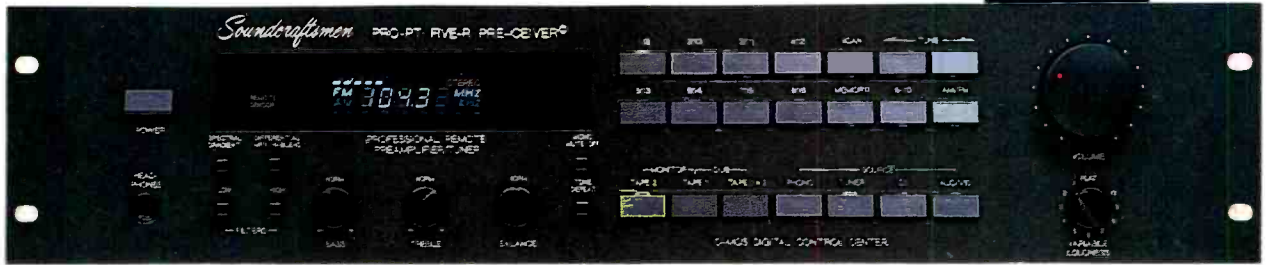
The ultimate in audio/video systems is the Surround Sound system, where the Theatre environment is recreated by stereo front and stereo rear speakers.



Enter No. 30 on Reader Service Card

Soundcraftsmen Pre-ceiver[®]...

NEW Remote-Control Preamp-Tuner
... the perfect Control Center to match
your choice of any Power Amplifier...



Professional Rack-Mount C-MOS Digital Control Center

Soundcraftsmen, America's leader in separate components, introduces the new **PRO-PT FIVE-R PRE-CEIVER**. This new Control-Center/Preamplifier/Tuner combines the outstanding performance and features of our separate tuner and preamplifiers, and adds the versatility of **WIRELESS REMOTE CONTROL**. The **PRE-CEIVER** offers the sensible alternative to the "all-in-one" receiver, by allowing the freedom to choose a separate power amplifier to match the needs of the speaker systems. This intelligent **PRECEIVER** approach allows you to avoid the inherent problems and compromises found in today's receivers, and still enjoy the cost-saving of combining the compatible preamplifier and tuner stages on a single chassis.

Due to space and technical design limitations, ordinary receivers cannot be equipped with the **high-current, high-voltage** power stages found in even modestly-priced separate power amplifiers. In a receiver, these heavy-duty power stages, necessary for high dynamic range amplification, would generate levels of heat, hum, and noise unacceptable to the tuner and preamplifier's low level, sensitive circuits. The new **PRE-CEIVER** eliminates all of these compromises by keeping the low-level preamplifier and tuner stages completely separate from the incompatible high-level power amplifier stages; thus providing a near-perfect and distortion-free output signal to drive **any amplifier**, from 50 watts to 600 watts.

The **PRO-PT FIVE-R's PREAMPLIFIER SECTION** has the quality and features you need as the cornerstone of your audio system. **Discrete FET** transistors are used in critical circuits for lowest distortion and noise. Our unique **Spectral Gradient** circuit provides extremely critical discrete filtering to eliminate the harsh characteristics associated with many analog/digital Compact Discs. Our unique **Variable Contour Loudness Control** allows precise and easy selection of frequency balance at any volume level.

The **PRO-PT FIVE-R TUNER SECTION'S** advanced technology incorporates a **DIGITALLY SYNTHESIZED**, quartz-referenced crystal oscillator, **Differential MPX High-Blend** circuit, **Micro-Computer** memory system, **Direct access** retrieval of any of your preprogrammed stations is as simple as pressing one or two buttons. The **Scan Selector** provides you with easy access to strong stations or direct access to even the weakest of stations. The **Mono/Mute-Off** selector allows noise-free listening of very weak stereo broadcasts.

FOR A DEMONSTRATION, VISIT NEAREST DEALER LISTED BELOW

However, many additional Dealers—too numerous to list here—are located throughout the U.S. with many models on display. If no dealer is shown near you, or you encounter any difficulty please phone us at 714-556-6191, ask for our "Dealer Locator Operator!"

ARKANSAS Jonesboro THE SOUND CENTER **NO. CALIFORNIA** Berkeley UNCLE RALPH'S AUDIO Chico G&G STEREO Sacramento TURNTABLES UNLIMITED **SO. CALIFORNIA** Cerritos FEDCO Costa Mesa ATLANTIC STEREO, FEDCO Goleta CAPTAIN VIDEO Hollywood AUDIO-VIDEO SOLUTIONS Los Angeles FEDCO Montebello AUDIO-VIDEO SOLUTIONS, SML, INC. Newport Beach ATLANTIC STEREO Ontario FEDCO Orange FIDELITY SOUND Pasadena FEDCO San Bernardino FEDCO San Diego FEDCO Santa Ana FIDELITY SOUND Van Nuys FEDCO Whittier HI FI HAVEN **FLORIDA** Fort Lauderdale SPEAKER WAREHOUSE Hollywood SPEAKER WAREHOUSE Miami, South AUDIO PLUS, ELECTRO SOUND, PARS ELECTRONICS Orlando SOUND EFFECTS West Palm Beach SOUND SHACK **GEORGIA** Atlanta ATLANTA SOUND WORKS **HAWAII** Hilo YAFUSO T.V. APPLIANCE Honolulu BOSE ENTERTAINMENT CENTER, VIDEO LIFE **IDAHO** Idaho Falls PHASE 4 STEREO **ILLINOIS** Burbank POLK BROS. Chicago MARTROY ELECTRONICS, MIDWEST STEREO, MUSICRAFT, POLK BROTHERS Cottage Grove, POLK BROS. Elgin, POLK BROS. Evergreen Park MUSICRAFT Gurnee OPUS EQUIPMENT Homewood MUSICRAFT Melrose Park, POLK BROS. Jacksonville FRONT ROW RECORDS Motion Grove MUSICRAFT Naperville, POLK BROS. Oak Park MUSICRAFT Palatine MUSICRAFT Springfield REEL TO REAL DESIGNS Villa Park MUSICRAFT **INDIANA** Michigan City AUDIO CONNECTION New Haven HJS SOUND West Lafayette VON'S ELECTRONICS **KANSAS** Overland Park AUDIO ELECTRONICS **KENTUCKY** Louisville HI-FIDELITY, INC. **LOUISIANA** New Orleans TULANE PRO AUDIO **MAINE** Ellsworth Falls ELLSWORTH AUDIO **MARYLAND** Frederick THE ELECTRONIC SHOP Gaithersburg AUDIO BUYS **MASSACHUSETTS** Boston HIGH STYLUS **NEW HAMPSHIRE** Nashua TECH HI FI **NEW JERSEY** The WIZ STORES Boundbrook PRANZATELLI'S STEREO Edison, E. Hanover TOPS APPLIANCE Kinnelon SOUND CITY Newark MEG RADIO CORP. New Brunswick BARRACKS TRADING POST Secaucus TOPS APPLIANCE Trenton BARRACKS TRADING POST Wildwood SEASHORE STEREO **NEW YORK** THE WIZ STORES Bronx VICMARR STEREO, BRONEN ENTERPRISES, CRYSTAL SOUND, D&J ELECTRONICS Brooklyn CENTRAL AUDIO, MAGNA ELECTRONICS New York City STEREO PLAZA, VICMARR STEREO, CANAL HI FI, 14TH STREET AUDIO, U.S.A. ELECTRONICS Syracuse SUPERIOR SOUND **NORTH CAROLINA** Charlotte SOUND AUDIO Raleigh CREATIVE ACOUSTICS Shelby SOUND ADVICE **OHIO** Columbus AUDIO EXCHANGE Defiance ZELLER'S SOUND STORE Lima HART AUDIO Wooster S&W TELEVISION **OKLAHOMA** Oklahoma City JOHNSON TV & SOUND **PENNSYLVANIA** Chambersburg SLNRISE ELECTRONICS McKeesport THREE RECORD WAREHOUSE Philadelphia SOUND OF MARKET Reading, Shillington PHOENIX HI FI Pittsburgh AUDIO JUNCTION Willow Grove SOUNDEX **PUERTO RICO** San Juan R. F. ELECTRONICS **SOUTH CAROLINA** Greenville DON JONES STEREO **TEXAS** Arlington SOUND IDEA Austin MUSICAL DIFFERENCE Dallas/Carrollton VERY SERIOUS TOYS El Paso CASA SONIDO Lake Jackson RCS Laredo JETT SALES Mesquite VIDEO ACCESSORIES Plus Midland FCLGERS San Antonio THE SOUND IDEA **VIRGIN ISLANDS** St. Thomas, U.S. and British Virgin Islands ELECTRONICS UNLIMITED **VIRGINIA** Great Falls STAR-SHIP AUDIO **WASHINGTON, D.C.** VENUS STEREO **WISCONSIN** Appleton AMERICAN TV Gendale SOUNDSTAGE Madison AMERICAN TV Mantowoc M & A ELECTRONICS Waukesha AMERICAN TV

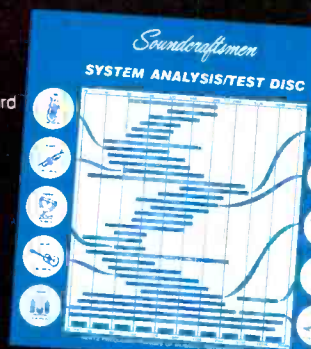
FREE System/Analysis Test Recording,
Now available on 5" COMPACT DISC!

Enter No. 30 on Reader Service Card

Soundcraftsmen

FREE!

\$89.95 SYSTEM EVALUATION KIT, includes your choice of 5" Instructional Test/Analysis COMPACT DISC, or 12" LP, plus 2-sets of Computer Charts, 1-Connector Cable for comparison test, 1-Instruction folder. WRITE TO US FOR FAST ACTION, OR CIRCLE READER CARD, and we'll send you FREE SPECIAL OFFER DETAILS, and 16-page COLOR BROCHURE.



Ironically, the success of early-music groups has made many symphony orchestras stop playing Handel, Bach, and other baroque music.

capture an eloquence and spirit hard to duplicate with modern instruments.

There are a few adjustments the listener must make on the way to enjoying period instrument performances. First, there is the matter of intonation in the wind and brass sections of the ensembles. The suavity of modern woodwinds will be missed, and in their place will be somewhat rough-edged sounds of lesser dynamic range and less precise tuning. The brass instruments are valveless, and as such depend on the player's "lipping" tones, up or down as needed, to place the pitch. These problems in pitch accuracy simply must be accepted as such. The strings are played without a vibrato, and string attacks are apt to be less incisive, due to the lightness of the bowing.

The small size of most early-music ensembles is welcomed in most cases, as are the more modest recording venues. Recording directors often seek out venues which have lots of "bloom," an immediate sense of reverberation and ambience. The venues which work best are often old ballrooms with lots of plaster, wood, articulated surfaces, and coffered ceilings. When vocal resources are included, the singing style is light, unforced, and most "unoperatic" in the conventional 19th-century sense.

Few standing early-music groups perform regularly in concert. Most of their activity is in the recording studio, and the pervasiveness of their efforts, via FM broadcast and disc sales, is a measure of just how significant the record industry has become in shaping musical tastes. More to the point is the effect on programming of concerts by major orchestras.

An ironic consequence of early-music groups' success is that many symphony orchestras have simply stopped programming the compositions of Bach and Handel, and other baroque works. This is a musical loss for the audience and may be a downright liability for the orchestra. As conductor Gerard Schwarz pointed out last year in "A Conductor Must Help to Shape Public Taste"—an article in the September 17 issue of *The New York Times*—orchestras which ignore 18th-century repertoire in favor of 19th- and 20th-century music lose certain ensemble skills which the earlier music

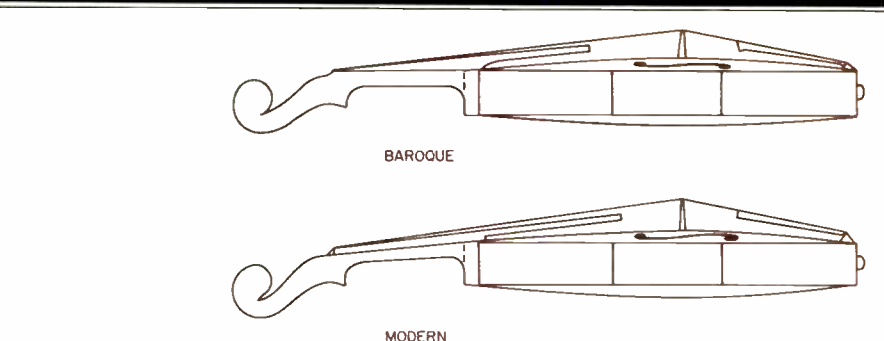


Fig. 1—Baroque and modern violins. Note the higher bridge and slanted neck of the modern instrument.

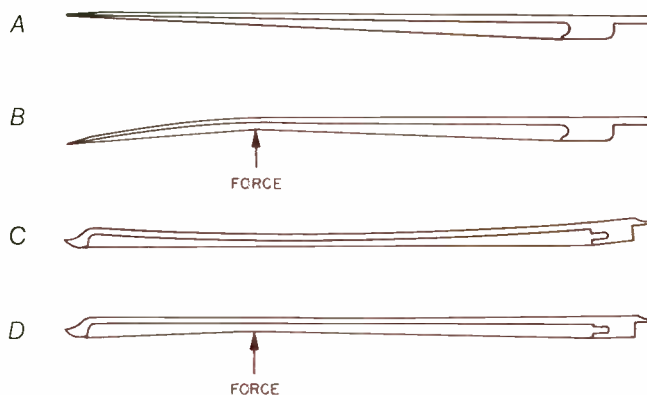


Fig. 2—The flat top of old-style violin bows (A) deflected easily when the bow was pressed against the string, wrapping the bow around the string (B) and making it difficult to play one string at a time loudly. The reverse curve of the modern Tourte bow (C) maintains greater tension, so deflection is minimal (D).

reinforces, and general competence may suffer as a result.

This last point is especially of concern at present, in that the early-music forces have embraced music of the classical era. The symphonies of Haydn, Mozart, and Beethoven are now available in many performances by authentic instrument ensembles, and the fortepiano has made a triumphant return as these ensembles' chosen vehicle for Mozart and Beethoven piano concertos. Pity the modern orchestra that is daunted by this and stops programming Mozart, Haydn, and Beethoven!

It may be quite a while before most of us are willing to trade in new instru-

ments for old in the classical literature. After all, we have been so thoroughly conditioned in this repertoire by the great conductors and orchestras of this century, not to mention the legendary keyboard virtuosi who have performed the concertos. Musicality, not authenticity, is likely to be our chief concern here, even though it is relatively easy to demonstrate that the fortepiano is, in a purely acoustical sense, a better match for a classical size ensemble than is the modern concert grand piano.

The most venturesome conductor and ensemble on the period instrument scene are, unquestionably, Roger Norrington and the London Classi-

Research.

And development.



What do you do after building the largest, most sonically-accurate speaker system in the world?

If you're Infinity, you take everything you've learned from the 7½ foot, \$50,000 Infinity Reference Standard V and apply it to the most sonically-accurate compact speaker system in the world.

And you call it Modulus. A speaker system for the 1990's. Technologically, it is an

encyclopedia of high science, from its time-aligned driver array to its servo-controlled subwoofer to its acoustically-inert, sand-filled pedestals.

Sonically, it has the power to drop jaws with its absolutely uncanny musical accuracy.

And visually, it would be as at home in the Museum of Modern Art as in any listening room. With or without its optional modular components.

To audition the new Modulus system, bring your favorite disc or tape to a selected Infinity dealer.

And experience Research and Development, Infinity style.

 **Infinity**[®]

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

For literature and the name of your nearest Infinity dealer, call (800) 765-5556. In Canada, call (416) 294-4833, H. Roy Gray, Ltd. ©1989 Infinity Systems, Inc. **H** A Harman International Company.

We're conditioned to baroque on early instruments, but it may be a while before we're ready for old instruments in the classical literature.

cal Players. Having gone through most of the Beethoven symphonies, Norrington and his group issued late in 1989 a period-instrument recording of "Symphonie Fantastique" by Berlioz. The recording is immensely successful and has moments of considerable insight. Perhaps the problem most people

have listening to it is the preconception that it is a large "Romantic" work requiring resources akin to those common toward the end of the 19th century. The fact is that the work dates from 1830, just barely out of the classical era into the Romantic. The identification of Berlioz as the Father of the Mod-

ern Orchestra further confuses our expectations and judgments.

If Berlioz, then why not the early Romantics: Schubert, Mendelssohn, and Schumann? There are no reasons why not, if the motives are right. What about extending the notion forward to period-instrument performance of Brahms, Tchaikovsky, and Wagner? This is okay if the notion of "original instruments" is tempered to include certain performance values.

For example, Brahms wrote for the so-called "natural" French horn, an instrument without valves. He preferred it for its purity of tone, as compared with the valved form of the instrument. While there are some expert players on the natural horn, all major symphonic horn players today use the ubiquitous "double horn" version, which has extra sets of tubing and makes for greater accuracy in playing. Would we be willing to put up with split horn notes in Brahms' symphonies for the sake of authenticity? I don't think so—at least not for long.

Perhaps the best way to approach the late Romantic period is to start at the present, analyzing current performance practices and working backward. If we did this, we would find that modern orchestras play far too loudly. We would remove some of the wire-wound strings from the violins, violas, and cellos, and we would certainly ask the brass players to tone things down considerably so that the strings could be heard without forcing.

We would take a look at middle-European orchestral practice, which favors a soft-edged approach to sound production and reaches a real fortissimo only once or twice during a typical concert.

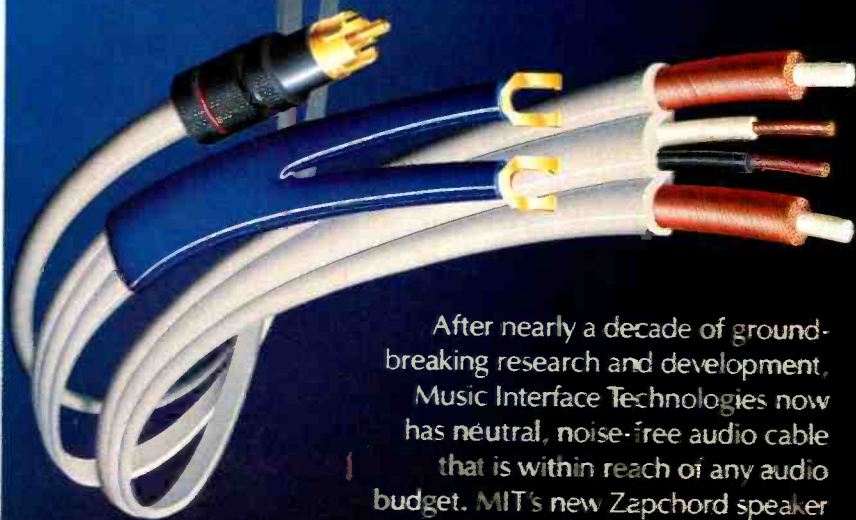
We would take note that modern woodwind instruments can play so well in tune, but we would ask them to play still a bit more softly.

We would implore our architects and acoustical consultants to be leery of what Michael Forsyth refers to in his MIT Press book, *Buildings for Music*, as the Hi-Fi Concert Hall, and return to earlier values.

Finally, we would ask recording engineers and producers to use fewer microphones, do less gain riding and "spotlighting," and strive for the pickup of natural stereo perspectives. **A**

ZAPCHORD™

Speaker and Interconnect
Interface Cables
from MIT®



After nearly a decade of groundbreaking research and development, Music Interface Technologies now has neutral, noise-free audio cable that is within reach of any audio budget. MIT's new Zapchord speaker and interconnect interface cables "ZAP" the noise with "Zapline" networks and patented termination techniques. Because Zapchord interface cables remove the noise, audio components sound more powerful, dynamic, defined, and detailed than ever before.

Music Interface Technologies **MIT**

Transparent Audio Marketing • Rt. 202 • Box 117
Hollis, ME 04042 • Tel: (207) 929-4553 • FAX: (207) 929-4271

HOME AUDITION PLAN
Visit Your Authorized MIT Dealer

Enter No. 36 on Reader Service Card



Any way you look at it
Hafler advances the
state of the art while it reduces
the price of admission.





Any way you look at it, Hafler advances the state of the art while it reduces the price of admission.

New Hafler SE Series. The SE Series embodies the basic Hafler design philosophy: Innovative circuitry, high reliability and, above all, sonic excellence. The result is pure, unimpeded sound at an affordable price.

SE100 J-FET Preamplifier. Based upon the critically acclaimed reference standard DH 11C circuitry. The SE 100's all J-FET line stage offers "tube-like" sound while maintaining ultra-low noise and distortion.

SE130 AM/FM Tuner. Features Delco Electronics receiver circuitry. This American-built tuner incorporates sophisticated stereo blending and superior interference immunity.

SE150 CD Player. Dual 16-bit digital to analog converters and quadruple oversampling capture all the dynamics and low-level resolution you expect from the latest in CD technology. A full-function remote control is provided to allow easy access to all of your favorite music.

SE120 MOSFET Amplifier. Featuring 60 watts per channel of MOSFET output power. This conservatively rated power amplifier is based upon the heralded DH 120 circuitry. Utilizing a novel drive circuit which is extraordinarily linear, it achieves ultra-low distortion without the use of high negative feedback. The result is: Fugedness. Linearity. High speed. And the "tube-like" characteristics of smoother sound with less distortion.

The Hafler SE line of products, hand built in America, represents the affordable high end in separates.

Hafler

A DIVISION OF ROCKFORD CORPORATION

"The Affordable High-End"



For More Information

41270

Call 1-800-553-4355

AUDIO ON-SALE AT THESE FINE STORES

AUDIO DEALER LISTING

ALABAMA

Huntsville
Audio Video Lab.
2801 Newby Rd.

ARIZONA

Douglas
DM Electronics
929 G. Ave.

ARKANSAS

Paragould
Sound Choice
1605 W. Kings Hwy

CALIFORNIA

Salinas
Bay Video & Stereo
1168 S. Main

Pomona
Dr of Audio
575 7th Ave

Calexico
Seiki Stereo
700 Imperial Ave.

Modesto
CD Exchange
435 McHenry

Los Angeles
Henry Audio
2050 S. Bundy Drive

Mountain View
Sound Goods
391 S. San Antonio Road

San Diego
Stereo Design
9353 Clairmont Mesa Blvd.

COLORADO

Grand Junction
The Sound Shop
528 South Tejon
636-1684

Boulder
Listen Up Inc.
2034 Avapahoe Street

CONNECTICUT

Waterbury
Zinno Music Inc.
195 Meriden Rd.

Hartford
New York Sounds
624 Wethersfield Ave.

FLORIDA

Tampa
Audio Visions
14306 Dale Mabry Hwy. N.

Altamonte
Sound Advice Orlando-Two
455 W. State Road 436

Sound Advice Coral Gables
1222 S. Dixie Hwy.

Dania
Sound Advice
1901 Tigertail Blvd.

Hialeah
Sound Advice Hialeah
6490 W. 20th Avenue

N. Miami Beach
Sound Advice Miami Beach
1595. N.E. 163rd Street

Sunrise
Sound Advice Sunrise
2200 N. University Drive

Boca Raton
Sound Advice Boca Raton
444 N. Federal Hwy.

Tampa
Sound Advice Tampa One
625 N. Dale Mabry

Sound Advice Tampa Two
1102 E. Fowler Ave.

Sarasota
Sound Advice Sarasota
6307 S. Tamiami Trail

Orlando
Sound Advice Orlando One
4835 E. Colonial

Ft. Lauderdale
Sound Advice Ft. Lauderdale
4008 N. Federal Hwy.

Hollywood
Sound Advice Hollywood
5951 Hollywood

Miami
Sound Advice Kendall
13915 S. Dixie Hwy.

W. Palm Beach
Sound Advice W. Palm Beach
2275 Palm Beach Lakes Blvd.

Clearwater
Sound Advice Clearwater
1451 US Hwy 19 South

St. Petersburg
Sound Advice St. Petersburg
2925 Tyrone Blvd.

GEORGIA

Atlanta
Stereo & Video Designs Inc.
6300 Powers Ferry

ILLINOIS

Rockford
Absolute Audio
4227 Maray Dr.

Bloomington
Lasers Edge
512 IAA Dr.

INDIANA

Bloomington
Campus Audio
413 E. Kirkwood Ave.

Portage
Who's Your Entertainment
P.O. Box 22

Huntingburg
Audiosource Electronics
322 W. 4th

KANSAS

Wichita
Advance Audio
5507 E. Kellogg

LOUISIANA

Baton Rouge
Art Colley's Audio Specialists
711 Jefferson Hwy

MARYLAND

Lutherville
Gramophone Ltd.
1081 Tony Drive

MASSACHUSETTS

Northhampton
Sound & Music Inc.
Millbank Place 351
Pleasant Street

Plymouth
PM Systems
20 Court St.

MICHIGAN

Grand Rapids
Electronic Sound Equip Co.
2249 Division S

Dearborn
Little Professor
22174 Michigan Ave.

Rochester
Rochester Book Center
1410 Walton Blvd.
Rochester Hills Plaza

NORTH CAROLINA

Greenville
Todd's Stereo Center
105 Trade

Durham
CD Superstore
5410 N. Highway 55

NEW HAMPSHIRE

Concord
Audio of New England
31A S. Main

NEW JERSEY

Vincetown
Sound Waves
RD 10 RT 206

Bloomfield
Sound Reproduction
237 Bloomfield Ave.

Verona
Audio Connection
615 Bloomfield Ave.

North Plainfield
Stereo City
950 US Hwy 22

Livingston
Metro Media Design Inc.
15 Tarlton Dr.

Morris Plains
J.S. Audio
643 Speedwell

Plainsboro
Sound Ideas
Princeton Meadows
Shopping Center

NEW YORK

Liverpool
Audio Excellence
4974 Alexis Drive

Hartsdale
Stereo Depot
155 S. Central Ave.

Montauk
Montauk TV Service
Main Street

Orchard Park
Stereo Chamber Inc.
Union & Orchard Pk. Rds

Roslyn
The Discriminating Bar
at the Harborview Shoppes
1518 Old Northern Blvd.

New York
Stereo Exchange Inc.
194 Mercer Street

Merrick
Performance Audio Svc.
2064 Sunrise Hwy

Lake Grove
Audio Den Ltd.
Smith Haven Plaza
2021 Nesconset Hwy

Hicksville
Avtronics Ltd.
260 Old Country Road

Rochester
Paul Heath Audio
217 Alexander Street

OKLAHOMA

Oklahoma City
Contemporary Sounds
10327 North May Ave.

OHIO

Westerville
Audio Horizons
20 Westerview Dr.

Warrensville Hts.
Hoffmans House of Stereo
23031 Emery Road

PENNSYLVANIA

Fairless Hills
Audiolab Stereo Center
500 Lincoln Hwy.

Hermitage
Sounds Good To Me
2481 E. State

SOUTH CAROLINA

Columbia
Sound Advice
2821 Ashland Rd.

TEXAS

Dallas
Omni Sound
4833 Keller Springs

Houston
Soundscape
2304 Portsmouth

Home Entertainment
2617 Bissonnet

San Antonio
Auto Sec & Sound Systems
6893-2 Bandera Rd.

Corpus Christi
Audio Video Designs
4904 S. Staples

Laredo
Audio Systems Inc.
4500 San Bernardo

McAllen
Showery Stereo
320 S. 10th

VIRGINIA

Danville
Aeolian Svcs.
215 Main Street

Newport News
Go-Ho Auto Audio
10817 Warwick Blvd.

WASHINGTON

Seattle
Definitive Audio
6017 Roosevelt Way N.E.

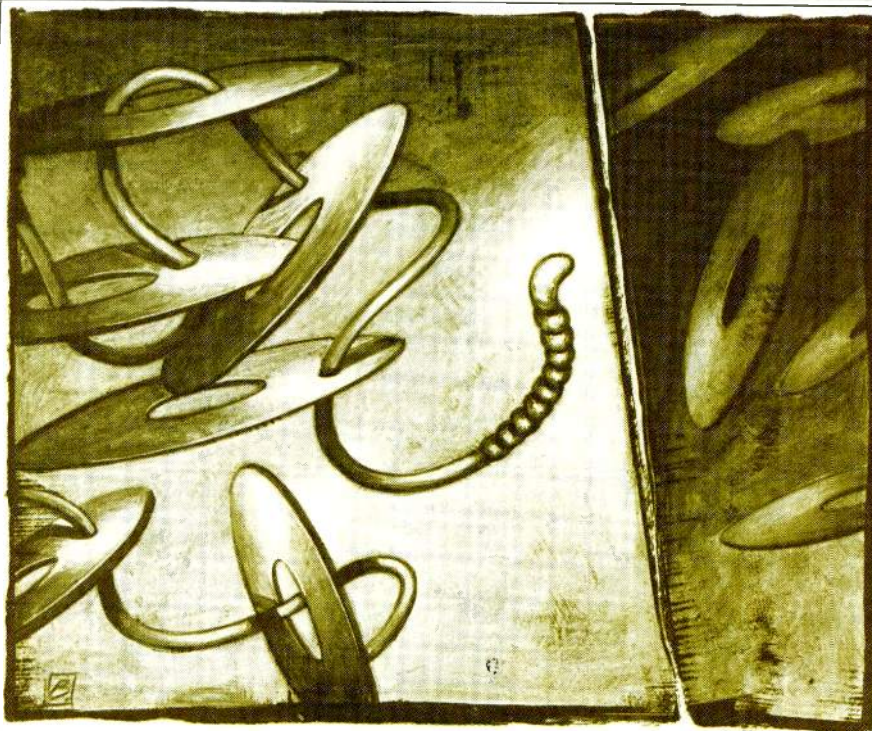
San Diego
Stereo Design
9353 Clairmont Mesa Blvd.

WISCONSIN

Greenbay
Hi-Fi Heaven
1917 S. Webster Ave.

Dealers interested in Audio should call 1-800-221-3148

DISCOMPATIBILITY

**The WORM's Turn?**

When I first heard mention of "compatibility" and "standards" problems in the development of recordable CD, I was rather puzzled. There's already a standard that ensures compatibility between all CD recordings and players. If a device can make recordings that CD players can't distinguish from commercial pressings, then compatibility has been achieved, right?

But if two companies come up with different ways of achieving it, they'll probably use different recording media requiring different laser output settings. Each company's machine would be able to play back recordings made on the other's, but probably neither would be able to record on the other's blanks. The systems would slug it out in the marketplace until a winner emerged, whereupon blank discs for the losing systems would become harder and harder to find. Eventually, the recorders that used those discs would become useless, but the discs they'd made would still be universally playable.

So far, the only recording systems I've heard of that produce discs

compatible with CD playback are WORM (write-once, read-many) systems, such as the ones from START Labs and Gotham Audio, whose discs can't be erased and rerecorded. Some people don't see this as a problem; after all, most cassettes are only recorded once—if they weren't, blank cassette sales would be dwindling as the tapes sold years ago were rerecorded. Still, a write-once system leaves you no room for mistakes such as miscues and errors in level setting.

There are systems whose discs *can* be erased and reused at will. All those I've heard of are magneto-optical disc (MOD) systems, such as the Thomson system featured in our March issue and a Sony consumer prototype I saw at last October's Japan Audio Fair. The MODs don't reflect light in quite the same way conventional CDs do, so they can't be played on current CD equipment. (The recorders can play conventional CDs, though.)

This is why there's a cry for standards and compatibility. Making a player that can handle both CDs and MODs is apparently not much of a problem, but no manufacturer wants

to do it until they know just what kind of MODs such a player would face. Should a single MOD standard be established, combination CD/MOD players would begin to appear. Should MOD catch on, eventually all new players would be this dual-purpose type. And as new players replaced the old, MODs would be almost as universally playable as CDs (and WORM discs) are today.

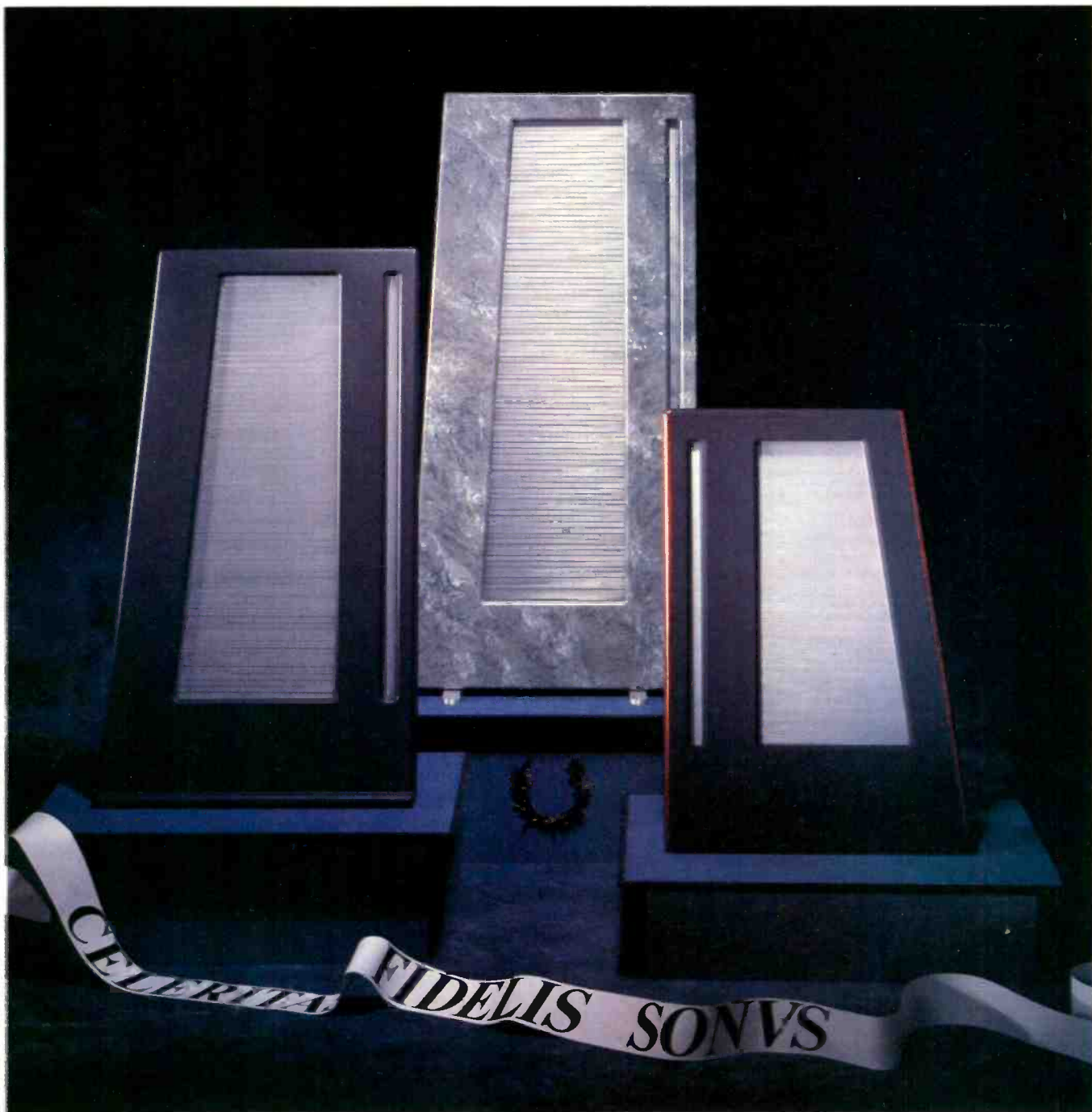
The ideal system would be both compatible with CD players and erasable, but no such systems seem to have surfaced yet. This leaves MOD and WORM adherents jockeying for position—sometimes even within a single company (such as Sony, a partner with Taiyo Yuden in the START Lab WORM process as well as a MOD developer).

If I had to choose between a CD-compatible write-once system and an incompatible, erasable system, I'd take the former. But then, I'm equipped to make my mistakes on DAT, so I could transfer only my successes onto disc. (*Other Editor's Note:* I'd take the other system.—E.P.)

For most people, a CD-compatible recording system would let them use CD for everything. No more buying recordings in one format for the house and in another for the car, no more time wasted dubbing new CDs onto tape for car use. No more crotchety turntables, once you've dubbed the records you really treasure onto CD. There would still be audiophiles who cherish the old formats, but Compact Disc would become *the* medium for home, car, and portable use.

This could prove to be a boon to the record companies. They could stop issuing and stocking recordings as CDs, cassettes, DATs (if they ever really start), and LPs (which they've already all but pulled the plug on) and produce only CDs. They'd save millions just in stocking and handling costs, not to mention earning more by dropping all their lower profit media in favor of the medium they make their highest profits on. As the availability of home recorders allows listeners to use CD for all their music needs, consumers will buy more CD players, creating a demand for still more recordings on CD.

HIGH PERFORMANCE BY APOGEE



WE'RE PUTTING IT ON AT THE RITZ.

FROM THE AFFORDABLE "STAGE" TO THE INCREDIBLE "DIVA", APOGEE BLENDS ADVANCED DESIGN WITH CUTTING EDGE TECHNOLOGY. APOGEE'S RIBBON TECHNOLOGY CONTINUALLY WINS BEST SOUND DISTINCTIONS AT AUDIO SHOWS WORLDWIDE. COME HEAR US DURING THE JUNE CONSUMER ELECTRONICS SHOW, SUITE 3105, THE RITZ CARLTON, 160 EAST PEARSON STREET AT WATERTOWER PLACE IN CHICAGO, OR CONTACT APOGEE ACOUSTICS FOR THE DEALER NEAREST YOU.

APOGEE ACOUSTICS

APOGEE ACOUSTICS, INC., 35 YORK INDUSTRIAL PARK, RANDOLPH, MA 02368 • (617) 963-C124 • FAX (617) 963-8567
Enter No. 6 on Reader Service Card

Paradigm

AUTHORIZED DEALER LIST

AK - ANCHORAGE: PYRAMID AUDIO
 AR - FAYETTEVILLE: STEREO ONE • FT SMITH: STEREO ONE • JONESBORO: PRO AUDIO SOUND • LITTLE ROCK: CUSTOM AUDIO
 AZ - PHOENIX: RAZZ JENSEN'S SOUND ADVICE • TUSCON: WILSON AUDIO
 CA - AUBURN: WOODEN SHIP STEREO • CAMPBELL: SOUND GOODS • CANOGA PARK: SHELLEY'S STEREO • CHICO: SOUNDS BY DAVE • DAVIS: STEREO IMAGE • DUBLIN: STEREO DOCTOR • EUREKA: SOUND ADVICE • FRESNO: VALLEY STEREO • MCKEON: PARADISE • MOUNTAINVIEW: SOUND SYSTEMS • REDONDO BEACH: SYSTEMS DESIGN GROUP • RIVERSIDE: SHEAKER/CRAFT • SACRAMENTO: PARADISE • SAN CARLOS: HERMAIY'S • SAN FRANCISCO: MAYBRUN'S • SANTA MONICA: SHELLEY'S STEREO • SANTA CRUZ: WATER ST. STEREO • SANTA ROSA: GOLDEN EAR • WALNUT CREEK: SOUND CONNECTION
 CO - COLORADO SPRINGS: THE SOUND SHOP • DENVER: PISTOL'S STEREO • FORT COLLINS: AUDIO JUNCTION
 CT - NEW CANAAN: AUDIO IMAGE
 DE - WILMINGTON: HI-FI HOUSE
 FL - BOCA RATON: VERN'S ELECTRONICS • BRADENTON: AUDIO WORKSHOP • LAKELAND: SOUND FACTORY • LAKE WORTH: AUDIO ADVISORS • LARGO: SOUND CREATIONS • ORLANDO: ELECTRONIC SHOP • PENSACOLA: AUDIO DISTINCTIONS • PORT ST. LUCIE: SOUND AUDIO • TAMPA: AUDIO VISIONS
 GA - ATLANTA: STEREO VIDEO DESIGNS
 IA - DAVENPORT: AUDIO ODYSSEY • DES MOINES: AUDIOCLABS • IOWA CITY: HAWKEYE AUDIO
 ID - BOISE: STEREO SHOPPE • BURLEY: SOUND COMPANY • TWIN FALLS: SOUND COMPANY
 IL - ALGONQUIN: TEAM ELECTRONICS • AURORA: STEREO SYSTEMS • BURBANK: DIGITAL AUDIO • CHAMPAIGN: POPS • CHICAGO: AUDIO ENTERPRISES • MILWAUKEE: PRO MUSICA • CHICAGO HEIGHTS: AUDIO ENTERPRISES • CLARENDON: SOUNDS DELUXE • GURNEE: OPTIC RECORDING • JOLIET: STEREO SYSTEMS • KANKAKEE: BARRETT'S • MORTON GROVE: MEDIA ROOM • MURPHYSBORO: SARBIN AUDIO • NAPERVILLE: NORMAL SLENKOPOL'S • PEORIA: SOUND OF PEORIA • ROCKFORD: ABSOLUTE AUDIO • STERLING: STERLING ELECTRONICS
 KY - LOUISVILLE: AUDIO VIDEO BY DESIGN
 LA - BATON ROUGE: ART COLLEY AUDIO • LAKE CHARLES: CLASSIC AUDIO • NEW ORLEANS: WILSON AUDIO • SHREVEPORT: AUDIO FIDELITY
 MA - BELMONT: TROUBLE STEREO • CAMBRIDGE: IS AUDIO • NORTH DARTMOUTH: SOUND • NORTHAMPTON: SOUND & MUSIC • WORCESTER: OCEANS
 MD - BALTIMORE: SOUNDScape
 ME - FALMOUTH: HI-FI EXCHANGE
 MI - DETROIT: PECAR ELECTRONICS • E LANSING: JEMSTONE AUDIO • GRAND RAPIDS: ELECTRONIC SOUND • JACKSON: SOUNDS PERFECT • NOVI: PECAR ELECTRONICS
 MN - MINNEAPOLIS: STEREO LAND • ROCHESTER: AMAGAMATED AUDIO • ST. PAUL: HOUSE OF HIGH FIDELITY
 MS - JACKSON: CUSTOM AUDIO • STARKVILLE: IDEAL ACOUSTICS
 MT - BOZEMAN: THIRSTY EAR • MISSOULA: ELECTRONIC PARTS
 NC - CONOVER: AUDIO HALS • DURHAM: AUDIO VISIONS • GREENVILLE: TODD'S STEREO
 ND - FARGO: TODAY ELECTRONICS
 NH - KEENE: INTERFACE • NASHUA: TECH HI-FI • NEW LONDON: NORTHSTAR ELECTRONICS • WEST LEBANON: AUDIO ARTS
 NJ - CHERRY HILL: HI-FI SALES • DEPFORD: HI-FI CONNECTION • EATONTOWN: HI-FI TECH STEREO • KINNELON: SOUND CITY • MORRISTOWN: SOUTH STREET STEREO
 NM - ALBUQUERQUE: ABSOLUTE AUDIO STORE • CLOVIS: TOWN CREEK
 NY - BIRMGHAM: WEST STEREO • ALLEGANY: SOUNDTRACK • BINGHAMTON: HART ELECTRONICS • BUFFALO: SPEAKER SHOP • HUDSON FALLS: VIDEO VISIONS AUDIO TOO • LAKE GROVE: AUDIO DEN • NEW YORK CITY: AUDIO SALON • PARK PLACE AUDIO • ONEONTA: SOUNDTRACK • PLATTSBURGH: ALPHA STEREO • PLEASANTVILLE: AUDIO EXCELLENCE • ROCHESTER: SALAMANCA • SALAMANCA: SALAMANCA SOUNDTRACK • SYRACUSE: GORDON ELECTRONICS • WAPPINGERS FALLS: SOUND ODYSSEY • WATERTOWN: NORTHERN ELECTRONICS • WEST BAYLON: AUDIO VISIONS
 OH - AKRON: OHIO SOUND • CINCINNATI: LA SOUND • DAYTON: STEREO SHOWCASE • NILES: SOUND CHOICE • TOLEDO: JAMESON'S STEREO • YOUNGSTOWN: SOUND CHOICE
 OK - BARTLESVILLE: SOUND STATION • LAWTON: AUDIO TECH • OKLAHOMA CITY: AUDIO MIDWEST • STILLWATER: AUDIO SOUND • TULSA: IMPERIAL SOUND
 OR - CARVALLIS: NORTHWEST AUDIO • LAKE OSWEGO: POSH AUDIO • PORTLAND: HAWTHORNE STEREO • SALEM: HEAR NO EVIL
 PA - BROOMALL: HI-FI HOUSE • DOYLESTOWN: SOUND ADVICE • ERIE: CUSTOM AUDIO • GREENSBURG: STEREO SHOP • LANCASTER: GEM STEREO • MILTON: AMBRON'S • MONROEVILLE: AUDIO COMMUNICATIONS • PHILIPSBURG: WISSELL'S • PITTSBURGH: ALBERTA HART • STATE COLLEGE: PAUL & ION'S • SCRANTON: HART ELECTRONICS • WILKES BARRE: HART ELECTRONICS • WEXFORD: AUDIO INSIGHT • YORK: AUDIO CLINIC
 RI - PROVIDENCE: STEREO CENTER
 SC - CHARLESTON: INTERNATIONAL HI-FI • COLUMBIA: AUDIO ALTERNATIVES • GREENVILLE: AMERICAN AUDIO • HILTON HEAD: SOUND IDEAS
 TN - JOHNSON CITY: MR. TODD'S • KNOXVILLE: HI-FI HOUSE • NASHVILLE: TENZEL'S AUDIO
 TX - ABILENE: SOUND EFFECTS • AUSTIN: MARCIUM ELECTRONICS, AUDIO CONNECTIONS • BEAUMONT: SALMAR AUDIO • BRYAN/COLLEGE STATION: SOUND WAVES • CORPUS CHRISTI: ARIE TOWN AUDIO VIDEO • DALLAS: HART'S HI-FIDELITY • HOUSTON: ALLSTAR AUDIO ESOTERIC EAR • LAREDO: ITT AUDIO • NACOGDOCHES: SPINET MUSIC • ODESSA: SOUND CONNECTION • SAN ANTONIO: ALICIA • AUSTIN: ACCENTS • SAN ANGELO: SOUND BOX • TEXARKANA: SOUND TOWN • WICHITA FALLS: AUDIO VIDEO
 UT - SALT LAKE CITY: AUDIOWORKS
 VT - S. BURLINGTON: CITY STEREO • MIDDLEBURY: SOUND SOURCE
 WA - BELLEVUE: HAWTHORNE STEREO • BREMERTON: BREMERTON STEREO • RICHLAND: QUICKSILVER AUDIO • SILVERDALE: EVERGREEN AUDIO • SPOKANE: HAL'S STEREO
 WI - APPLETON: SUSS AUDIO • FOND DU LAC: PRO AUDIO VIDEO • MADISON: HIGH PERFORMANCE AUDIO • MILWAUKIE: GENERAL ELECTRONICS
 WV - MORGANTOWN: SOUND INVESTMENTS
 WY - LARAMIE: MUSIC BOX

CANADA
 AB - CALGARY: KBW AUDIO • EDMONTON: AUDIO AIR • BEED REE: AUDIOWEST
 BC - CHILLIWACK: SOUND ARCHIVE • CRANBROOK: ALLSTAR AUDIO • KELOWNA: KELOWNA SIGHT & SOUND • NANAIMO: SOUND ATTRACTIONS • POWELL RIVER: SOUND ATTRACTIONS • PRINCE GEORGE: KA TERE ID • QUESTNELL: QUESTNELL ELECTRONICS • RICHMOND: TITAN ELECTRONICS • TRAIL: ROCK SLAND TAPE CENTRE • VANCOUVER: PETER J. BROADWAY • VICTORIA: SOUND BY MOJIBU OK 4M AUDIO • VICTORIA: EDGEWATER SOUND • WILLIAMS LAKE: HI EXPRESS
 SK - REGINA: KRAZY KLEF • SASKATOON: KRAZY KLEF
 MB - WINNIPEG: CREATIVE AUDIO GILLAM SOUND
 NB - FREDERICTON: MAGIC FOREST MUSIC STORE • MONCTON: HI-FI EXPRESS • ST. JOHN: QUADRASONIC HI-FI
 NT - GRAND FALLS: DEAN'S RADIO
 NS - BRIDGEWATER: SHORE SOUND • HALIFAX: BLACKMAN VIDEO • KENNESICOTT: ELECTRONIC PARTS • MUSKOGEE • NEW GLASGOW: C.P. SMITH • NEW MINIAS: LYPCASOUND • SYDNEY: SOUNDFAIR
 ON - AJAX: HI-FI AUDIO VISUAL • BARRIE: JERRY'S RADIO • BELLEVILLE: BECIBF AUDIO • BRACEBRIDGE: BRACEBRIDGE TAPES • BRANTFORD: BRANI STEREO • BROCKVILLE: TODD'S HI-FI ELECTRONICS • BURLINGTON: HARVEY HI-FI • CHATHAM: CHATHAM STEREO • COBOLIDGE: JIMMY D. • CORTLAND: TERRAULT ELECTRONICS • DRYDEN: SOUND OF MUSIC • FORT ERIE: J.W. SKING • FORT FRANCIS: SIGHT & SOUND • GUELPH: MORTON • HAMILTON: GLOBE AUDIO • KINGSTON: VERN NAPER'S • KITCHENER: NATURAL SOUND • LONDON: POWER ELECTRONICS • MIDLAND: AUDIO SHOPPE • MISSISSAUGA: FARRIEN ELECTRONICS • NORTH BAY: POPULAR AUDIO • ORILLIA: AUDIO SHOP • ORLEANS: SOUND ADVICE • OSHAWA: COMBAYS STEREO • OTTAWA: SOUND ADVICE (MURRAY) SOUND ADVISORS • BANKS • OWEN SOUND: PAUL S. AUSTON • PEMBROKE: SONI AUDIO • PETERBOROUGH: GUYTON ELECTRONICS • SARINIA: SI CLAU • SCARBOROUGH: HART ELECTRONICS • ST. CATHARINES: ELECTRONIC SPECIAL CENTRE • STRATFORD: MUSIC • SUDBURY: TITAN SIGHT & SOUND • THORNHILL: HI-FI TAPE STORE • THUNDER BAY: POWER CENTRE AUDIO • TORONTO: ARTS RECORDS • WATERLOO: NATURAL SOUND • WINDSOR: LIVE WINDS • WOODSTOCK: DICKI'S STEREO
 PQ - ANJOI: SON OR • HATERIUE: BOURGEOIS TV • LAVAL: MUSIQUEAU • LONGUEUIL: PAQUIN AUDIO • MONTREAL: HILTIROQUE RADIO LORENZ SOUND STUDIO • QUEBEC CITY: CORA • ROUVEY: TELEVISION J.P. • SEPT-ILLES: SEPT-ILLES AUDIO • SHEBOOKE: ROUSSEAU STEREO • SOREL: LA BOUTIQUE DU SON • ST. CATHE DES MONTS: DEANSONIA SON • ST. ANACLET: ARCHIVES SONORES • ST. HUBERT: ATELIER ELECTRO ACOUSTIQUE • ST. JEAN SUR RICHELIEU: PAQUIN AUDIO • STE-HYACINTHE: MICHEL SI-PIERRE AUDIO • TROIS RIVIERES: LE DOMAINE DU SON • VAL D'OR: BN ELECTRONIQUE • VICTORIAVILLE: MAYRAND FRERES

Recordable CD could usher in a golden age for the record companies, but they'll fight like blazes to prevent it.



Thomson's MOD



START Lab's WORM

Only two things stand in the way of this new golden age of record industry sales and profits. First, the hardware and standards that will set it off are still under development. Second, I'm sure the recording

industry will fight like blazes to keep CD recorders out of people's homes, just as they fought DAT and tried, too late, to fight cassettes (which now account for a substantial chunk of their revenues). Just wait.

Case of the Purloined Sapphire

The turntable I was using last spring was a SOTA, on loan from the manufacturer. So when Robert Becker, SOTA's chief executive, called to say he was lending it to someone else, I had no kick coming. As it turned out, however, Becker did.

The turntable's new would-be borrower had called SOTA to say he worked for an ad agency and wanted to use a Star Sapphire as a photo prop in a carpet commercial. Since the ad man and I were both in New York City, it was simpler for Becker to have him pick up my loaner than to ship a new one out—especially as the fellow said he had a deadline to meet.

As it turned out, he now has a more serious deadline. A few weeks after the turntable had been picked up, Becker got a call from a postal inspector, asking if the turntable was his. It turns out that our "ad man" was nothing of the kind. The whole affair had been a scam. For many months, the turntable that had been in my listening room was locked in an evidence room somewhere in Manhattan, awaiting its day in court. Becker ruefully sees the whole affair as a validation of the high-end concept: "It's a sign of the times," he says. "Even con men recognize the value of good audio equipment. I just hope the next one will recognize the value of someone else's."

Wait for the Wafer?

It's been predicted that the CD's eventual replacement will be a solid-state memory system with no moving parts. A small move in this direction is the Wafer Stack, a memory system from Anamartic Inc. of San Jose, California. The system uses the uncut wafer discs from which individual memory ICs are usually sliced. A sealed, two-wafer module holds 40 megabytes, but six such modules can be stacked into a unit that holds 240 megabytes.

That's still no substitute for the CD, of course. The Wafer Stack's capacity

is still a bit less than one-half as much as the CD's. The memory is also volatile, forgetting its contents as soon as it's powered down. And it costs \$38,850 for a 240-megabyte board with controller and SCSI digital interface.

If systems like this ever make it into audio, they'll probably start in studios, for digital editing, which can take advantage of the Wafer Stack's ultra-fast data access, about 200 times as fast as computer hard-disk drives. Even so, the price will have to drop and the capacity rise to make it practical.

EXPENSIVE SOUNDING SPEAKERS!

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*.

So go ahead, get expensive sounding speakers.... without the expense. Visit your authorized Paradigm dealer.... *and listen*.

The critics agree:

"... For once we wholeheartedly agree... the Paradigm is most definitely a no-compromise two-way design capable of outperforming systems costing several times as much."

- *Hi Fidelity 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*

Sound & Vision



CRITIC'S CHOICE AWARD

Paradigm[®]
music . . . above all.

In the U.S.: **AudioStream**, MPO Box 2410, Niagara Falls, New York 14302
In Canada: **Paradigm Electronics Inc.**, 457 Fenmar Drive, Weston, Ontario M9L 2R6

Enter No. 10 on Reader Service Card

ES

For Sony ES,
redefining the
Compact Disc Player
means changing
more than a bit.



Today, the entire focus of Compact Disc player development appears to have been reduced to a single bit. While this approach has some merit, to the engineers of Sony ES it is merely the starting point in redefining the CD player.

But then, the ES engineers have always charted their own course. These are the same people whose independent thinking created the world's first Compact Disc player. And their digital insights have enabled them to engineer proprietary advances in D/A conversion, digital filtering, data synchronization, error correction, laser optics and chassis rigidity—in short, all the elements necessary to establish an entirely new benchmark in Compact Disc performance.

A converter with a pulse all its own.

Sony started with the High Density Linear Converter™ system. Based on an all-new integrated circuit, the CXD-2552, this pulse sys-



Not restricted to the deluxe CDP-X77ES shown opposite, Sony's new definition of the CD player extends to the affordable CDP-X33ES.

tem replaces the typical converter's sixteen or more switches with a simpler, more efficient design. With a single stroke, it eliminates non-linearity, glitches, and crossover problems. The HDLC system also operates at the unprecedented speed of 45 MHz—the world's fastest conversion rate—to help substantially reduce harmonic and inter-modulation distortion.

As a result, converter distortion measures an astonishing 0.001%. Dynamic range is 124 dB—exceeding the theoretical maximum of the CD itself. The audible benefits are equally impressive. You'll experience music that is warmer and less clinical, with a more spacious stereo soundstage.

Nothing less than a total system approach.

We've matched the new HDLC system to our legendary CXD-1244 digital filter, a Sony design that overcomes requantization error through superlative calculating accuracy. And Sony overcomes a principal source of error in pulse converters: the time-base inaccuracies called "jitter." These errors cause modulation in the analog

signal, veiling the music and altering the sound stage. By integrating our Direct Digital Sync™ circuitry directly on the converter chip, the Sony HDLC system corrects jitter automatically and decisively.

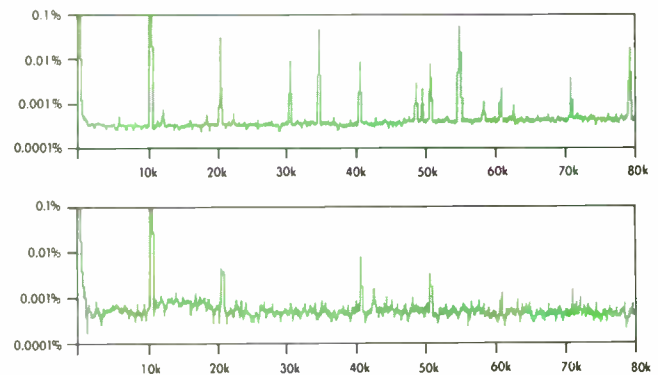
Similar inspiration led to other pivotal developments in rigid anti-resonant chassis design, linear motor transports, and low-noise servo stabilizer circuits. These developments motivated *Stereo Review*



Extended playback meets an extensive technical resume with the CDP-C85ES five-disc carousel changer.

to make this pronouncement: "Our test results leave no doubt that the Sony CDP-X55ES represents the current state of the art in CD players. Virtually every measurement surpassed those of the best players we have tested in the past."*

Best of all, these landmark advancements are not reserved for one or two high-priced models. They grace every ES single-disc player and both ES five-disc changers. And each model is backed by a three-year limited parts and labor warranty. (See your authorized ES dealer for details.)

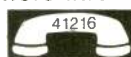


Spectrum analysis of a 10kHz signal with a typical pulse converter (top) shows additional non-harmonic distortion. With the Sony HDLC system (bottom) this distortion is negligible.

So call **201-930-7156** (Monday–Friday, 9:00 am–5:00 pm EST) to locate an ES dealer. Then audition the ES Compact Disc players. Just don't be surprised if other players seem to fall a bit short.



For More Information



Call 1-800-553-4355

SONY®

THE LEADER IN DIGITAL AUDIO™

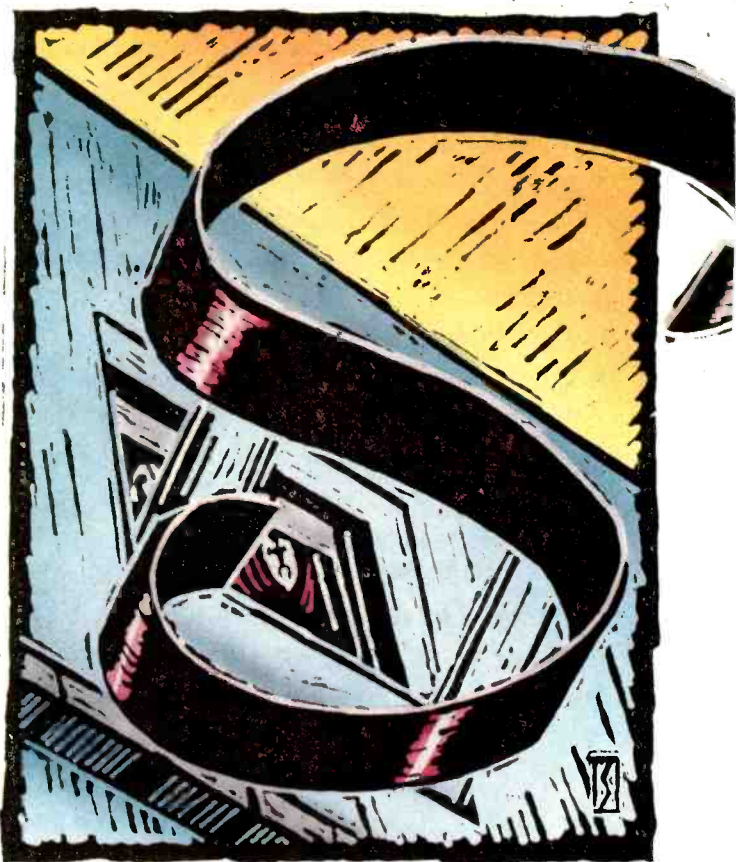


ILLUSTRATION: NEIL SHIGLEY

INTRODUCING DOLBY S-TYPE NOISE REDUCTION

KENNETH GUNDRY AND JOSEPH HULL



Since the introduction of the Dolby SR (spectral recording) process in 1986, the professional music recording, broadcast, and cinema industries have equipped more than 35,000 analog audio channels worldwide with this recording enhancement system. Dolby S-type, a new noise-reduction system from Dolby Laboratories for improving the popular home audio cassette, uses several of Dolby SR's

proven techniques to achieve similar ends—increased headroom, lowered distortion, and greatly reduced noise. Dolby S-type is less complex and less costly than Dolby SR. Among other reasons, this is possible because home listening levels are lower than those in studios, and because the spectral content of cassette noise differs from that of open-reel tape. However, both systems share such objectives as freedom from audible side effects, and are based upon similar principles of operation.

Kenneth Gundry, Dolby Laboratories' Principal Staff Engineer, has been with the company since 1971 and is currently in charge of developing a Dolby S-type encoder for use in production of prerecorded cassettes. He is also the inventor of the Dolby HX (headroom-extension) system and codeveloper of the Dolby ADM (adaptive delta modulation) digital system.

Joseph Hull, resident wordsmith at Dolby Laboratories, originally joined the company in 1978, after working as Director of Communications at Advent. As a freelancer, he wrote manuals and product literature for Boston Acoustics, Cambridge SoundWorks, Kloss Video, Lucasfilm, and Mitsubishi.

The authors are indebted to their colleagues Stan Cossette, who has spearheaded the development of Dolby S-type, and Ray Dolby, who conceived the principles upon which it is based.

Principle of Least Treatment

Complementary noise-reduction systems, such as those developed by Dolby Laboratories, boost the signal as it is recorded (compression) and then reduce the boosted signal by the same amount (expansion) in playback; tape noise is also reduced by the same amount. The original signal theoretically survives the complementary process unscathed, as opposed to playback-only NR systems, where the original signal is inevitably damaged in the attempt to remove noise retroactively.

The companding action need not be the same at all frequencies. For example, in cassette recording, tape hiss so predominates that it is desirable to concentrate the noise-reduction action at higher frequencies. Yet whatever the spectral effect of the action, it must be confined to lower level signals to prevent overloading the medium (e.g., saturating magnetic tape) when high-level signals occur.

Dolby A-type NR uses four fixed-action bands; Dolby B and C use one sliding band. Dolby S uses both sliding and fixed bands.



At first glance, designing a system to operate only at lower levels makes sense, because high-level signals are assumed to mask noise. Wide-band compressors, which boost the entire frequency spectrum at low levels upon recording and lower it at playback, work on this assumption. Unfortunately, it is not entirely valid.

On quiet signals, noise reduction is indeed effective, because full recording boost is applied (Fig. 1A). However, because it is necessary to prevent overload by not boosting higher level signals as they are recorded,

these systems allow the noise level to go up upon playback as signals get louder, an effect called noise modulation (Fig. 1B). The higher noise can be heard under certain circumstances, because it is only at and near a signal's frequency that masking occurs. If the music is loud in only part of the spectrum, noise will be heard in the other parts, where there is neither masking nor boost (i.e., no NR effect). The result is annoying changes in noise level concurrent with changes in signal level.

The ideal noise-reduction system, on the other hand, would act *wherever* signals fall below a certain threshold, even when there are loud signals elsewhere in the spectrum. Ideally, with a loud rap on a bass drum, there would be no record boost on the drum itself, to prevent overloading the recording medium. But there would be full boost, and therefore effective noise reduction upon playback, over the rest of the spectrum.

We call the application of constant gain wherever there are no high-level signals, even in the presence of such signals elsewhere in the spectrum, "the principle of least treatment." Reductions in record boost to prevent overload should be confined just to those parts of the spectrum where loud signals, and thus natural masking, occur (Fig. 2A). This results in audibly consistent noise reduction. By contrast, in the presence of any loud signal, a wide-band compander reduces the record boost *throughout* the spectrum, resulting in audible changes in the NR effect (Fig. 2B).

The Dolby A-type professional noise-reduction system strives for the ideal by splitting the spectrum into four bands with independently acting compressors. Thus, with a loud bass drum, Dolby A-type NR does not operate in the low-frequency band where masking occurs, but does act in the higher frequency bands where there is no masking. In Dolby B-type and C-type NR, a single companding band of frequencies slides up out of the way of the bass drum, keeping the NR effect active at higher frequencies where tape hiss is audible. In Dolby S-type and Dolby SR, a combination of fixed and sliding bands, along with other new developments, results in the closest adherence yet to the principle of least treatment.

Benefits of Least Treatment

The major benefit of adhering to the principle of least treatment is a better recording system, virtually free of such side effects as noise modulation. However, the fact that high-level signals have little effect on low-level signals has significant additional advantages in the real world, where encoded recordings are subject to decoding errors.

Decoding errors can be divided into two categories. The first we might call "inadvertent," that is, errors resulting from frequency response or level changes introduced between original encoding and ultimate decoding with the same complementary system.

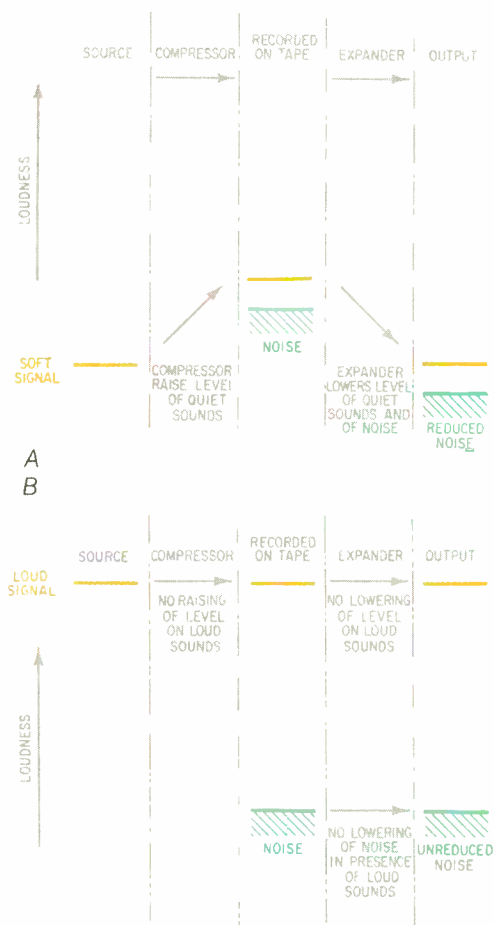


Fig. 1—With a wide-band compander, noise is reduced in the presence of soft signals (A) but is allowed to rise back to its original level in the presence of loud signals (B).

These are the kind of errors that occur, for example, when using a tape formulation for which the original recorder was not optimized. The other category we might call "deliberate," that is, errors that would result, say, from playing back Dolby S-type cassettes on a machine that is equipped only with Dolby B-type NR.

As a result of its adherence to the least-treatment principle, Dolby S-type is robust. If a tape is made on a recorder with less than perfect response, the listener is unlikely to notice anything wrong beyond the original imperfection itself (if indeed it is audible). If a tape is recorded with S-type and played with B-type, a critical listener may notice a reduction in dynamic range, which may even be desirable in a noisy environment such as an automobile. However, there is virtually no distracting "pumping" or other dynamic artifacts. Minimizing the effect of high-level signals on low-level signals, which eliminates the principal mechanism by which the ear detects the use of level-sensitive processing, may well become a factor in the software industry's consideration of releasing Dolby S-type prerecorded cassettes.

Action Substitution

"Action substitution," which was applied first in Dolby SR and is now being used in Dolby S-type, is a new development enabling closer adherence to the principle of least treatment. It results from combining both fixed-band and sliding-band techniques in a way that maintains their advantages while mitigating their disadvantages.

Figure 3A illustrates a sliding-band system. When high-level signals, if any, are relatively low in frequency, the band assumes the quiescent characteristic represented by the solid curve. If a higher frequency signal then comes along at a level high enough to require less boost, the band must slide up considerably, even to achieve only 2 dB less boost as shown (dashed curve). Thus, considerable noise reduction below the dominant signal's frequency is lost (as shown by the shaded area)—a disadvantage. However, above that frequency, the NR effect is essentially unchanged—an advantage.

Figure 3B illustrates a fixed-band system having the same quiescent characteristic, again represented by the solid curve. When, as above, the dominant signal is loud enough to require less boost, there is an overall reduction of boost (dashed curve) and an equivalent loss of NR effect (shaded area). This means that unlike the sliding band, the fixed-band system causes a loss of NR effect above the dominant frequency—a disadvantage. However, there is significantly less loss of noise-reduction effect below the dominant frequency than with the sliding band—an advantage.

At higher frequencies, where tape hiss predominates, Dolby S-type combines both sliding and fixed bands in a way which results in what we call "action substitution."

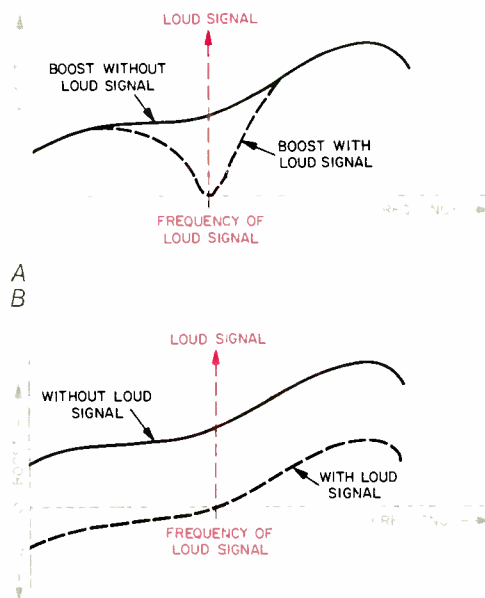


Fig. 2—The effect of high-level signals on cassette noise-reduction systems vary with the system used. In systems such as Dolby S-type, which follow the principle of least treatment (A), gain is reduced only at and near the frequency of a loud signal. Record boost, and thus noise reduction, is therefore unaffected except in a region masked by the signal itself. In a wide-band compander system (B), gain is reduced throughout the spectrum, regardless of the loud signal's frequency. Record boost, and thus NR, is therefore lowered or eliminated everywhere that masking does not occur.

Figure 3C illustrates an action-substitution system having the same quiescent characteristic as the individual system discussed above (solid curve). When less boost is required (dashed curve), the action of the fixed band predominates below the dominant frequency, so that less NR effect is lost than when using a sliding band alone. Above the dominant frequency, the sliding band predominates, resulting in none of the NR loss which would occur with a fixed band alone. Thus, with action substitution the boost of low-level signals is more constant, as is the

If a tape is recorded with Dolby S-type NR and played back with B-type, you may only notice a reduction in dynamic range between the two.

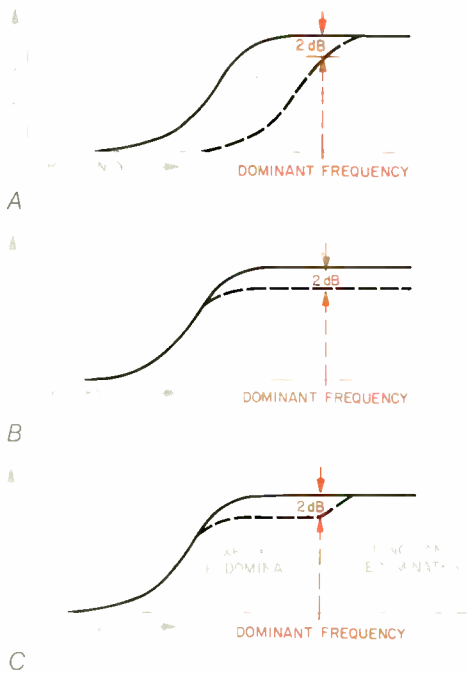


Fig. 3—Effects of dominant signals within the NR band also vary with the system. To effect a given decrease in gain (2 dB shown) at the dominant frequency, the NR band of a sliding-band system (A) slides up, reducing NR at frequencies below the signal. In fixed-band system (B), boost (and thus NR) is reduced throughout the band by the amount of gain decrease required at the dominant frequency. Combining fixed and sliding bands (the "action substitution" system used in Dolby S-type NR) confines the gain decrease more closely to the dominant frequency, resulting in less loss of NR (C).

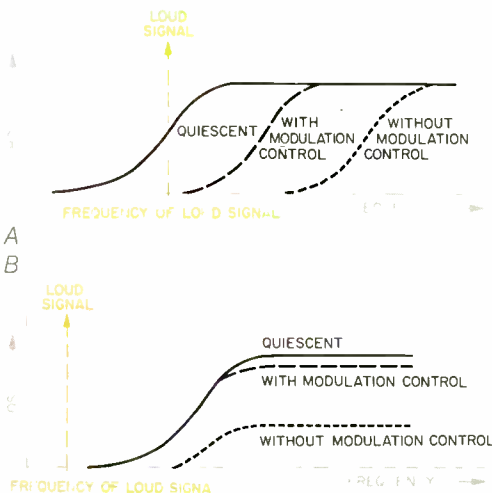


Fig. 4—Modulation control reduces the tendency of a sliding band to move further away from a high-level signal than necessary (A) and of a fixed-band system to reduce gain in the presence of a high-level signal at a nearby frequency (B).

NR effect, so that the system conforms more closely to the principle of least treatment.

Action substitution has an additional benefit. With a complementary NR system, changes in level introduced after the signal is initially processed can cause the playback processor to mistrack, that is, it may not act as a precise mirror image of the record processor. With a sliding-band system, a relatively small (and otherwise innocuous) level change introduced by the recorder at the dominant frequency can cause disproportionate, and potentially audible, decoder mistracking at lower frequencies. With Dolby S-type, however, the fixed band predominates at frequencies below the dominant frequency, reducing the potential for audible mistracking.

Modulation Control

In contrast to action substitution, modulation control, also developed originally for Dolby SR, deals with the effects of high-level signals outside the NR bands which need not, and should not, be boosted. With a sliding-band system, such high-level signals cause the band to slide up in frequency, out of their way. However, the higher the signal level at a given frequency, the further away the band slides. If left to its own devices, a sliding band can move so far away as to create a gap between its noise-reduction effect and the natural masking of the high-level signal, thereby causing a subtle form of noise modulation.

With a fixed-band system, dominant high-level signals nominally outside, but close to, the band can cause an undesirable reduction in the band's boost. This is because the filter used to create the bandpass cannot have an infinitely steep slope. If the dominant signal is strong enough, even quite far down the slope it will have the same effect as a lower-level dominant signal well within the bandpass. As with the sliding band, the high-level signal causes a reduction in NR effect where there should be none; that is, it causes noise modulation.

With Dolby S-type, a special technique called modulation control is applied to both the sliding and the fixed bands. It reduces the tendency of a sliding band to move further away from high-level signals than is necessary (Fig. 4A), and reduces a fixed band's tendency to react to high-level signals outside, but close to, the band (Fig. 4B). Thus, like action substitution, modulation control helps to keep all low-level signals in a more constantly boosted state in accordance with the principle of least treatment.

Spectral Skewing and Antisaturation

Spectral skewing and antisaturation techniques have been incorporated in Dolby S-type, as in Dolby SR. Spectral skewing consists of networks in the encoder which roll off the extreme low and high ends of the spectrum; complementary networks in the decoder restore flat response. The networks re-

duce the dependency of the system's action on signals at the extreme ends of the spectrum, thereby reducing decoder mistracking as the result of response errors introduced by the recorder in those regions. Such errors include those at low frequencies caused by head bumps, and those at high frequencies caused by variations among tape formulations even within the same nominal category, and by head-azimuth variations between the machine on which a tape is recorded and those on which it is played back. While spectral skewing results in some loss of NR effect at those extremes, the ear is so insensitive to noise at the extremes that the benefits far outweigh the theoretical NR loss.

Antisaturation consists of high-frequency shelving networks which operate at high signal levels; complementary networks restore flat response at playback. The shelving significantly reduces the high-frequency losses and distortion caused by tape saturation, thereby significantly extending headroom and further reducing the likelihood of decoder mistracking. Antisaturation reaches lower in frequency than spectral skewing, so its effects are limited to high levels to prevent any audible loss of NR effect.

Antisaturation effects are also contributed by both the low- and high-frequency spectral skewing networks. The low-frequency network, for example, virtually cancels out the low-frequency boost imparted by standard 3,180- μ S cassette equalization, resulting in a notable reduction in distortion on strong low-frequency signals. This improvement is possible because Dolby S-type provides noise reduction at low frequencies, without which eliminating the standard pre-emphasis would increase low-frequency noise. The combined effects of spectral skewing and antisaturation techniques at both low and high frequencies can be seen in Fig. 5, which illustrates Dolby S-type's overall encode characteristics.

Multi-Level Staggered Action

The principle of least treatment calls for a fixed gain, determined by the amount of noise reduction desired, wherever in the spectrum signals fall below some threshold. But there is also a need to fix the gain on signals which occur above a higher threshold, to reduce the effects of high-level overshoots. Overshoots are brief, exaggerated increases in level which occur during the time it takes for a compressor to react to a suddenly louder signal and start reducing the gain. At low signal levels, overshoots are of little concern: They are recorded onto the tape and then "undone" by the decoder at playback. But at high signal levels, overshoots from the encoder can get lost as a result of tape overload, resulting in distortion and decoder mistracking.

Therefore, changes in gain should occur only at intermediate levels, a characteristic we call bilinear compression and expansion (Fig. 6). To achieve this characteristic with

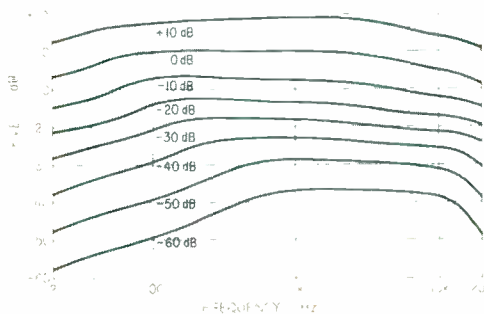


Fig. 5—Dolby S-type encode characteristics, showing the effects of spectral skewing and antisaturation at various input levels. The decode characteristics are the inverse of these curves.

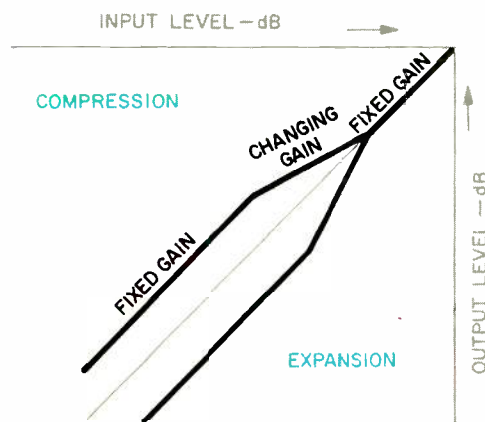


Fig. 6—Idealized bilinear compression and expansion.

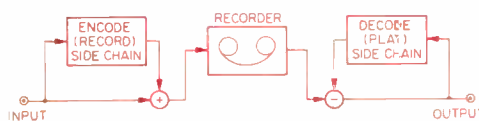


Fig. 7—In Dolby S-type, as in Dolby SR and the Dolby A, B, and C NR systems, processing takes place in a side chain, whose output is added to the main signal path for encoding and subtracted from it for decoding.

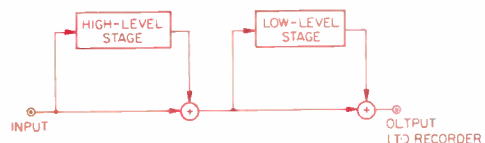


Fig. 8—In Dolby S-type, two high-frequency stages, sensitive to different signal levels, are used in the side chain (encoder shown).



Combining fixed-band with sliding-band NR techniques maintains the advantages of both while mitigating disadvantages.

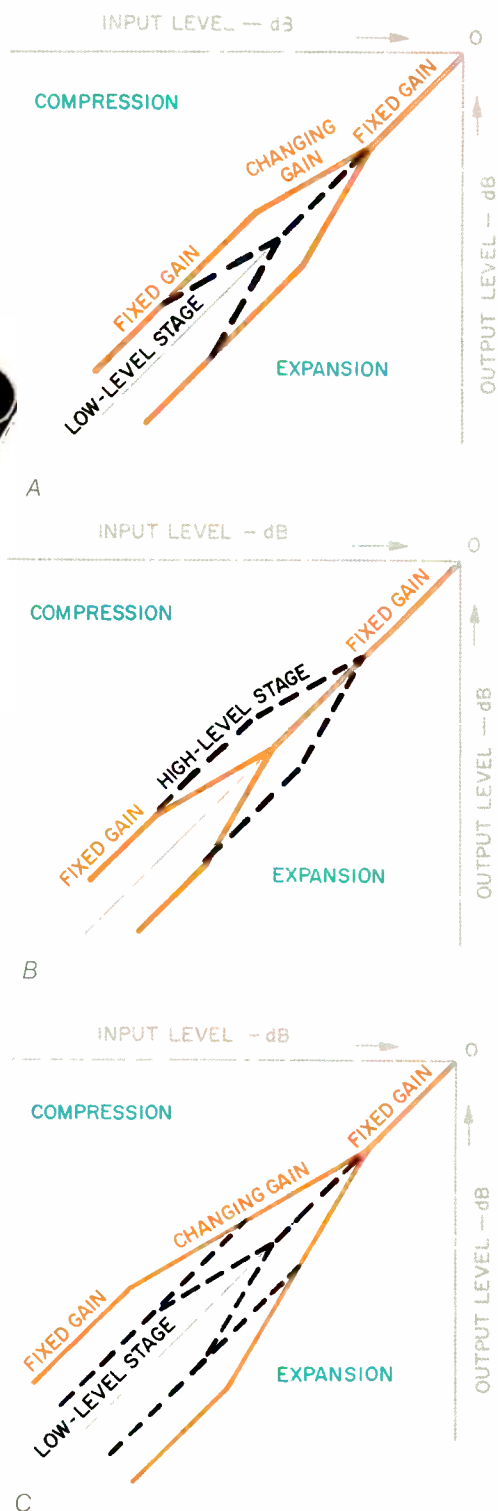


Fig. 9—The Dolby S-type NR system prevents multiplication of compression ratios by staggering the signal levels at which gain changes occur, as shown for the high-level stage (A) and low-level stage (B). However, at low levels, the boosts of the two stages add (C) to provide more noise reduction.

Dolby S-type, as in all our systems, a dual-path circuit configuration is used whereby processing takes place only in a side chain, whose output is added to the main signal path for encoding and subtracted from the main signal for decoding (Fig. 7). At low input levels, the side chain's compressed output makes a significant contribution to the encoder's total output. Because the encoded signal is still comparatively low, the overshoots introduced are of little consequence, as described above. However, as the input signal level increases, the side chain's contribution lessens proportionally, so that the unprocessed main path predominates. Eventually a level is reached above which the side chain might as well not be there; changes in gain, and therefore overshoots, virtually cease.

However, as more boost is designed into the compressor to achieve more noise reduction, the levels below and above which gain is fixed tend to move lower and higher, respectively. Preventing the one from going too low and the other from going too high runs the risk of introducing too high a compression ratio, which could magnify response and level errors in the recorder and thereby increase the potential for decoder mistracking. Therefore, at the high frequencies, where cassette noise predominates, Dolby S-type uses two 12-dB companding stages connected in series to provide what we call "multi-level staggered action," a technique developed originally for Dolby C-type NR and refined for Dolby SR (Fig. 8). The use of two stages enables us to achieve more noise reduction and maintain the advantages of a bilinear characteristic, without introducing unduly high compression.

Each 12-dB stage has a bilinear compression/expansion characteristic. At the low signal levels where maximum noise reduction is desired, the boosts imparted by the two stages add to provide the desired 24 dB. However, the thresholds of the stages are staggered: In what we call the low-level stage, the levels above and below which gain is fixed are lower than those for what we call the high-level stage. As a result, their compression ratios do not multiply, and the signal is never subjected to a higher ratio than that of an individual stage (Fig. 9).

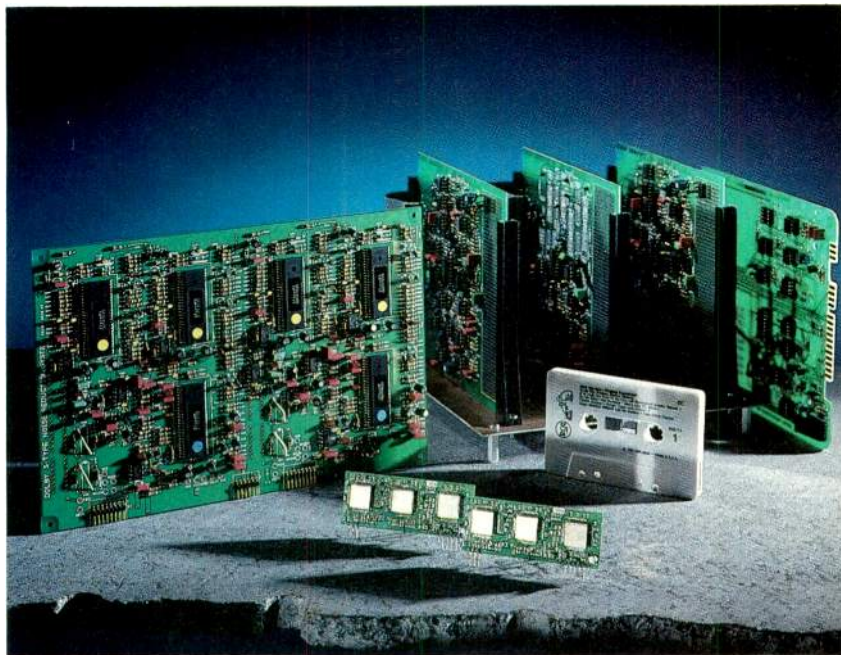
Multi-level staggered action has additional benefits. For example, the slopes of both stages' NR bands combine to provide steeper overall characteristics (Fig. 10), so dominant high-level signals can be that much closer in frequency to the bands without causing their gain, and thus the NR effect, to change. In addition, production tolerances for the individual stages of a multi-level configuration can be wider than for a single-level configuration with similar parameters, resulting in a system more readily mass-produced.

Final Elements

Figure 11 is a block diagram of a complete Dolby S-type encoder (the decoder is essen-

DOLBY S-TYPE AT A GLANCE

- New system for cassette recording derived from Dolby SR combines both fixed and sliding bands.
- 24 dB of noise reduction at higher frequencies, with 10 dB at lower frequencies.
- Increased headroom, particularly at frequency extremes.
- Minimal effect of high-level signals on low-level signals minimizes noise modulation as well as decoding errors.
- Encoded signal free of dynamic artifacts.
- Newly developed dedicated IC configuration for use in consumer products.
- New higher performance standards for products licensed to incorporate Dolby S-type.



Development stages of the new Dolby S NR system: Right background, multi-board configuration used to finalize Dolby S-type circuit design; left, two-channel card with new Dolby S-type three-IC sets suitable for production tape decks; center, space-saving single-channel hybrid circuits.

tially a mirror image of this). There is one element on the diagram that we have not yet discussed: A single-stage fixed band providing 10 dB of low-frequency noise reduction, in addition to the high-frequency stages' 24 dB. Because of the spectral content of cassette noise, the ear's reduced sensitivity to low-frequency noise, and the high-frequency stages' relatively low reach, the low-frequency band has to provide only modest noise reduction, and only below 200 Hz. For these reasons it was also judged that providing both fixed and sliding low-frequency bands was not subjectively worth the added cost. The low-frequency band also helps balance the encoded signal spectrally for playback without Dolby S-type decoding.

Another element in Dolby S-type is not on the block diagram at all: Dolby Laboratories' requirement that recorders with Dolby S-type meet new, higher performance standards. These include extended high-frequency response, tighter overall response tolerances, a new standard ensuring head height accuracy, increased overload margin in the electronics, lower wow and flutter, and, for the first time in the cassette recorder industry, a head azimuth standard. These new standards will not only contribute to unprecedented cassette performance but will also help to ensure that tapes recorded on one machine—including prerecorded cassettes—will play back with unprecedented accuracy on any other.

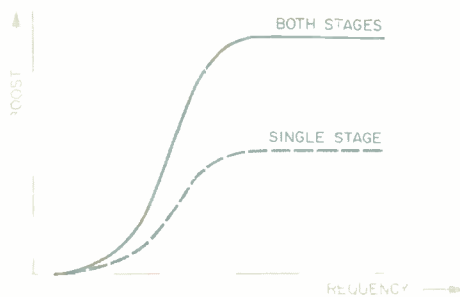


Fig. 10—Dolby S-type's multi-level configuration steepens the slopes of the NR band, further minimizing the effects of high-level signals on low-level ones.



Fig. 11—Block diagram of the S-type encoder. The decoder diagram would be essentially a mirror image of this.



The first tape decks with Dolby S-type will use a new, dedicated three-IC set developed with our cooperation by Sony's IC division, which will be making them available to all Dolby licensees. Later this year, Sony expects to complete the development of a single-chip version having identical performance and other IC manufacturers have expressed interest in doing so as well. However, Dolby S-type is always likely to cost more than our current consumer systems. That higher cost, combined with the higher overall performance required of the machine, means that cassette recorders with Dolby S-type may remain at the higher end of the price range. The first models, expected later this year, definitely will be so.

Dolby S-Type and The Future

We cannot predict now many home listeners might want better cassette performance, and how much more they will be willing to pay for it. However, the success of the CD indicates that higher quality sound is appealing to a significant market, and we have found that, at the highest playback levels likely to be encountered in the home, sophisticated listeners subjected to A/B comparisons of CDs and Dolby S-type cassettes are unable to identify which is which with any regularity. We are also unable to predict if the prerecorded cassette industry, unwilling to release titles in more than one format, will consider Dolby S-type cassettes sufficiently "compatible" with B-type playback to issue significant numbers in the new format. Be that as it may, the initial response to demonstrations we have conducted for the industry is generally favorable, and we are proceeding with the development of an appropriate professional encoder. Adding to these factors is the enormous investment in the cassette format by consumers, the music industry, and the audio industry (prerecorded cassettes significantly outsell CDs and LPs combined, and more than 280 million cassette machines with Dolby noise reduction alone have been sold). Therefore, there is a real possibility that Dolby S-type will extend and increase the returns on that investment, just as Dolby SR is already doing for professional analog formats.

A

This short evaluation of Dolby Laboratories' new Dolby S NR system was made using a Teac V-10000 Esoteric cassette deck, which also has Dolby B and C NR. In addition, it has signal generators which produce a 400-Hz tone for level calibration and a 10-kHz tone for bias setting. I used Fuji FR Metal tape for all my tests.

Pink noise, band-limited at 15 Hz and 25 kHz, was the source for the first tests. After deck calibration, a third-octave RTA showed a rising response above 10 kHz at -20 dB, so I increased the bias slightly to get flatter overall responses. Figure B1 shows record/playback responses from +5 dB (relative to meter zero, which is at Dolby level) down to -25 dB, in 5-dB steps. The highest levels show some saturation effects, but the curves are very flat, in general, over the wide range in levels.

One of the more interesting features of Dolby S NR is the spectral skewing at both low and high frequencies. (Dolby C NR has it at high frequencies only.) Both Dolby C and S NR have high-frequency antisaturation circuits. I measured the saturation caused by increasing levels (from -20 to +10 dB) for Dolby B, C, and S NR and without NR. The great improvement across the entire band with Dolby S NR, compared to Dolby B or no NR, was immediately very obvious. Resistance to saturation with Dolby C NR was close to that for Dolby S NR at the high frequencies but was clearly not as good as with Dolby S NR at the low frequencies. The low-frequency maximum output level (MOL) results with Dolby C NR were very slightly better than with Dolby B NR. With Dolby S NR, however, the MOL improvement over Dolby C NR was 0.7 dB at 1 kHz, in-

Recorders licensed for Dolby S-type NR must meet new performance standards that would also help ensure better compatibility between tape decks.



A FIRST TEST

DOLBY S-TYPE

creasing at lower frequencies to over 8 dB at 20 Hz, a significant change. The Dolby S saturation output level (SOL) results were better than those for Dolby C NR from 3 kHz to about 14 kHz, where they dropped just below those for Dolby C.

I recorded the band-limited pink noise at -20 dB with Dolby C NR and played it back using Dolby B (Fig. B2). There was some boost around 8 kHz and a roll-off above 10 kHz, but these were not bad, overall, for a change in mode at a level sensitive to errors. I also recorded with Dolby S and played this back with Dolby B NR. In this case, the changes in frequency response were more widespread and the level shifts were greater. I tried the same two combinations over a range of levels, and the basic results generally remained the same: For playback with Dolby B NR, the response deviations were less with the Dolby C recording than with the Dolby S recording.

I purposely misadjusted bias and level calibrations a few different ways and confirmed Dolby Laboratories' claim that Dolby S NR is more resistant than Dolby C NR to mistracking from calibration errors. Final conclusions awaited results from the listening tests.

Next, I ran signal-to-noise tests, referred to Dolby level, using all NR modes. With A-weighting, the ratios were 55.0, 63.4, 72.1, and 73.4 dBA for no NR, B, C, and S NR, respectively. With CCIR/ARM weighting, the figures were 52.0, 62.2, 71.8, and 71.8 dB, in the same order. Checking noise in third-octave bands, I confirmed that low-frequency noise (around 80 to 100 Hz) was 10 dB lower with Dolby S NR than with any other NR choice. The noise with Dolby S NR was slightly higher than with Dolby C NR from 2.5 to 5 kHz, but noise with C NR was no-

ticeably higher than with S NR from 20 Hz to 2 kHz and from 10 to 20 kHz. From the RTA display, the maximum reduction in third-octave noise with Dolby S NR was 20.5 dB at 1 and 1.6 kHz. Referred to the 400-Hz MOLs, the signal-to-noise ratios were 72.6, 81.6, and 84.2 dBA for Dolby B, C, and S NR, respectively.

The first CD I tried recording was *Bach: The Organs at First Congregational Church, Los Angeles*, with Michael Murray (Telarc CD-80088). I was quickly convinced that at high recording levels, Dolby S NR yielded superior results on the low pedal notes. Between tracks, I detected no difference in noise level between the CD source and the tape playback

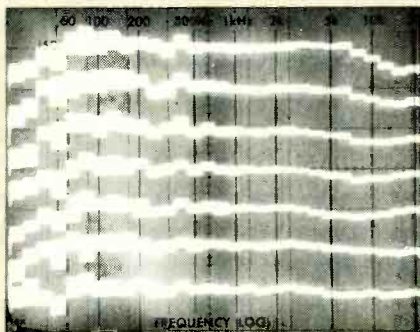


Fig. B1—
Record/playback responses at (top to bottom) +5, 0, -5, -10, -15, -20, and -25 dB, on Fuji FR Metal tape, using Dolby S NR. (Vertical scale: 5 dB/div.)

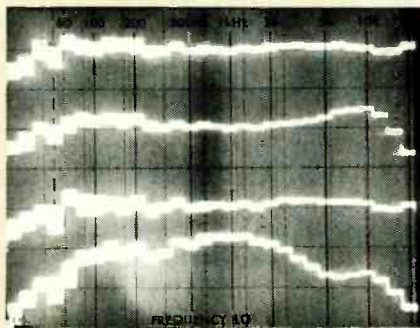


Fig. B2—
Compatibility test between Dolby NR systems, using recordings made at -20 dB. Curves show: Recording made with Dolby C NR, played back with Dolby C (top) and Dolby B NR (second curve), and recording made with Dolby S NR played back with Dolby S (third curve) and Dolby B NR (bottom curve).

with Dolby S NR; with Dolby C NR, I had heard a slight difference. The next CD was Tchaikovsky's *1812 Overture* (Telarc CD-80041), performed by Kunzel and the Cincinnati Symphony Orchestra. I concentrated on recording and playing back the last minute of the overture. Very quickly I demonstrated the challenge of recording this CD: I thought I had set the input pots conservatively, but the cannons caused levels way above +10 and the sound was badly distorted, so I reduced level a bit. At that point, I got very acceptable results with Dolby S NR, even though momentary peaks still came up to +10. For the first time, I truly appreciated the cannon sound in the playback. Other NR modes were definitely not acceptable unless the level was lowered greatly.

Stravinsky's *Firebird Suite* (Telarc CD-80039), with Shaw and the Atlanta Symphony Orchestra, was very well recorded with Dolby S NR. The playback of the "Infernal Dance of King Kastchei" and the finale was low in distortion and well detailed from the bass drum to the cymbal crashes. I then tried recording other sections of this CD with Dolby S NR, switching back and forth in playback between this NR system and Dolby B or C NR. In the medium- and low-level passages, I could hear the response shifts which had shown up in the bench tests, and I certainly preferred the sound when playing this Dolby S-encoded tape through the Dolby S decoder. Yet when listening to this same tape through Dolby B and C decoders, though the spectral balance was no longer accurate, it did not change when the level of the signal changed even though the levels varied over a wide range. I did not detect any disturbing pumping or obvious shifts in spectral characteristics. Overall, the sonic compatibility with Dolby B and C NR was definitely better than I thought it would be.

Dolby S NR has established itself as my preferred noise-reduction process for its resistance to overload across the band, good signal-to-noise ratio at all levels, low distortion, and resistance to calibration errors. Let's hope the chip makers can bring the cost down to facilitate including Dolby S NR in more than just the top-of-the-line cassette decks.

Howard A. Roberson

P R O D U C T I V

THE AUDIO INTERVIEW --- STEVEN EPSTEIN

S U S A N E L L I O T T

Given his relatively few years, Steve Epstein has produced an enormous number of recordings. Among the artists this Sony Classical (formerly CBS Masterworks) executive producer most frequently records are trumpeter Wynton Marsalis, cellist Yo-Yo Ma, violinists Cho-Liang Lin and Isaac Stern, and pianists Murray Perahia and Vladimir Feltsman. The Chicago Symphony, Berlin Philharmonic, and Vienna Philharmonic are all entrusted to Epstein, as are Michael Tilson Thomas, Lorin Maazel, and Zubin Mehta.

Epstein started his career at CBS Records in 1973, when he was hired as a music editor fresh out of college. (He holds a B.S. in music education from Hofstra University.) He apprenticed for a year with Tom Frost before being given his first major project at age 23, and since then has produced well over 100 recordings, many of them garnering highly prestigious awards.

Five of his nine Grammy-winning discs are Wynton Marsalis projects; Epstein produces this talented trumpeter both as a classical and a jazz artist. Given Epstein's successful fence-straddling, it was interesting to learn the particulars of his approaches to the two different genres.

S.E.

You've produced nine out of the 12 records Wynton Marsalis has made for CBS/Sony. How did you two hook up in the first place?

Buddy Graham [who now engineers Marsalis' classical recordings] and I were in Vienna, where we had just finished recording Mahler's Fourth—the first Mahler record I had done—with Lorin Maazel and the Vienna Philharmonic. This was 1983. We were in the airport on our way back to the States, and who do we see but Wynton. I had met him once before, so I went up and reintroduced myself. The three of us sat down for a drink—Wynton had a Perrier, he doesn't drink—and started talking about recordings. Wynton mentioned that he liked the live Gershwin

record I had made with Sarah Vaughan and the Los Angeles Philharmonic. He had two jazz records out, and he was telling me that he wanted a bigger sound on his next one. He knew I was going to be producing his next classical album, so he asked if I'd be interested in doing his jazz album too. I said sure, I'd love to.

I'd never done a jazz album before, other than the Gershwin, and that was more symphony orchestra/pops than jazz. But he liked my philosophy of recording jazz—that it should be done in real time (that is, live with no overdubbing) in a nice-sized room. The whole idea is for everyone to play off everyone else in real time. That's what makes jazz jazz.

E-PRODUCER



PHOTOGRAPH: ROBERT LEWIS

His previous jazz recordings had been done at Media Sound, which is a fine studio, but my instinct told me that RCA's Studio A would be a better room for jazz. It's large enough to allow an ensemble with potentially high volume levels to "breathe," while at the same time it's not overly reverberant, which would yield a less intimate environment than you want for jazz. The first record we did was *Hot House Flowers*.

That was larger scaled than most jazz records.

True. It had a small orchestra—a string section, some winds and brass—which, of course, played from charts. So that made it a little more like a classical recording, and I was able to hone in on things by using bar numbers and so forth—"bar so and so is not great." It was a nice gradual way for me to slip into jazz.

Hot House Flowers won a Grammy, as have most of your jazz records with Wynton.

Right, it turned out just fine. Ever since then, Tim Geelan [who engineers Marsalis' jazz records] and I have been honing and refining our technique, using the multi-track digital machine to

experiment with different microphones, which we also do with classical. That's the fun of recording—experimenting.

Do you have a background in jazz?

Not really. My father loved it, and I listened to it through him. My background is classical, but I love what jazz is about and I'm moved by it. Certainly, producing Wynton I realize that I have a lot to learn about jazz. But that's one of the joys of working with him.

But you must have some frame of reference.

Well, sure, I've listened to recordings. But basically I feel someone who has good ears, good taste, a solid musical upbringing, and a knowledge of how instruments are supposed to sound can do a good recording, be it jazz, pop, or classical. There's really no magic; you just have to know what you sense to be correct.

You might find producers who are better versed in jazz than I am or who play jazz part-time or even full-time, but who may not know how to transfer what happens in the studio onto the tape. That's what's important.

During the sessions for Wynton's recent jazz disc, The Majesty of the

Blues, I noticed you doing little drum fills with your hands.

Oh yeah, I probably was. I guess I'm a frustrated drummer, just like I'm a frustrated conductor. You get into it. Some people tap their feet. I play it out with my fingers.

What's your general philosophy about recording jazz?

From a recording standpoint, jazz falls right between pop and classical. It comes closer to classical, in that it's all done in real time and pop is mostly layered. In jazz, you don't mike at the same distance you do in classical. Jazz is more intimate and is meant to be heard in a closer perspective, like in a club, than classical. At the same time, you don't want to record it in a closet and have it sound dead. Instruments are instruments. And jazz acoustic instruments are meant to be heard in a reasonably sized room. Wynton has a beautiful trumpet sound. You want to allow it to blossom a little bit. You don't want it to be stuck in front of a microphone in an anechoic chamber. That is what Wynton liked about our approach. Of course, this was the approach they used back in the '50s

WYNTON MARSALIS



Photograph: ©David Gahr

**THE AUDIO
INTERVIEW**
**STEVEN
EPSTEIN**

**JAZZ SHOULD BE RECORDED
LIVE, IN A NICE-SIZED ROOM.
THE IDEA IS FOR EVERYONE TO
PLAY OFF EVERYONE ELSE—
THAT'S WHAT MAKES IT JAZZ.**

and '60s, recording Miles Davis and some other artists at the CBS 30th Street Studio.

And the more recent approach has moved away from that?

It seems that on some recordings I've heard, yes, the tendency is to get pretty close and to have this closet-like, claustrophobic sound.

I wonder why. The pop mentality, perhaps?

Well, it's funny. It's almost cyclical. Before the days of multi-tracking, people recorded in large rooms with just the few tracks that were available. With the advent of multiple tracks, the tendency of some producers and engineers in the late '60s and '70s was to use more mikes and therefore get closer to the instruments. This affected pop, jazz, even classical recording. And consumers liked hearing close-sounding recordings because they were impressive—stereo components didn't have the sensitivity they do these days. Close-miking pretty much prevailed throughout the '70s, but now—and hopefully we've had something to do with this—the tendency is to get back to a more natural sound. Instruments are meant to be heard from a certain distance. And in digital, and with the quality of playback equipment today, you really don't have to mike that closely. A symphony orchestra is meant to be heard not from a foot away from the center of the orchestra, but from at least 10 rows back. It takes at least that distance for the bass frequencies to blossom. And now, with the high sensitivity of digital recording, you can capture that. By the way, I'm not addressing mike placement here, just the listening environment.

What about jazz?

You're compelled to mike closer than in classical because you want the mu-

sic to have the impact it would have, say, in a nightclub. But if you get too close, then you'll distort the frequency spectrum, which makes for a rather unpleasant, strident sound. Again, you want the instruments to sound like real instruments.

I hear a lot of crossover recordings, bordering between pop and classical, where a large symphony orchestra is called for and it's been recorded in a dead studio. It sounds awful. You might as well use a small orchestra. Why waste all those musicians?

Was it a conscious decision on your part to take jazz into the classical recording context?

Absolutely. It was the jazz recordings I'd heard that had been done in a very dry studio that compelled me to try the change. It just seemed the natural way to go.

I also think that with *Hot House Flowers*, we were the first to record jazz digitally, although I can't say that for sure. A lot of classical recordings were being made digitally then [1984], but a lot of the pop people didn't like the medium and were afraid of it.

I've read that you use a modified Decca tree in making classical recordings. Can you explain how it works?

The original one was devised by Kenneth Wilkinson, one of the Decca engineers from the '50s through the '70s. He made some great recordings. It's a very simple setup using three omnidirectional microphones mounted on a tree in a "T" configuration. The leg of the "T" predominantly picks up the center of the orchestra, and the two other microphones pick up the left and right—high strings and low strings. The center picks up the other mass of strings and, mostly, woodwinds. Everything else has depth because it comes into those mikes at the proper time

delay. The trumpets come in a little later than the strings, which are closer to the microphones. The apparatus is placed 10 feet from the floor of the stage, over the conductor's head. For a greater spread and depth, Buddy Graham and I augment those three mikes with two more omnidirectionals. They're mounted at the same plane and height as the other microphones, but further to the conductor's left and right. So one flanks the high strings and the other, the low strings.

The use of omnidirectionals placed accordingly pretty much yields the balance the conductor himself hears. Years back, Buddy and I used mostly cardioid microphones. We wouldn't have dared using omnis—too dangerous! Some companies still do use cardioids as a main pickup. They'll put four or five on the strings—one for each section—and four or five for woodwinds, plus mikes for all the brass, horns, and percussion, and maybe ambience mikes. Buddy and I have been moving away from multiple miking for at least five or six years. Many times, you'll hear conductors who are used to that old technique say to the orchestra, "Oh well, they can take that down in the mix later, don't worry about it." I'm finding that I constantly have to re-educate on that point. Before recording, I explain, "We have very little flexibility after the fact. What you, the conductor, hear is pretty much what we're getting. If I get too much trumpet on the tape, it's not us, it's happening out there in the hall."

Do you use mikes in the hall at all?

Sometimes we do. If it's a fairly reverberant hall, like the Concertgebouw or Musikvereinsaal, where we record the Vienna Philharmonic, we won't because there's enough ambient information coming into the main microphones. That's why mike placement is critical: We're using only a few mikes to capture the immense sound of a large symphony orchestra.

Do you prefer recording in a hall to recording in a studio?

Yes. Always. At least in classical. Not in jazz, where listening to a quartet or quintet in a concert hall is antithetical to what it's all about. You have this big cavernous sound, and the music just loses all its effect.

Aside from achieving a natural sound, what is your approach to classical recording?

Ever since I was a little kid, I've always liked to close my eyes when listening to a recording and pretend I was in a



**STEVE EPSTEIN WITH
WYNTON MARSALIS**

Photograph: Terry Lott

**THE AUDIO
INTERVIEW**

**STEVEN
EPSTEIN**

**THE FINEST HALL I'VE USED
FOR CLASSICAL RECORDING
IS THE CONCERTGEBOUW
IN AMSTERDAM. IT JUST
HAS A GOLDEN GLOW OF
REVERBERATION.**

concert hall. That's what I try to create on record—an illusion. In the concert hall, you have many senses being stimulated. You hear a little bit with your eyes. You see a massive string section, and your mind synthesizes more strings than are really there. A recording has to make up for the lack of that visual aspect. You have to set up your mikes to take full advantage of a massive string sound. And chances are, what will be deemed natural over speakers will be a fuller string sound than what you might hear in a live concert. Sometimes it takes a little bit of artifice to make up for no artifice. Two or three microphones placed in an ideal position in an audience will sound hollow and cavernous over loudspeakers. And the ideal placement for microphones is not the ideal placement for listening to an orchestra, just by the nature of psychoacoustics.

How important is the hall in classical recording?

In the '60s and early '70s, the quality and size of the hall were not as important because closer miking meant you

would have less of the hall's influence. Equipment wasn't as sensitive. And in the analog days, you didn't have to worry as much about ambient noise, rumble, and traffic noise.

So finding a good hall that is quiet and has good acoustics has become much more important than it was. The success of the sound of a classical recording is 90% dependent on the hall that is selected.

What's the best hall you've ever worked in for classical?

The Concertgebouw in Amsterdam. It just has a golden glow of reverberation. The characteristics are so uniform and umbrella-like, in the sense of an even tapering off of sound. We record on the floor, not the stage, and take out all the seats except those on the perimeter of the room, which we leave in to soak up some of the excess reverberation.

For your standard five-microphone set-up, how many tracks do you use?

Since, to my knowledge, no four- or eight-track digital machine is currently on the market, our choice in classical

and jazz is two- or 24-track. Effectively, we could very easily make an adequate two-track recording simply by blending those five mikes into a two-track picture. But I refuse to go into a session with only two tracks at our disposal. Suppose we're in a hall that we don't use everyday—after all, we're sort of like nomads, going from great hall to great hall—with a control room that I'm not entirely familiar with; it might have acoustic anomalies and resonances that could give us the wrong picture of what we're getting on tape. So we get back to a control room that we're familiar with—you know, the real world—and we discover that, say, in the case of a piano concerto, the piano is either way too loud or way too soft. If we're only in two-track, we're locked into that balance. Multi-tracking offers us the opportunity to critically and properly balance in a room we're familiar with. Another example: If we do use ambience mikes, I don't want to lock myself into a blend of ambience and main microphones and end up with an overly reverberant recording.

Frankly, I'd be very happy to have a four-track, an eight-track, or, for opera, a 16-track recorder. But the fact that we have 24 tracks gives us a little more flexibility and also enables us to experiment.

Of course, as soon as you mention multi-track in classical recording, some audiophiles raise their eyebrows because they feel it's not the purist's way. And even though we're only using a few of the 24 tracks, people see the 24-track machine noted on the liner information and say, "Hah, they're using multiple microphones, they're in multi-mono and it's a big corporation and what do they know about classical recording?" You find that in many reviews. Rather than just listening to what they hear, people get caught up by what they see or read and become misled. They feel that those in the establishment, in a big corporation, have untold amounts of dollars, so they just use everything—multiple mikes, multiple tracks—and it's all supervised by a fat-cat producer with a big cigar. It just isn't that way.

You usually edit on the Soundstream [digital editing system]. Doesn't that limit you to eight tracks?

Right. And we think that system is wonderful. It cuts our editing time tremendously because it's instant-access editing on hard disk, as opposed to real-time editing, where you have to record each take onto another ma-

chine just to build a master. Sony has also developed software to enable their DAE-3000 two-track editor to interface with their 24-track digital recorder. This works quite well and allows us to edit the full 24 tracks.

Do you use a Sony 24-track in recording jazz as well as classical?

Yes, we have been. Until Sony comes out with a smaller machine that supplies us with only eight tracks, I'm happy with that.

I understand Sony has come out with a new version of the 3324.

It's called the 3324A, and it's got improved analog-to-digital and digital-to-analog converters that, in my opinion, are the best on the market.

How has Sony's acquisition of CBS Records affected your division?

Very positively. Messrs. Ohga and Breest have made some very positive statements about making Sony the Number One classical label in the world. Obviously, that made us very happy. [Norio Ohga is president of Sony Corp.; Guenther Breest is president of Sony Classical, of which Masterworks is now a U.S. division.]

Does this mean you'll only be able to use Sony equipment?

The choice of microphones, and things that are basically a question of taste at the time of recording, will be left up to the producer and the engineer. But we will be using Sony digital consoles and Sony equipment in the control rooms and post-production rooms. We'll be experimenting with prototypes too. For instance, Sony is in the process of developing studio microphones. The prototypes are very promising.

Tell me about Wynton's classical recordings.

We've done four together. Our first was a baroque album recorded in St. Barnabas Church, north of London. Excellent acoustics, although we had something of a noise problem with trains and cars. The second one was a French album with the Philharmonia Orchestra and Esa-Pekka Salonen. That was done in Walthamstow Town Hall, also about an hour away from the center of London. It's one of the best places to record a symphony orchestra in London. The third, *Carnaval*, was a cornet record Wynton did with the Eastman Wind Ensemble in the Eastman Theatre. The most recent one was multiple baroque trumpet, which was done in St. Barnabas with the English Chamber Orchestra and conductor Raymond Leppard. Saint Barnabas Church has a very nice, atmospheric,

warm sound. It's not overly reverberant and yet it allows instrumental choirs to blend very naturally, so it's well suited for baroque music. It's too small to house a much larger ensemble.

What was the mike setup on Wynton's most recent classical disc, Baroque Music for Trumpets?

Actually, the most recent album was very unconventional because it employed a lot of overdubbing. Wynton played eight trumpets on one of the pieces. [The procedure was quite tricky: After laying down the basic trumpet-with-orchestra tracks in St. Barnabas, Epstein returned to New York to edit. He and Marsalis then returned to the church and overdubbed live: While one machine played back the original tracks, another recorded them with Marsalis playing the second trumpet part. This process was repeated for as many trumpets as were called for—in one case, eight—with the soloist positioned as near or far from the microphone as authenticity dictated. Due to variances in reverberation time, Marsalis frequently had to play slightly before the prerecorded music in order to be in sync with what was already on the tape. Epstein's liner notes on this album explain the process in greater depth.]

To lay down the basic trumpet with orchestra, we used our standard setup: Five omnidirectional mikes spread across the orchestra, giving a basic, general nondiscriminating pickup. We also used a woodwind microphone and a spot mike for the trumpet, to define it. But the majority of the sound was the leakage into the five main microphones. As usual, we had very little control on rebalancing.

How do your philosophies for miking Wynton differ, jazz from classical?

In classical, the whole idea is to pick him up in the main microphones. They are responsible for providing the body of his sound and the main tone that he imparts. His particular mike is only there to define the sound. In jazz, we rely much more on that solo mike; it's responsible for his primary sound.

In a general sense, how does his sound differ?

He likes more air in his jazz recordings and likes a rounder sound for classical, both of which he gets on his own.

Is Wynton more at ease in jazz than classical?

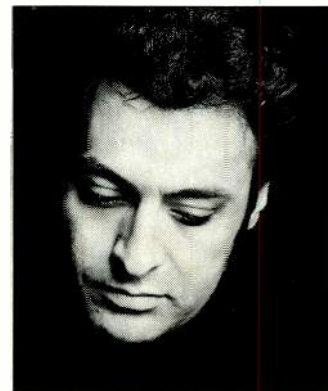
Yes. Jazz is his first love, and he feels more comfortable in that setting. He knows exactly what he wants. He's even admitted to being a bit nervous in



LORIN MAAZEL



CHO-LIANG LIN



ZUBIN MEHTA



MURRAY PERAHIA



**THE AUDIO
INTERVIEW**
**STEVEN
EPSTEIN**

**MY MAIN JOB, CLASSICAL OR
JAZZ, IS TO CAPTURE ON TAPE
WHAT THE ARTIST DOES BEST.
THAT'S WHAT I'M HERE TO DO.**

a classical session. But as soon as he puts the mouthpiece on his lips, his nerves are dispelled.

You would never know that he devotes most of his life to jazz when you hear him play the baroque trumpet. It's just uncanny. He's also an unrelenting perfectionist about getting the sound he wants on the tape. That can be very frustrating at times because you want to hear what he's hearing or what he wants to have happen, but you can't. I've gotten to the point where my ears are so attuned to his perfectionism about sound and attack, that in other sessions, I'm always surprised at what other trumpet players deem acceptable. Wynton would not accept what most players do.

In sitting in on the session for The Majesty of the Blues, I noticed that you were using several mikes on his trumpet. Why?

With Wynton, we always make it a point to try a new microphone at every session. We'll put it on its own track, which we may never even use. This goes for classical as well as jazz. As happy as he is with the trumpet sound, he always likes to see how far we can go to improve it. So we always experiment.

What are your preferences in microphones?

It's interesting, because two microphones can have exactly the same specification and yet sound completely different. Almost like a phono cartridge or speakers. B & K has been very helpful in keeping us apprised of their latest products. For the most part, they're our preferred microphones, particularly for classical. They've just come out with a new cardioid mike that, so far, has worked in more applications than other mikes we've used.

You used the B & K on Wynton for The Majesty of the Blues?

Right. The B & K 4011 cardioid has a very full-bodied sound and works well on loud material and on soft.

Weren't you also using a Schoeps?

That sounds very good, too. Sometimes we switch mikes when Wynton's using a mute. A muted trumpet can have a great deal more high-frequency material in it, and a particular mike, such as the Schoeps, may be better suited for that.

For this session, there were the B & K, the Schoeps, and one more.

We also used a Neumann U67, which is an old standby and has been very successful for trumpets. It's still a competitive mike in some ways. It has a large diaphragm; you can derive a lot

Photograph: Robert Lewis

of warmth out of a sound with a large-diaphragm microphone.

What about the piano mikes?

Here we could experiment as well, because of the abundant tracks. Recently, we've been using an AKG C422 stereo mike, which gives us a nice, accurate pickup for the piano. We've also been using two Neumann U87s. Then we decide at a later date, with critical listening, which we're going to use. So you're talking about four tracks now for the piano, of which two will be used in the final mix.

How close to the strings are the mikes?

Certainly closer than in classical recording. The mikes are pretty much over the strings, but the cover is up. On a lot of pop recordings, the cover is down and they put blankets over it. We don't do that.

What about the bass?

For the bass pickup we place an Electro-Voice RE-55 omni mike under the bridge. What we've been using recently as a main bass mike is a Neumann TLM 170i, which is new. It has superb applications for voice, for pizzicato bass, and particularly for brass and saxophone.

Do you ever go direct in bass?

Bass direct is pretty much a no-no in jazz, but if we're doing a real burnout piece, where everybody's playing at very high levels, we will have a direct track on the tape just in case the bass has gotten lost.

You also always have this problem of bass drum and bass fiddle conflicting in their similar frequency ranges. On some occasions we may ask the bass drum to voice his instrument a little higher to mitigate the problem. That way you can still hear the impact of the bass drum and recognize the low frequencies from the bass fiddle.

So, yes, we'll edge in the bass direct in those circumstances where we've really lost articulation. But we prefer not to.

Drums?

In the old days, we used a mike on every tom-tom, on the splash and ride cymbals, and on the bass and snare drums. I wanted to do away with all those mikes because it turns the drum set into its own recording studio. It draws too much attention to itself. So recently we've cut down on the number of mikes and tried using two omnidirectionals as an overhead pickup. You'd think omnidirectional wouldn't be advisable because it's picking up everything, and what you really want is

the impact. So you'd use maybe two cardioids to give it that hot sound.

But we use two B & K 4003 omnidirectional microphones, an AKG D12 mike on the bass drum, and an AKG 451 on the snare drum, which picks up the high-hat too. You get a much more natural sound using that setup, and you still have the impact. There's plenty of energy.

How close?

Relatively close—the main microphones are maybe a foot-and-a-half over the cymbals.

Sax?

The Neumann that we used on the bass is also the best saxophone mike. We've tried a lot of saxophone mikes, and we think the TLM 170i is the best available.

Do you use any room mikes?

We use two. We've been using a pair of Schoeps MK2S microphones and also B & K 4003 omnis. In a ballad, we'll edge them into the mix a little more. If it's a real burnout we won't, because there's so much leakage.

How about outboard equipment?

We use very little during recording, though we might do some things for the monitor mix or use a little equalization on the bass drum. But we try to do as little as possible.

We generally put the monitor mix onto two tracks of the digital machine, just to see what we did at the time of recording. You would be surprised at how close we come in the final mix to what we did for the monitor during the session.

When we mix, we might use a limiter on the bass to give it a more linear response, to even out the resonances. And we'll definitely use reverberation, but just a little bit, because the whole idea of using a big room is to let it speak for itself. On the other hand, the room may not always have a nice tail, or decay, which we can achieve with digital reverberation.

Do you use digital reverberation in classical too?

Yes, sometimes. Thank God for equipment such as the Lexicon 480 digital reverberation unit, particularly if we record in a very dry hall. What we'll do, if necessary, is add a little bit of reverberation to the ambience mikes, just to give it a natural-sounding decay. We did that for Wynton's Eastman Wind Ensemble album. The Eastman Theatre has a nice acoustic, but it's dry. In the Musikvereinsaal, we do not add reverberation because it's a fairly live venue.

Do you use equalization in classical? Rarely, if ever. The quality of microphones is so fine, we don't need to. **This is also true of Wynton's jazz recordings?**

No. In a jazz recording, we will use equalization, though only to assist in what wasn't picked up accurately by the microphones or what the studio wasn't offering.

What's your all-time favorite studio?

For classical, it used to be the CBS 30th Street studio. That was the greatest room in the country. Tragically, it was sold in the early '80s and torn down. It was an old church, barely big enough for a symphony orchestra. All the Broadway shows were recorded there; even Stravinsky used it. No one had the foresight to realize its importance. It was the quick-buck mentality, which fortunately Sony doesn't have. Now that 30th Street is gone, EMI Studio—Abbey Road—is probably the world's best symphonic studio. It's acoustically superb. You can do anything there. It's a very live room, so if you're doing chamber music or pop, you have to screen it off a little bit to soak up some of the reverb.

Is that for jazz as well?

No, a studio that is ideal for classical is not ideal for jazz, pop, or show music because you need a longer reverberation time in classical. For jazz, I prefer to work in RCA Studio A.

As a producer, how does your role differ, jazz to classical?

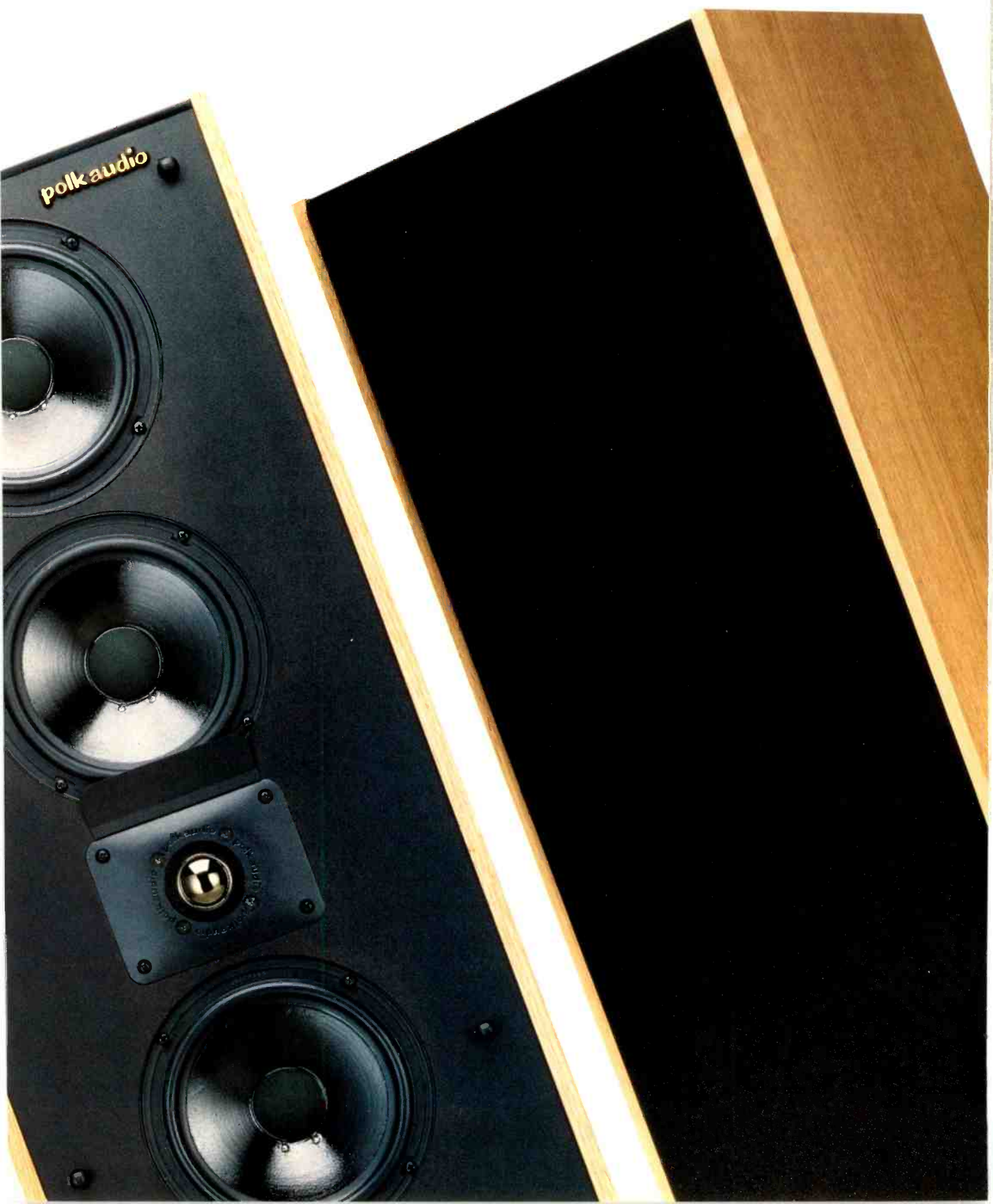
In a jazz recording, the artists are always composing. As a producer it's somewhat frustrating, because I'm used to contributing a lot to classical recordings, commenting on right notes, wrong notes, interpretation, and sound. In jazz, how do you tell an artist, "I don't like what you just played," when it's something he played—improvised—from his heart? It's not a question of interpretation, it's a question of taste, of actual music being composed, rather than right or wrong or notes on a page.

So what contributions do you make in a jazz recording?

Offering the odd comment about performance. If I think something is a little slow, a little fast. I might suggest a cymbal roll here or for the bass to cut out there. Just to make sure the sound is correct, the balances are right, and to follow the recording through to its final end, till it comes out on CD.

My main job, classical or jazz, is to capture on tape what the artist does best. That's what I'm here to do. **A**

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.



polk audio
The Speaker SpecialistsSM

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

**Where to buy Polk Speakers?
For your nearest dealer, see page 122**

Enter No. 42 on Reader Service Card

1

SONY CDP-X77ES CD PLAYER

Manufacturer's Specifications

Frequency Response: 2 Hz to 20 kHz, ± 0.3 dB.

S/N: Greater than 117 dB.

Dynamic Range: Greater than 100 dB.

THD: 0.0015%.

Channel Separation: Greater than 110 dB.

Wow and Flutter: Below measurable limits ($\pm 0.001\%$ wtd. peak).

Analog Output Levels and Impedances: Unbalanced, fixed, 2.0 V/10 kilohms; variable, 0 to 2.0 V/50 kilohms; balanced, 2.0 V/10 kilohms; headphone, 40 mW/32 ohms.

Digital Output Levels and Impedances: Coaxial, 0.5 V peak to peak, 75 ohms; optical, -18 dBm (660-nm wavelength).

Number of Programmable Items per Disc: 20.

Power Requirements: 120 V a.c., 50/60 Hz, 22 watts.

Dimensions: 18 $\frac{1}{8}$ in. W \times 5 in. H \times 14 $\frac{5}{8}$ in. D (47.2 cm \times 12.7 cm \times 37.1 cm).

Weight: 37.4 lbs. (17 kg).

Price: \$1,700.

Company Address: Sony Dr., Park Ridge, N.J. 07656.

For literature, circle No. 90



Every time I think I have come up with a reference CD player in the under-\$2,000 price category, along comes Sony with a next-generation player that surpasses my choice on just about every count. Such was the case with the CDP-X77ES, which is Sony's successor to the acclaimed CDP-X7ESD, my previous selection as a reference player.

The refinements and enhancements in the CDP-X77ES include innovations and improvements in circuitry as well as user convenience features. Like many new CD players, this unit embraces what many call "one-bit" D/A technology (a bit of a misnomer, but not a serious one). Much has been written concerning the advantages of one-bit D/A conversion (which uses techniques developed by NTT, the Nippon Telegraph and Telephone Corp.), so I won't spend time detailing its principles except to say that such converters can theoretically be free of several problems associated with conventional, step-waveform D/A converters. These problems include differential nonlinearity distortion, zero-crossing distortion, and glitches caused by minute timing differences between the various bit switches. Sony's version of one-bit technology, which they call a High Density Linear Converter System, consists of a noise-shaping digital filter, a new "pulse D/A converter," and an analog low-pass filter.

Noise-shaping filters are integral to the design of one-bit converters. Since such converters operate on one bit at a time, instead of all 16 bits simultaneously, the bit rate must be reduced to be practical with today's IC technology. Noise shaping permits this bit reduction to be done without loss of audible dynamic range, by shifting much of the noise up to inaudible frequencies. In the CDP-X77ES, Sony employs a third-order filter system that operates at a 64-times oversampling rate.

While the output of a conventional D/A converter is a stepwise version of the original analog signal, the output of a pulse D/A converter consists of a train of pulse-length modulated (PLM) pulses which, like the stepwise outputs of other D/A circuits, can be converted to a smooth analog wave by a high-pass analog filter. To raise the pulse density for higher accuracy, the converter uses a clock generator that operates at a maximum of 50 MHz, about twice as high as that of ordinary high-speed C-MOS ICs. To eliminate minute, secondary distortion components that would show up predominantly when reproducing higher audio frequencies, Sony uses two pulse D/A converters per channel in complementary mode.

Since a pulse D/A converter defines musical signals by altering pulse density, it is important to time those pulses precisely to ensure conversion accuracy. Sony uses a Direct Digital Sync circuit to accomplish this. The circuit was incorporated in last year's players as a separate IC, but has now been integrated into the new HDLC IC, enabling direct connection of a highly accurate quartz-oscillator master clock to the PLM pulse converter.

By using these techniques, Sony claims to have achieved a theoretical S/N ratio of 124 dB! These enhancements also contribute to what I found to be amazingly low residual distortion in the CDP-X77ES.

Custom Edit and Custom File, two convenience features which take advantage of the subcodes found on all CDs,



are used here, as they were in earlier Sony players. Custom Edit makes it easy to calculate how many selections can fit on a cassette of given length. As you program the player, the time display shows the total accumulated time that you have programmed. A manual fade feature lets you smoothly fade a selection digitally if you must use up the last bit of tape while transcribing a CD, so that when it is played back, there is no abrupt interruption in sound as you come to the end of one side of the tape. Custom File lets you store your programming choices for a disc in a "program bank" so that you can call up the program whenever you play that disc again. Every time you insert the disc, the player can recall your selections and play them in the order you had previously selected. Of course, such features as shuffle play, single play, and the various types of repeat play are also available.

Control Layout

Most of the special features just described are accessible only from the supplied remote control, so as to keep the front panel's layout relatively uncluttered. The main power switch, the headphone jack, and the level control (which affects both the headphone and variable line outputs) are at the left end of the panel. Nearby is the smoothly operating disc tray, and below it is a large display area. In addition to the usual displays of elapsed or remaining time and track and index numbers, this display shows playback mode ("Program Bank," "Single," and "Repeat A-B"), the presence of a disc, and "Custom Index" status.

Every time I think I have found a reference CD player for under \$2,000, Sony brings out something that completely surpasses it.

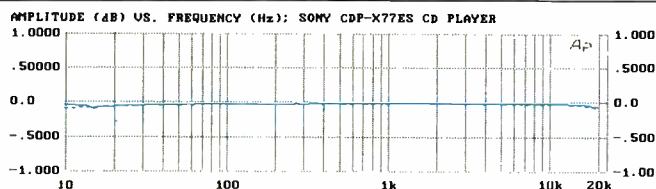


Fig. 1—Frequency response, from 10 Hz to 20 kHz, for left channel (solid curve) and right channel (dashed curve).

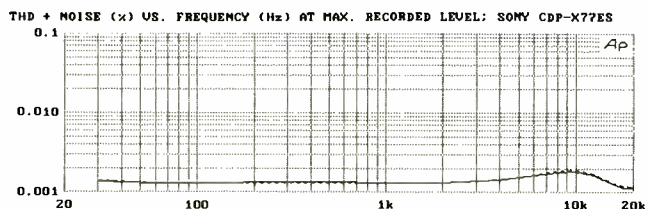


Fig. 2—THD + N vs. frequency for left channel (solid curve) and right channel (dashed curve).

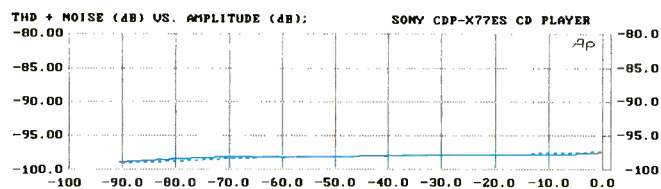


Fig. 3—THD + N (referred to 0-dB recorded level) vs. signal amplitude for left channel (solid curve) and right channel (dashed curve).

Immediately to the right are the "Display On/Off" and drawer "Open/Close" buttons. At the upper right of the panel is the button for selecting analog or digital output, with a pair of indicator lights to show the current output mode. Track advance and reverse buttons (Sony calls them "AMS," for Automatic Music Search), fast forward and reverse search buttons, and the usual play, stop, and pause buttons complete the panel layout.

The remote control's keys duplicate all of the controls found on the front panel, even including the disc tray open/close function. In addition, there are 20 numbered buttons for instant track access and programming. If a disc contains more than 20 tracks, a ">20" button takes care of accessing the higher numbered tracks. Buttons for indexing, repeat play, and all playback modes (program, shuffle play, single track, custom index, and continuous play) are found on the remote, as are buttons labelled "File," "File Recall," "Erase," program "Clear," and "Check" (to review a program you have assigned to a disc). While the fast-search buttons on the front panel allow audible searching at a fairly rapid speed, the remote has two sets of search buttons. The search speed initiated by the first set is the same as that initiated by the front-panel buttons, but the second set, labelled "Slow," reduces the speed of the audible search.

The rear panel of the CDP-X77ES is equipped with coaxial and EIAJ Standard optical digital output jacks, balanced analog output XLR connectors, and fixed and variable unbalanced RCA output jacks.

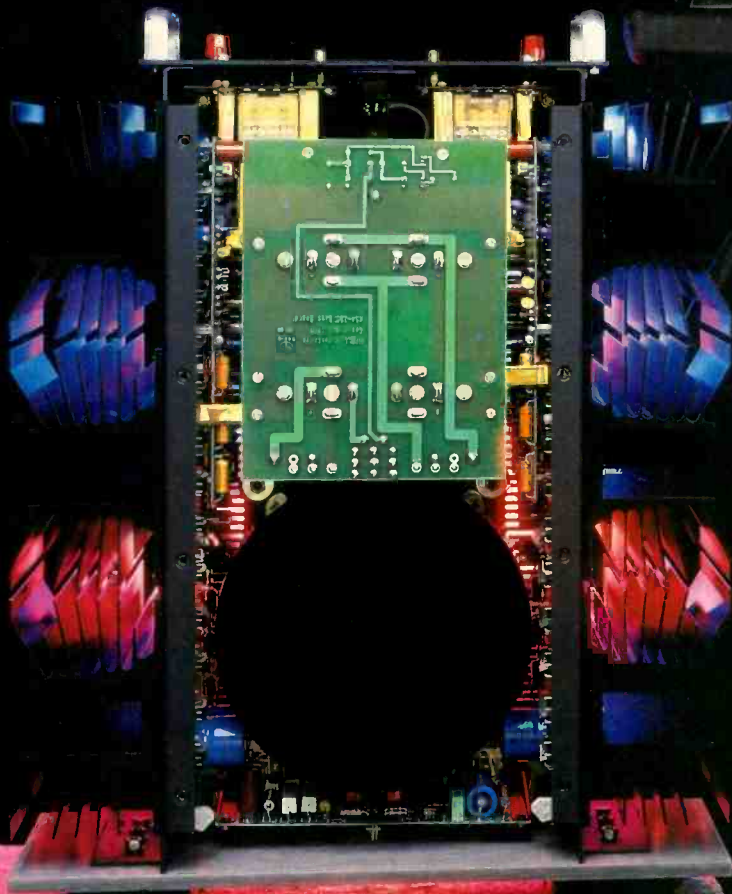
Measurements

Figure 1 shows the frequency response of this player, from 10 Hz to 20 kHz. Deviation from flat response never exceeded 0.07 dB, even at 20 kHz, where most CD players begin to have some roll-off. Of course, a slight deviation or roll-off at 20 kHz would hardly be cause for concern, so the flatter frequency response of the CDP-X77ES may not be a contributing factor to its superior sound quality.

I am convinced, however, that the distortion measurements I obtained do show some of the reasons why this player sounds as good as it does. Consider Fig. 2, the plot of THD + N. When have you seen distortion in a CD player test report that never exceeded 0.002%, even at the high end of the frequency spectrum? And at 1 kHz, THD + N was an even lower 0.0013%. This level of THD + N (relative to maximum recorded level) is maintained or bettered at all playback levels, from 0 dB (maximum) down to -90 dB, as shown in Fig. 3. A further check was done using the FFT spectrum analysis capability of the Audio Precision System One, and the results for a 1-kHz, high-level signal are shown in Fig. 4A. The tall spike at the left represents the desired 1-kHz output. The test was repeated for a recorded level of -60 dB, and results are shown in Fig. 4B. The spike at the left is the new reference and corresponds to the recorded level of -60 dB, so as you can see, noise and distortion components of the CDP-X77ES are approximately at the 0.1% point relative to -60 dB signals! This corresponds to 60 dB below the -60 dB point, or -120 dB relative to a maximum-level signal.

Sony makes a point of the fact that their new D/A conversion system is particularly good at reducing distortion com-

Power Tools



KSA-250 AMPLIFIER

6
88 joules @ 1 ohm
for 22 milliseconds
120KHz
Equivalent force 507 lbs
236 amps

Horsepower
Energy Delivered

Frequency Response
Force Generated
Peak Current Delivery
into 1 ohm for 20 milliseconds
both channels driven

HAMMER

2.5
38 joules/impact

1.34KHz
219 lbs/stroke
N/A

For More Information



Call 1-800-553-4355



KRELL INDUSTRIES ■ 35 Higgins Drive ■ Milford, CT 06460 ■ Phone: 203-874-3139 ■ Fax: 203-878-8373
For more information contact your nearest Krell Dealer. See the Krell Digital advertisement in this issue.

Its ultra-low distortion has more to do with this Sony's good sound than does its ultra-flat response.

ponents normally associated with high-frequency program content. I was already pretty well convinced of this after examining the results in Fig. 2, but to further prove the point, I played back a maximum-level, 10-kHz signal from my CBS CD-1 test disc and did another spectrum analysis of the output. Results are shown in Fig. 5. No band limiting was used and the sweep was extended out to 80 kHz, which was sufficient to show how low the harmonic components associated with a 10-kHz playback signal were. I also made spot tests of SMPTE-IM distortion, using a maximum-level recorded signal; IM was 0.003% on the left channel and 0.0027% on the right. Even clock-frequency accuracy was better than I have ever measured. It was off by a mere -0.0006% , which corresponds to a 440-Hz musical tone being reproduced as 439.99736 Hz—not particularly "off key" by even the most stringent standards!

When playing the "no-signal" track of the CBS CD-1 test disc, I obtained a remarkably low A-weighted signal-to-noise ratio of -123 dB on the left channel and -123.4 dB on the right. I believe this is a new record for a CD player. Furthermore, a spectrum analysis of the residual noise, which can be seen in Fig. 6, showed that even at the power-supply frequency, noise was still more than 130 dB below maximum recorded level. Channel separation at 1 kHz was also superb, 188 dB from left to right channel and 111 dB from right to left; even at 20 kHz, separation was 100 dB or more.

Having studied the literature concerning Sony's new High Density Linear Converter System in some detail, I was not surprised that this player's linearity was the best I have ever measured. As shown in Fig. 7, deviation from linearity for nondithered signals was about $+0.65$ dB for signals at the -90 dB level; for dithered signals it was closer to zero—even at -100 dB—than I have seen for any CD player, regardless of price!

The fade-to-noise test, conducted as an additional check, served to confirm the incredible linearity achieved by the CDP-X77ES. As Fig. 8 shows, there was virtually no departure from perfect linearity, right down into the residual noise level at -120 dB. The EIA dynamic range reading that this plot enabled me establish was about 115 dB—which, by the way, is the theoretical maximum for CD players. Using the EIAJ method for measuring dynamic range, I obtained a value of only 100 dB, the figure that Sony claims. I presume, therefore, that Sony used the EIAJ's method to obtain the published spec.

My one remaining test, viewing the player's output for a unit pulse signal, showed that the CDP-X77ES does not invert polarity of recorded signals.

Use and Listening Tests

I was, of course, intrigued by the Custom File and Custom Edit features of this player, but before I started using them and before I set aside the test instruments and addressed the ultimate question about how music sounded when reproduced by this player, I wanted to check out its ability to handle discs with severe dropouts. The Sony's tracking ability and resistance to external vibration were as impressive as its lab measurements. The CDP-X77ES was able to play through dropouts 1.5 mm in length without so much as

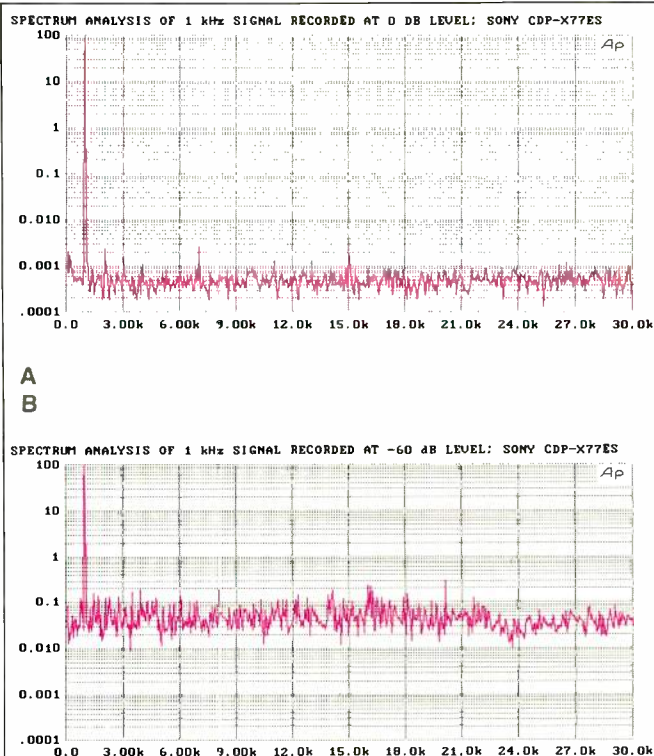
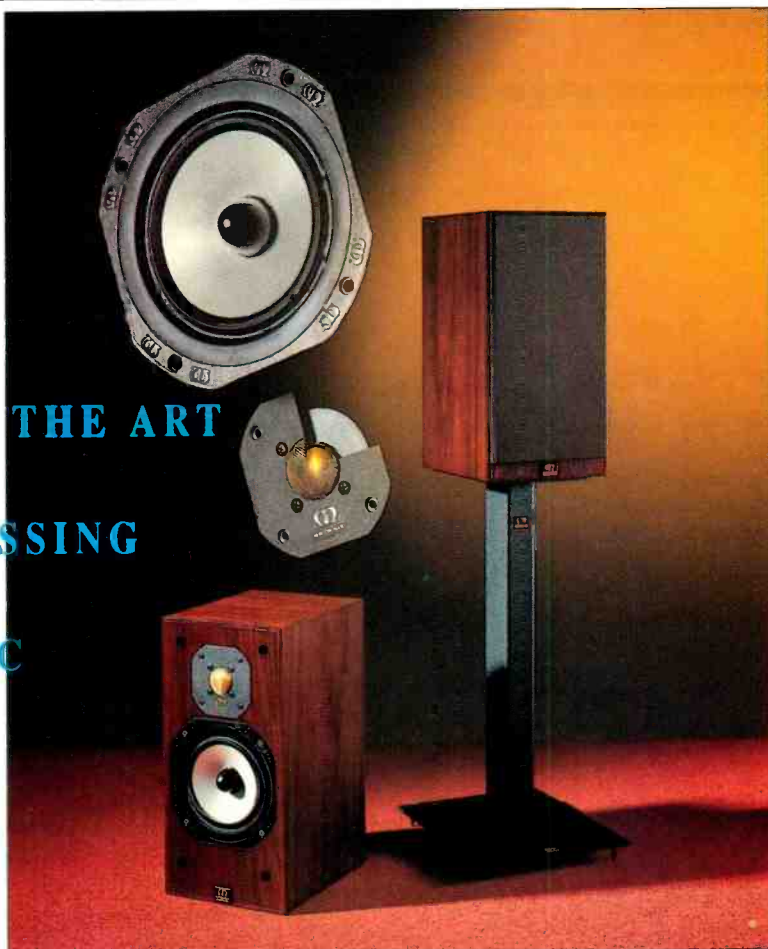


Fig. 4—Spectrum analysis of 1-kHz signals recorded at 0-dB, or maximum, level (A) and at -60 dB (B).

an audible glitch. Even when track pitch was reduced to the minimum allowed by the CD Standard, the player still was able to handle such long dropouts; when successive dropouts of that length were played, they too were handled by this player as though the digital data was unimpaired.

I chose two recent CD releases for my initial listening tests. The first was a Telarc recording, *Beethoven: Piano Sonatas Nos. 1, 2 & 3, Op. 2* (CD-80214), played by John O'Connor. It is no secret by now that recording a piano digitally and having it reproduced so that it sounds like a real piano is not easy. Yet this recording, played on the

REFINING THE ART
OF EXPRESSING
THE MUSIC



MONITOR AUDIO

Making music is an art; making loudspeakers is a science. Nowhere will you find leading-edge technology put to finer effect than with Monitor Audio.

Monitor Audio's gold-dome tweeters and ceramic coated metal cone woofers work as one, producing staggering detail and dynamics within a coherent sound stage.

Beautifully hand finished to the finest furniture standards using only premium matched, real-wood veneers, that's Monitor Audio - - where art and science meet!



MADE
IN
ENGLAND

(Studio 10) . . . "I found listening to this design to be an exhilarating experience bordering on intoxicating at times, and one that didn't pall."

Hi-Fi Review (Feb. 90)

For information on the complete line of award winning loudspeakers contact:

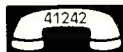
KEVRO
INTERNATIONAL INC.

IN U.S.A.
P.O. Box 1355
Buffalo, New York 14205
Telephone: (416) 831-4741
Fax: (416) 831-6933

IN CANADA
1755 Plummer St., Unit 20
Pickering, Ontario L1W 3S1
Telephone: (416) 831-4741
Fax: (416) 831-6933

Enter No. 34 on Reader Service Card

For More Information



Call 1-800-553-4355

Linearity was the best I've ever measured: About +0.65 dB for undithered signals at -90 dB and nearly zero at -100 dB for dithered signals.

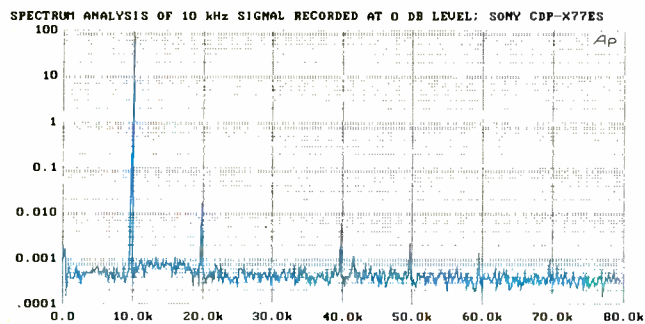


Fig. 5—Spectrum analysis of 10-kHz signal recorded at 0-dB (maximum) level.

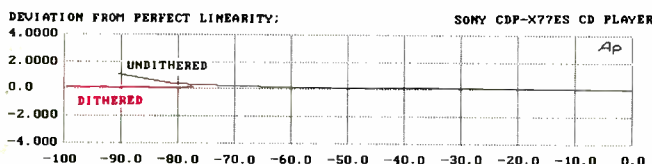


Fig. 7—Deviation from linearity for undithered signals from -90 to 0 dB and for dithered signals from -100 dB up.

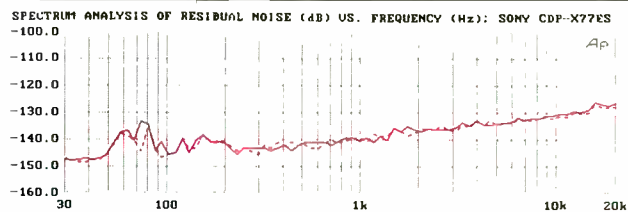


Fig. 6—Spectrum analysis of residual noise for left channel (solid curve) and right channel (dashed curve).

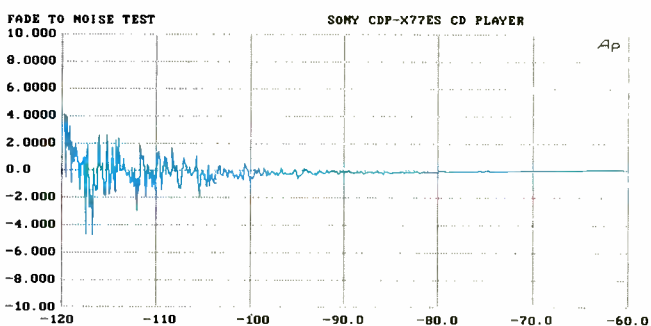


Fig. 8—Fade-to-noise test.

Sony, came as close to realizing that goal as anything I have ever heard. What's more, as good as the recording is, I found that when it was used with two other CD players in the lab, the piano lacked some of the detail and took on a somewhat "colder" sound, with some of the subtler shadings of O'Connor's playing no longer distinguishable.

For contrast, the second CD I chose was a Delos release (DE-3083) featuring the Seattle Symphony, conducted by Gerard Schwarz, playing the complete ballet music from Béla Bartók's *The Miraculous Mandarin* and selections from Zoltan Kodály's opera *Háry János*. Another selection on this disc, "Galanta Dances," also by Kodály, features solo clarinetist Christopher Sereque. It was this last selection that impressed me particularly. I was able to clearly separate the mellow, smooth clarinet sounds from the rest of the orchestral structure even when both elements of the music were interwoven—something I found difficult to do as well when the same disc was played on other machines.

Needless to say, I played a wide assortment of other discs on the CDP-X77ES. While listening to all of this musical fare, my thoughts could not help wandering back to the beginning of the CD player era, and then to the players that I tested as recently as a few months to a year ago. I thought back to the superlatives I had used in my reports on earlier players and wondered how I could top them, in words, as Sony has managed to top its own earlier players, in technology. My most recently acclaimed player, the Sony CDP-X7ESD, was tested for *Audio* less than a year ago (November 1989). That player was actually more costly, proving that, if it's executed properly, one-bit technology, by whatever name, not only results in superior D/A conversion but—all other things being equal—actually results in cost savings as well. So now the CDP-X77ES replaces the CDP-X7ESD as the player that others will have to challenge—at least in my laboratory and listening room. What a difference another "7" has made!

Leonard Feldman

State Of The Art That Leaves Room For The Art.



Now it's perfect. The final touch. ■ High-fidelity, in-wall speakers from Sonance. They add a dimension throughout your home that enhances fine art, compliments decor and completes an environment that delights all your senses. ■ Music. ■ Music that is startlingly accurate. Rich. Dynamic. A total audio ambience produced by these compact but powerful speakers. ■ Sonance is the leader in Architectural Audio,[™] with the world's most complete, single-source line of speakers, switchers, wires, and accessories. ■ Learn how easy it is to fill your home with audio art while leaving room for your visual art. ■ Contact the Sonance dealer nearest you. Call 1-800-582-7777. Outside the U.S.A. 714-661-7558, in Canada 604-873-4475. Or, write: Sonance, 32992 Calle Perfecto, San Juan Capistrano, CA 92675, Fax 1-714-240-4995.

For More Information



Call 1-800-553-4355



T H E • L E A D E R • I N • A R C H I T E C T U R A L • A U D I O [™]

Enter No. 44 on Reader Service Card

2

ROCKFORD
FOSGATE
RF200 PREAMP**Manufacturer's Specifications**

Frequency Response: Phono and high level, 20 Hz to 20 kHz, ± 0.4 dB.

Maximum Output: 9.25 V rms.

Rated THD: 0.005%.

Input Sensitivity: MM phono, 0.6 mV; high level, 60 mV.

Phono Overload: 75 mV at 1 kHz.

Maximum Input Signal: High level, 7.4 V rms.

S/N Ratio: Phono, 83 dB; high level, 90 dB.

Tone Control Range: Bass, ± 13 dB at 38 Hz; treble, ± 11 dB at 20 kHz.

Crossover: 12 dB per octave; supplied as -3 dB at 100 Hz for both high and low cut, modules available for other frequencies.

Crosstalk: Phono, -78 dB; high level, -90 dB.

Separation: Phono, 72 dB; high level, 76 dB.

Input Impedance: Phono, 47 kilohms in parallel with 150-pF capacitance; high level, 19.5 kilohms.

Dimensions: $17\frac{1}{2}$ in. W \times $2\frac{3}{4}$ in. H \times $8\frac{1}{8}$ in. D (44.5 cm \times 7 cm \times 20.6 cm).

Weight: 5.9 lbs. (2.7 kg).

Price: \$575.

Company Address: 613 South Rockford Dr., Tempe, Ariz. 85281.

For literature, circle No. 91

The Rockford Fosgate RF200 is a fitting companion for the RF2000 power amplifier, also tested for this issue. It is designed to be placed on a shelf, although a rack-mount front panel is

Continued on page 80





ROCKFORD FOSGATE RF2000 POWER AMP

Manufacturer's Specifications

Power Output: 200 watts per channel into 8-ohm loads, 20 Hz to 20 kHz; 300 watts per channel into 4-ohm loads, 20 Hz to 20 kHz; bridged mode, 600 watts into 8-ohm load.

Rated THD: 0.05% with 8-ohm loads, 0.1% with 4-ohm loads.

Rated IM Distortion: 0.01% with 8-ohm loads, 0.02% with 4-ohm loads.

Slew Rate: 80 V/ μ S.

Frequency Response: 20 Hz to 20 kHz, +0.1, -0.25 dB; 5 Hz to 75 kHz, +0.1, -3.0 dB.

S/N Ratio: 110 dB, re: full power.

Peak Output Current: 50 amperes.

Dimensions: 17½ in. W x 4½ in. H x 13 in. D (44.5 cm x 11.4 cm x 33 cm).

Weight: 35 lbs. (15.9 kg).

Price: \$1,250.

Company Address: 613 South Rockford Dr., Tempe, Ariz. 85281.

For literature, circle No. 92

The RF2000 power amplifier is the first in a series of high-performance audio components offered by Rockford Fosgate, an Arizona-based manufacturer which has gained a good reputation in the professional audio field. In fact, in most details, the RF2000 is similar to the company's PRF2000 professional model. The chief differences lie in the input arrangement: The pro version permits balanced or unbalanced operation and uses XLR or phone-jack input terminals, whereas the version I tested has standard RCA phono jacks.

The RF2000 uses a total of 32 MOSFET output devices, 16 per channel. Each device is rated at 4.0 amperes continuous current drain at a temperature of 100° C. The amp is fully rated for loads of 8 and 4 ohms and is stable down to load impedances of 2 ohms. A form of analog computing system protects the output devices: Device temperature is continuously calculated and compared to a maximum limit; if

Continued on page 84

The phono section's RIAA playback equalization was one of the best I've ever measured, never more than 0.2 dB from perfect.

Continued from page 78

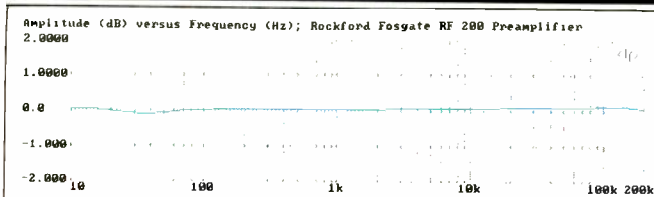


Fig. 1—Frequency response via high-level inputs.

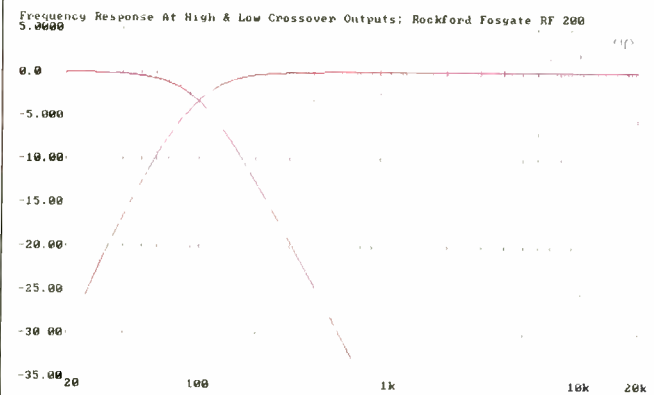


Fig. 2—Response of built-in crossover, set for 100 Hz, measured at high and low outputs.

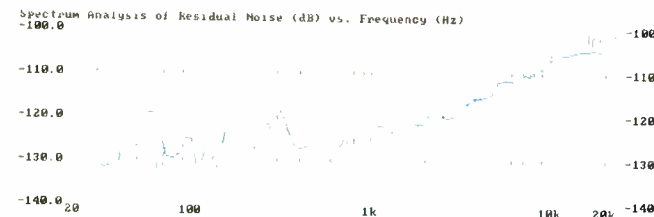


Fig. 3—Spectrum analysis of residual noise (in dB, re: 0.5 V), with high-level input selected and volume set for unity gain.

optional. The RF200 has an external processing loop in addition to the usual tape monitor loop. There are also dual sets of preamp outputs so that several power amplifiers can be connected. An unusual feature is this preamp's set of active adjustable crossovers, which can be adjusted by exchanging modules (eight-pin DIP packages) accessible from the back panel.

The unit's power supply, like that of the matching RF2000 amp, employs a toroidally wound transformer. Its smaller size, higher efficiency, and freedom from stray magnetic fields make it an ideal choice for a preamplifier of this high quality. There are few frills on the RF200, which is perhaps

indicative of the fact that Rockford has chosen to stress performance and sound quality rather than needless switches and knobs.

Control Layout

On the left of the preamp's front panel are four pushbutton selectors for choosing "Phono," "CD," "Tuner," or "Video/AUX" inputs. Nearby but separated from these others is a "Tape Monitor" pushbutton. "Bass" and "Treble" tone control knobs come next, together with a separate "Tone Bypass" switch. Between the rotary "Balance" and "Volume" knobs is a "Mono/Stereo" switch. A phone jack, power indicator light, and on/off power switch complete the front-panel layout.

The rear panel is equipped with the required pairs of input jacks. Phono jacks accommodate only moving-magnet cartridges, so if you want to use a moving-coil pickup, you will need either a suitable step-up transformer or a separate pre-preamplifier. Tape loop record-out and tape-in jack pairs are also found on the rear panel, as are the jacks for the external processor loop. These are shipped with jumper bars installed, but if the bars are removed, external processors, such as a graphic or parametric equalizer or a dynamic range expander, can be connected to the system.

In addition to the pair of "Main Out" jacks, outputs labelled "High Out" and "Low Out" are provided in case you plan to configure a bi-amplified system. As an option, you can press a button behind the crossover's cover to bypass the "High Out" crossover network. Doing so will cause the signal at the "High Out" jacks to be the same as that at the "Main Out" jacks. The RF200 is capable of simultaneously feeding all three sets of outputs—main, low, and high. A switched a.c. outlet and a ground terminal are also on the rear panel, as is a crossover module access cover. Removing this cover reveals the frequency module used to create the crossover filters. Other frequency modules are available, but if the specific crossover frequencies you want are not available, the owner's manual offers advice on how to build your own, complete with a table of resistor values for some 18 different crossover frequencies.

Measurements

High-level frequency response was virtually flat from 10 Hz to 200 kHz, as shown in Fig. 1. I also measured frequency response at the "High Out" and "Low Out" jacks and superimposed the curves in Fig. 2. As you can see, the crossover frequency, as supplied by Rockford, was almost precisely at 100 Hz, and attenuation was exactly -3 dB at that point. High-level, A-weighted S/N ratio measured 88.1 dB for the left channel and 86.8 dB for the right. These results were obtained using an input level of 0.5 V and adjusting the volume control to produce unity gain, or an output of 0.5 V.

Figure 3 is a spectrum analysis of residual noise versus frequency, referred to the same input and output levels. Note the minimal contribution of the power-line frequency (60 Hz) and its harmonics and the similarity of the noise spectra of each channel. These plots reveal the advantages of using a toroidal power transformer and show its ability to contain any magnetic fields generated in the power supply.



Believe it or not, compact disc for the car has been around awhile. There are even a chosen few who could actually afford to buy one.



Well, now car CD is really here.

Because Pioneer has advanced the technology so far and created a line of players so extensive that now it's possible for anyone to afford the clarity of digital CD sound.



It begins with our new single-play CD systems.

You'll love the high power as much as the price. But try not to overlook the detachable faceplate. An innovative security feature we recently developed for added convenience.



And while we're on the subject of convenience, Pioneer's 6-disc multi-play changers let you enjoy hours of uninterrupted music while you drive. Plus they can be easily added to your car without replacing your existing audio system.

For those who want it all, we also offer an incredible



ANNOUNCING THE ARRIVAL OF CAR CD. FIVE YEARS AFTER IT WAS INTRODUCED.

3-source system that puts multi-play CD, AM-FM tuner and cassette all at your fingertips with a remarkable wireless remote.



There's much more, of course. And to find out, call 1-800-421-1404.

We'll send you a free copy of our new bro-

chure. As well as give you the name of a Pioneer dealer near you, who will be glad to show you our complete line of car CD systems. After all, he's been waiting for this moment just as long as you have.



Rockford has succeeded in their aim of making the RF200 a reliable, accurate, distortion-free preamp without needless frills.

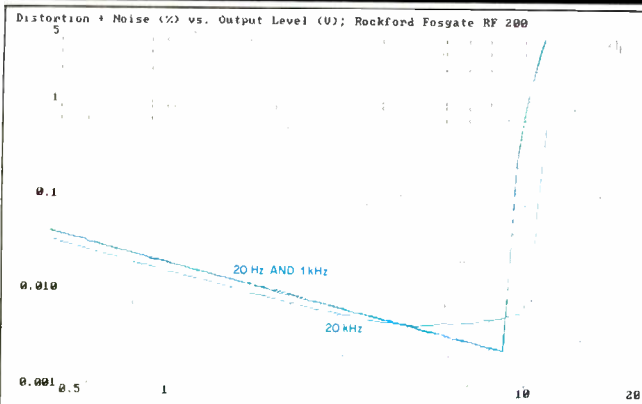


Fig. 4—THD + N vs. output level.

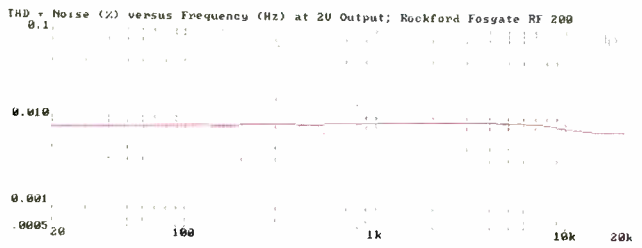


Fig. 5—THD + N vs. frequency, at 2 V out.

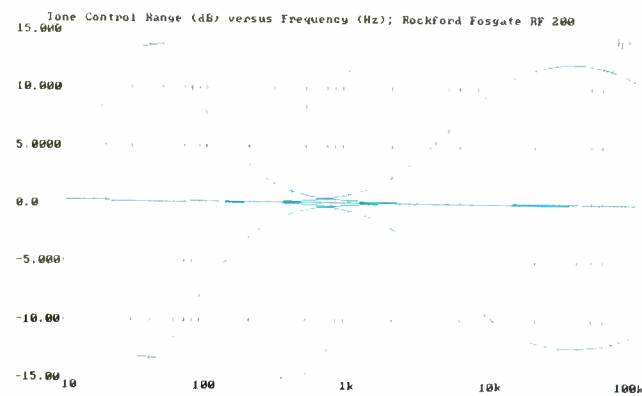


Fig. 6—Tone control range.

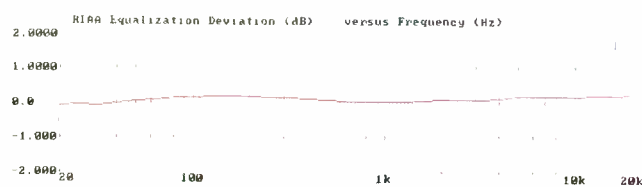


Fig. 7—RIAA equalization error, using MM input.

Figure 4 shows how THD + N varied with increasing output levels, for 20-Hz, 1-kHz, and 20-kHz signals. It is important to understand that, while the percentages of THD + N seem higher for lower output levels, these tests include the sum of distortion *plus* noise. At lower levels, the residual noise adds to the overall percentage read by the test equipment; at higher levels, however, what you see is dominated by the distortion itself. At 5 V output, for example, the total THD + N at all three test frequencies was only about 0.004%. Figure 5 shows that THD + N remained virtually constant at around 0.007%, decreasing slightly at the extreme treble frequencies, when output was regulated by the test equipment to remain constant at 2.0 V. Again, these results represent the sum of THD + N. Had I been able to separate distortion from noise, I have no doubt that the figure would have been well below the 0.005% claimed.

The range of the bass and treble tone controls is shown in the multiple sweeps of Fig. 6. Of particular significance is the fact that, even at maximum boost or cut settings of both controls, very little alteration of mid-frequency response occurs. If a preamp is going to be limited to bass and treble tone controls, I've always maintained that this is the way they should be designed. All too often, controls of this type have a very significant effect upon the important midrange frequencies, which, I feel, makes them virtually useless in compensating for problems of room acoustics or in allowing some tweaking at the frequency extremes on certain program material.

High-level input sensitivity measured 55 mV for an output of 0.5 V. Overall maximum gain of the high-level circuitry was, therefore, 19.2 dB. Maximum output for the high-level inputs was 8.2 V.

Input sensitivity for the phono section was 0.5 mV for 0.5 V out, so overall gain from phono input to output was exactly 60 dB. A-weighted S/N ratio for the phono inputs was 76.9 dB for the left channel and 72.7 dB for the right. These figures are referred to 5 mV input, with volume adjusted to provide 0.5 V output. Phono overload occurred with an input signal of 77 mV at 1 kHz.

This preamp's RIAA equalization was one of the most accurate I have ever measured. Figure 7 shows deviation from perfect RIAA playback equalization, with the tone controls set flat (or defeated). There was never more than 0.2 dB of equalization error, and that maximum occurred way out at 20 kHz.

Conclusion

As Rockford states in the owner's manual, they set out to design and build a reliable preamplifier devoid of needless frills and capable of delivering accurate, distortion-free signals to a power amplifier. In this they have succeeded eminently well. Everything about this preamplifier connotes quality and care—from the nicely crafted knobs used for tone, balance, and volume control to the high-quality internal parts on the well laid-out circuit board. As for the RF200's sound quality, I will discuss that in my companion report on the Rockford Fosgate RF2000 amplifier. These two components together, though not inexpensive, could certainly be the foundation for an audio component system anyone could happily live with.

Leonard Feldman



ProPerformers

MINIMUM SIZE. MAXIMUM PERFORMANCE.

ProPerformer Series Loudspeakers: Maximum musical performance in a minimum size. The same grand scale sound that has made JBL's larger speakers the No.1 choice of recording studios, concert halls, clubs and rock stages worldwide is quite at home in the ProPerformers.

The only limit on their performance is your imagination. They fit anywhere...from the living room to the kitchen to the workshop to the office. The choice is yours.

There are ProPerformer Series Loudspeakers and subwoofer combinations to match your musical desires. Come in and audition JBL ProPerformer Series Loudspeakers and bring pro sound home.



ProPerformers by 
Pro Sound Comes Home

H A Harman International Company

JBL IN USA-240 CROSSWAYS PARK WEST, WOODBURY, NY 11797 / 516-496-3400

Enter No. 52 on Reader Service Card

Its high dynamic headroom,
2.44 dB for 8-ohm loads,
lets the RF2000 produce
up to 350 watts per channel
on power peaks.

Continued from page 79

the limit is reached, the power is automatically cut back and the front-panel LED for the affected channel turns red.

A pair of thermistors, one on each heat-sink, measures temperature of the input system. The thermistors control fan speed and provide thermal shutdown when temperatures are too high for safe operation. The cooling fan has continuously variable speed control and is extremely quiet. As the amp is driven harder, the fan turns on and gradually speeds up to whatever extent will allow the power dissipation needed for the operating conditions.

The amp's power supply uses a 1,000-VA toroidal transformer. Energy storage for the supply consists of two 42,000- μ F capacitors. This large capacity provides a low-impedance source of high current to handle surges, musical transients, and wide variations in speaker impedance.

Four output modes of operation are available. The RF2000 can, of course, be operated as a two-channel stereo amplifier or, in bridged mode, as a single-channel amp for higher power requirements. In addition, the amplifier can be operated in dual mono, with both channels driven

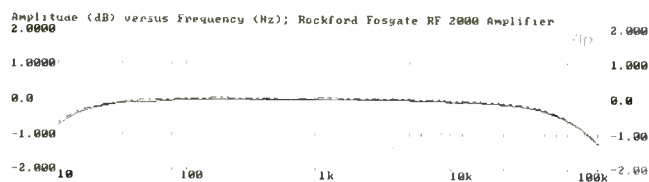
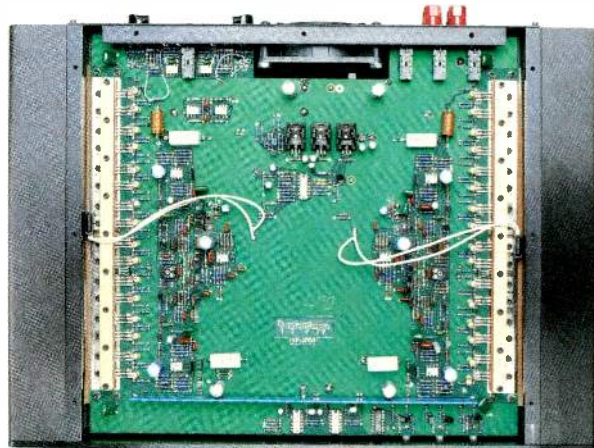


Fig. 1—Frequency response.

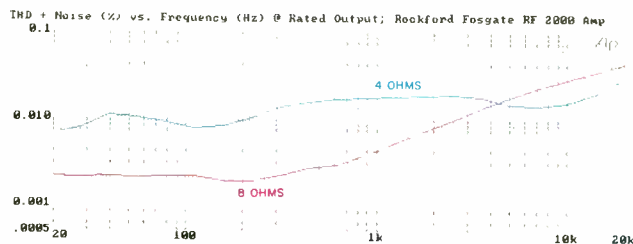


Fig. 2—THD + N vs. frequency, at rated power output of 200 watts per channel into 8 ohms and 300 watts per channel into 4 ohms.

by the same input signal. You might, for example, use this configuration to biampify a speaker which has separate inputs for the high- and low-pass sections of its internal crossover network. Or you might want to drive multiple speakers whose parallel impedance would be too low if driven from the amplifier in its single-channel bridged mode. Finally, this amp can be operated in stereo-plus-bridged mode, which allows you to drive a pair of satellite speakers and a bridged mono subwoofer or bridged center channel speaker simultaneously, using only a single RF2000 amplifier. This is the first home stereo amplifier I've encountered that offers this last configuration, which I suspect will be welcomed by many owners of three-piece satellite/subwoofer systems.

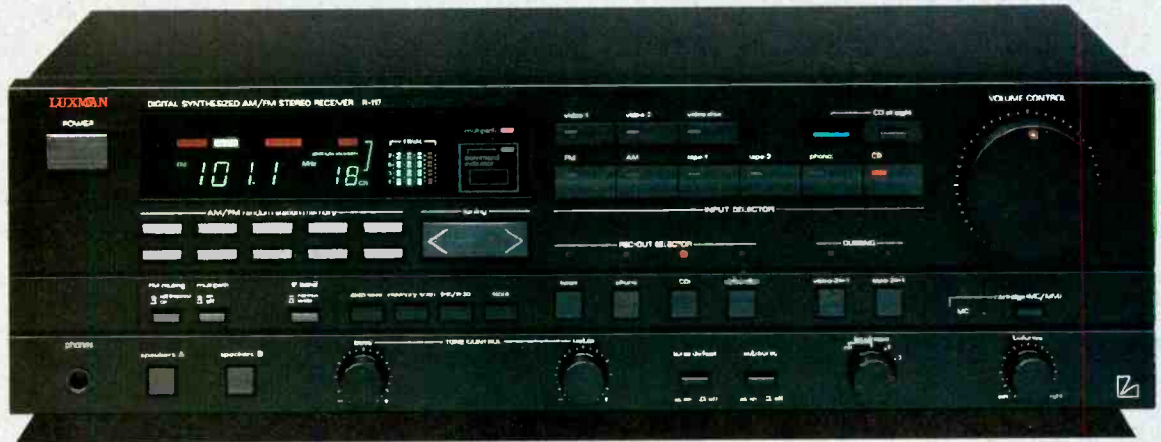
Control Layout

A three-LED multicolor display on the unit's front panel shows amplifier status, including power, signal level, distortion, and thermal condition. The channel status LEDs remain off when there is no signal or when output levels are below about 200 mW; they turn green when output power exceeds this figure—so long as the amplifier's distortion remains low—and turn red when the output signal becomes distorted. The power status LED also has three indications, being off when the RF2000 is shut off, green in normal operation, and red when the amplifier's overheat-protection system is activated.

On the right of the rear panel are the left and right input jacks, each accompanied by its own gain control. Gain can be varied from 0 to 36 dB by means of these controls. The fan grille is at the center of the rear panel; to its left are color-coded, five-way speaker terminals and individual 5-ampere fuse-holders. The fuses are for speaker protection only; during my tests, I found it necessary to replace them with fuses of higher amperage in order to conduct tests of rated power output.

Pushbutton switches are provided for setting any of the operating modes previously described, so that it is not necessary to alter any internal wiring to achieve bridged

ULTIMATE UPGRADE. SIMPLY THE BEST RECEIVERS IN THE WORLD.



R-117 w/multi-room remote. The State-of-the-Art Receiver, 160 W/ch (8 ohms), capable of 700 watts of dynamic power (2 ohms).



R-115 w/multi-room remote, 70 W/ch (8 ohms), capable of 270 watts of dynamic power (2 ohms).



R-114 w/multi-room remote, 50 W/ch (8 ohms), capable of 130 watts of dynamic power (2 ohms).



R-113, 35 W/ch (8 ohms), capable of 100 watts of dynamic power (2 ohms).



TOTAL SONIC INTEGRITY All Luxman receivers incorporate massive power supplies to deliver high dynamic power. In fact, the R-117 measures over **700 watts** of dynamic power per channel (2 ohms) to ensure distortion-free transients. The pre-amplifier section of all Luxman receivers combine several proprietary Luxman circuit designs to optimize sonic accuracy, and the AM/FM stereo tuners are sonically the finest in the world. In all, Luxman receivers provide the purity and musical warmth of the original source, plus the high dynamic power output necessary to ensure total sonic integrity at all volume levels.

AUDIO/VIDEO REMOTE CAPABILITY The R-117, R-115 and R-114 Luxman receivers include a hand-held remote to control the major functions of each Luxman audio component.

The R-117 can select up to three video sources from the handpiece, and incorporates professional-grade video amplifiers to maintain a high quality picture. This single component will function as a complete audio and video control center with total remote capability, and with the addition of an external remote eye, the system can be controlled from any room in your house.

LONG TERM RELIABILITY All Luxman receivers are designed with a no-compromise approach to long-term reliability, and have the best warranty in the industry—5 Years Parts and Labor, if purchased from an authorized Luxman dealer.

Luxman receivers. The Ultimate upgrade for audio/video systems.



LUXMAN

For your authorized dealer, call: 1-800-4-LUXMAN
Enter No. 28 on Reader Service Card

This is a remarkably stable and reliable amplifier that was impervious to failure, no matter how hard I drove it.

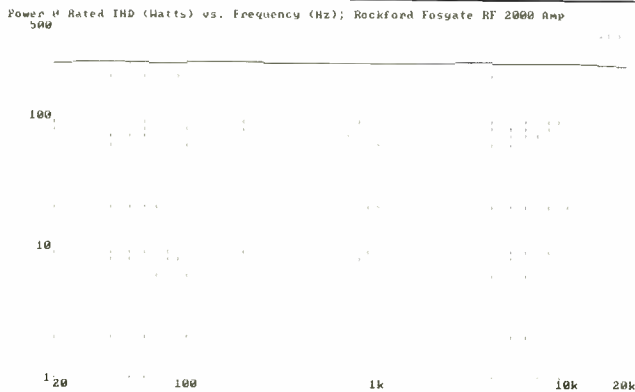


Fig. 3—Power output for rated distortion of 0.05% into 8 ohms.

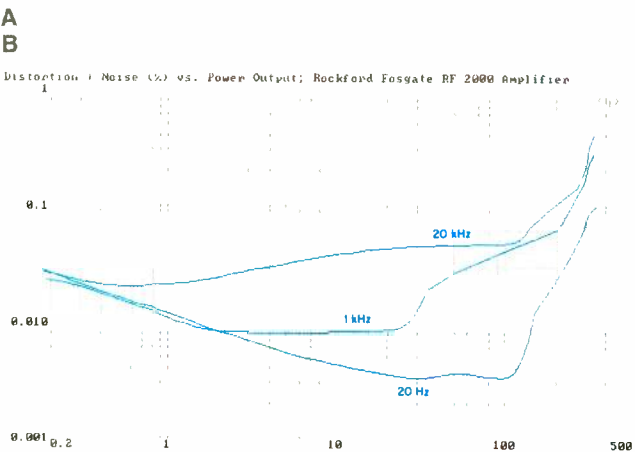
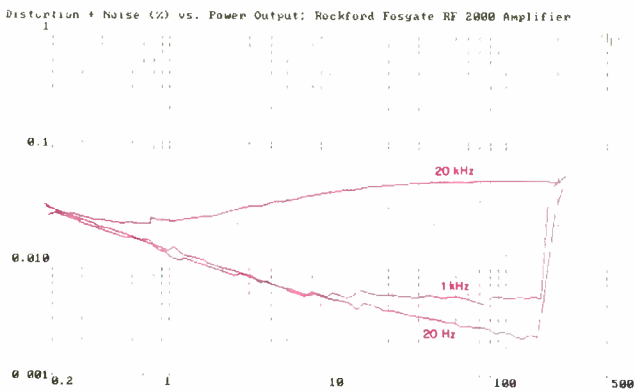


Fig. 4—THD + N vs. power output per channel into 8 ohms (A) and 4 ohms (B). The distortion at high power output levels for 4-ohm loads is due to limitations of test setup; see text.

mono, dual mono, stereo, or stereo plus bridged mono operation. Another pushbutton switch selects either "Floating" ground (chassis and output sections grounded separately) or "Chassis" ground (chassis and output grounded together).

Measurements

Figure 1 is a plot of frequency response over the range from 10 Hz to 100 kHz. At 20 Hz, response was down about 0.2 dB, while at 20 kHz, it was off by a mere 0.14 dB. At 100 kHz, response was off by only 1.25 dB.

Figure 2 shows how THD + N varied with frequency for both 8- and 4-ohm loads. With input signals carefully regulated by my test system to maintain a constant output of 200 watts per channel into 8 ohms, I measured only around 0.002% below 200 Hz, 0.0041% at 1 kHz, and 0.043% at 20 kHz—all well within the manufacturer's published claims. For 4-ohm loads, with output regulated to a constant 300 watts per channel, THD + N was only 0.0065% at 20 Hz, rising to an insignificant 0.018% at 1 kHz and to 0.03% at 20 kHz—all far lower than the 0.1% specified by Rockford.

I was curious to see just how much power the amplifier could produce for its rated THD, so I tried a new test: Plotting power output for rated distortion—in this case, 0.05% for 8 ohms. The results are shown in Fig. 3. I was amazed to find that this rugged amplifier was able to deliver around 250 watts per channel, with both channels driven into 8-ohm loads, over almost the entire audio spectrum.

Figures 4A and 4B show how THD + N varied as a function of power output for three test frequencies—20 Hz, 1 kHz, and 20 kHz—with 8- and 4-ohm loads. In making the 4-ohm measurement (Fig. 4B), I noted that THD + N at the rated power level of 300 watts per channel exceeded the manufacturer's 0.1% rating. I was puzzled by this, until I discovered that the regulation of my variable-voltage transformer—used to maintain a steady 120 V a.c. for powering amps during these tests—was not as good as I had thought it was. As the sweeps of Figs. 4A and 4B progressed from low power levels (0.2 watt per channel or less) to higher power levels, I noted that the line voltage began to dip below the 120 mark at the end of each sweep. The lesson is, if you want to get full power out of any power amplifier, you'd better make sure your line voltage is really at 120 V!

Figure 5 shows how SMPTE-IM distortion varied with power output. With 8-ohm loads, SMPTE IM measured only 0.0066% at an output of 200 watts per channel; with 4-ohm loads, it was 0.03% at an output of 300 watts per channel. Once again, the poor regulation of my variable-voltage transformer caused the line voltage to dip slightly below 120 V at the high end of this sweep, which accounts for the SMPTE-IM figure being slightly higher than specified for 4-ohm loads. I confirmed that this was so by taking a fixed, or spot, reading of SMPTE IM, manually adjusting the line voltage to precisely 120 V. Now, for an output of 300 watts per channel with 4-ohm loads, SMPTE IM was indeed well below 0.02%, measuring only 0.015%. I also conducted a test of CCIF-IM (twin-tone) distortion as a function of power output, using 18- and 19-kHz test signals mixed in equal proportions (Fig. 6). For 8-ohm loads, CCIF IM was only 0.002% at an output of 200 watts per channel; for 4-ohm



THE MONOLITH III

The Monolith III stands alone. Powerful. Imposing. Thrusting you into a world of harmony and purity that both caresses and assaults you in its beauty, truth and timelessness.

The challenge was to maintain the famous Martin-Logan electrostatic purity and still deliver uncompromised levels of power and frequency response. This was achieved by incorporating a massless transducer in a perfectly linear field with no crossovers in the critical music range, yet dispersing energy in a controlled wavepath.

By seamlessly integrating this advanced ESL technology to a tailored superfast subwoofer, a new standard has been achieved.

The challenge now is for you to determine our success. Go, hear, experience the Monolith III for yourself.

MARTIN·LOGAN, LTD.

The electrostatic loudspeaker technology company

913-749-0133 · lawrence, kansas 66044

For More Information



Call 1-800-553-4355

This amplifier and preamp reproduced the majesty of the organ's sound without strain or overload—even on deep bass passages.

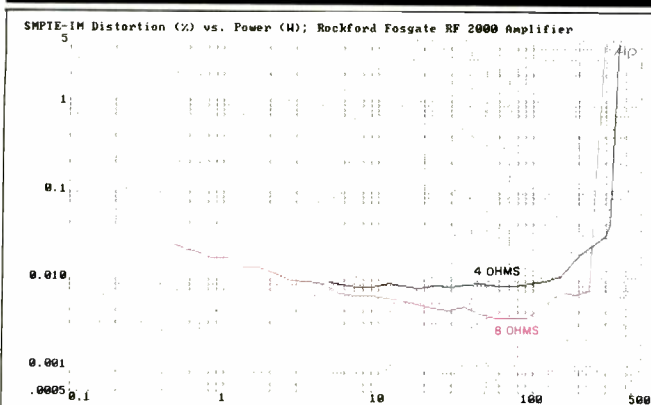


Fig. 5—SMPT-IM distortion vs. power output into 8- and 4-ohm loads.

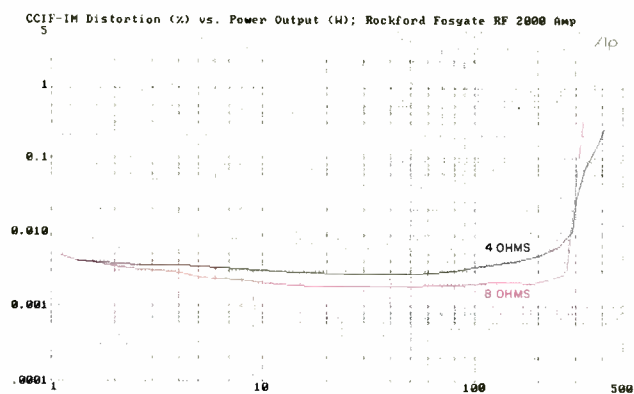


Fig. 6—CCIF-IM (twin-tone) distortion vs. power output into 8- and 4-ohm loads.

loads, CCIF IM was 0.025% at an output of 300 watts per channel.

A-weighted S/N ratio measured 89.9 dB for the left channel and 86.3 dB for the right channel. These measurements were made with respect to 1 watt output. Translated to a reference of full output (200 watts into 8-ohm loads), this would work out to be 112.9 dB for the left channel and 109.3 dB for the right channel.

With 8-ohm loads, the RF2000 exhibited an extremely high dynamic headroom of 2.44 dB. So, for short bursts, the amp can be expected to deliver peaks up to 350 watts per channel! Damping factor, also referred to 8-ohm loads and using a test signal of 50 Hz, measured 210.

Input sensitivity was approximately 640 mV for rated output, with gain controls fully open. In terms of EIA standards, it would therefore take approximately 45 mV to produce 1 watt output into 8-ohm loads.

Use and Listening Tests

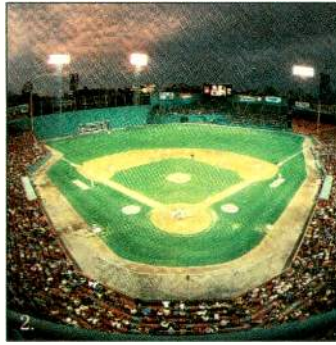
The attributes of the RF2000 can be summed up in a couple of sentences. It is a remarkably stable and reliable amplifier that seemed impervious to any failure—no matter how hard I drove it. Of course, I popped some speaker fuses during my tests, but not once did the amp shut down because of thermal problems or for any other reason. I can assure you that my bench tests subjected this amp to far more stressful conditions than it is likely to encounter under normal use as a music signal amplifier in a home system.

Since I tested the Rockford Fosgate RF2000 power amplifier and the RF200 preamplifier during the same couple of weeks, it seemed appropriate to do my listening tests with both units in the setup. The power amp was used to drive KEF 105/2 reference loudspeakers with a Sony CDP-650ESD reference CD player as a source. In addition, a DAT recorder I acquired overseas is not incorporated in my listening setup, so I played one of the few prerecorded DATs I own. It is a Classic Masters recording of Mozart piano sonatas played by Richard Shirk (CMDT-1005); the same program material is also available on CD (CMCD-1005). Among the newer CDs I used to confirm the sound quality of these components were two Telarc releases. *The Young Bach* (CD-80179) features Michael Murray playing the organ at the College of St. Thomas in St. Paul, Minn. The power and majesty of that organ sound was beautifully reproduced by this pair of components, which showed no sign of strain or overload—even during the deep bass passages. The second disc (CD-80186) presents four of Mozart's lesser known symphonies—Nos. 24, 26, 27, and 30—and was recorded with Sir Charles Mackerras and the Prague Chamber Orchestra. This disc illustrates how a relatively small instrumental ensemble can create a well-balanced sound on CD that, with the aid of good equipment such as this Rockford Fosgate pair, can transport the listener into an imaginary concert hall of the appropriately small dimensions suited to this music. Oh, yes—I subjected the combination to more contemporary works as well—including some New Wave music. No matter what I fed these top-performing components, they seemed equal to the task, and then some. Interestingly, although I sought material with extremes of dynamic range, I was never bothered by the fan in the RF2000 amplifier. Either it wasn't running at all or it was running at such slow speeds and so quietly that it did not serve as a noise-floor limit to my extended listening. I had thought the RF2000's \$1,250 price tag was a bit high. Happily, the \$575 price for the RF200 preamp is, if anything, on the low side, considering its performance. So, in my opinion, the total cost for these two components comes in just about where it belongs.

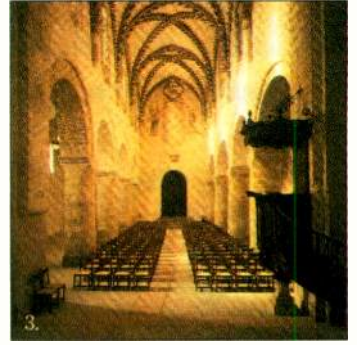
Leonard Feldman



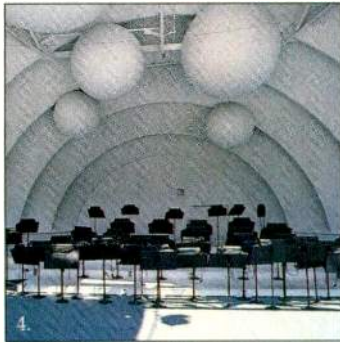
1. Ralph's house.



2. Ralph's house.



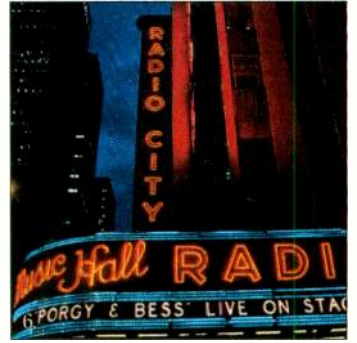
3. Ralph's house.



4. Ralph's house.



5. Ralph's house.



6. Ralph's house.



7. Ralph's house.



8. Ralph's house.



Ralph's home theater system.



YST-SE10
Deep bass effects
channel speaker.*

Ralph actually lives in a one bedroom condo.

That is, until he starts pressing the buttons on his Yamaha DSP-A700 Digital Soundfield Processor.

Then he starts turning his place into all different kinds of entertainment environments.

How?

Well, a few years ago, our engineers and sound technicians packed

their bags and headed out to sample a variety of entertainment environments all over the world.

Opera houses, stadiums, jazz clubs, concert halls, movie theaters, discos, cathedrals and amphitheaters.

And after several months of testing, recording and eating strange food, they brought home actual acoustic samples of dozens of these types of environments. Digitally recorded them onto a computer disk. And put them all onto one tiny computer chip.

Then they added seven channels of amplification, Dolby® Surround Sound, Dolby Pro Logic and YST technology. And put it all into one component.

All the jet lag and hard work paid off because they came up with one of the most advanced, yet simplest home theater components on the market.

But don't take our word for it. Drop by a Yamaha dealership and press a few buttons yourself. And find out just how big your place can be.

YAMAHA®

1. Movie theater. 2. Outdoor stadium. 3. Cathedral 4. Amphitheater. 5. Indoor stadium. 6. Music hall. 7. Disco. 8. Jazz hall.

*Our compact YST-SE10 wall/shelf speakers will enhance the performance of your effects channels with deep, powerful bass.

© 1990 Yamaha Electronics Corporation, USA P.O. Box 6660, Buena Park, CA 90622. Dolby is a registered trademark of Dolby Laboratories Inc.

3

PIONEER TZ-9 SPEAKER

Manufacturer's Specifications

System Type: Bass reflex.

Drivers: Two 10-in. (25.4-cm) woofers; 2.56-in. (65-cm) dome mid-range; 1-in. (2.5-cm) dome tweeter.

Crossover Frequencies: 600 and 4,000 Hz.

Frequency Range: 20 Hz to 40 kHz.

Sensitivity: 91 dB SPL at 1 meter for 2.83 V input.

Nominal Impedance: 4 ohms.

Power Handling: 60 watts nominal, 300 watts maximum.

Dimensions: 48.6 in. H x 14.6 in. W x 20.1 in. D (123.4 cm x 37.1 cm x 51.1 cm).

Weight: 143.3 lbs. (65 kg).

Price: \$4,000 per pair.

Company Address: P.O. Box 1540, Long Beach, Cal. 90801.

For literature, circle No. 93



The TZ-9 is Pioneer's flagship loudspeaker system in its Elite series of audio/video components. Key specifications of the TZ-9 are: 143.3 pounds each, 48½ inches high, and \$4,000 per pair. A little less of everything is available for \$1,800 per pair in the TZ-7. Three new "ST" models in Pioneer's regular line incorporate as much of the "TZ" technology as Pioneer can translate to a lower price.

Pioneer has priced the TZ-9 against some formidable competition from Apogee, B & W, Infinity, KEF, Mirage, Quad, and Vandersteen, just to name a few examples. Also, for far less money, there are large and highly regarded floor-standing systems from AR, Klipsch, Polk, Thiel, VMPS, and others. Note also that all of the competitors I've listed are non-Japanese manufacturers. For whatever reason, North



Introducing the Next Great Wadia Decoding Computer

The Wadia DigiMaster X-32

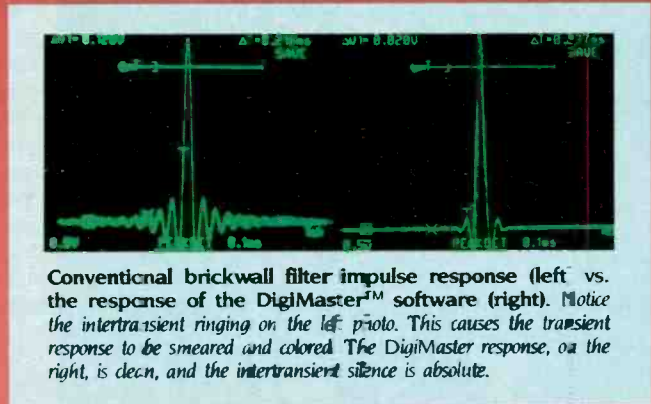


We would all like to enjoy every bit of music, every bit of ambience encoded in our CDs and DATs. But so much of that is lost in the digital filters and digital-to-analog converters in our machines; many displeasing artifacts are added. Likewise, "digiphobes" have despaired of ever finding a fix for these vexing problems. Until now.

As reviewers and sound professionals the world over have discovered, the solution is called **Wadia**.

Advanced Design.

DigiMaster X-32 introduces a new CPU engine, cutting size and enhancing performance by means of two ultra-fast AT&T DSPs and two giant programmable gate array chips. Software, and now even hardware, upgradeability is as easy as replacing ROM chips! Incredible!



Conventional brickwall filter impulse response (left) vs. the response of the DigiMaster™ software (right). Notice the intertransient ringing on the left photo. This causes the transient response to be smeared and colored. The DigiMaster response, on the right, is clean, and the intertransient silence is absolute.

Revolutionary Software. Wadia's patent-pending DigiMaster™ decoding software is at the heart of the DigiMaster X-32. It is the only decoding software available that is purposely designed to handle all dynamic music structures — including both harmonic and inharmonic waveforms, plus attack transients, without ringing and smearing. The DigiMaster™ software is based upon the LaGrangian and Spline algorithms, and is available only from **Wadia**.

The DigiMaster X-32 operates at 32X resampling and 18-bit resolution. It is priced at \$1,995.

Go With The Leader! To hear what the winner of three prestigious international awards (IEEE, MUSE & COTY) can do for your CDs and DATs, visit a **Wadia** dealer today.

Wadia
DIGITAL CORPORATION

511 2nd STREET
HUDSON, WISCONSIN 54016
(715) 386-8100 FAX (715) 386-8116

The Pioneer TZ-9 is big for deep bass, heavy for good damping of the system, and expensive for high-tech parts and good construction.

American audiophiles have not generally accepted Japanese high-end loudspeakers as fully as they have accepted Japanese electronic components. So, what makes Pioneer think they have a shot at the high-end U.S. speaker market? Read on.

First, the TZ-9 is an American speaker. It was conceived, designed, and voiced out of Pioneer's Long Beach, Cal. facility, with drive units and technical development coming from Japan. The TZ-9 is manufactured in the U.S. and sold only in North America by fewer than 200 select high-end retailers. You won't find appliance-store "midnight madness" sales blowing TZ-9s out the door at half price, and you won't find the TZ-9 in Tokyo.

The second reason for Pioneer's confidence is the size, experience, and technology of the parent company. A loudspeaker named "Pioneer" was the first product of Fukuin Denki Kabushiki Kaisha, founded by Nozomu Matsumoto in 1938. The company was renamed Pioneer in 1961 and grew quickly as a result of its innovations in car stereo, home



electronics, loudspeakers, and the LaserDisc. A major resource currently is the speaker design team that designed the TAD professional loudspeakers. These drive units are widely considered to be the best available for high-level sound applications. In summary, Pioneer is larger and older than any of the competitors mentioned above.

The final reason to take the TZ-9 seriously is the advanced technology incorporated into it. A special process is used to form pure carbon into ceramic graphite domes for midrange and tweeter. Pioneer has found this brittle material to have mechanical characteristics superior to such exotic dome materials as titanium, carbon fiber, beryllium, boron alloy, carbon graphite, and ceramic carbon. Incidentally, most of these materials were first developed for loudspeakers by Pioneer.

The midrange dome and tweeter below it are mounted on a thick subpanel separated from the front baffle board by an isolating layer of foam. However, I question the extent of the isolation because the driver-mounting bolts extend through the foam, rigidly coupling the two panels. The crossover components are mounted on another subpanel in a similar manner. Input to the high- and low-frequency sections of the crossover are available separately for biamping. Four heavy-duty, gold-plated, five-way binding posts are normally strapped to accept a single speaker cable to each cabinet. There are no provisions for making level or equalization adjustments.

Two woofers, one on the front and one on the rear, are used in the TZ-9 to cancel reaction forces from cone acceleration. This reduces cabinet vibration and radiation of the panel walls. While the cabinet walls themselves could provide the mechanical coupling between the woofers, the TZ-9 goes a step further by internally connecting the speaker magnets with a steel rod. To my knowledge, KEF was the first to use this technique, in the Model 104. KEF also physically reversed one woofer (maintaining acoustic polarity) to cancel some motor nonlinearities as well.

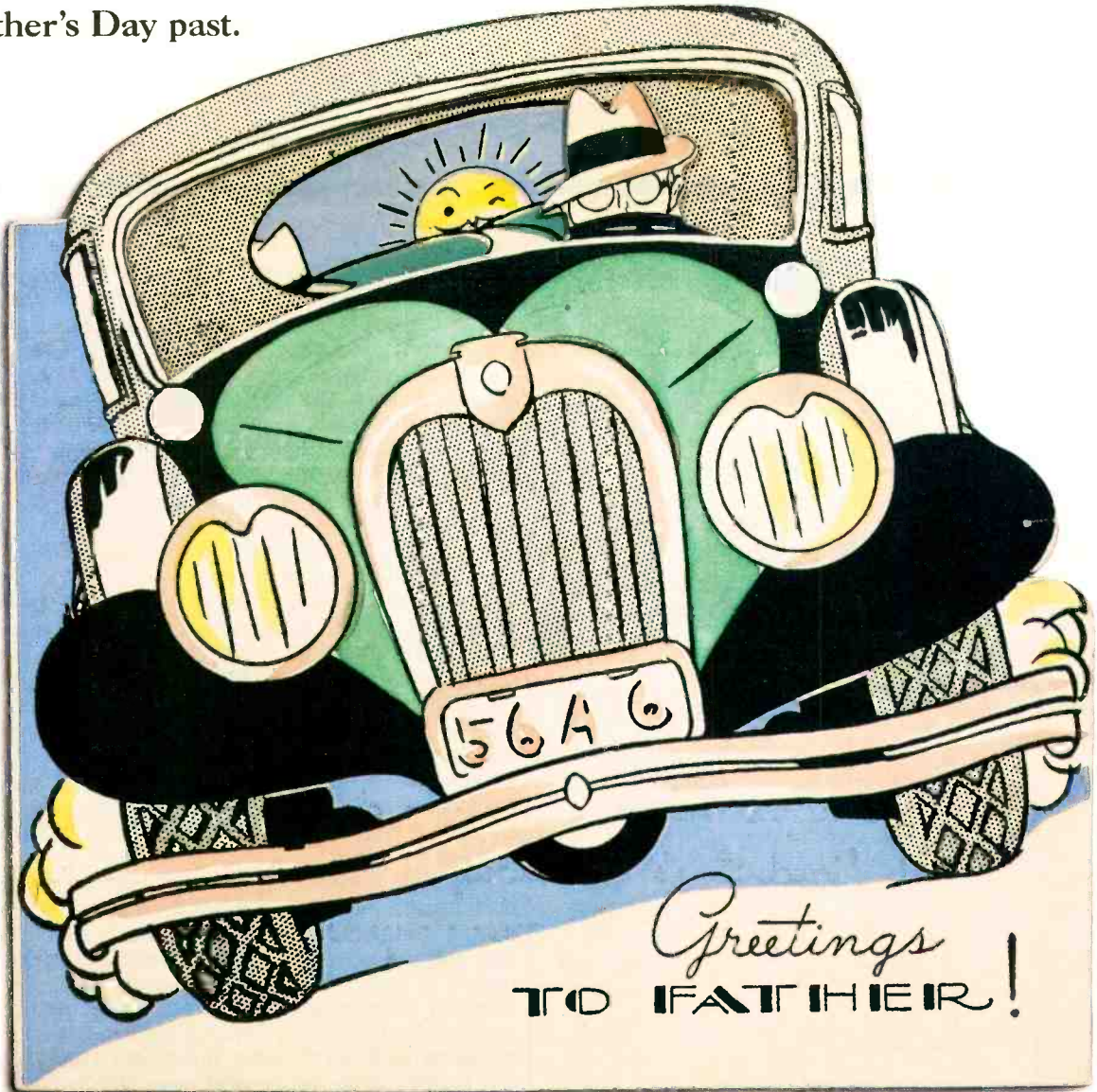
Computer simulations, computer-based instrumentation, and Doppler laser techniques were used extensively by the Japanese engineers to design the enclosure. The design is covered in a paper delivered at the AES 85th Convention in November 1988 (Preprint No. 2739), "A New Loudspeaker System with Reduced Radiation of Sound Pressure from Parasitic Enclosure Vibration," by Takashi Oyaba. Extensive mechanical, electrical, and acoustical measurements are also presented in a 41-page paper from Pioneer.

The result of all this is the TZ-9: Big, heavy, and expensive. Big means that you can get clean, deep bass response with good efficiency (although this speaker has a fairly small footprint). Heavy buys you thick enclosure walls, damping panels, and cast speaker frames. Expensive gets you the high-tech ceramic carbon domes (each protected by a wire mesh), precision, intricate construction, and a beautiful oak veneer. None of this guarantees great sound, but why start with compromises?

Measurements

Figure 1 plots the input impedance magnitude of the TZ-9. A minimum of just about 4 ohms is reached at the cabinet resonance frequency of almost exactly 30 Hz. Both the

Father's Day past.



12 YEARS OLD WORLDWIDE • BLENDED SCOTCH WHISKY • 43% ALC/VOL. (86°) • © 1989 CHIVAS BROS. IMPORT CO. NEW YORK, N.Y.

Greeting card, 1934. Used with permission

Father's Day present.



Visit your local retailer, or call 1-800-238-4373 to send a gift of Chivas anywhere in the U.S. Void where prohibited.

WHAT ARE YOU SAVING
THE CHIVAS FOR?

The TZ-9 speaker can be expected to sound great in a balanced, lively room that has good diffusion.

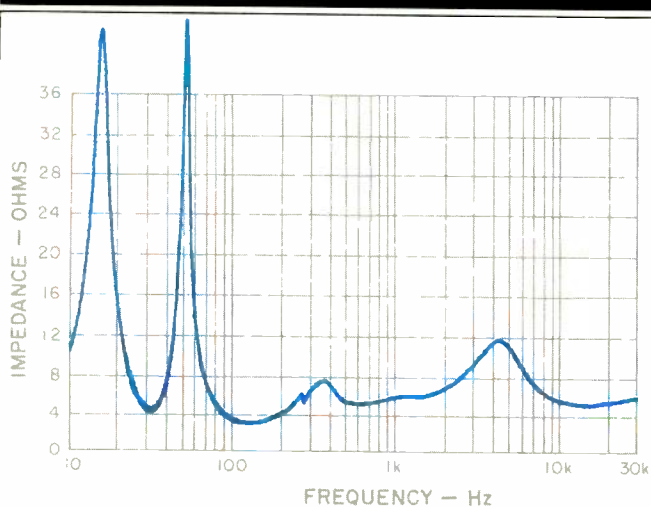


Fig. 1—Magnitude of impedance.

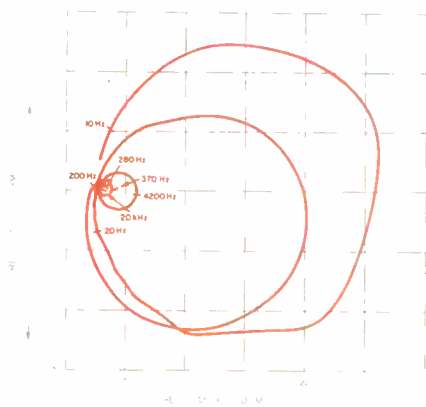


Fig. 2—Complex impedance.

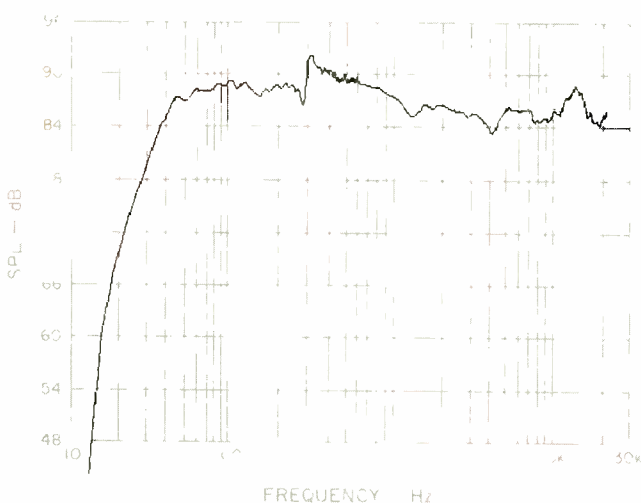


Fig. 3—One-meter, on-axis anechoic frequency response, with an input of 1.0 watt into 4 ohms (2.0 V).

magnitude and the complex impedance plot, Fig. 2, show a glitch at 280 Hz.

Anechoic frequency response of the TZ-9 was measured at a distance of 1 meter along a line from the acoustic center of the system to a seated listener 3 meters away and 1 meter high. Various measurement techniques were used to get high-frequency resolution at all frequencies without room reflections. The amplitude response of the first-arriving signal is plotted in Fig. 3. Except for a jump at 280 Hz, the response is very uniform, varying only about ± 2 dB from below 40 Hz to the end of the measurement at 20 kHz. The low end is solid to 30 Hz, with a fast roll-off—typical of vented designs—below that. Sensitivity for 1 watt input is about 88 dB SPL, which confirms Pioneer's claim of 91 dB SPL with 2 watts input.

The amplitude glitch at 280 Hz puzzled me, and I traced it to a simple, internal standing wave between the top and the bottom of the cabinet. I first calculated its possible existence by dividing the 13,548 inches/S speed of sound by the 46-inch internal height of the TZ-9; this gives the frequency of a 46-inch wavelength. At this frequency (296 Hz calculated, close enough to the measured frequency), the center-mounted woofers activate the second top-to-bottom resonance mode. The standing-wave theory was confirmed by sound pressure measurements made inside the loudspeaker's cabinet.

Inside the cabinet, at 280 Hz, the woofer cones have to work against the pressure wave they generated half a cycle earlier. This acoustic loading restricts woofer cone motion and delivers more power to the *inside* of the cabinet, which results in wall flex. From the outside of the cabinet, the reduced cone motion at 280 Hz means reduced sound radiated by the cones, and this combines with the out-of-phase cabinet-flex radiation to produce a sharp dip. Above this frequency, the air column goes off resonance and the phase shifts rapidly to produce a slight reinforcement.

Phase response was measured along with the amplitude response and is plotted in Fig. 4. Any phase shift caused by the acoustic resonance must be small, because no corresponding glitch is visible on the down-sloping plot of the TZ-9. The majority of this phase shift is produced by the conventional frequency-dividing networks necessary in a multi-way system. Most loudspeaker system designers do not consider it to be an audible problem if the two stereo speakers are identical, and I found unusually close tracking of the phase responses of my review pair.

Figure 5 plots the TZ-9s' amplitude response modified by early reflections in a room. The speaker positions used were those found to be optimum in the earlier listening evaluation, well out from the rear and side walls and rotated inward. The 0° plot was made at the listening position, and the 30° plot was made close to the side wall near the speaker. Reflections in this range can produce coloration to the sound, imaging instability, and—most believe—suppression of recorded ambience information. The TZ-9 performs well, keeping peaks and dips narrow and constrained to about ± 6 dB. The usual floor-bounce cancellation around 300 Hz is thankfully missing. Perhaps this is due to the rear-firing woofer. The 30° off-axis, in-room performance is even better than the on-axis, in-room response of this speaker.



The Marque of a Lifetime

The test of any great product comes with time, with years of use and years of reliably superb performance. When it passes the test, the marque carried by that product comes to signify something very special to thousands of owners, and to thousands more who hope to become owners. The name itself becomes a symbol of pride, of distinction.

In audio, no marque comes so close to this stature as Audio Research, which has been defining and redefining the state of the art for over two decades. Many of our products have become collectors' items, earning extraordinary resale values. Our first pre-amplifiers were seminal in the creation

of "high-end" audio. Today, the sophisticated hybrid technology of the SP15 continues that same passionate commitment to music. Most recently, the LS1 line-stage preamp and Classic 30 power amp have made leading-edge performance accessible to more music-lovers than any products in recent memory.

Excellence. Reliability. Integrity. Value. These are what come with every Audio Research product. To be enjoyed as long as you own the marque—for a lifetime.



1970 - 1990

audio research[®]
HIGH DEFINITION[®]

6801 Shingle Creek Parkway / Minneapolis, Minnesota 55430 / Phone: 612-556-7570 FAX: 612-556-3402

Enter No. 9 on Reader Service Card

These speakers' size and weight dictate some planning. For instance, you will need a ceiling higher than 8 feet to unpack them easily.

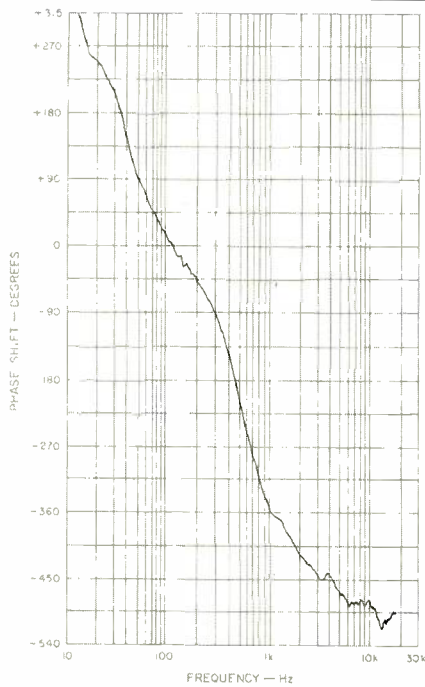


Fig. 4—One-meter, on-axis anechoic phase response.

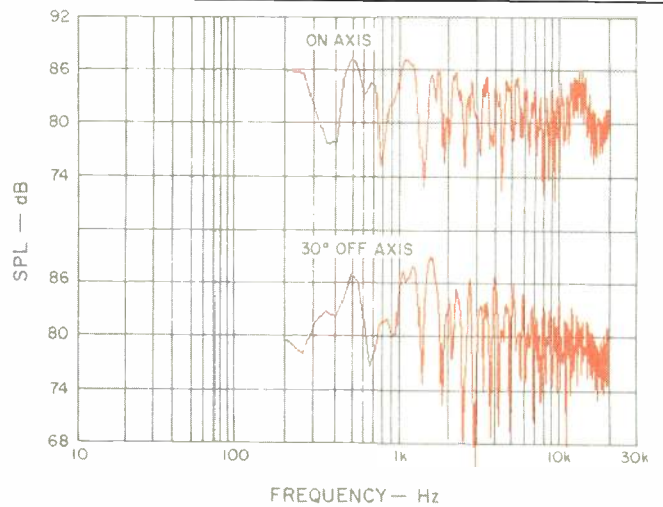


Fig. 5—Three-meter room response measured on axis and 30° off axis; for clarity, off-axis curve has been lowered.

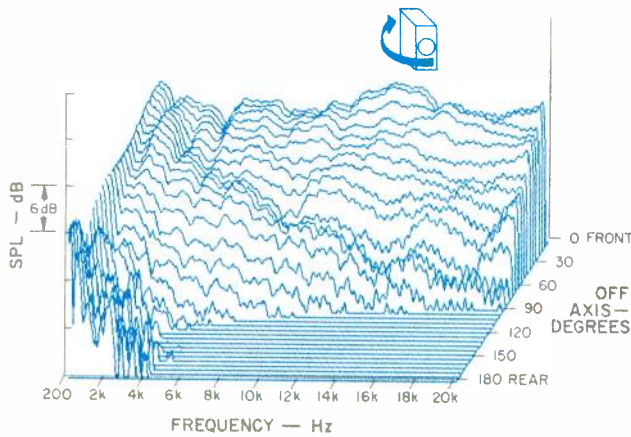


Fig. 6—Horizontal off-axis polar response taken from the front, around the side, and to the rear of the speaker.

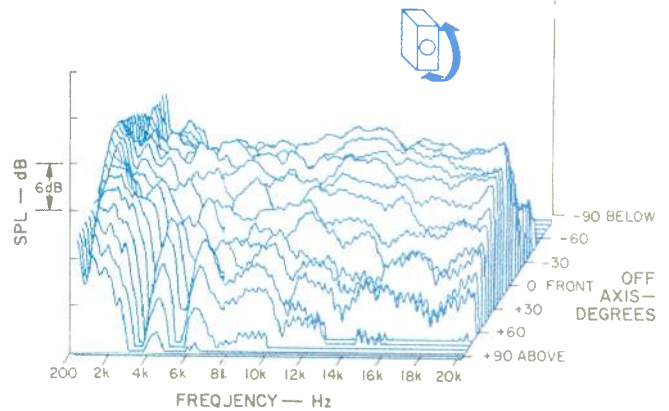


Fig. 7—Vertical off-axis polar response taken from below, up the front, to the top of the speaker.

Horizontal polar amplitude response was measured every 3°, starting behind the TZ-9, coming around the side, and finishing directly on axis; results are plotted on a linear frequency scale in Fig. 6. We see nearly ideal behavior in the gradual narrowing of the radiation angle at high frequencies. Thanks to well-chosen crossover frequencies, there is none of the alternating narrow and wide behavior found in

most two-way, and some three-way, speaker systems. The presence of ranges of narrow directivity implies that less energy is radiated into the room in these ranges; the result would be corresponding imbalances in the reverberant energy heard by the listener. The Pioneer TZ-9, however, can be expected to sound great in a balanced, lively room that has good diffusion.

T H E M A X I M U M M I N I M U M

NO 29



**Musical enjoyment,
performance,
reliability, durability,
beauty, stability,
compatibility, value,
pride of ownership.**

Size, weight, heat,
distortion, downtime,
coloration, veiling,
listening fatigue,
consumer regret.

mark
levinson®

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

Table courtesy of Fairhaven Woodworks

All in all, the TZ-9 proved remarkably distortion-free, and it should handle very high power on musical peaks without signs of distress.

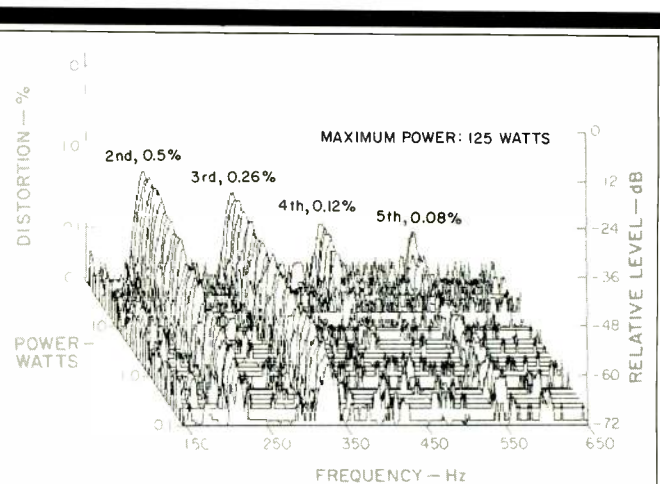
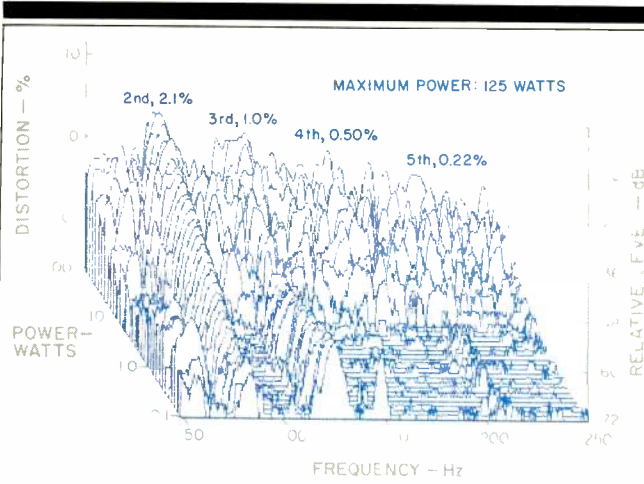


Fig. 8—Harmonic distortion products for the tone E₁ (41.2 Hz).

Fig. 9—Harmonic distortion products for the tone A₂ (110 Hz).

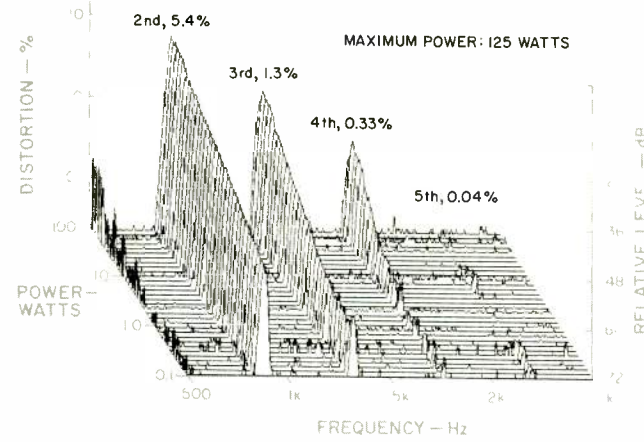


Fig. 10—Harmonic distortion products for the tone A₄ (440 Hz).

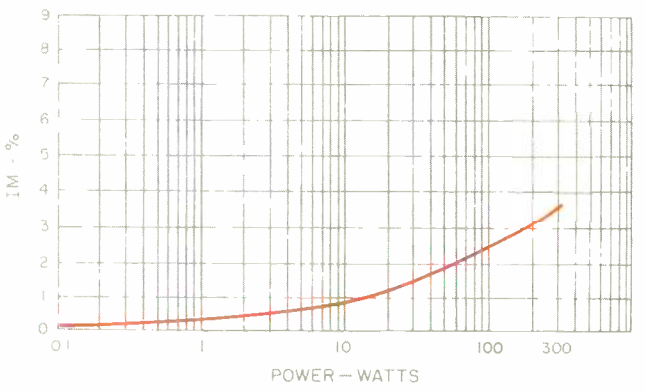


Fig. 11—IM distortion on 440 Hz (A₄) produced by 41.2 Hz (E₁) when mixed in one-to-one proportion.

A similar "3-D" display of vertical polar radiation is shown in Fig. 7. The curves were measured from below, up the front, to directly above the cabinet. Since each change in measurement angle also results in a change in distance from the vertically aligned drivers, there is interaction around the midrange-tweeter crossover frequency of 4 kHz. The amount shown is fairly small and occurs only at angles well off axis. Otherwise, the excellent, wide directivity found

in the horizontal plane is maintained here as well. The wide overall directivity suggests that the TZ-9s be kept well away from side walls and overhangs to avoid early reflections.

Harmonic distortion products are shown as a function of drive level in the "3-D" plots of Figs. 8, 9, and 10 for input frequencies of 41.2 Hz, 110 Hz, and 440 Hz. For reference, the open E string on a string bass sounds at 41.2 Hz, while the other two frequencies are musical notes as well, A₂ and



A NAIM FOR MUSIC

At Naim Audio we believe in a basic truth. You deserve a hi-fi system worth coming home to. And there are sound reasons why proud Naim owners have been coming home to us for twenty years.

We never settle for less than the very best in musical reproduction and we don't expect you to either. From the start of the design process to the last detail of production, rigorous care goes into every piece of Naim equipment.

We utilize a unique combination of high technology and skilled craftsmanship. Our robot loads the circuit boards, then every item of our equipment is hand-built with justifiable pride. If you haven't seen the inside of a Naim amplifier, send for our brochure or better yet,

see your nearest Naim dealer. This is our art and we are proud of it.

We test our equipment in our factory, not in your home. We measure distortion, stability, bias, noise levels and over a dozen other parameters, to ensure they fall well within our, and your, demanding specifications. Finally each piece of Naim equipment has to pass the ultimate test - we listen to it. Think about that, thousands of components every year, each auditioned prior to shipment.

Most importantly, Naim is about music. We have behind us a twenty year tradition of excellence, craftsmanship and innovation.

Visit your Naim dealer and audition our full range of electronics and speakers.

NAIM AUDIO NORTH AMERICA
1748 NORTH SEDGWICK STREET
CHICAGO
IL 60614
U.S.A.
TEL (312) 9440217



ALCYON ELECTRONIQUE
6818 ST DENIS
MONTREAL
HUS 252
CANADA
TEL (514) 276 4C04

Stacked against its many high-end competitors, I'd say the Pioneer TZ-9s are in the running but they don't blow the others away.

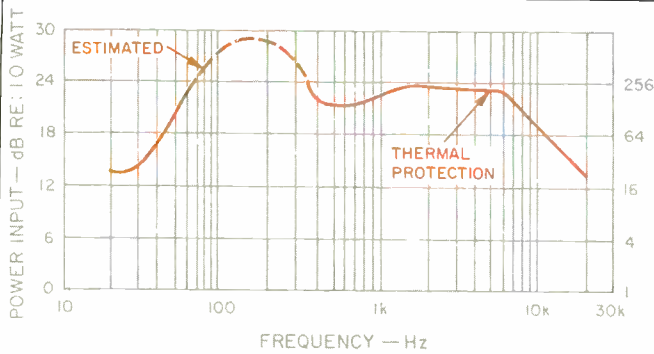


Fig. 12—Power linearity.

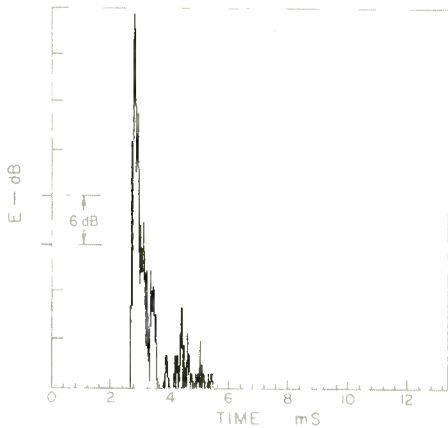


Fig. 13—One-meter, on-axis energy-time response.

C₄ (middle C). This E note is an easy frequency for the TZ-9, because it is above the box resonance frequency and most of the sound is radiated by the ports. Indeed, the highest distortion product, the second harmonic, is a mere 2.1% at 125 watts input. However, note the additional nonharmonic noise that rises at power inputs above 10 watts. This is a "chuffing" sound from air rushing in and out of the ports at

high velocity. This noise is very audible on sine waves and can be heard on certain music passages (try Saint-Saëns' Organ Symphony adagio section on Philips 412619-2). This "port-noise complaint" was never audible on percussion or on music having upper range instruments playing to mask the noise. One design cure for this problem is to use a larger port diameter or a more aerodynamic port configuration. Using a rear or down-firing port helps as well, by dispersing the noise.

Distortion at 110 Hz is an almost nonexistent 0.5% at maximum power. At 440 Hz, distortion is up somewhat because the midrange dome is just crossing in and is working hard. At higher frequencies, I expect distortion would go down again. All in all, the TZ-9 is a remarkably distortion-free speaker except for the chuffing low bass.

Another way of looking at low-frequency linearity is to measure a low-frequency sine wave's effect on a simultaneous higher frequency signal. Figure 11 shows the modulation of 440 Hz by 41.2 Hz (middle C by E₁) versus total input power. (Technically, the power calibration is that of a sine wave with the same peak voltage as the combined test signals. This is the same calibration method used for testing power amplifiers.) Again, the TZ-9 shows very linear behavior, which justifies the use of a high-power amplifier if you want very high sound pressure levels.

Power linearity, plotted in Fig. 12, is a full-range test of power handling. The plot shows the power input which causes a 1-dB compression of the acoustic output. Compression can be due to port turbulence, voice-coil heating, or nonlinear distortion. Power levels above the 1-dB compression level produce more mush than fidelity. The TZ-9 handles 100 watts or more over most of its range. Little of its observed compression was due to nonlinear waveform distortion, so the TZ-9 could be expected to handle very high power inputs on musical peaks without sounds of distress.

Energy versus time is plotted in Fig. 13. A perfect speaker would show a single spike, indicating that signals of all frequencies arrive at the same time and that there are no reflections or edge diffractions. The TZ-9 comes very close to this ideal.

Use and Listening Tests

The large size and heavy weight of the Pioneer TZ-9s make planning an important part of experimenting with them. For instance, to unpack them you need an 8-foot-plus ceiling to lift the box off easily. After unpacking, I used a small padded hand truck to move them around for best imaging. Once in place, the TZ-9s tend to blend in nicely because of their tall, slim shape and light, attractive finish.

Most users will not have many placement options for speakers of this size. Fortunately, I found the imaging and spectral balance to be relatively insensitive to location. At first, I used them well out from the wall behind, and about 8 feet apart, with very good results. As I became accustomed to these speakers' superior power output, I opted for a more distant placement, close to the wall behind them and further apart. I angled them inward to reduce early, side-wall reflections and achieved a wide area of listenable stereo, although listening on the equidistance center line was still the best position.



THE MD-1 CD TURNTABLE

Designed for superior accuracy in digital data recovery, the MD-1 incorporates an extremely accurate CD ROM laser transport, proprietary circuitry, four point suspension, and massive machined aluminum chassis construction.

Remote control and compatibility with both Fiber Optic and Coaxial output complete this elegant component whose artistic design is matched only by its playback capabilities.

With the MD-1 linked to the Krell Digital SBP-64X, SBP-16X or any other Digital-to-Analog converter, the listening experience is nothing short of spectacular.

For More Information



Call 1-800-553-4355

KRELL DIGITAL INC. ■ 20 No. Plains Industrial Rd., Suite 12 ■ Wallingford, CT 06492
Phone: 203-874-3139 ■ Fax: 203-87E-8373

See the Krell Industries advertisement in this issue.



Overall, the TZ-9s excel in presenting an airy sense of space with either delicacy or power, as the case demands.

Listening to the CD *Lyle Lovett and His Large Band* (Curb MCAD-42263), I began to realize that I don't always play this disc loudly enough on other speakers. This is brass and percussion recorded with a close-up perspective, which translates to *loud*. As I increased the volume to truly live levels, the TZ-9s responded, producing a big, airy soundstage with no sense of strain. They seemed to take command of room acoustics, rather than interact with them.

Other music auditioned included Jennifer Warnes' *Famous Blue Raincoat* (Cypress 661 111-2). The music was open and bright with a hint of an electronic sound to the reverberation. I think this is an indication of the TZ-9s' accuracy, because electronic reverb was undoubtedly used to make the recording. However, Jennifer's voice was apparently split at times, seeming to come from both speakers, rather than locking in naturally at a single perceived location between the speakers. Also, low, mid, and high components of the voice did not blend seamlessly in depth perspective. In particular, a tendency for low-mids to come forward in the soundstage was noted. Perhaps this was an audible effect of the 280-Hz internal resonance found in the measurements.

As usual, I listened extensively to these speakers before making measurements, but nowhere in my notes did I say, "... upper bass resonance—check it out." I did comment on extra warmth and the subtle depth-imaging shift on cello

and on Warnes' voice. This resonance is at most a minor sonic issue and could probably be eliminated with additional internal layers of acoustic absorption material one-quarter and three-quarters of the way up the cabinet, where the particle velocity of this resonance is at its maximum.

All-out acoustic power of the TZ-9s was tested with "The Race" from the *Flag* CD by the group Yello (Mercury 836426-2). This is rubber-room music at its finest. Clean, chest-thumping volume and sense of space were excellent. I did notice that the information around 20 Hz, normally audible with large subwoofers, was not present. To the TZ-9s' credit, this extreme signal condition did not cause its woofers any distress; they just ignored it. Overall, the TZ-9s excel in presenting an airy sense of space with either delicacy or power, as the music demands.

In relation to its many high-end competitors, I'd say the Pioneer TZ-9 is in the running, though it doesn't blow the others away. For example, a competitive loudspeaker may respond all the way to 20 Hz but may not develop the clean, high sound pressure levels above 30 Hz that the TZ-9 did. Another may have pinpoint imaging at a stereo sweet spot but demand unpleasantly dead room acoustics. It's a buyer's market; at \$4,000 per pair, there are many great loudspeakers available. For good looks, noncritical placement of speaker or listener, and an airy, powerful, clean sound, check out Pioneer's TZ-9.

David L. Clark

Hafler MSE



Shaping the Future

The MSE from Hafler. A new line of multi-channel, mosfet amplifiers designed inside and out for improved mobile audio performance. From the thermally efficient, sculpted heat sink to the "Dielectric Isolation" (DI) integrated circuitry, the Hafler engineering team is shaping the future of mobile audio. For more information on these new 2, 4 and 6 channel amplifiers and the dealer nearest you call 1-800-366-1619.

Hafler, shaping the mobile environment with sonic excellence and inherent value.

Hafler. "The Affordable High-End"

For More Information



Call 1-800-553-4355



*Make your next move to Velodyne.
It's guaranteed to put new life
into your system!*



For sound performance, a Velodyne subwoofer is the single most dramatic addition you can make to any system. Experience the true power of bass without harmonic distortion. Experience *all* the music. Experience Velodyne.

Velodyne

For More Information



Call 1-800-553-4355

Enter No. 50 on Reader Service Card

1746 Junction Ave., San Jose, CA 95112 408/436.0688 800/VELODYNE In Canada: 416/671.8990

4

ONKYO INTEGRA T-4700 TUNER

Manufacturer's Specifications

FM Tuner Section

Usable Sensitivity: Mono, 10.3 dBf; stereo, 17.2 dBf.

50-dB Quieting Sensitivity: Mono, 16.1 dBf; stereo, 36.1 dBf.

Frequency Response: 30 Hz to 15 kHz, +0.5, -1.0 dB.

Output Voltage: 0 to 1.0 V rms.

S/N: Mono, 85 dB; stereo, 77 dB.

THD in Wide I.f. Mode: Mono, 0.03%, stereo, 0.07%.

Separation: Wide i.f. mode, 45 dB at 1 kHz, 33 dB from 70 Hz to 10 kHz.

Muting Level: 17.2 dBf.

Capture Ratio: Wide i.f. mode, 1.3 dB.

Image Rejection: 100 dB.

Alternate-Channel Selectivity: Narrow i.f. mode, 80 dB.

I.f. Rejection: 100 dB.

AM Suppression: 55 dB.

AM Tuner Section

Usable Sensitivity: 25 μ V.

S/N: 40 dB.

THD: 0.7%.

Output Voltage: 0 to 300 mV.

I.f. Rejection: 40 dB.

Image Rejection: 40 dB.

General Specifications

Power Requirements: 120 V a.c., 60 Hz.

Dimensions: 17 $\frac{1}{8}$ in. W \times 3 $\frac{5}{8}$ in. H \times 14 $\frac{7}{16}$ in. D (43.5 cm \times 9.2 cm \times 36.6 cm).

Weight: 9.3 lbs. (4.2 kg).

Price: \$449.95.

Company Address: 200 Williams Dr., Ramsey, N.J. 07446.
For literature, circle No. 94

I have always been a fan of Onkyo tuner designs. The company's T-9090 tuner, both in its original form and in its Mark II update, represents the best of what is possible, given today's somewhat antiquated FM broadcast standards. I fully expected that this lower priced Onkyo tuner would prove to be a worthy successor to Onkyo's earlier Model T-4087, which it replaces. In many ways, it was, but I must report that in some details my sample did not fully measure up to published specifications. That's not to say

that the tuner is a poor performer; it's just that I expected the front-end of this tuner to be more sensitive than my measurements indicated. More about all of this later. First, a review of the T-4700's circuitry and convenience features.

Circuitry includes a seven-varactor, MOS-FET front-end, an i.f. strip that uses up to five ceramic filters (in its narrow tuning mode), dual antenna inputs, FM tuning adjustable in 25- or 50-kHz increments (useful if your cable TV company supplies FM at nonstandard frequencies within the FM



McIntosh[®] is *MUSIC*

Conceived in total dedication to the pursuit of excellence, the time required to develop the research program for this system has spanned at least two decades. The elusive combination of variables required to yield a uniform field has been tantalizing researchers for many years. Finally, after McIntosh built one of the most advanced and best instrumented acoustical laboratories in the world was it possible to follow the many theoretical leads to their conclusion. Then, after this extensive effort of analyzing so many different approaches to uniformity of field, was it possible to synthesize all of this knowledge and in one flash of intuitive genius the director of our acoustical laboratory saw a seemingly simple solution in the correct matching of diameters, masses and compliances and what evolved is a new measure of accuracy and realism. The intellectual and emotional experience of listening to the XR 1052 is something you simply must enjoy in your own home.



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

McIntosh Laboratory Inc.
Department 290A
PO Box 96 East Side Station
Binghamton, NY 13904-0096

STEINWAY & SONS, STEINWAY and the LYRE Device are Registered Trademarks of Steinway, Inc. and Steinway & Sons, and are used with permission of Steinway, Inc.

Handcrafted with pride in the United States by dedicated, highly trained craftspeople.

Enter No. 31 on Reader Service Card

The user can categorize and access preset stations by program type or by the name of the family member who listens to them.

band), and a new power-supply configuration that improves sound quality, provides greater interstage isolation, and reduces residual noise by providing single-point grounding and parallel connections to all circuit blocks.

Onkyo's four-mode APR system (the acronym stands for Automatic Precision Reception) constantly monitors signal quality and automatically chooses the best settings for stereo/mono, high blend on or off, wide or narrow i.f. response, and local- or distant-reception sensitivity. All of these "decisions" can be overridden manually if desired. The tuner has 40 station presets, and preset memory retention does not require batteries (it is maintained by charged capacitors). Furthermore, when power is turned off, the last tuned-to station frequency will be accessed when power is turned on again.

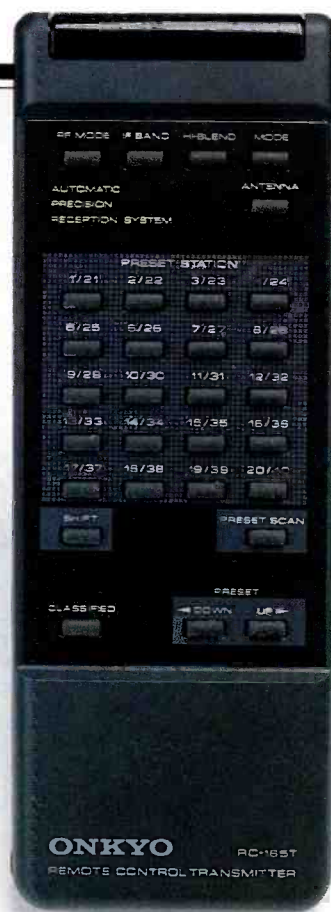
Each of the 40 preset stations can be assigned to one or more separate categories for convenient access. Categories may be designated by broadcast content (classical, jazz, rock, etc.) or by any other notation, such as the name of a household member who listens to that format. An alphanumeric identifier can be programmed into memory (along with the broadcast frequency) and displayed to make station choices easier. Nearly all of the functions and convenience features of the T-4700, with the exception of output level adjustment, can be controlled by a supplied infrared remote control.

Control Layout

The power pushbutton for this tuner is at the lower left of the front panel. Much of the upper area of the panel is given over to a display area. The left half of the display shows whether APR is activated and what its current settings are, which of the two antenna inputs is selected, and whether tuning is currently automatic or manual. The right section of the display shows tuned frequencies or alphanumeric characters, stereo indication, signal strength, memory classification, preset station number, and tuning level. Tuning level refers to a choice of muting threshold, which can be set at either 27 dBf or 37 dBf depending upon local reception conditions.

A row of narrow buttons just beneath the display area consists of a "Tuning Level" selector, a "Display" selector button, "Up" and "Down" buttons for tuning or character selection, "AM" and "FM" band switches, and a "Cable/Mute" button. This last one had me puzzled until I discovered that the only way to defeat this tuner's muting circuitry was to set it to tune in 25-kHz steps ("Cable") rather than in steps of 50 kHz. This is mentioned in the owner's manual only in connection with a paragraph on more precise tuning.

Further down below the left section of the display are pushbuttons to select antenna input, APR on/off, r.f. mode (local or distant), i.f. bandwidth, high blend on/off, mono or auto stereo, and tuning mode (automatic or manual). To the right of these are six larger buttons for preset-station classification assignment. In the panel's top right corner are 20 pushbuttons which are used for setting and accessing preset stations. A "Preset Shift" button doubles the number of presets available. A "Preset Scan" button, a "Memory" button, and a small "Output Level" control knob complete the front panel's layout.



The rear panel of the T-4700 tuner is equipped with two coaxial, 75-ohm, FM antenna connectors; AM antenna terminals (to which a supplied AM loop antenna can be connected); left and right audio output jacks, and a pair of remote-control jacks intended for connection of other Onkyo components. A pair of 75/300-ohm transformers is supplied for those who might want to use 300-ohm ribbon antenna lead-in cable.

Measurements

Figure 1 shows the frequency response of the FM tuner section, which was down 1.22 dB at 15 kHz. Figure 2 is my usual plot of S/N, or quieting, as a function of FM signal strength. From Fig. 2, I am able to report that 50-dB quieting in mono required 24 dBf (as opposed to 16.1 dBf claimed by Onkyo); in stereo, 50-dB quieting took nearly 45 dBf worth of input signal, much more than the 36.1 dB claimed by the manufacturer. What was impressive, however, was the ultimate signal-to-noise ratio reached with strong signal inputs. It measured 83 dB in mono (a bit short of the claimed 85 dB, but still an excellent number) and about 70 dB in stereo. When signal strength was increased beyond the standard 65 dBf, to around 80 dBf, S/N in stereo continued to improve until I obtained a reading of 78.5 dB. I made these measurements for both the wide and narrow settings of the i.f. circuits but found little difference between the two sets of readings.



Signature II—The tower speaker that's been six years in the making.

The Monitors — Accuracy unbounded by dimension.



Legacy Loudspeaker Systems

3021 Sangamon Ave.
Springfield, IL 62702

- Factory Direct
- Home Auditions
- Ten Year Warranty

1-800-283-4644

IMAGERY • TRANSPARENCY • DYNAMICS

Call or write for complete literature!

Enter No. 43 on Reader Service Card

The ultimate S/N ratio was impressive, reaching 83 dB in mono and, eventually, 78.5 dB in stereo.

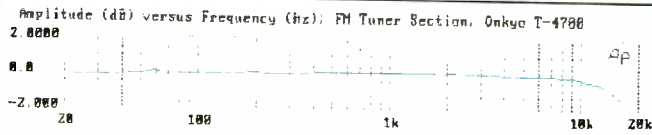


Fig. 1—Frequency response, FM section.

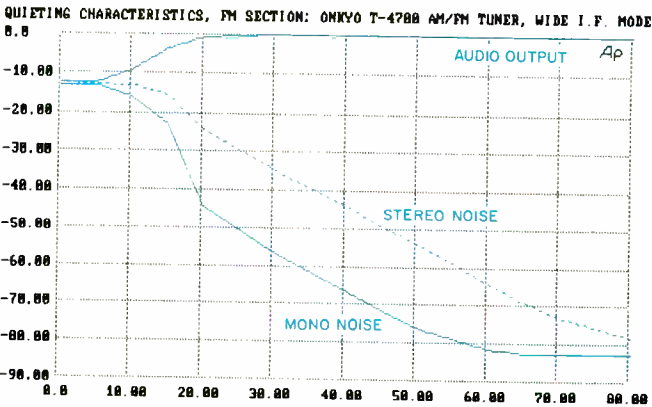


Fig. 2—FM quieting characteristics.

Such was not the case, naturally, when I plotted THD + N versus frequency (Fig. 3). In the wide i.f. mode, mono and stereo THD + N at 1 kHz was quite good, 0.029% for mono and 0.085% for stereo. At 6 kHz, THD + N measured a mere 0.02% in mono and 0.092% in stereo. When the tests were repeated using the narrow i.f. mode, stereo THD + N increased markedly, now measuring over 1.7% at 1 kHz, nearly 1.5% at 100 Hz, and just over 1% at 6 kHz. Mono THD + N remained low at 100 Hz (only 0.038%) but rose to 0.23% at 1 kHz and to 0.47% at 6 kHz.

Using a constant 1-kHz modulating signal, I next measured THD + N as a function of signal strength (Fig. 4), first using the wide i.f. setting and following up with the narrow i.f. measurements. Fairly good correlation was obtained between these readings at strong signal levels and those obtained in Fig. 3. The two sets of curves in Fig. 4 also enabled me to establish the least usable sensitivity figures for this tuner. Here, best results were obtained in the narrow i.f. mode, where usable sensitivity measured 20 dBf in mono and 14 dBf in stereo, as against the 10.3 dBf in mono and 17.2 dBf in stereo claimed by Onkyo.

Figure 5 shows how separation varied with frequency. The two dashed curves represent separation results (referred to the upper, solid traces) for the wide i.f. mode (upper solid curve and lower dashed curve) and for the narrow i.f. mode (lower solid curve used as reference to upper dashed curve). At 1.2 kHz (the closest data point to 1 kHz that the test system captured), a numeric readout showed that the modulated channel was within -0.1 dB of reference level and that separation was 49.33 dB below reference level. (Or, if you want to be as precise as my Audio Precision test gear, separation was therefore 49.23

dB at 1.24883 kHz!) At 10 kHz, separation was still a very impressive 41.3 dB, while at 100 Hz it remained as high as 46.5 dB. When the narrow i.f. mode was selected, separation decreased, as I would have expected, but still measured better than 35 dB at mid-frequencies.

My upgraded Audio Precision test gear now serves as a sophisticated spectrum analyzer, using Fast Fourier Transform (FFT) operation and digital signal processing. My gear enabled me to plot a narrow-band spectrum analysis of a 5-kHz signal modulating one channel (Fig. 6A), while in a second trace (Fig. 6B), spectrum analysis revealed the crosstalk component appearing in the unmodulated channel output. The tall spike reaching 0 dB in Fig. 6A represents the desired 5-kHz signal, while the shorter spike at that frequency in Fig. 6B reveals that separation at 5 kHz was -43.78 dB. Other spurious distortion and crosstalk components can be seen at higher frequencies. Residual 19-kHz pilot carrier was down some 62 dB. Also visible are the sidebands of the 38-kHz subcarrier that are used to convey the L - R difference signals in a stereo multiplex tuner. These appear at 33 and 43 kHz (38 kHz, ± 5 kHz).

Capture ratio in the wide mode measured 1.3 dB, as claimed. Alternate-channel selectivity in the narrow mode

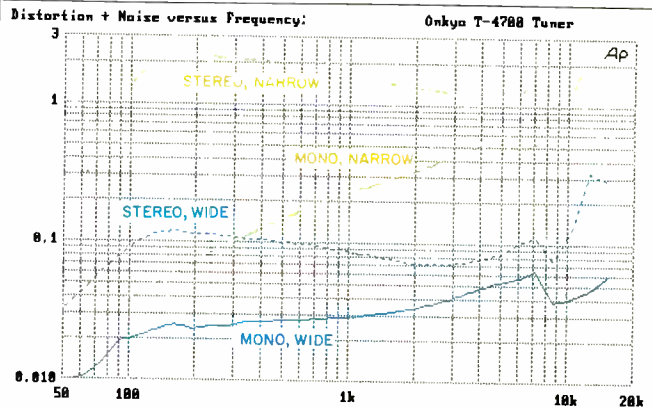


Fig. 3—THD + N vs. frequency.

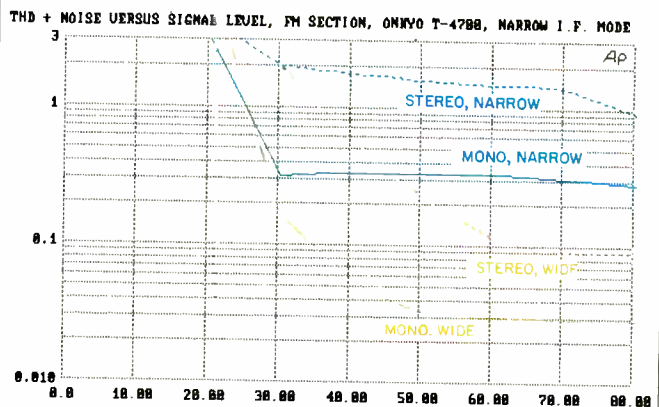


Fig. 4—THD + N vs. r.f. input signal level.



DETROIT'S NIGHTMARE. MUSIC LOVER'S DREAM.

MTX Music Modules have features you won't find in a conventional "off-the-shelf" plate-style loudspeaker or sound you won't find in a factory system. We use the same molding machines utilized by luxury automakers to build each MTX Music Module to the exact dimensions of your car.

We've made installation easy. All models require only small holes behind the woofer unit and these are usually the standard factory holes. Pop off the door panel, secure with provided hardware, and replace the door panel and grille. You're done.

To color-match the car's interior the entire unit can be sprayed with vinyl dye available at any retail automotive supply store. The pay-off is a factory OEM look with audiophile sound not available in factory systems.

MTX Music Modules are built to last and to make a lasting impression. The door panel versions and the rear deck models are tough, high quality audio components featuring die-cast baskets, mid-bass drivers, and ferrofluid soft dome tweeters, coupled with a sophisticated L/C cross-



over network and over-power protection circuitry. Musicality, sharp definition, great frontal staging, solid bass. It's the sound you've been listening for.

You know MTX. **We're the only company that warranties every loudspeaker we make for a full ten years.** That's commitment. At MTX, we don't make it because it's different, we make it because it's better.

For the MTX dealer nearest you, call 1-800-223-5266 or write us at One Mitek Plaza, Winslow, IL 61089. When calling, please refer to ad number 27265.

Find out more about Music Modules and MTX, the company that's serious about sound. Because you are.

MTX[®]

Serious about sound

I pulled in 46 stations,
40 of them in acceptably
noise-free stereo, with
excellent sound quality
and inaudible distortion.

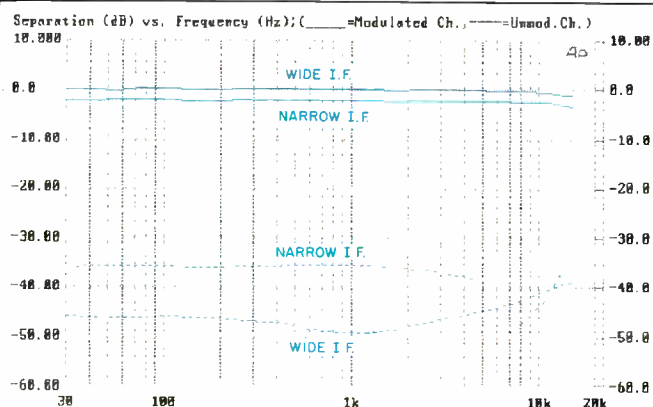


Fig. 5—Frequency response and stereo separation.

was 82 dB; in the wide mode it decreased, as expected, to around 58 dB. AM suppression measured 56 dB, while the results for i.f. rejection and image rejection were both in excess of 100 dB.

Figure 7 shows the frequency response of the AM tuner section of the T-4700. Response was down -6 dB at 3.0 kHz, and it was also off by the same amount at 60 Hz. Total harmonic distortion for 30% modulation of the AM signal was 0.73%, close enough to the 0.7% claimed by Onkyo.

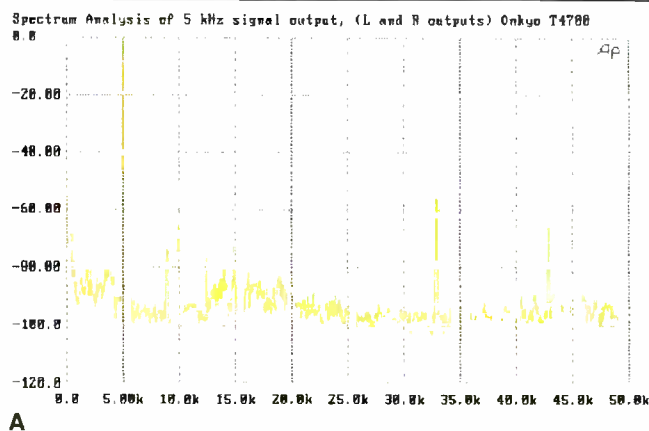
Use and Listening Tests

I had no problems with the way this tuner functioned and sounded or the way it made its decisions concerning wide/narrow i.f., high blend on or off, distant or local r.f. settings, or automatic mono/stereo switching. All of these aspects of Onkyo's APR system worked perfectly—I couldn't have made the selections any better myself, though I was pleased that I could override the APR decision if I chose to do so. What bothered me was the rather poor sensitivity figures obtained in mono for both wide-band and narrow-band i.f. settings.

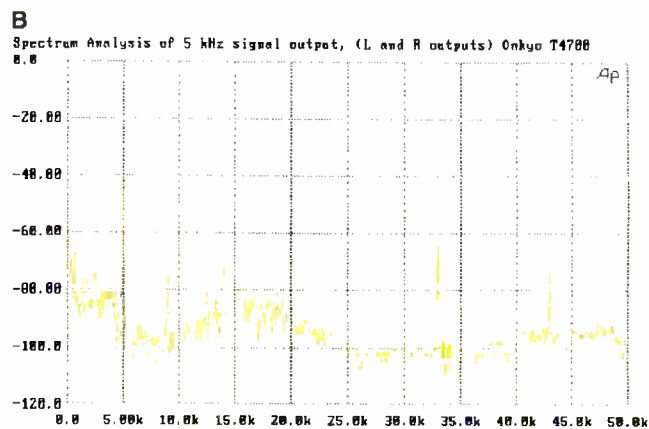
For all of that, however, the 46 station signals that I did pull in when the tuner was connected to my outdoor antenna (40 of them in acceptably noise-free stereo) were reproduced with excellent sound quality and inaudibly low distortion. I needed to use the narrow mode for only two of those stations, which happened to be at frequencies only one channel away from powerful local stations in my area. The narrow mode eliminated the interference from stronger signals, as it was supposed to do.

The elegant automatic APR features of this tuner will appeal to the FM listener who simply wants the best possible reception of all incoming FM signals, even if that means occasionally giving up some separation or tolerating an increase in distortion. Being able to defeat APR also enables the more serious FM listener to decide which settings are preferable. If the sensitivity had been a bit better, the Onkyo Integra T-4700 would have earned highest marks from this FM fan. As it is, it comes close by being a superb value in its price class.

Leonard Feldman



A



B

Fig. 6—Spectrum analysis of channel modulated by 5-kHz signal (A) and unmodulated channel (B), showing crosstalk products.

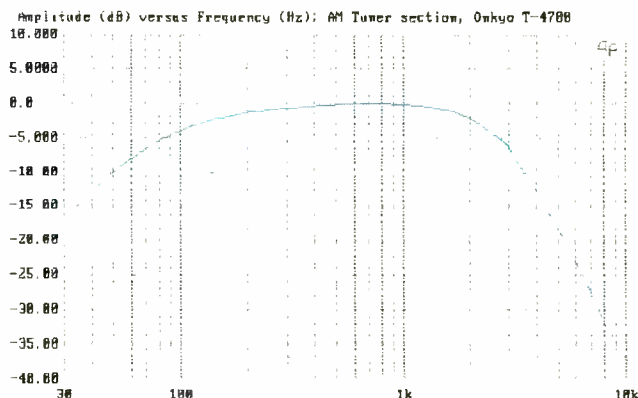


Fig. 7—AM frequency response.

Sunday morning. Time to kick back, get comfortable, and perfect the art of doing absolutely nothing. The ideal companion? Pioneer's new PD-M710 six-disc CD player. Now you can enjoy up to six hours of your favorite music without lifting a finger.

The secret is Pioneer's innovative six-disc magazine format. It works in both Pioneer home and car multi-play systems and allows you to catalog and store your favorite CD's. And it even features Non-Repeating Random Play, which is like having your own computerized disc jockey.

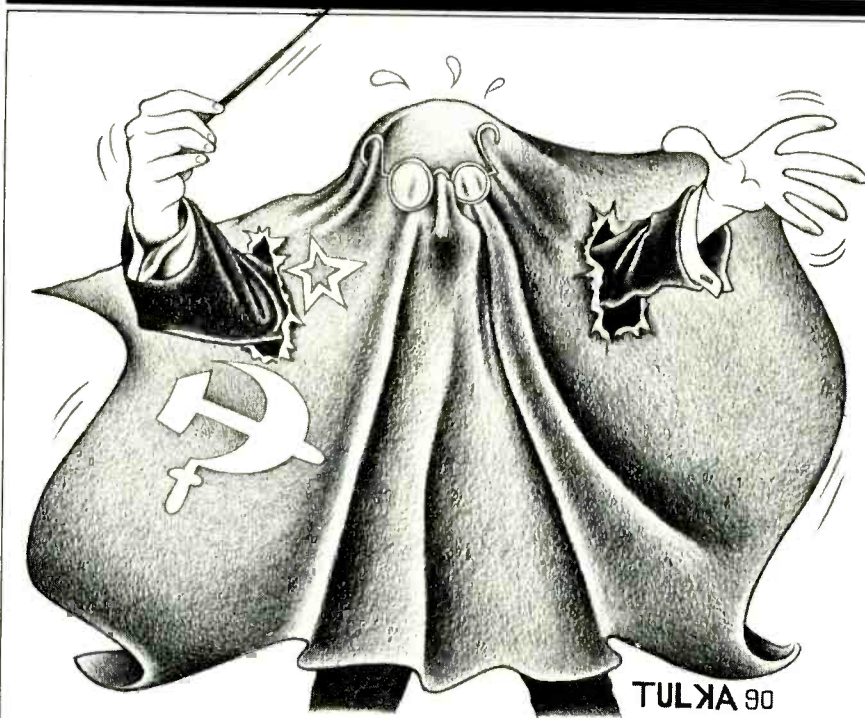
All of which means you can spend less time changing your music and more time enjoying it. But don't wait for the weekend.



PIONEER

We Bring The Revolution Home.

SLIGHTED SYMPHONY



Shostakovich: Symphony No. 4 in C Minor, Op. 43. Scottish National Orchestra; Neeme Järvi, conductor; Brian Couzens, producer.
Chandos 8640, CD; DDD; 61:20.

This massive, commanding masterpiece has a troubled history, including not years but decades of neglect and oblivion. The blazing performance it gets here, brilliantly recorded, provides us a welcome opportunity for discovery.

The more we come to know about Dmitri Shostakovich, the more he emerges as an authentically tragic figure. He owed a great deal to the 1917 Bolshevik Revolution's brand-new Union of Soviet Socialist Republics—and vice versa: Shostakovich, the first important composer educated and trained entirely under the Soviet system, exemplified to the world the unfettered, revolutionary new artist. The first three decades of his life, he enjoyed every official privilege and apparently could do no wrong. His dazzling First Symphony (composed at age 19 for his graduation from the Leningrad Conservatory) conquered the world; even in this country, Leopold Stokowski recorded it with his Philadelphia Orchestra. Shostakovich gratefully

wrote his Second Symphony, "October," for the revolution's 10th anniversary; he subtitled his Third, enthusiastically, "May Day." He began his Fourth in 1934; it had to wait 27 years, though, for its premiere. What in the world happened?

Shostakovich's powerful opera *Lady Macbeth of Mtsensk* had opened in Leningrad in January 1934, and it quickly chalked up 200 performances—an astonishing success for a contemporary work. Two years after the premiere, however, that eminent, ultimate authority on all the arts and every other aspect of Soviet life, Joseph Stalin, finally caught a performance of the great operatic hit by the Soviet music world's golden boy. An unsigned editorial (probably written by the eminent artistic authority Himself) in the official Party organ, *Pravda*, promptly demolished the opera as totally unworthy of Soviet audiences. Shostakovich, terrified (and with ample reason), withdrew not only the opera but also his new ballet, *Limpid Stream*, and his brand-new Fourth Symphony as well, for fear of adding fuel to the *Pravda* flame. The age of Socialist Realism had begun; Soviet art went into a decline which made it the pitied laugh-stock of the world for about the next

half-century. Audiences in Moscow finally heard Shostakovich's Fourth Symphony in 1961; visitors to the Edinburgh Festival heard its "extra-Soviet" unveiling in 1962. Even today, the work has not yet caught up in currency or familiarity with Shostakovich's 14 other symphonies, and that makes this splendid recording of it all the more welcome.

When Günther Herbig conducted the Fourth during the San Francisco Symphony's 1989 to 1990 season—my own first encounter with it in live performance—its extraordinary power almost blew me out of the hall. Sheer volume played only a subsidiary part. The size of the orchestra that the score demands does testify to young Shostakovich's discovery of Gustav Mahler, whom he greatly admired: The score calls for quadruple woodwinds (plus second piccolo), eight horns, two tubas, etc. The symphony's real power, though, derives from the music itself. One can only speculate what the fiery, hot-blooded, fearlessly pioneering 31-year-old who created this masterpiece might have gone on to if concern for his very existence had not forced him to slam on the brakes and revise his style completely. Shostakovich's next time out with a symphony (associated for all eternity with the lickspittle phrase, "A Soviet artist's reply to just criticism"), he produced yet another genuine masterpiece—but one cast in such a conservative mold that the Fourth makes it sound rather pallid by comparison.

Never again would Shostakovich employ such wrenching dissonances as here. The first movement opens with a shriek of pain and goes on from there. Not for years to come would he dip even a tentative toe into the forbidden dodecaphonic waters of Arnold Schoenberg's compositional system, but for long stretches of music here the tonality of the moment remains ambiguous, imponderable. Shostakovich's gradual, tragic personal transformation from an exuberant, cheeky young genius into a bitter, despairing old man provides one of the grimmest chapters in the history of Soviet art; one cannot help wondering whether the violent soul-storms throughout this unusually long symphony had their origins in what he had already begun to recog-

Illustration: Rick Tulka

TOP OF THE LINE

SUBWOOFERS



MX-2000 Push-Pull Dual Driver Powered Subwoofer

The new standard of subwoofer excellence has arrived—the M&K MX-2000. Reaching a new pinnacle in performance, the MX-2000 powered subwoofer proudly becomes the top of the audio industry's *only* eight model line of subwoofers.

The MX-2000 achieves this status by bringing together great clarity and detail; tremendous low frequency power and impact; high sound power levels down to 20 Hz; plus the ability to seamlessly blend with any speaker.

The 300 watt continuous RMS MX-2000 incorporates M&K's remarkable new Horizontal Push-Pull Dual Driver System—producing the tightest,

clearest and most powerful bass M&K has ever offered. This innovative system delivers superior transient performance; lower harmonic distortion; reduces cabinet coloration and vibration; and couples remarkably well to the listening room.

Building On Excellence

Fifteen years of unmatched experience puts M&K at the forefront of the subwoofer industry. No other manufacturer offers as wide a variety of styles and sizes of high-performance subwoofers. From the very affordable to the state-of-the-art, M&K subwoofers are unsurpassed in audio and audio-video system performance.

And M&K offers the ultimate Satellite-Subwoofer systems with a

choice of five highly acclaimed Satellite speakers. These small speakers are optimized for music or multi-channel surround-sound home theatre systems, and actually outperform large speakers.

The Only Choice

Building on M&K's legendary high level of subwoofer excellence, the MX-2000 becomes M&K's finest achievement in a subwoofer—blending seamlessly with any speaker. For high-performance audio and audio-video systems, the MX-2000 is the only choice."

 MILLER & KREISEL
SOUND CORP.

1091 Jefferson Blvd., Culver City, CA 90232 213/224-2854

Perhaps the soul-storms in the Fourth stemmed from Shostakovich's recognition of the hideous realities of his own Stalinist era.

nize as the manifold hideous realities of his own barbarous Stalinist era.

Naturally, the score does have its lighter moments, even its brief passages of comic relief—such as the end of the second movement, when the orchestra seems to have converted itself temporarily into a clockmaker's work-

shop. Yet as a whole, the work requires courageous, adventurous listening. It evokes a true story about that crusty old Connecticut Yankee, Charles Ives, when he addressed himself to a fellow auditor ridiculing some brand-new work on a concert program. "Don't be such a God-damned sissy," Mr. Ives

advised him. "When you hear strong music like this, use your ears like a man!"

Paul Moor

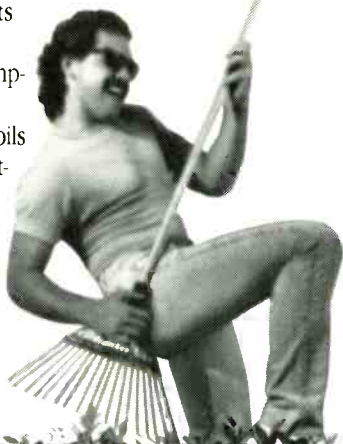
Famous Opera Arias. Munich Radio Orchestra, Giuseppe Patané; Marjana Lipovšek, mezzo-soprano.
Orfeo C179891A, CD; DDD; 56:31.

Rock Gardening Made Easy

Rock outside with Parasound All Weather Monitors. These extraordinary 9" tall sound machines easily become year-round residents of your garden. 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. High temperature voice coils handle enough power to fill any outdoor area. And, the 12dB crossover networks mean great clarity and power handling. Models start from \$199/pair including mounting brackets.

Call Parasound for the dealer near you. And jazz up your garden with a little rock 'n roll.



Parasound 950 Battery Street San Francisco, CA 94111
In CA 415 397-7100 Outside CA 1-800-822-8802 FAX 415 397-0144
Enter No. 38 on Reader Service Card

If we have learned anything from our era of vocalism, it should be that even the greatest singers can make ungratifying sounds. Think of Callas' raw shriek or Sutherland's stifled cooing at their respective worst. Lipovšek has no such shortcomings. Moreover, hers is a rich, exciting mezzo-soprano voice with a vibrant top, a secure bottom, a lot of velvet in the midrange, and, evidently, power to spare (though records easily deceive on this last point, and I haven't heard her live). Further, temperamentally (again judging from this record alone), she might be compared, say, to Zinka Milanov.

So why do I balk at the idea that Lipovšek may be an operatic superstar in the making? I don't know. Admittedly, there are some difficulties evident in this program: Gluck, Handel, and Massenet with one selection apiece, Mozart and Bizet (two apiece), and Verdi and Saint-Saëns (three apiece). Operaphiles will easily guess almost all the selections, particularly when I add that the parts involved are Orfeo (Orpheus), Serse (Xerxes), Sesto, Dora-bella, Eboli, Azucena, Carmen, Charlotte, and Dalila (Delilah). But in this sort of recital, the point is the singer, not the song.

The least hackneyed selection is "Parto, parto" from Mozart's *La Clemenza di Tito*—a wonderful piece but not well served by, or flattering to, Lipovšek because she makes somewhat heavy going of the coloratura. Her very determination to make every note squeaky-clean underlines her failure to do so. In some of the other tracks, her top end evinces a tendency to turn squally. There are annoying affectations in her Carmen, where her French diction suffers from minor oddities. Throughout, she has a way of placing the voice too much in the throat; it's like playing LPs—I sometimes fancy I can hear the wear taking place.

Am I being unfair to Lipovšek? Am I letting my distaste for this sort of mixed

WE'RE ABOUT
TO TURN
THE AUDIO
INDUSTRY
ON ITS
EAR.



Introducing the
Sonic Enhancement
Series from Allsop.

Designed to insure
maximum sonic performance
from your audio components.

The CD Plus Protective
Stabilizer reduces disc vibration.
For greater laser reading
accuracy. And truer, clearer, more
natural sounding music.

The NAVCOM™ Audio Isolators
separate your components from
unwanted vibration. Purifying the
process of audio signals. For less
distortion, tighter bass and optimum
sound quality.

Find them wherever digital audio software
and hardware is sold.

ALLSOP 

1-800-426-4303

© 1989, 1990 Allsop Inc.

The more I listen, the less
I notice Lipovšek's flaws
and the more admiration
I have for both the voice
and the temperament.

bag of chestnuts—where the want of context precludes dramatic and psychological development—color my feelings about a major operatic find? Quite possibly.

Among the parts she assumes for this record, only Dorabella is mentioned in Gottfried Kraus' effusive

notes as one of Lipovšek's roles at the Hamburg State Opera (since 1981) or the Munich State Opera (more recently). He does say, however, that she made a hit as Delilah at the Bregenz Festival in 1988.

And that raises another problem. The climax of "Mon coeur s'ouvre à ta

voix" is not in Delilah's part at all, but in Samson's capitulation to her seduction and the thunderclap by which Heaven makes its displeasure known. Without a Samson, there is no climax and no thunderclap. Any mezzo essaying "Mon coeur" *so/a* is thus left to seduce thin air, and with no palpable result. Granted that no true Samson—it requires a world-class heroic tenor—is likely to lend his services for the few phrases involved (though Georges Thill did it, superbly, for Germaine Cernay around 1930), so it would be idle to hope for a more adequate presentation when the mezzo herself has yet to achieve international stardom.

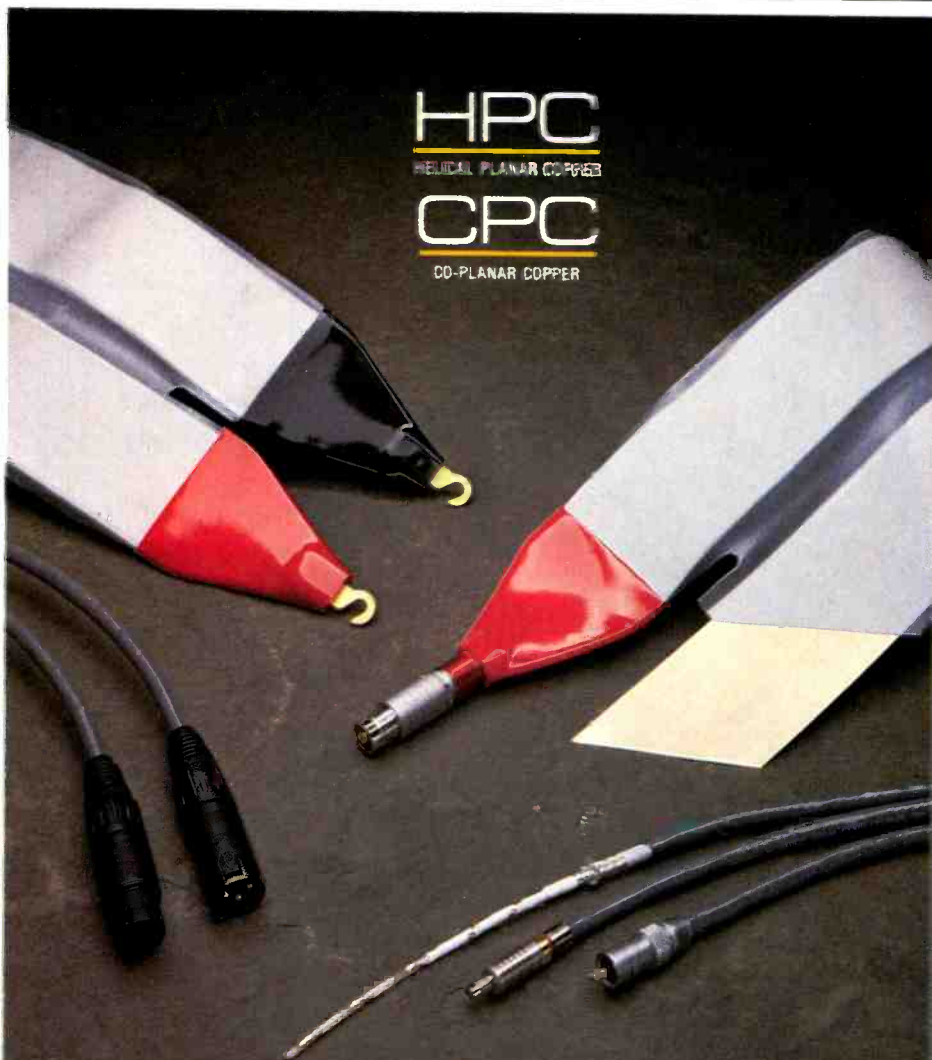
Such pitiable fragments are patently inadequate as "a kind of inventory of Marjana Lipovšek's art," in Kraus' words. I can only say that the more I listen to the disc, the less acutely I'm aware of its vocal flaws and the more admiration I have for both the voice and the temperament.

The recording itself was made in April 1989 in Studio I of the Bavarian Radio. It is typical of its genre. Both implied space and dynamics are ample, with the voice neither entirely swamped by the orchestra nor unnaturally out in front of it—a thoroughly competent but not exceptional studio job. No texts or translations are supplied, but with such familiar material, they may be unnecessary. The sequence is fairly chronological and places all the Italian excerpts ahead of the French. Otherwise, it has no sense of organization or momentum and ends lamely with Delilah's "Amour, viens aider ma faiblesse," oddly transposed after "Mon coeur," which would have made a more satisfying finale, even mutilated.

Robert Long

Bartók: String Quartet No. 6; Piano Quintet. Chilingirian Quartet; Steven De Groote, piano.
Chandos CHAN-8660, CD; DDD; 69:12.

This is the final installment in the Chilingirian's complete traversal of the Bartók string quartets, the earlier CDs of which were CHAN-8588 (Nos. 1 and 2) and CHAN-8634 (Nos. 3, 4, and 5). Quartet No. 6 dates from 1939—a tragic year for Bartók and for the world—and takes us into emotional realms



Over two years ago the staff at Madrigal Audio Laboratories began accumulating convincing evidence that solid conductors of rectangular cross-section would do a better job of carrying musical signals. Years of listening and engineering tests making use of ribbons of specially processed, high-purity copper with teflon insulation and the highest quality terminations, have resulted in the new Madrigal HPC and CPC cables.

Visit your Madrigal dealer and hear what these original designs can do to improve your music system.

HPC and CPC cables are designed by, and manufactured exclusively for

Madrigal Audio Laboratories, P.O. Box 781, Middletown, CT 06457 ITT TLX 4942158

ORIGINAL MASTER RECORDINGS™

ULTRADISC™

The Sound with the Midas Touch.

*The 24K gold answer in the quest for optimal compact disc reproduction. Original Master Recordings that demand Intelligent Engineering and Proprietary Mastering Technology. Exacting Technical Specifications satisfied by a process that offers a compact disc with the highest reflectivity and enhanced longevity. Current releases on **ULTRADISC™**: The Beach Boys, Sting, The Moody Blues, Steely Dan and more. Upcoming releases on **ULTRADISC™**: Boz Scaggs, The Jefferson Airplane, Elton John and Pink Floyd.*

ORIGINAL MASTER RECORDING



VOICES

ORIGINAL MASTER RECORDING
JEFF BECK WIRED



ORIGINAL MASTER RECORDING
CLASSIC EDITION
ROD STEWART



ORIGINAL MASTER RECORDING



*The **ULTRADISC™** is protectively packaged in the "Lift-Lock" jewel box*



For a complete free Original Master Recordings catalog, call toll free: 800-423-5759, or write: Mobile Fidelity Sound Lab, 1260 Holm Road, Petaluma, CA 94954.

Enter No. 33 on Reader Service Card

What makes this recording special is the relatively obscure Quintet for String Quartet and Piano, written when Bartók was just 22.

that, perhaps, had remained unexplored since Beethoven's last years. The comparison is often made, at any rate, and it has more than a little to recommend it.

The Chilingirian's approach is closer to the urgency and edge of the ground-breaking old Juilliard Quartet

mono recording (on Columbia, replaced by a stereo remake) than to the justly celebrated and very polished Végh reading (on Telefunken, reissued on Astrée). Perhaps the Juilliard players were a little too ready to be swept away, and the slightly less headlong approach of the Chilingirian Quartet is

more just. At any rate, it is a fine performance that I would choose, together with the Juilliard, over the Végh.

What makes this record really special, however, is the relatively obscure Quintet for String Quartet and Piano. It was written in 1904, when Bartók was 22. John Cox's notes describe it as "Brahmsian melancholy filtered through the influence of . . . Ernő [von] Dohnányi." That is a fair basic characterization, though the piece is far more. It is passionate and impulsive—particularly as played here—and altogether engaging.

Cox also makes much of the encounter, later in 1904, between Bartók and true Magyar folk music, which was to have a profound influence on his style and musical thinking. The deliberately nationalistic quintet still accepts the traditional Haydn/Brahms/Liszt view equating Hungarian with Gypsy.

Yet, there's something distinctly Bartókian about the quintet. Its sense of how musical rhetoric works bears striking similarity to that of, say, the Concerto for Orchestra or the Third Piano Concerto. Many influences—Richard Strauss in particular, perhaps—are traceable in the quintet. A comparison might be drawn to Schoenberg's "Verklärte Nacht," which also makes bigger, denser, more Straussian sounds than are typical of its composer but hints at his mature identity.

Though the Chilingirian Quartet is resident in London at the Royal College of Music, both recordings were made out of town. The quartet was taped in July of 1988 in St. Bartholomew's Church, Orford. The miking is too close to project much of the church ambience. The sound is generally excellent, though some loud passages are slightly congested. The quintet was taped a few months later in The Maltings, Snape—home to the Aldeburgh Festival and a famous acoustic gem. The sound here is much fuller, with a somewhat greater sense of background space, though the overall effect still is intimate. I enjoyed it immensely, but with that rich a bass end, the piano tone may sound a mite thumpy on some equipment.

Don't let this deter you, however. The sound is never less than very good, the performances compelling, and the music superlative.

Robert Long

If a CD isn't **FINYLIZED**[™] you haven't really heard it!



MORE THAN A CLEANER...

Science In The Service Of Music

Finyl's Scientific Formula Utilizes Optical Impedance Matching For Enhanced Laser-Read Playback

BETTER CD SOUND

Finyl also cleans and protects with a safe micro-thin coating. Long-lasting treatment of over 200 CDs with simple spray & buff application—about 13¢/CD.

\$29⁹⁵

If your dealer does not yet have FINYL, call 1-800-24 FINYL (In Maine 929-4553)
Dealer inquiries invited.

Distributed by Transparent Audio Marketing, Inc., Box 117, Hollis, ME 04042 (207) 929-4553
Manufactured by Digital Systems and Solutions, Inc., Box 3640, San Diego, CA 92103

FINYL[™]
THE DIGITAL SOLUTION

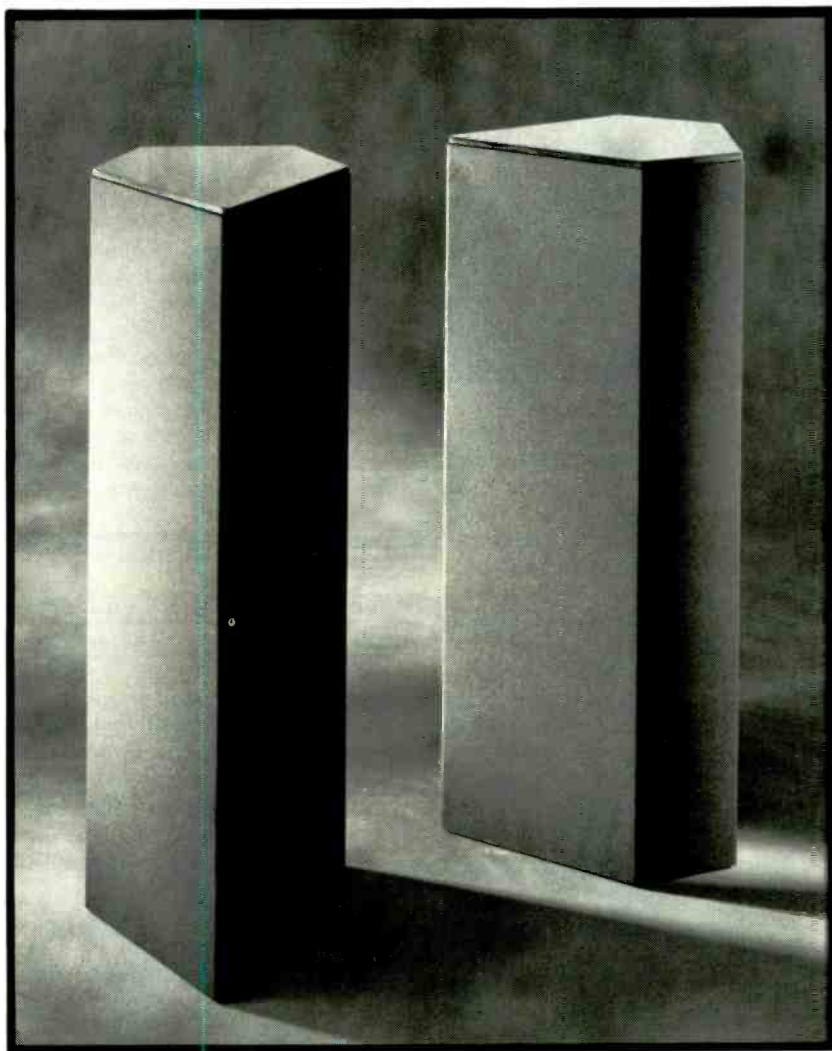
"... the analyzer curve is astoundingly smooth. Subjectively, this speaker's most outstanding characteristic was its superb clarity and resolution of inner detail in complex textures, achieved without excess brightness or exaggeration of sibilance. String sound was smooth and rosy, imaging was excellent, and choir voices could be identified individually. I've heard few speakers that are as satisfying with both pop and classical music."

Peter W. Mitchell
Stereophile Magazine
Vol. 13 No. 4, April 1990

Soundwave

Baffleless Loudspeakers

REFLECTION FREE SOUND



Soundwave loudspeakers have the open, seamless, and transparent sound of the best "panel" (electrostatic, ribbon, and planar) speakers, while offering the superior dynamic range and extended bass response of the best "dynamic" designs. And they offer a stereo image that is second to none.

A revolutionary patented design, achieved by the utilization of acoustic intensity mapping techniques, Soundwave loudspeakers have a unique "baffleless" enclosure, special drive units, and a 180 degree radiation pattern. The result is sound so natural and three dimensional, you'll think there are live musicians performing in your listening room.

"Their radical design offers a breathtaking stereo image and excellent dynamic range. Further, they are harmonically correct, and superb at resolving nuance and subtlety. They are, in a word, 'musical.' I can recommend them with enthusiasm to the most demanding audiophiles."

Dr. Christopher Rouse
Composer-in-Residence
Baltimore Symphony Orchestra
Associate Professor of Composition
Eastman School of Music

"The Soliloquy speakers are honest. You can hear all the way back to the recording studio as the speakers treat the original source material not only accurately, but also fairly and kindly... I have been more satisfied with the Soliloquy speakers than any others that I can remember evaluating."

Tom Krehbiel
Sound Equipment Reviewer
Buffalo News Nov. 1989

"... The net result was a big, smooth, open sound, exceptionally free from typical box coloration."

Jim Stoneburner
Stereophile Magazine
Vol. 12 No. 7, July 1989

For further information, write Soundwave Fidelity Corp.
3122 Monroe Avenue, Rochester, New York 14618
(716) 383-1650 or (800) 752-2445 FAX: (716) 383-1355

Soundwave™

FROM THE HIGH COUNTRY



The Caution Horses: Cowboy Junkies
RCA 2058-2-R, CD; DDD; 44:37.

Sound: B Performance: B

This is definitely not the kind of music to play first thing in the morning to jolt yourself into your daily maneuvers. Gentle, permanently wistful, and lingering over each beat as if reluctant to part with it, Cowboy Junkies deliver a languid, strangely attractive sound that has propelled them from the bar band circuit to the arena in just a year. It's a disarmingly simple sound, that of a countrified Canadian band with a sweet-sounding female singer. Nearly all their material is very fragile sounding and slowed way down, decelerated to the verge of torpor without the poetry, irony, or rough edges that Dylan, The Velvet Underground, or Neil Young have protected themselves with when they've slowed things down.

But the sound is neither soporific nor enervating; it's just specialized, perfect for certain moments and certain moods, though out of place at other times. The Cowboy Junkies largely save themselves from musical entropy with a sort of sheer and unsure beauty, and a stubborn fidelity to what they simply are.

Both of these qualities are enhanced by the one-shot recording process used here. *The Caution Horses*, like the group's first album, is a live, off-

the-floor recording completed essentially in one day. Bereft of endless overdubbing and refinements that can take the life out of any music, the songs have both a live and a living sound, especially the opening track, "Sun Comes Up, It's Tuesday Morning," which sets the tone for the whole melancholy cycle of lost-love vignettes that ends on the positive notes of "You Will Be Loved Again." Songwriter/producer Michael Timmons also credits the Calrec Soundfield Ambisonic microphone, which may be what turns the soft, tonally limited voice of sister Margo into a shivering doe nuzzling your ear, or the creative accordion em-

bellishments of Jaro Czerwinec into piercing shafts of melody, especially on the Neil Young song, "Powderfinger." In this song, slowed down and stretched to fill nearly six minutes, Margo Timmons flattens out Young's haunting melody, and the Junkies do away with an essential lick. Yet these critical deviations (which would normally make for an evisceration of one of Young's most poignant pieces) simply transform "Powderfinger," etherealizing Young's angst over the responsibilities of manhood into a dreamy resignation.

I suppose most people would consider the heart of this band to be the Timmons siblings, who write and sing these songs. I'd like to include Jeff Bird on mandolin, harmonica, and fiddle; Kim Deschamps on steel guitars; David Houghton on percussion, and Jaro Czerwinec on accordion. Perennially credited merely as sidemen, it is predominantly their contributions that infuse the songs with color and character and, to be honest, save the music from blandness. *Susan Borey Sherman*

The Million Dollar Quartet:

Elvis Presley
RCA/BMG 2023-2-R, CD; AAD; 66:58.

Sound: B+ Performance: A

Most of Elvis Presley's recordings were carefully coached performances, distinguished not only by Presley's vocal stylings but by the arrangement and production provided. Even on live recordings, there was very little spontaneity, as the band was well re-



Jerry Lee Lewis, Carl Perkins, and Johnny Cash backing up Elvis Presley.

POWER From The GODS



AUTOMOTIVE STEREO AMPLIFIERS AND COMPONENTS

HIFONICS is the one single manufacturer supplying all of the auto stereo users' needs.

With amplifiers from 40 to 1200 watts (RMS power into 4 ohms) in 1, 2, 4 and 6 channels.

ALL DESIGNED AND MANUFACTURED IN THE U.S.A.

HIFONICS also manufactures parametric equalizers, electronic crossovers, a full range of loudspeakers and accessories.



HIFONICS®
MADE IN U.S.A.

HIFONICS CORPORATION®
11 Victoria Terrace, Ridgefield, NJ 07657 • 201/945-8880 • Fax: 201/945-1218
HIFONICS WEST®
725 B Industrial Road, San Carlos, CA 94070 • 415/595-0600 • Fax: 415/595-2620

For More Information



Call 1-800-622-5456

Circle No. 24 on Reader Service Card

Returning to the scene of his early sessions, Elvis feeds off the Sun groove and sings in an unbridled, exhilarating manner.

heard and Elvis didn't indulge in improvisational singing. However, one day late in 1956, before Elvis The Singer became Elvis The Religion, Mr. Presley let his hair down, joining a Carl Perkins session in progress and turning it into what journalists would call The Million Dollar Quartet.

To provide a little background, Presley had already been sold off to RCA Records by Sun's Sam Phillips, who had a small stable of other artists with minor successes of their own. Perkins had made some noise on the pop charts earlier with "Blue Suede Shoes," but his hospitalization made

personal promotion of the record impossible, and his version of that song (along with his career) was quickly eclipsed by Elvis' string of hits, including "Blue Suede Shoes." Jerry Lee Lewis, the third leg of this quartet, was just starting to make some noise as a singer but was playing sessions at Sun to keep the bill collector from his door. Johnny Cash, whose participation in the session was minimal, had sold some pop records but had more in common with the other three in terms of the music he had grown up with than in the direction he was heading (read: He was not a rock 'n' roller).

Thus the stage was set for this friendly jam session, during which these three exchanged knowledge of country & western and spiritual classics, ran through a few of their hits (and hits-to-be), and basically clowned around in a fashion that hadn't been heard on previous recordings. Then little known, Jerry Lee Lewis had few reservations about coming on strong with the biggest pop star in the world; it must have taken a tremendous amount of self-confidence and chutzpah for an upstart such as Lewis to even open his mouth in this situation. Perkins might have known Elvis prior to the session, and Presley had recorded some of his material. But Perkins keeps a tight lip and sticks mainly to playing guitar. The liner notes explain that he'd been singing most of the day.

Returning to the scene of his early sessions, Presley feeds off the Sun groove and sings in an unbridled, exhilarating manner. It's a pure joy to hear one of the great rock singers of any era let loose without the self-consciousness that mars many of his recordings. The sparse musical backing allows the vocals to breathe, and although the recording is not always perfect, Phillips doesn't miss much. Those who may doubt the purity of the music of any of these guys could learn a lot from a record like this, and enjoy it at the same time.

Jon & Sally Tiven

Hats: The Blue Nile

A&M CD-5284, CD; ADD; 38:58.

Sound: A — Performance: A —

Hats, The Blue Nile's second release, comes nearly seven years after

Where to buy Polk Speakers

AUTHORIZED HOME DEALERS

CANADA Call Evolution Technology, Toronto for nearest dealer 1-416-947-8888
AK Anchorage: Magnum Electronics • Fairbanks: Holt's
AL Birmingham: Audition • Huntsville: Sound Distributors • Mobile: Hi Fi Zone • Montgomery: The Record Shop • Tuscaloosa: Kincaid Stereo & TV
AR Fayetteville/Ft. Smith: Stereo One • Little Rock: Leisure Electronics • Searcy: Soltmart
AZ Phoenix/Mesa: Hi Fi Sales • Tucson: Audio Emporium • Yuma: Warehouse Stereo
CA Bakersfield: Casa Moore • Campbell: Sound Goods • Canoga Park: Shelley's • Chico: Sounds By Dave • Corona Del Mar: Pacific Coast Audio Video • El Toro: Genesis Audio • Escondido: Sound Company • Eureka: Eureka Audio Video • Lancaster: California Soundworks • Long Beach: Audio Concepts • Mountain View: Sound Goods • Napa: Futurvision • Penngrove: California Stereo • Redondo: Systems Design • Riverastro: Speakerscraft • Sacramento: Good Guys • San Diego: Sound Company • San Francisco & Suburbs: Good Guys • San Gabriel: Audio Concepts • San Jose: Good Guys • San Luis Obispo: Audio Ecstasy • Santa Barbara: Creative Stereo • Santa Cruz: Sound Wave • Santa Maria: Creative Stereo • Santa Monica: Shelley's Stereo • Stockton: Gluskins • Thousand Oaks: Creative Stereo • Upland: Audio Haven • Ventura: Creative Stereo • Visalia: Metro Stereo • Westminster: Videotek Stereo
CO Boulder: Soundtrack • Colorado Springs: Sunshine Audio • Denver & Suburbs: Soundtrack • Glenwood Springs: Stereo Unlimited • Grand Junction: Sound Company • Minturn: Custom Audio Video • Pueblo: Sunshine Audio
CT Danbury: Carlson's • Fairfield: Audio Design • Greenwich: Al Franklin's • Hartford: Al Franklin's • New Haven: Audio Etc • Newington: Hi Fi Stereo House • New London: Robert's • Norwalk: Audiotronics • Waterbury: Zimo Music
DE Wilmington: Bryn Mawr Stereo
FL Daytona Beach: Stereotops • Ft. Myers: Stereo Garage • Ft. Lauderdale: Sound Service • Ft. Pierce: Sound Shack • Gainesville: Electronics World • Jacksonville: Audio Tech. Spectrum Home Theater • Key West: Audio International • Lakeland: Sound Factory • Mary Esther: Palm Audio Video • Merritt Island: Southern Audio • Miami: Electronic Equipment Co. • Sound Advice • Naples: Stereo Station • Panama City: Watwood Stereo • Pensacola: All Pro Sound • Sunrise: Sound Advice • St. Petersburg: Sound Advice • Tallahassee: Stereo Store • Tampa: Sound Advice • W. Palm Beach: Electronic Connection, Sound Advice
GA Athens: Hi Fi Buys • Atlanta & Suburbs: Hi Fi Buys • Augusta: Stereo City • Brunswick: HiFi Service Store • Columbus: Merit TV • Gainesville: Audio Dimensions • Macon: Georgia Music • Savannah: Audio Warehouse • Valdosta: Stereo Connection
HI Honolulu: Honolulu Audio Video
IA Davenport: Gregg's Music • Des Moines: Audio Labs • Dubuque: Reniers Iowa City: Hawkeye Audio • Mason City: Sound World • Sioux City: Audio Visions
ID Boise: Stereo Shoppe • Ketchum: Infinite Audio • Moscow: Stereo Shoppe • Twin Falls: Audio Warehouse
IL Alton: Reliable Stereo • Aurora: Stereo Systems • Carbondale: Southern Stereo • Champaign: Good Vibes • Chicago & Suburbs: United Audio • Decatur: Team Electronics • DeKalb: Classic Hi Fi • Fox Valley/Aurora: United Audio • Highland Park: Columbia • Joliet: Stereo Systems • Kankakee: Barrett's Entertainment • Lansing: Uni-Tek Electronics • Naperville: Stereo Systems • Niles: United Audio • Normal: Sound One • Northbrook/Dakota: United Audio • Peoria: Team Electronics • Rockford: Columbia • Schaumburg: United Audio • Springfield: Sundown One • Spring Valley: Audio Labs • Sterling: Sterling Electronics • Vernon Hills: United Audio
IN Bloomington: Campus Audio • Bluffton: Eley TV & Appliance • Evansville: Risley's • Ft. Wayne: Classic Stereo • Indianapolis: Ovalton • Jasper: Risley's • Lafayette: Good Vibes • Marion: Classic Stereo • Michigan City: Audio

Connection • Muncie: Classic Stereo • South Bend: Classic Stereo • Terra Haute: Stereo Crafters • Vincennes: Risley's
KS Junction City: Audio Junction • Kansas City: Brands Mart • Overland Park: Audio Electronics, Brands Mart • Wichita: Audio Visions • Topeka: Nelson's
KY Bowling Green: Proston's • Campbellsville: Coppock's • Lexington: Ovalton Audio • Louisville: Audio Video Buy Design, Ovalton • Madisonville: Risley Electronics • Dwanaboro, Paducah: Risley's • Pikeville: Mayo Inc.
LA Alexandria: Simpson Electronics • Lafayette: Sound Electronics • Metairie & New Orleans: Alt-terman Audio • Shreveport: Wrights Sound Gallery
MA Boston: Goodwins, Waltham Camera & Stereo • Fitchburg: Fitchburg Music • N. Dartmouth: Sound II • Pittsfield: H.B.S. Stereo • Waltham: Waltham Camera & Stereo • Worcester: O'Coins
ME Bangor: Sound Source
MD Baltimore: Soundscape • Gaithersburg: Audio Buys • Hagerstown: Sunrise Electronics • Millersville: Hi Fi Buys • Birmingham: Almas Hi Fi • Dearborn: Almas Hi Fi • Farmington Hills: Almas Hi Fi • Flint: Stereo Center • Grand Rapids: Classic Stereo • Iron Mountain: Sound North • Kalamazoo: Classic Stereo • Lansing: Midland: Hi Fi Buys • Petoskey: Kurtz Music • Rochester: Sound Choice • Saginaw: Court St. Listening Room • Traverse City: Kurtz Music
MN Alexandria: Sound Shop • Duluth: Mel's TV & Audio • Grand Rapids: Audio Files of Grand Rapids • Mantake: Audio King • Minneapolis & Suburbs: Audio King • Rochester: Audio King • St. Paul: Audio King
MO Cape Girardeau: Stereo One • Columbia: Johnston Audio • Jefferson City: The Entertainer • Kansas City: Brands Mart • Springfield: Harvey's Stereo • St. Louis: Sound Central
MS Columbus: Hooper's • Gulfport: Hooper's • Hattiesburg: McLeland TV • Jackson: Hooper's • Pascagoula: Empress, Hooper's
MT Billings: Video Sat & Sound • Bozeman: Thirsty Ear • Great Falls: Rocky Mountain Hi Fi • Kalispell: Audio Visions • Missoula: Aspen Sound
NC Asheville: Pro Sound • Boone: Hollins • Chapel Hill: Stereo Sound • Charlotte: Audio Video Systems • Conover • TriCity • Greensboro: Stereo Sound • Hendersonville: Pro Sound • Kinston: Stereo Concepts • Moorehead City: Anderson Audio • New Bern: Anderson Audio • Raleigh: Audio Buys, Stereo Sound • Rocky Mount: Microwave Audio • Wilmington: Atlantic Audio • Wilson: Modern Stereo • Winston-Salem: Stereo Sound
ND Bismarck: Pacific Sound • Fargo: Today Electronics
NE Kearney: Midwest Audio • Lincoln: Stereo West • Norfolk: Mid City Stereo • Omaha: Stereo West • York: Midwest Audio
NH Concord: Audio of New England • Laconia: Greenlawn Music • North Hampton: The New Audioophile • Salem: Cuomo's
NJ East Brunswick: Atlantic Stereo • Maple Shade: Bryn Mawr Stereo • Paramus: Harvey Electronics • Raritan: AC Audio • Ridgewood: Sounding Board • Shrewsbury: Moonmouth Stereo • Toms River: Rands Camera • Trenton: Hais Stereo Sound Center • Wall Twp.: Moonmouth Stereo • Westfield: Starts Audio Video
NM Alamogordo: D&K Electronics • Albuquerque: West Coast Sound • Carlsbad: Beason's • Clovis: Towne Crier • Santa Fe: West Coast Sound
NV Elko: Elko Audio • Las Vegas: Upper Ear • Reno: Good Guys • South Shore Lake Tahoe: Audio Video Den
NY Albany: Clark Music • Amherst: Speaker Shop • Batavia: Unicorn Audio • Bedford Hills: The Sound Concept • Buffalo: Speaker Shop • Corning: Chemung • Elmira: Chemung • Forest Hills: Continental Sound • Fredonia: Studio One • Glens Falls: Audio Genesis • Goshen: Long-player's Stereo • Harriman: The Sound Concept • Rhaca: Chemung, Sound Image • Jamestown: Studio One • Massena: Hi Fi Shop • Nanuet: The Sound Concept • Newburgh: Audio Expressions •

polkaudio

The Speaker Specialists®

New Hartford: Adirondack Music • **New York City:** Electronic Workshop, Haney Electronics • **Plattsburgh:** Alpha Stereo • **Rochester:** JB Sound • **Syracuse:** Clark Music • **Vestal:** Hart Electronics • **Westbury:** Harvey Electronics • **White Plains:** Haney Electronics
DH Akron: Audio Craft • **Canton:** Belden Audio • **Cleveland & Suburbs:** Audio Craft • **Cincinnati:** Stereo Lab • **Columbus:** Stereo Lab • **Dayton:** Stereo Showcase • **Findlay:** Audio Craft • **Lima:** Classic Stereo • **Toledo:** Audio Craft • **Wooster:** Far East Audio
OK Lawton: Hi Fi Shop • **Oklahoma City:** Audio Dimensions • **Shawnee:** Rave Sounds • **Stillwater:** Cartunes • **Tulsa:** Audio Advice
OR Eugene: University Hi Fi • **Grants Pass:** Sheekell's • **Medford:** Sheekell's • **Portland:** Magnolia • **Salem:** Kellys Home Center
PA Allentown: Bryn Mawr Stereo • **Blakely:** Hart Electronics • **Bryn Mawr:** Bryn Mawr Stereo • **Camp Hill:** Bryn Mawr Stereo • **Chambersburg:** Sunrise Electronics • **Erie:** Studio One • **Harrisburg:** Bryn Mawr Stereo • **Jeanette:** Audio Communications • **Johnstown:** Gary's Entertainment • **Kingsport:** Hart Electronics • **Lancaster:** G'n'T Stereo • **Longhorne:** Bryn Mawr • **Montgomeryville:** Bryn Mawr Stereo • **Natrona Heights:** Stereo Land • **Philadelphia & Suburbs:** Bryn Mawr Stereo • **Pittsburgh:** Audio Communications, Audio Junction • **Quakertown:** Bryn Mawr Stereo • **Reading:** G'n'T Stereo • **Selinsgrove:** Stereo Shoppe • **State College:** Paul & Tony's Stereo • **Stroudsburg:** Main St. Audio Video • **Williamsport:** Robert M. Sides
Puerto Rico Rio Piedras: Precision Audio
RI Middletown: Flint Audio • **N. Providence:** East-ern Audio
SC Anderson: Music Machine • **Charleston:** Audio Warehouse • **Columbia:** Music Machine • **Greenville:** American Audio • **Greenwood:** Stereo Shop • **Spartanburg:** Stereo Shop
SD Aberdeen: Engel Music • **Rapid City:** Team Electronics • **Sioux Falls:** Audio King
TN Chattanooga: R&R TV • **Cookeville:** Lindsey Ward • **Jackson:** New Wave Electronics • **Kingsport:** Audition • **Knoxville:** Lindsey Ward • **Memphis:** Lindsey Ward • **Memphis:** New Wave Electronics • **Nashville:** Hi Fi Buys • **TX Amarillo:** Sound Systems Ltd. • **Arlington:** Sound Idea • **Austin:** Marcum Electronics • **College Station:** Audio Video • **Corpus Christi:** Tape Town • **Dallas:** Americel • **Denton:** Bell Audio Video • **El Paso:** Soundquest • **FL Hurst:** Sound Idea • **Houston:** Sheffield Audio • **Hurst:** Sound Idea • **Laredo:** Metex International • **Longview:** Audio Techniques • **Lubbock:** Electronics Supercenter • **McAllen:** Metex • **San Angelo:** Sound Box • **San Antonio:** Mobile HiFi • **San Marcos:** Discovery Audio Video • **Sherman:** Worldwide Stereo • **Tampa:** Audio Tech • **Tarzxanna:** Sound Town • **Victoria:** Dyer Electronics • **Waco:** Audio Tapes • **UT Logan:** Consumer Technologies • **Salt Lake City:** Broadway Music • **S. George:** Boulevard Home Furnishings
VA Charlottesville: Holdrens • **Colinsville:** Holdrens • **Falls Church/Mannassas:** Audio Buys • **Harrisonburg:** Ace Music • **N. Electronics • Radford:** Holdrens • **Richmond:** Gary's Stereo • **Roanoke:** Holdrens • **Virginia Beach:** Digital Sound
VT Brattleboro: Scientific Stereo • **Essex Junction:** Creative Sound
WA Bellingham: OC Stereo • **Chehalis:** Music Store • **Dak Harbor:** OC Stereo Center • **Seattle/Bellevue/Lynnwood:** Magnolia • **Spokane:** Electracraft (H&S) • **Tacoma:** Magnolia
WI Appleton: Sound World • **Fond Du Lac:** Audio Plus • **Green Bay:** Sound World • **Lacro:** Sound World • **Madison:** Happy Medium • **Milwaukee:** Audio Emporium • **Oshkosh:** Audio Plus • **Ripon:** Audio Plus • **Shaboyan:** Genes Sound & Camera • **Wausau:** Sound World
WV Barboursville: Beckley, Charleston: Pied Piper • **Clarksburg:** Audio Visual Concepts • **Huntington:** Pied Piper • **Parkersburg:** Video Warehouse • **Piedmont:** Sound Gallery • **Wheeling:** Look "N" Listen
WY Cheyenne: Electronics Unlimited • **Gillette/Sheridan:** Star Video Library

If you're looking
for answers,
visit a dealer
who welcomes
your questions.

A PARA dealer.

Anyone who's ever shopped for equipment has probably experienced it. The salesperson's blank stare, followed by a mumbled "I don't know". Then, of course, the inevitable fumbling through product literature.

Sometimes, it can be worse. You're given an obviously rehearsed sales pitch. Or shown product you don't want. Or even made to feel foolish.

Well, we promise that none of the above will happen when you visit a PARA dealer. The Professional Audio/Video Retailers Association is comprised of the industry's most experienced independent dealers, representing the industry's finest product lines. Audio and video experts who welcome your interest—and your inquiries.

That's because to be members of PARA, dealers must possess a high level of technical understanding as well as the ability to communicate this knowledge so it's easily understood. Even by a first time hifi buyer.

But, there's more to PARA than just exceptional customer care and superior components. PARA now offers extended warranty plans on all equipment, plus the ability to easily obtain service from all PARA dealerships nationwide. That means we not only sell you the best, we stand behind it as well.

So, the next time you have an equipment question or problem, visit a dealer who specializes in answers and solutions. Your local PARA dealer.



Professional
Audio/Video
Retailers
Association

For More Information



Call 1-800-543-4355

For more information call
(816) 444-3500
9140 Ward Pkwy.
Kansas City, MO 64114



The Blue Nile may sound monochromatic, but their dark-hued songs are very emotional—suitable for a particular mood.



their first. It is something like Roxy Music's *Avalon*, only more downbeat and sad. The seven selections, all written by singer Paul Buchanan, are dark-hued, late-night or gray-day sounding pieces—music for a particular mood. The Blue Nile's songs may be somewhat monochromatic, almost station-

ary, but they are very romantic and very emotional.

The Blue Nile is a group that other artists, like Rickie Lee Jones and Shawn Colvin, have taken pains to praise. *Hats* may be an acquired taste, but once met halfway, it wasn't that hard to acquire. *Michael Tearson*

THE PULITZER PRIZE Winning Reporter
THE MATH, English, and History Professors
THE VOICE Of America Music Librarian
THE ACADEMY AWARD Nominated Motion Picture
 Sound Track Producer
THE INTERNATIONALLY Renowned
 Classical Guitarist

WHAT DO THEY HAVE IN COMMON?

They all write for *The Absolute Sound*
 The High End Journal of Music and Sound

Isn't it time that you read the one magazine that takes the reproduction of music in the home seriously?

Subscribe now for four issues for just \$22.95, using our toll-free number. We'll bill you after you receive your first issue. If you're not completely satisfied, just write "cancel" on your invoice and return it to us. You keep your first issue and owe nothing! Yes, we are that sure that if you start reading *The Absolute Sound*, you won't ever want to stop.

the absolute sound®

Call 9am-6pm ET, Mon.-Fri., at 800-222-3201 or 516-671-6342. Or mail this ad with your name, shipping and billing address to P.O. Box L, Sea Cliff, NY 11579

Live and Unreleased—The Radio Show: Jimi Hendrix
Castle Communications HBCD 100, three CDs; AAD; 58:24, 74:36, and 64:48.

Sound: A Performance: A

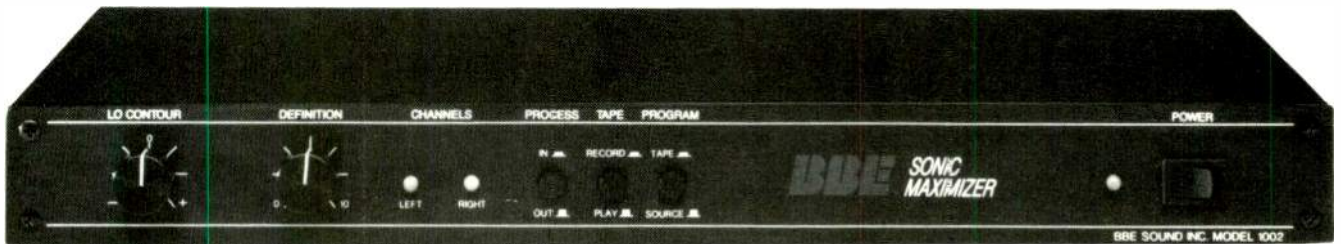
Maybe Jimi Hendrix was lucky. His career cut short after only a handful of records, he was spared the years in decline, burnout, and self-parody that seem to accompany quick rises to the top. In any case, just about any recording he was part of sounds like an important piece of history. This particular package (also available on cassette and LP) has lots of previously unavailable material, but what really distinguishes it is its documentary format, with interviews, narration, and, for the first time, an authoritative chronology of Hendrix's recording career.

First, the meat. In addition to really clean versions of most of his singles (noticeably different from the versions found on current CD releases), the package has a couple of pre-Experience guitar extravaganzas, culminating in Jimi's aggressive reading of "I'm a Man." There are some juicy outtakes from the regular albums: "Mr. Bad Luck" from *Are You Experienced*; an early mix of "One Rainy Wish" from *Axis, Bold As Love*; and "Cherokee Mist," "Drifter's Escape," and alternate takes of "Come On" and "Voodoo Child (Slight Return)" from *Electric Ladyland*. The real delights for collectors are amazing home demos of "Angel" (this one, just guitar and voice recorded in Jimi's apartment, is alone worth the album's price), "Voodoo Child," and "Cherokee Mist," as well as some incomplete songs from 1969 and 1970 called "Valley of Neptune," "Send My Love to Linda," and "South Saturn Delta." After all, freshly unearthed Hendrix songs, heard nowhere else, are something special.

The narration is well-researched and includes interviews with Jimi, his band-

"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

"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 the BBE."
- Hector G. La Torre, Audio Magazine

For your car's sound system, the BBE 3012 will provide the same dramatic improvement. Available at Rockford Fosgate, Perfect Interface & Hatler dealers across the US and Canada. For the dealer near you call: (800) 366-2349

"This piece is impressive. The system sounded cleaner, a lot crisper, brighter, and —simply put— better. The improvement on compact discs, is indescribable. I am not going to tell you that the signal sounded live, but it sure got pretty close."
- DJ Times

To us, the sound was immediately brighter, airier, and more sparkling, with added punch and snap to transients, more bite to sharp attacks, and more sheen to strings and vocals.... The result is nothing short of - using the term literally - sensational."
- Car 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

"BBE restores a proper stereo imaging and separation. As much as 15-20% increase in apparent openness and separation... brighten almost any input source and move 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. Calif.
ABC Warehouse - Michigan
Sound City - Kinnelon, NJ
Jazz Store - Honolulu
Union Premium - Las Vegas
Andersch - Pacific Northwest

**BBE
Sound Inc.**

5500 Bolsa Ave., Suite 245, Huntington Beach, CA 92649. (714) 897-6766. In Canada, contact Korbon Trading, 5600 Kitimat Dr., Mississauga, Ontario L5N 5M1. (416) 567-1920

If you don't live near a BBE dealer, you can buy from us. 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. _____

Peter Wolf's array of conventional instruments yields a sound that is soulful, not tarted-up like modern synth.

mates, his various girlfriends, his producers and engineers, and other musicians. My only complaint is that if the indexing had been done a little more carefully, you'd be able to access the musical tracks better. Not everyone wants to hear all the banter every time one listens to the music. There are also

unidentified musical snippets playing underneath the narration; I'd like to know what they are and hear a little more of them. These are minor gripes with a package that's a fine introduction for the uninitiated and a treat for fans who want a little more depth.

Jon & Sally Tiven

Be as selective in where you buy as you are in what you buy.

We know they're hard to resist. Guaranteed lowest prices in the universe. Every day's a sale day. Big, bigger, biggest.

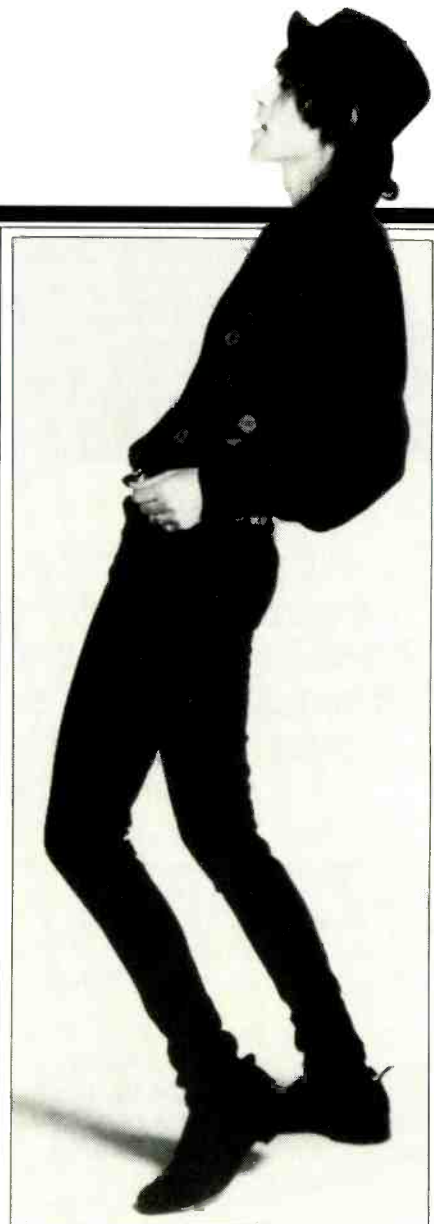
But, buying a serious audio or video component isn't the same as buying a dishwasher or microwave. And that's why AUDIO recommends you visit an independent A/V specialty retailer when shopping for equipment.

A/V product is the heart of his business, not a "profitable or trendy" sideline. That means the independent dealer will always be more concerned and more interested in helping you select the proper equipment than he will be in helping himself to a commission. Independents stay in business by creating customers for life, making sure you're completely satisfied over the long term, not the short term.

There's one more thing, and it may surprise you. When you eliminate the crazy price leaders the discount stores put out, you'll find that an independent will be every bit as competitive in price on better quality product.

So, be as selective in where you buy as you are in what you buy. Support your independent specialty dealer.

Audio The Equipment Authority



Up To No Good!: Peter Wolf
MCA MCAD-6349, CD; AAD; 43:34.

Sound: B+ Performance: B

Nothing too subtle here.

Former J. Geils frontman, the charismatic Peter Wolf has delivered an end-to-end set of party music: Rocking rhythm & blues with lots of sass and kick. Wolf has drawn on such favorite sources as Motown, Philly soul, and Chicago blues for inspiration and tossed it all into a lively, fun-filled brew.

This time around, Wolf avoids modern synth sounds in favor of the more traditional sounds of guitar, bass, keyboards, drums, horns, and harmonica. This leads the album to a real soulful sound that sounds true, not tarted-up.

Up To No Good! is a gas from note one all the way through. It's gonna make you smile. *Michael Tearson*

Wisconsin Discount Stereo

2417 West Badger Road • Madison, Wisconsin 53703

- ★ **Fast Delivery**
- ★ **10-Day Return Policy***
- ★ **30-Day No-Lemon**
- ★ **Widest Selection Over 100 Brands!**

1-800-356-9514

Phone Hours
 M-F 8 a.m. - 8 p.m.
 SAT 8 a.m. - 5:30 p.m.
 Closed Sunday
 Central Time Zone

If you find a better price—CALL US!



OR
C.O.D.

CASSETTE DECK	CASSETTE DECK	DISC PLAYER	DISC PLAYER	DISCMAN	PORTABLE W/CD	HEADPHONES	MISC CAR STEREO		
TEAC V285CMX \$89 Special Purchase • Dolby B/CX/PRO Fine Bias Control • Auto Tape Select TEAC Quality • S/N 70 0B (C)	TEAC V670 \$219 3 Head • 2 Motor • Dolby B/CX/PRO Index • Tape Run Time Modes • MPX Fine Bias Assist • Auto Tape Select	Magnavox CD2000 \$119 Remote • 4x Oversampling • SPECIAL Dual DIA's • Top Performance BELOW NORMAL DEALER COST	Magnavox CDB586 \$229 6 Disc Changer • Dual DIA's 4x • 11 Function Remote Top Rated • SPECIAL PURCHASE	Sony D2 \$149 2x Sampling • 16 bit Linear DIA 3-Way Repeat • High Speed Search AC Adaptor • Live Out Cord • Case	Sony CFD68 \$169 Portable With CD Player Mega Bass • Auto Reverse NEW MODEL • SPECIAL PURCHASE	Koss JCK2005 \$69 Cordless Headphones 20-20,000 Hz • Transmitter Below Normal Dealer Cost	Clarion 1000A \$167 50 W/Ch Amp • Bridgeable Adjustable Input Levels Overload Protection Circuitry		
Sherwood DD1630 \$189 Auto Reverse • Dolby B/CX/PRO	JVC TDW501 SPECIAL Turn HM U Turn AIR RecPlay	Sharp DXR770 \$129 Remote • 2x • Cue/Review • APS	JVC XLM403 BRAND NEW 6 • 1 Changer • 8x • Dual PEN DIA's	Sony D180K SPECIAL HomeCar • Car Cord • Cassette Adaptor	JVC PCX200 SPECIAL Digital Tuner • AIR • Dolby • 5 Band EQ	Sony MDRV6 \$74 BEST BUY RATING • 5300 000 Hz	Pyle KP6940 SPECIAL 6 x 9 • 200 W • 40 oz • Dome Tweeter		
JVC TDW503 BRAND NEW Turn HM U Turn AIR • B/CX/PRO	TEAC W570 \$139 B/CX/PRO • Two Motor • IC Logic	TEAC PD165 \$119 16 Bit • 16 Track Random Memory	SAE D102 CALL AUDIOPHILE CD • Remote • SPECIAL	Sony D555 CALL 8x • 18 bit DIA • 5 Band EQ	Sharp GXCD60 SPECIAL X-Bass • 5 Band EQ • JPM/SAP/SS	Sony MDR-IF5K \$145 Cordless • Hi-Band • NiCad Bat	Alphasonik PMA2050 SPECIAL 54 W/Ch Amp (100 Mono) • BEST BUY		
TEAC V970X \$469 3 Head • B/CX/PRO • 3 Motor	TEAC W660 \$219 Dual AIR RecPlay • B/C • Cont. Play	Magnavox CD3000 \$166 6 Disc Changer • Dual DIA • 4x	Soundcraftsman PROCD750 CALL SPECIAL CIRCULARITY	Sony D35 BRAND NEW 8x • Dual DIA • Mega Bass	Sharp GXCD75 \$299 Remote • X-Bass • Band New	Koss JCK3005 \$189 Cordless Headphones	Alphasonik PMA2100 SPECIAL 100 W/Ch Amp (200 Mono) • BEST BUY		
JVC TDV 531 BRAND NEW 3 Head • B/CX/PRO • Dual Capstan	TEAC PD700M \$189 6 Disc Changer • Dual DIA • 4x • Remote	JVC XL611 CALL Dual 18 Bit • 4x • Program Memory	Sony D9 CALL Mega Bass • 16 Bit DIA • Case	TDK SA90 \$14.90 CS 9-Pack • High Bias	Sony MDRCD6 \$79 Dome Driver • 225,000 Hz	Bearcat RD9XL \$134 Radar Detector • Top Rated			
MISC HIGH END	SPEAKERS	LARGE TV	LARGE TV	VHS	HIFI VHS	CAMCORDER	CAMCORDER		
SAE T102 \$199 Computer Direct Line Tuner	Reconon Wireless 100 \$149 Wireless Add On Speakers	JVC AV27795 \$598 27" • 180 Ch • 600 Lines • HyperBass	JVC AV27795 \$598 27" • 180 Ch • 600 Lines • HyperBass	Zenith Remote 414 \$198 414 • Remote • SPECIAL	Sharp HTS MH1 \$299 6/21 • On Screen Programming	Magnavox CVK300 \$649 VHS • 8x • 3 Lux • 250K Pixels	Panasonic PV520 \$999 VHS • 3 Lux • 8x • FEH		
Proton D1200 CALL 100 W/Ch AMP • DPD Circuitry	Design Acoustics PS3 CALL Subwoofer/Satellite System	Toshiba CF3254J SPECIAL 32" • Top Rated • 600 Lines • Timer	Toshiba CF3254J SPECIAL 32" • Top Rated • 600 Lines • Timer	JVC HR600 SPECIAL 4-Head • Au 4 HQ • 4:14	JVC HRD840 SPECIAL 4 Head • LCD Remote • All 4 HQ	JVC GR60 SPECIAL VHS • 8x • 4 Page Timer • 360K	JVC GR5707U CALL 5 VHS-C • Hi • Hard Case • Edit		
SAE PS02 SPECIAL 200 W/Ch (1600 Mono) • Bridgeable	Celestion DL121H SPECIAL Audiophile Tower • Black Lacquer	JVC AV35895 SPECIAL 35" • 700 Lines • Dolby Surround	JVC AV35895 SPECIAL 35" • 710 Lines • Dolby Surround	Toshiba MH640 SPECIAL 4 Head • All 4 HQ • Index • 8095	Toshiba MHF845 SPECIAL 155 Ch • 4 Head • Index • HQ Pro	SHARP VHS SPECIAL VHS • 8x • FEH • 270K	JVC GR5777U CALL 5 VHS-C • 360 Pixels • Flying Edge Heads		
ADC S5525X \$339 12 Band EQ • Remote • Mic • 4 Memory	ADC S5525X \$339 12 Band EQ • Remote • Mic • 4 Memory	Hitachi CT7881 SPECIAL 27" • BEST BUY • 560 Lines	Hitachi CT7881 SPECIAL 27" • BEST BUY • 560 Lines	Hitachi 4 Head SPECIAL 120 Ch • 4/285 Day • On Screen	RCA VR620 SPECIAL 4 Head • 8/365 • On Screen Program	Toshiba SKF200K SPECIAL VHS • 4 • Lux • 360 Lines • Index	Panasonic PV502 CALL VHS • 3 Lux • 6x • Index • Time Lapse		
RECEIVER	TURNTABLE	*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.				CAR STEREO		MISC SPECIAL	
TEAC AG75 \$199 75 W/Ch • 16 Presets • CD Direct High Current Discrete Circuitry Var-Loudness • Matrix Surround	Audioholic CS5000 \$329 Audiophile Performance • Belt Drive Quartz 3 Speed Motor • Accoustic Mat Walnut Base • 4 Point Suspension	★ SOME ITEMS CLOSE-OUTS • LIMITED QUANTITIES ★				Clarion 9770RT \$209 Digital • 18 Presets • AIR • Dolby Removable Dn • 18 Presets AIR • Dolby • 25 W/Ch • Quartz Bass Treble • Fader • ETR		Audiosource SS2 \$159 Dolby Surround Sound • Remote Variable Surround • 30 W/Ch Amp Variable Time Delay	
Sherwood RA1140 \$99 25 W/Ch • Surround Sound • AV	Thorens TD318 MKII \$299 Walnut Base • TP28 Tone Arm • Belt					Clarion 8702 \$149 Digital • 18 Presets • AIR • Dolby		ATUS AM300 \$149 Professional Mixer • 2 Mic • 2 TT	
JVC RX703 BRAND NEW 100 W/Ch • Dolby Surround • AV Remote	JVC ALF055BK SPECIAL Direct Drive • Quartz • Full Auto					Sherwood XR1604 \$219 Removable Dn • Dolby B/C • CD In		Audiosource EQ8II \$89 10 Band EQ • Spectrum 2 Spks.	
Sherwood RV1340 \$279 100 W/Ch • Dolby Surround • 5 Band EQ	JVC ALA151 SPECIAL Belt • Sem • Straghi Arm					Clarion 9730 \$189 Dn • AIR • Dolby • 25 W/Ch • Bass7		Stanton 8385 II SPECIAL Top Of The Line Phonic Carriage	
Proton D940 SPECIAL DPD Circuitry • Schutz Tuner	Sherwood PF1170 \$99 Direct • Auto • Repeat • Digi-Lit					Clarion 5671 BRAND NEW CD-MP/FM • Power • 4x • Remote		Sherwood RA1145 \$159 50 W/Ch Receiver • 30 Presets	

**WDS RATED #1
IN PRICE AND SERVICE**

Wisconsin Discount Stereo

2417 West Badger Road • Madison, Wisconsin 53703

TWO-AXE PLAY

Time On My Hands: John Scofield
Blue Note CDP 7 92894 2, CD; ADD;
63:22.

Sound: A Performance: A

Cornucopia: Stanley Jordan
Blue Note CDP 7 92356 2, CD; AAD;
70:29

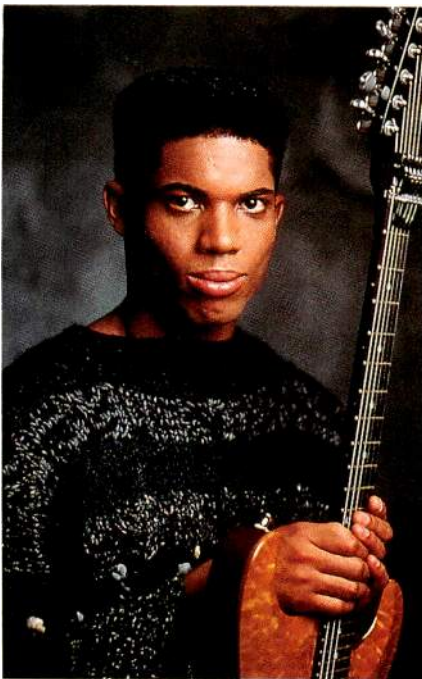
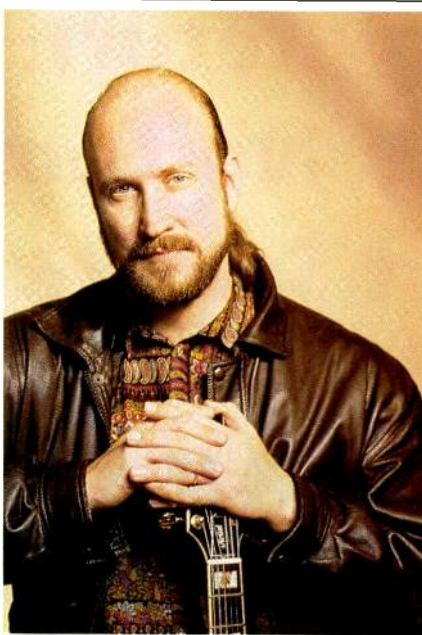
Sound: A Performance: B-

The old saw about skinning cats couldn't be better demonstrated than by this pair of recordings by guitarists John Scofield and Stanley Jordan. Both offer "traditional" jazz in the sense of taking a tune to the moon with hot improvisation, but boy, do they achieve different effects.

John Scofield's *Time On My Hands* displays the consummate be-bop axeman, with the title referring equally to his highly developed rhythmic sense and the control in his magic fingers. For this set, Scofield has enlisted saxist Joe Lovano, bassist Charlie Haden, and drummer Jack DeJohnette to help him blow through 11 original numbers (including two bonus cuts on the CD).

Featuring sax along with guitar makes for curious contrasts, especially since they play in similar frequency ranges. (It's also the mark of mature musicians who are more into music than ego.) Rather than simply trading licks, Scofield frequently doubles Lovano's silky smooth tone and slithering, cascading runs using a chorus effect which slightly detunes pitches and flares out the sound in a complementary fashion. Check out "Farmacology" and "So Sue Me" for some very fancy duets. In his soloing, Scofield deftly employs complex, bounding rhythmic figures and rubbery note bends, jerking time signatures around in subtle ways which totally activate the music. Also check out "Wabash III" and "Fat Lip" to hear Scofield take what could be ordinary lines to the outside. The album's hottest spot is "Stranger to the Light," a virtuosic jam which brings all of this together masterfully. John Scofield's *Time On My Hands* should excite jazz and guitar fans alike.

Two-handed tapper Stanley Jordan's *Cornucopia* is apparently named with the mixed bag of music on this disc—emphasis on the "mixed"—in mind. Unfortunately, we're back to the "will the real Stanley Jordan please



stand up" issue. Jordan has worked hard to establish the legitimacy of his tapping technique, which is now accepted as a mainstream tool. Finding his *musical* voice has been more difficult, and the schizophrenia persists.

The first five cuts (including the CD bonus, "Fundance") were recorded live and are killers, with Jordan tapping off improves on standards like Col-

trane's "Impressions," "Willow Weep for Me," and "Autumn Leaves." Two originals, "Still Got the Blues" and "Fundance," will make you want to cheer. This is jazz.

Enter identity crisis as Jordan switches gears to three studio cuts which are highly sweetened Urban Contemporary pop. The synth piece "Asteroids" is almost New Age. The album's final song, the title cut, is a 21-minute improvisation performed on the new Casio synth guitar; it takes us off into a reflective mood that's completely at odds with the rest of the album. It's not that these are bad tunes, just that Jordan needs to decide what kind of music he wants to make. If he wants to be eclectic, fine, but he should put it on different albums or else figure out how to make it all work together on one. Use of the programming feature on your CD player is recommended for Stanley Jordan's *Cornucopia*.

John Scofield and Stanley Jordan are two cats who skin jazz in entirely different ways. *Michael Wright*

The Complete Blue Note and Pacific Jazz Recordings: Clifford Brown
Mosaic 104, five LPs.

Sound: A- Performance: A to B

Thirty-five years ago, Clifford Brown was the hope on which much of the future of modern jazz seemed to rest. Everyone who heard him play, even as far back as 1949, when he sat in with Dizzy Gillespie's band as a teenager, was sufficiently impressed to spread the word.

By 1953, Brown was in New York, and Blue Note had begun recording him. *Brownie Speaks*, a tour de force with underrated pianist Elmo Hope, shows how much of a musician Brown was before his 23rd birthday. Later that year, on a J. J. Johnson date, Brown played beautifully on "Capri" (with swinging piano work by John Lewis). Johnson's prophetically named "Turnpike" and two takes of "Get Happy" show a young Brown soloing full of fire, the crackle in his notes a throwback to masters like Armstrong and Eldridge. In August 1953, Brown had his first session under his own name. Notice how well, on (a very young) Quincy Jones' "Wail Bait," Brown handles the turnarounds (the bridges to the tunes);

PATTI AUSTIN

love is gonna getcha



Produced by Dave Grusin



Available on
Compact Disc,
HQ Cassette
and Records.

©1990 GRP Records

THE
DIGITAL MASTER
COMPANY

Enter No. 21 on Reader Service Card





he races through them, ideas tumbling over one another, when many players were content to coast through this part of a composition. Brown had by now mastered the long, flowing bop line, as is clearly evident in "Hymn to the Orient"; "Brownie Eyes" is a Quincy Jones ballad vehicle with Gigi Gryce in the background on flute.

We move to Los Angeles for the 1954 Pacific dates, with Zoot Sims and pianist Russ Freeman the most prominent sidemen. Brown's own "Dahoud" and "Joy Spring," two compositions jazzmen return to again and again, have splendid soloing by the maturing master. Another 1954 date has Brown playing "Blueberry Hill," the 1940 song associated with Fats Domino and, in jazz, Armstrong.

The balance of Mosaic's box has four sides devoted to a live 1954 Birdland recording engineered by the excellent Rudy Van Gelder and featuring Horace Silver on piano, Lou Donaldson on alto sax, and Art Blakey on drums. Silver's "Split Kick" produces some powerful blowing by the horns and composer; Charlie Parker's "Now's the Time" and "Confirmation" elicit tremendous playing by everyone. At the Birdland date's conclusion, Art Blakey is heard congratulating the musicians for their superb efforts and saying that he would like to work with them forever. This was not to be. *Frank Driggs*

**Heart & Soul: Hubert Sumlin
Blind Pig 73389, CD; AAD; 37:05**

Sound: A Performance: B+

In an age of super-sophisticated, high-tech guitarists, it's refreshing to dip back into the well from which these modern chops-meisters sprang. On *Heart & Soul*, Hubert Sumlin, who achieved recognition as axeman to the late Howlin' Wolf, gets down with some simple, soulful Delta-cum-Chi-town blues riffing.

Reunited with his childhood band-mate James Cotton on harp, Sumlin's backed by his current band, New York blues rockers Little Mike and the Tornados. With funky, finger-picked bursts of percussive leads—the guitar equivalent of a slap bass playing lead—Sumlin has a unique style that keeps its country flavor while rocking to an urban beat.

Most of the 10 cuts on *Heart & Soul* are Hubert Sumlin originals. There are three covers: The Wolf's "Sitting on Top of the World," Willie Dixon's "Little Red Rooster," and a tune which was given to Cotton, Little Walter's "Juke." Sumlin's band cooks considerably hotter live than on record, and Sumlin's vocals are nice but lack the power of the great belters. Still, the real star is the distinctive picking that jumps back and forth around the groove. Sumlin's playing was a major component of Howlin'

PARTICIPATING LOCATIONS

- ALASKA**
PYRAMID AUDIO, ANCHORAGE
- ARIZONA**
HASSLER'S, PHOENIX—HI FI SALES, MESA—WILSON'S AUDIO, TUCSON
- ARKANSAS**
AUDIO WORLD, LITTLE ROCK, NO. LITTLE ROCK—HI FI HOUSE, BATESVILLE—STEREO JUNCTION, PINE BLUFF—STEREO ONE, FAYETTEVILLE
- CALIFORNIA**
ATLANTIC STEREO, COSTA MESA—AUDIO ECSTASY, SAN LUIS OBISPO—AUDIO VIDEO CITY, CULVER CITY—BOOTS CAMERA, VIDEO, AUDIO, FRESNO—CLYDES TV, REDDING—CREATIVE STEREO, CARPENTERIA, GOLETA, SANTA BARBARA, SANTA MARIA, THOUSAND OAKS, VENTURA—DAVID RUTLEDGE AUDIO, PALM SPRINGS—DB AUDIO, BERKELEY—DIGITAL EAR, TUSTIN—DOW STEREO, CHULLA VISTA, EL CAJON, ESCONDIDO, SAN DIEGO, VISTA—EBER ELECTRONICS, MENLO PARK, SAN FRANCISCO—EUREKA AUDIO/VIDEO, EUREKA—FUTURVISION, NAPA—GLUSKINS, STARKTON—THE GOLDEN EAR, CHICO—MARCONI RADIO, GLENDALE—PARIS AUDIO, WEST LOS ANGELES, WOODLAND HILLS—ROGERSOUND LABS, CANOGA PARK, EL TORO, PASADENA, SANTA MONICA, TORRANCE, VAN NUYS, WESTMINSTER—ROYAL SOUND, LOS ANGELES—SHERMAN OAKS CAMERA & SOUND, SHERMAN OAKS—SOUND GOODS, CAMPBELL, MOUNTAIN VIEW—STEREO UNLIMITED, CONCORD, FAIRFIELD—TURNTABLES UNLIMITED, SACRAMENTO—WATER STREET STEREO, SANTA CRUZ—WESTCHESTER TV, BAKERSFIELD—WILSHIRE TV, LOS ANGELES
- COLORADO**
AUDIO JUNCTION, FT COLLINS—LISTEN UP, BOULDER, DENVER, COLORADO SPRINGS—SOUND SHOP, COLORADO SPRINGS
- CONNECTICUT**
AUDIO ETC, NEW HAVEN—COUNTY AUDIO, STAMFORD—HI FI CONSULTANTS, DANBURY—SOUND I, NORWICH—SOUND UNLIMITED, BRISTOL
- DELAWARE**
HI FI HOUSE OF DELAWARE, WILMINGTON
- FLORIDA**
AUTO AUDIO & STEREO STORE, TALLAHASSEE—CONSUMER CENTER, TAMPA—ELECTRONICS CREATIONS, ALTAMONTE SPRINGS—ELECTRONICS ENVIRONMENTS, DRMOND BEACH—HOUSE OF HIGH FIDELITY, NAPLES—HOYT HI FIDELITY, JACKSONVILLE—ISLAND AUDIO/VIDEO, MERRIT ISLAND—SALON OF MUSIC, WEST PALM BEACH—SOUND ADVICE, ALTAMONTE SPRINGS, BOCA RATON, CLEARWATER, CORAL GABLES, DANIA, FT. LAUDERDALE, HIALEAH, HOLLYWOOD, MIAMI, NORTH MIAMI BEACH, ORLANDO, SARASOTA, ST. PETERSBURG, SUNRISE, TAMPA, WEST PALM BEACH—SOUND IDEAS STEREO, GAINESVILLE—SUNCOAST SIGHT & SOUND, DUNEDIN—T.V.C., TEQUESTA—TV & MUSIC CENTER, ST. PETERSBURG
- GEORGIA**
AUDIO WAREHOUSE, SAVANNAH—G. A. MUSIC, MACON—HI FI BUYS, ATHENS, ATLANTA, DULUTH, KENNESAW, MORROW, NORCROSS, RIVERDALE, SMYRNA, TUCKER—HI FI SALES & SERVICE, THOMASVILLE—MELTONS PRO SOUND, ATLANTA, DORALVILLE
- IDAHO**
GOOD EAR AUDIO, BOISE—INFINITE AUDIO, KETCHUM—SOUND COMPANY, BURLEY, TWIN FALLS
- ILLINOIS**
CENTURY AUDIO VIDEO, CRYSTAL LAKE—GOOD VIBES SOUND, INC., CHAMPAIGN—MILLS RECORDING, CHICAGO—SABIN AUDIO VIDEO, MURPHYSBORO—STEREO SYSTEMS, AURORA, JOLIET, NAPERVILLE—SUNDOWN ONE, NORMAL, SPRINGFIELD—TEAM ELECTRONICS OF PEORIA, PEORIA—UNITED AUDIO CENTER, AURORA, CHICAGO, NILES, NORTHBROOK, SCHAMBURG, VERNON HILLS—VILLAGE TV, WILMETTE
- INDIANA**
GOOD VIBES SOUND, LAFAYETTE—HJS SOUND, NEW HAVEN—TOM DOHERTY AUDIO, CARMEL
- IOWA**
AUDIO ODYSSEY, DAVENPORT, IOWA CITY—GRIGGS MUSIC, DAVENPORT—STEREO SOUND STUDIOS, DES MOINES
- KANSAS**
BRANDS MART, OVERLAND—RED BARON, WICHITA
- KENTUCKY**
THE STEREO SHOPPE, LEXINGTON, LOUISVILLE—WILDER ELECTRONICS, LOUISVILLE
- LOUISIANA**
ALTERMAN AUDIO, METAIRIE, NEW ORLEANS—KADAI'R'S SIGHT & SOUND, BATON ROUGE—SIMPSON ELECTRONICS, ALEXANDRIA
- MAINE**
NEW ENGLAND MUSIC, SCARBOROUGH
- MARYLAND**
AUDIO BUYS, GAITHERSBURG—GRAMOPHONE LTD, ELLICOTT CITY, LUTHERVILLE—PROFESSIONAL PRODUCTS, BETHESDA—SOUNDScape, BALTIMORE
- MASSACHUSETTS**
AUDIO STUDIO STEREO LAB, BOSTON, BROOKLINE—HIGH FIDELITY HOUSE, WORCESTER—NATURAL SOUND, FRAMINGHAM—Q AUDIO, CAMBRIDGE—SERVICE BENCH, NORWOOD—SOUND & MUSIC, NORTHAMPTON
- MICHIGAN**
AUDIO DIMENSIONS, ROYAL OAK—AUDIOVISION, WEST BLOOMFIELD—POINTE ELECTRONICS, GROSSE POINTE WOODS—STEREO CENTER, FLINT—STEREO SHOPPE, ANN ARBOR, EAST LANSING, LANSING, SAGINAW, TRAVERSE CITY
- MINNESOTA**
AUDIO KING, BROOKLYN CENTER, BURNSVILLE, EDINA, MANKATO, MINNEAPOLIS, MINNETONKA, ROCHESTER, ROSEVILLE, ST. CLOUD, SIOUX FALLS, ST. PAUL
- MISSISSIPPI**
AUTOMOTIVE AUDIO, RIDGELAND—McLELLAND TV, HATTISBURG

AUDIO INFORMATION MAGAZINE

TECHNOLOGY UPDATE #9

MISSOURI

BRANDS MART, KANSAS CITY - SOUND CENTRAL LTD., ST. LOUIS - SPEAKER & STEREO STORE, KIRKWOOD - STEREO ONE, CAPE GIRARDEAU

MONTANA

ASPEN SOUND, MISSOULA - ROCKY MTN HI FI, GREAT FALLS

NEBRASKA

NEBRASKA APPLIANCE CENTER, NORFOLK - STEREO WEST, LINCOLN - OMAHA - U.S. TECH, GRAND ISLAND

NEW HAMPSHIRE

CUOMO'S, SALEM - MELODY SHOP, KEENE - TECH HI FI, NASHUA

NEW JERSEY

ABINGTON AUDIO & VIDEO, BURLINGTON - ATLANTIC STEREO, E. BRUNSWICK - AUDIO NEXUS, SUMMIT - COMTEL CORPORATION, WEST CALDWELL - HARVEY ELECTRONICS, PARAMUS - LANDES AUDIO, CHESTER - MONMOUTH STEREO, FARMINGDALE, SHREWSBURY - RECORD SHOP, CHERRY HILL - ROUTE ELECTRONICS 17, PARAMUS - ROUTE ELECTRONICS 46, TOTOWA - SOUTH STREET STEREO, MORRISTOWN

NEW MEXICO

HUDSON'S AUDIO CENTER, ALBUQUERQUE - THE CANDY MAN, LTD., SANTA FE

NEW YORK

ALTAIR AUDIO, ALBANY - AUDIO EXCELLENCE, PLEASANTVILLE - AUDIO NOUVEAU, CANANDAIGUA - CHEMUNG ELECTRONICS, CORNING - EL MIRA, ITHACA - CONTINENTAL SOUND, REGO PARK - DEFINITE HI FI, MAMARONECK - GRAND CENTRAL RADIO, NEW YORK - HARVEY ELECTRONICS, NEW YORK - WESTBURY WHITE PLAINS - LISTENING ROOM, SCARSDALE - LYRIC HI FI, NEW YORK - LYRIC HI FI NORTH, WHITE PLAINS - PARK AVENUE AUDIO, NEW YORK - PERFORMANCE AUDIO/VIDEO, HUNTINGTON - RABSONS AUDIO/VIDEO, BROOKLYN - GARDEN CITY, NEW YORK - SPEAKER SHOP, INC., AMHERST - SQUARE DEAL RADIO & TV, PATCHOGUE - STEREO CHAMBER, ORCHARD PARK - STEREO EXCHANGE, NEW YORK

NORTH CAROLINA

AUDIO BUYS, RALEIGH - AUDIO VIDEO SYSTEMS, CHARLOTTE - VIDEO-AUDIO CONNECTION, LENOIR

OHIO

ALAMO TV, CINCINNATI - AUDIO CORNER INC., CANTON - AUDIO ETC., FAIRBORN - B & B APPLIANCE, EUCLID - MIDDLEBURG HEIGHTS - JAMIESONS INC., TOLEDO - NEWCOMER SOUND, WORTHINGTON - STEREO LAB, CINCINNATI - COLUMBUS - THRESHOLD AUDIO, HEATH

OKLAHOMA

AUDIO ADVICE, TULSA - AUDIO ASSOCIATES, INC., OKLAHOMA CITY

OREGON

BRADFORD'S HI FIDELITY, EUGENE - FRED'S SOUND OF MUSIC, GRESHAM - PORTLAND - HEAR NO EVIL, SALEM - MAGNOLIA HI FI, BEAVERTON - CLACKAMAS

PENNSYLVANIA

ABINGTON AUDIO & VIDEO, ABINGTON - AUDIO INSIGHT, WEXFORD - AUTO COMMUNICATIONS, MOIRREVILLE - BUTCH'S SOUND SHACK, NATRONA HEIGHTS - HIGH FIDELITY HOUSE, BROOMALL - PAUL & TONY'S STEREO, STATE COLLEGE - SASSAFRAS AUDIO, INC., BRYN MAWR - FEASTERVILLE - MONTGOMERYVILLE - PHILADELPHIA - WHITEHALL - STEREO BARN, EPHRATA - LANCASTER - WYOMISSING - STEREO CONNECTION, SCRANTON

RHODE ISLAND

STEREO DISCOUNT CENTER, PROVIDENCE

SOUTH CAROLINA

READ BROS., CHARLESTON - SOUND ADVICE, COLUMBIA - STEREO VIDEO, GREENVILLE

TENNESSEE

HI FI BUYS, NASHVILLE - SOUND CONCEPTS, JOHNSON CITY - NEW WAVE ELECTRONICS, MEMPHIS

TEXAS

BEAUMONT SOUND, BEAUMONT - BJORN'S AUDIO/VIDEO, SAN ANTONIO - DIGITAL CENTER, INC., DALLAS - THE ESOTERIC EAR, HOUSTON - GROOVE AUDIO VIDEO, HOUSTON - HAROLD'S ELECTRONICS, MIDLAND - IDESSA - HI FI INC., AUSTIN - METEX INTERNATIONAL, LAREDO - McALLEN - OMNI SOUND, DALLAS - SOUND IDEA, ARLINGTON - FORT WORTH - SOUND SYSTEMS, LTD., AMARILLO - SOUTHWEST RECORDS & TAPES, HOUSTON - STEREO SUPERCENTER, LUBBOCK - STEREO & VIDEO CENTER, TYLER

UTAH

HI FI SHOP, OGDEN - STANDARD AUDIO & HI FI, SALT LAKE CITY

VERMONT

GREAT NORTHERN STEREO, SO BURLINGTON

VIRGINIA

AUDIOTRONICS, ROANOKE - AUDIO ART, RICHMOND - AUDIO BUYS, BAILEY'S CROSSROADS, MANASSAS - DAN JONES ELECTRONICS, WILLIAMSBURG - DIGITAL SOUND, VIRGINIA BEACH - EVERGREEN AUDIO, LEESBURG - SASSAFRAS AUDIO, INC., ALEXANDRIA

WASHINGTON

ADVANCED AUDIO, TACOMA - DEFINITE AUDIO, SEATTLE - HUPPINS HI FI, SPOKANE - MAGNOLIA HI FI & VIDEO, BELLVUE - LYNWOOD, SEATTLE, TACOMA - QC STEREO CENTER, BELLINGHAM, OAK HARBOR

WEST VIRGINIA

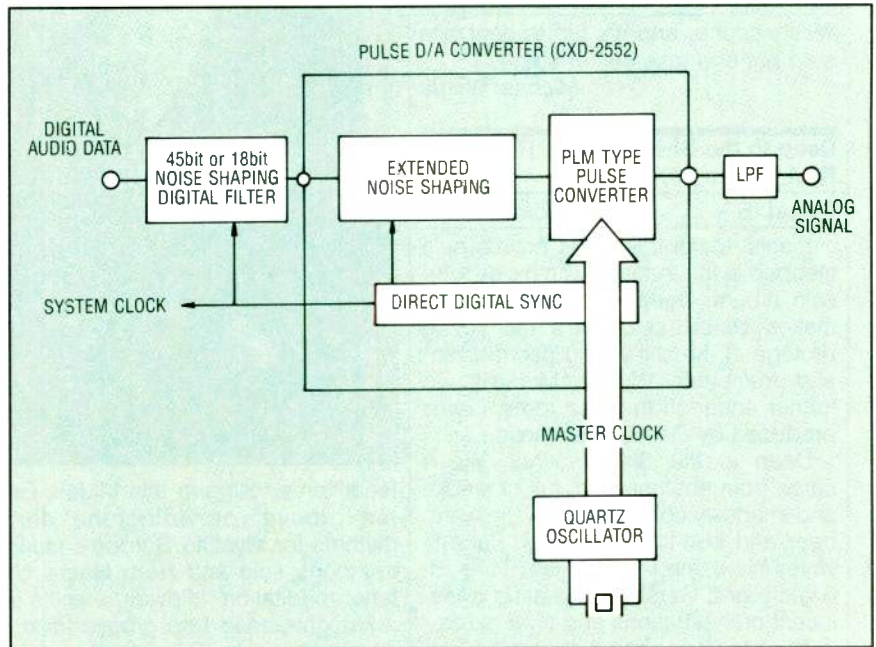
MACK & DAVE'S, HUNTINGTON - SODARO'S, CHARLESTOWN - SOUND INVESTMENTS, MORGANTOWN

WISCONSIN

AUDIO PLUS, OSHKOSH - FORWARD ELECTRONICS, WAUSAU - GENE'S, SHEBOYGAN - HAPPY MEDIUM, MADISON - HI FI HEAVEN, GREEN BAY - SALON 1 AUDIO, LTD., WISCONSIN RAPIDS - SOUND STAGE, MILWAUKEE - SUESS TV, APPLETON

WYOMING

MUSIC BOX, LARAMIE



Digital-to-Analog (D/A) converters in CD players are key to performance. Today, large scale, integrated circuit technology makes a new generation of converters possible. These pulse converters use LSI designs incorporating many circuits on a single chip. For example, Sony HDLC™ converters combine three fundamental functions on a single IC. This provides improved performance, long life and greater reliability.

Today's audio components are more complex than ever. Digital technology, new features and applications require more informed consumers. To help, Audio Magazine and Sony have teamed to create Audio Information Magazine (AIM). Written in a clear, concise manner, AIM is designed to help beginners and audiophiles alike. Of course, more informed consumers can make more appropriate choices for their own home music systems. Free AIM brochures are available exclusively at the fine dealers listed in the two columns on the left.



FREE! New D/A Converters
Improve CD Performance

For More Information



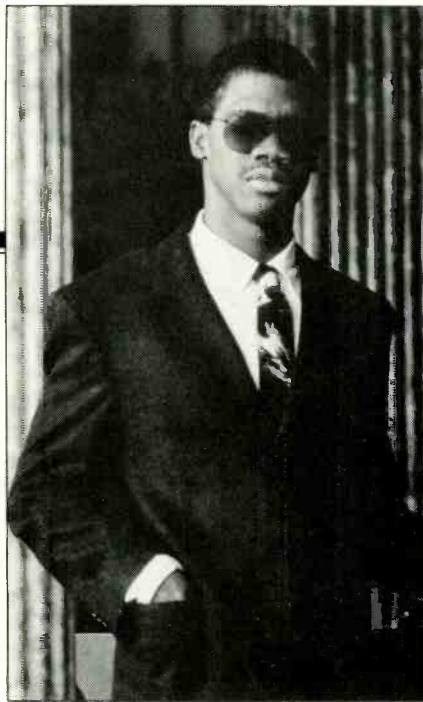
Call 1-800-553-4355



SONY

THE LEADER IN DIGITAL AUDIO™

Marcus Roberts' album sounds like it came from another time, full of smoke and shadowy corners.



Wolf's sound, and it's fun to hear him step out and take center stage.

Michael Wright

Deep in the Shed: Marcus Roberts
RCA/Novus 3078, LP.

Sound: B- Performance: B

Pianist Marcus Roberts proves he's steeped in the tradition with his second solo album, *Deep in the Shed*. That makes sense, since he's the young protégé of the still-young neotraditionalist trumpeter, Wynton Marsalis. To further entrench the jazz roots, it was produced by Delfeayo Marsalis.

Deep in the Shed sounds like it came from another time, full of smoke and shadowy corners. Out of the warm beer and butt-filled ashtrays, Roberts writes his name in the blues, Duke Ellington, and Gershwin, creating translucent orchestrations and terse solos.

The title track comes deep out of the "Night in Tunisia" groove of Art Blakey. Herlin Riley keeps the high-hat and

tenor toms rolling in this Middle Eastern groove, providing the dance rhythms for Wycliffe Gordon's plunger trombone solo and Herb Harris' dark tenor meditation. Midway, it shifts into a straight-ahead bop groove for a ruminating solo by Roberts. It's an odd way of framing the star, creating a song within a song.

As an arranger and leader, Roberts creates an almost tangible atmosphere with his darkly shaded horn arrangements and some bleak, melancholic solos. "Mysterious Interlude" sounds like it's based on the chord changes to Gershwin's "Summertime" and takes that same sweltering-hot pulse, like moving in slow motion through the heat distortion of a noonday sun.

Recording live and in the studio, Delfeayo Marsalis seems to mix both formats within a song, as on "Nebuchadnezzar," where the sound suddenly shifts from a flat studio ambience to a live one. It might have been intentional, but it's dislocating to hear.

Marcus Roberts makes it a point of being a pianist with a heritage. Perhaps that's why I have trouble defining his sound, singling out that tendency or flair that will set him alongside the jazz greats he admires. He doesn't have his own stylistic home yet, but he certainly takes you where the legends lived, deep in the shed. *John Diliberto*

FOSGATE
AUDIONICS

DSL SERIES

SURROUND PROCESSORS

Simplicity . . .
Versatility . . .
Excellence . . .



DSL • ONE


FOSGATE-AUDIONICS, PO BOX 70, HEBER CITY, UT, 84032, 801-654-4046, FAX 801-654-4112

Enter No. 20 on Reader Service Card

We Spoil Audiophiles

Magnavox CD Players

CDB605 Player no remote	149.95
CDB610 Player w/remote	199.95
CDB583 CD Changer	279.95
CDB630 Player w/digital out	329.95



ENERGY ABSORBING FEET

AudioQuest Sorbothane Feet		
CD Feet (set of 4)	21.95	
Large Feet (set of 4)	34.95	



Monster Footer w/ Isotech	49.95
All Purpose (set of 4)	49.95
CD Footers (set of 4)	95.00
Heavy Duty Footers (4)	95.00
Air Footers (4)	19.95

Navcom Silencers (Sims)

(pictured at left) Set of 4 65.00

Audioquest Moving Coil Phono Cartridge Demagnetizer



Only \$79.95 Batteries Included!


RETIPPING MC Cartridges

YES! You can trade up when you trade in!

Audioquest AQ Rully	169.95
AQ MC 5 1.4mv	195.00
AQ 404-1.4mv or 5mv	350.00
AQ 05v 1.4mv or 5mv	499.95
AQ B-200 1.4mv or 5mv	550.00
AQ 7000 3mv	895.00
Monster AQ-1000 MKII	450.00
Sumiko Blue Print	75.00
Blue Pl. w/Grain Trade In	85.00
Sumiko Taisima B vinyl	299.95
Sumiko Taisima II B vinyl	385.00
Sumiko Virtuoso D1	719.95

Replace its with used in store!

AUDIOPHILE HEADPHONES



Beyer Dynamic	
BDT 990 Pro	229.95
BDT990	189.95
BDT880	149.95
BDT550	129.95
Rpicmnt ear cushions	22.95
STAX	
SR-34 Special	149.95
SR-34 Pro	179.95
SR-84 Pro	269.95
SRE-15N 5m extension cable	39.95
SRE-16 5m Pro cable	95.00
SRE-17 5m Sig cable	189.95
Rpicmnt ear pads 34&84	19.95
AKG	
K240DF	119.95
K240M	95.00
K141	79.95
K2	35.00

GRADO Cartridges


ZTE-1	19.95
Signature Bmr MCZ TLZ	Call
X12	89.95
Bmr stylus	135.00
MCZ stylus	135.00

DB Protrac

Cartridge Alignment Gauge 29.95


LAST Record Care

#1 Power Cleaner	19.95
#2 Preservative	19.95
#3 Rep. Cleaner	14.95
#4 Stylus Cleaner	12.95
#5 Stylus	21.95



Niles Audio

Speaker Switching Boxes Call




ASC Tube Traps

TX6 Set \$869

SONEX JRs

2"x2"x2" SHEETS 4 colors
Box of (4) \$49.95




FM Antennas

AudioPrism antenna HI-D 49.95
APPA-1 249.95

Terk Pi Special 49.95
Terk Pi 79.95

Shure Gauge

Stylus Force Gauge Only 14.95



Minimum order: 2 LPs or CDs

Audiophile Samplers and Test CDs

Chesky 2037 Jazz Sampler-Test CD (cd) 14.98
Dorian Sampler Disc (cd) 12.95
Hi-Fi News Test CD 2 (UK) (cd) 29.95
Chesky NEW Jazz CDs (cd) 17.95

JD1 Johnny Frigo (cd) 14.98
JD2 Clark Terry (cd) 14.98
JD3 Phil Woods (cd) 14.98
JD28 Corun Rio After Dark (cd) 14.98
JD29 Bopika Nensop to Brazil (cd) 14.98
JD32 Earl Watt Gershwin (cd) 14.98
JD33 David Chesky Club de Sol (cd) 14.98
JD34 Phaedro D Rivera Test (cd) 14.98

Reference Recordings LPs or CDs (cd/lp) 15.98
RR-31 Trojok Alliance (cd/lp) 15.98
RR-32 Farrell Rodgers & Hart (cd/lp) 15.98
RR-33er Fats Waller Little Ed (cd/lp) 17.95
Progives: Canasta/Domingo (2 lps) 34.95 (cd) 16.95
Antiphone Blues Jazz (cd) 17.95

Audiophile LPs/CDs

MOBILE FIDELITY LPs

The Beatles (lps) 14.99 each
Spi. Peppers - Please Please Me For Sale (lp) 17.95
Frank Sinatra Collection (10 lps) 299.95
Rolling Stones Collection (11 lps) 299.95
Stellena: Kudo (cd) 14.99
Moscow Sessions set (3 lp/cd) 39.95
Wilson Audio: Center Stage (lp/cd) 15.98
Grace Cathedral Choir (lp/cd) 15.98
S Wonderful Jazz (lp/cd) 15.98
Winds of War and Peace (lp/cd) 15.98
Opera 3 Test Record/CD (cd) 23.95 (lp) 16.95
Dorian Classical CDs (cd) 16.95

Harmonia Mundt Recordings—Now on CD!

HMC379 G. Panagou (lp) 12.95 (cd) 14.95
HMC1050 La Folia Sp (lp) 12.95 (cd) 14.95
HMC7010 Water Music (lp) 12.95 (cd) 14.95
Paintinder: Natural Selection Jazz (cd) 16.95
East Wind Jazz CDs (cd) 18.95

INTERCONNECT CABLES

Aural Cards: Distech Audioquest MIT Monster (all) Call
Custom length interconnects Call

SPEAKER CABLES

Cardas, Distech, Audioquest, Monster, Tara Laos Space & Time Call

Tara Temporal Continuum Cable & Controllers (pictured at right)

(8') 460.00 pr (10' ft) 450.00 pr (12' ft) 595.00 pr

DELUXE POWERCORDS

Cardas Powerbridge II (8 ft) 169.95
Cardas Quavline PC (8 ft) 169.95
Cardas Hevline V PC (8 ft) 249.95
Tara Labs AC Infinity PC (6 ft) 179.95

VIDEO CABLES

Monster SVHS Video Cable 21.95 8M 29.95
Monster Video 2 Cable 11M 14.95 3M 19.95 20ft 29.95
Radioquest Video X 1M 34.95 2M 34.95
Radioquest Video Z 1M 69.95 2M 89.95
Tara Labs Video Cable 3M 34.95 6ft 34.95

Target Racks and Stands

RACKS	Shelves	PH	Price
T12	2	20	149.00
T13	3	33	219.95
PS3	3	33	215.00
JT	4	33	259.00
T15	5	33	275.00
T15L	5	40	299.00

HS STANDS

12 16 20 149.95

Target HJ

HJ2021 210.00
HJ2421 235.00



RAM Vacuum Tubes

Last larger vacuum better than original tubes. Complete sets

Countdown	45.00
5A1000	79.95
5A3000	69.00
5A2	69.95
5A3	69.95
5A5	69.95
5A7	69.95
5A12	69.95
5A20	129.95
Dynaco: 6X4	55.00
Sylvania J0	55.00
Mark III	119.95
MFA: 6X4	55.00
Minotaur	49.95
Minotaur	59.95

QUICKSHY MONIES

m/269.95
VTL Minutaur 49.95
Telvex 59.95

RAM PHONO TUBES

Tube PHONO TUBES 6018 &
Tune Noise 16.95 25.00
Phen 42.00 49.95

RAM POWER AMP TUBES


12AU7-12AT7 16.95ea
6X4 16.95ea
12BH6 16.95ea
5AR5 19.95ea
6BD6 (matched pair) 69.95
K188 (matched pair) 115.00
EL 34 (matched pair) 49.95
8117 (matched pair) 77.50
508T (1.6, matched pair) 77.50

VTL POWER TUBES

6550A (U) 30.00
6X4 20.00
K1 66.5811 (USSR) 15.00
907 (USSR) 20.00
300B (US) 335.00

POWER STRIPS

NOW IN 220V!



Clean up your power! Protection and better sound.

Triplett ISOBAR Line Filtrors	
ISOBAR 4 220 V outlet 220/240v	79.95
ISOBAR 6 6 outlet 3-stage filtering	89.95
ISOBAR 8 8 outlet 4-stage filtering	99.95

Triplett Power Regulators:

LC-1200 220 4 outlet 2 stage 1200 volt
output 120v 219.95 220v 249.95
LC-1800 6 outlet 3 stage for audio and video
1800 watt output 299.00


Clean isn't clean until it's vacuum-cleaned.

NITTY GRITTY Record Cleaning Machines

NG CD-1 CD cleaner 159.95
NG 1.5F 399.95
NG 2.5F 449.95
Mini-Pro 369.95
Hybrid 1 349.95

RECORD DOCTOR Vacuum-powered record-cleaning machine


The Record Doctor cleans records just like the expensive machines with liquid application and vacuum suck-up but costs only \$169.95! Made by Nitty Gritty USA. Comes with cleaning fluid and applicator brush 220V-240V version for Europe and Asian countries. \$189.95



Specialty Stands

ARCICI Stands B&M801M 389.95
ESL63 175.00
Ditl ESI 175.00

Sound Anchors Stands Vandersteen IIc 249.95
Magilla 299.95
B&W801M 449.95



RAM Vacuum Tubes

Last larger vacuum better than original tubes. Complete sets

ARC SP3a	85.00
SP8	55.00
SP8	69.95
SP9	79.95
SP10	199.95
SP11	75.00


ARC Power Amps

Audiophile Mac2 39.95
Callisto Audio Labs Alfa 49.95
Tempest 125.00
Callisto 129.95

ARC PHONO TUBES

ARC PHONO TUBES 6018 &
Tune Noise 16.95 25.00
Phen 42.00 49.95

LEAD BALLOON



Turntable Stand 299.95

VPI Record Cleaning Machines

VPI HW-16.5 369.95
VPI HW-16.5 220v 399.95
VPI HW-17 Call
VPI HW-17F fan model Call
VPI HW-16/17 suction tubes 19.95

Record Cleaning Solutions

Revelant Tru-ZXN (16 oz) 14.95
Super-Cleaner (16 oz) 12.95
(32 oz) 16.95 (1 gal) 24.95

Nitty Gritty First Record Cleaner (6 oz) 14.95
(16 oz) 24.95

Nitty Gritty Purifier #2 (16 oz) 11.95
(1 gal) 39.95



TIPTOES II

Tiptoes (Original) Short (5") 4.95
Tall (15") 6.50
Tall w/screw 9.95

ToneCones (New)

Short 3.95
Medium w/screw 7.95
Large w/screw 14.95


Audiophile Books

The VTI Tone Bank Monkey 12.95
Gold Standard Linn Dorian 17.95
The Great CD Guide: 89 17.95
The Wood Effect RC Johnson 7.95



Reference Video Standard Laser Disc

Reference Recordings LD-101 Video Calibration Laser Disc 59.95



Shipping & Handling

Shipping Charges (UPS, insured, 48 States) 4.95
Accessories: Ove Item 1.75
Extra Items 12.95
Electronics/Statics 6.95

Business Hours: Mon-Fri 9:00-7:00 EST Sat 10:00-3:00
Prices subject to change. Anti-3 - In Area

CHARGE IT!

Mastercard / Discover Visa / Amex

1-800-942-0220

225 Dakes SW Grand Rapids, MI 49503
FAX 616-451-0709 Service 616-451-3868

AUDIO ADVISOR

Carol Britto's style is technically formidable, and she is not afraid to tackle jazz hall-of-fame pearls.

Alone Together: Carol Britto
Town Crier TCD 515, CD; DDD; 52:21.

Sound: B+ Performance: B

For the past few months, I've enjoyed listening to a little-known and infrequently recorded jazz pianist named Carol Britto. I have in my possession two Britto releases, a cassette version of her 1985 Town Crier recording, *Inner Voices* (with bassist Michael Moore), and the 1987 session, *Alone Together*, featuring saxophonist Flip Phillips and bassist Moore, on Compact Disc.

Britto is a former classical pianist who came to New York, via Toronto, from her home town of Cleveland. Despite her talent and her experience accompanying numerous jazz greats, Britto remains a behind-the-scenes player. Her playing style is technically formidable, and she is not afraid to tackle jazz hall-of-fame pearls, as she does on this CD, jumping into "Stompin' at the Savoy" and "Sophisticated

Lady" as well as nine other challenging compositions.

Carol Britto manages to avoid the studied and stiff readings classically trained pianists often provide when interpreting other types of music. Although she doesn't transmit the creative fire and swing associated with jazz keyboard legends, Britto has a wonderful sense of harmony and dynamics; her rhythm and lead lines always smoothly support each other. She has the ability to flawlessly integrate different time and key signatures as well as the playful creative wit to occasionally inject other compositions into the main composition's theme.

Alone Together showcases Britto in solo modes and accompanied by Moore and Phillips. Moore, as usual, is impeccable both as a supporter and soloist, but it is tenor saxophonist Phillips who has a field day on this release. He swings his way through several tunes, at times evoking Ben Webster and Coleman Hawkins.

There is precious little technical information provided in *Alone Together's* booklet, other than to state it was digitally recorded by producer Claudia Marx and engineer Tom Lazarus. The record company does inform us that Britto plays a Baldwin SD-10 concert grand, and its recording is one of the most natural sounding I've heard in some time. Although, on "Li'l Darlin'" and "Stompin' at the Savoy," the solo piano—especially in the lower registers—sounds as if it has been enhanced by a too-long decay-time setting on a special effects processor (delay, reverb), which contributes to a slightly unnatural decay of the notes. Nonetheless, overall the piano recording is excellent.

Listening to Carol Britto's *Alone Together* leads me to wonder about the many very talented jazz players out there toiling in obscurity. Town Crier deserves thanks for bringing one of them to the front. Carol Britto is a real find.
Hector G. La Torre

"The M-200 power amplifier is a smashing success by any standard, and an absolute steal at the price."

Kent Bransford

Hi-Fi Heretic, Autumn 1989

Highlights of the review:

Over the years, B & K Components, Ltd. has become one of America's leading manufacturers of affordable, high-quality audio electronics. B & K has done an admirable job of providing musical, reliable preamplifiers and power amplifiers within the budget of virtually any music lover.

The M-200 can drive virtually any loud-speaker load in existence. Rated at 200 watts into 8 ohms and 400 watts into 4 ohms, the M-200 can drive loads as low as .75 ohms and still pump out its rated 200 watts! Rated peak current output of the M-200 is an incredible 150 amperes.

"I was floored by the M-200's sense of pace and drive."

Internal construction is most impressive—a massive, shielded toroidal transformer centrally sited within the steel chassis. Four filter capacitors offer nearly 70,000 mfd of

storage capacitance. The input and driver circuits are carried on a single glassfibre board that sits atop the power supply caps. A gold-plated premium input jack is included, with gold-plated 5-way binding posts handling speaker cable connection.

"I was bowled over by its combination of smoothness (a B & K hallmark) and detail."

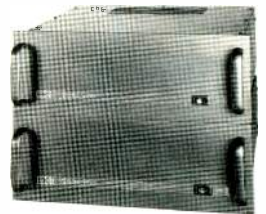
All too often extremely powerful amps excel on bombastic symphony works, but fall down when it comes to conveying the subtlety and nuance of "smaller" music. The M-200 proved to be a glorious exception. Yes, the massed brass and great whomping bass drum shots in "Uranus, the Magician" were appropriately startling, but equally satisfying were the quiet flute and violin passages. Delicate instrumental shadings and nuances that are so important in communicating the emotion of the music were never glossed over or homogenized. The M-200 had that essential

ability to draw me further and further into the music, rather than hurling it in my face. Equally impressive was the M-200's soundstage width and depth.

While offering the tonal naturalness that characterizes all B & K products, the M-200 goes far beyond previous B & K amps in its outstanding bass quickness and definition, as well as its excellent retrieval of low-level detail and recording acoustic.

The M-200 power amplifier is a smashing success by any standard, and an absolute steal at the price.

Reprinted by permission of *Hi-Fi Heretic*. Annual (four issue) subscriptions are \$15 (\$18 outside U.S.), available from: *Hi-Fi Heretic*, P.O. Box 2019, Yorba Linda, CA 92686.



B & K Sonata Series

B & K COMPONENTS, LTD., 1971 Abbott Rd., Lackawanna, NY 14218 1-800-543-5252 (NY: 716-822-8488) (FAX: 716-822-8306)

Enter No. 11 on Reader Service Card

New York Magazine says* Stereo Exchange is a “Best Bet”

We're betting you'll agree, here are a few good reasons why:

- 17 listening areas, including 9 sound rooms
- 30,000 Sq. Ft. on 3 Levels
- Multi-Room Installations, Entertainment Centers
- Custom Installation
- Audio/Video Consultants
- In-House Repair
- Pick-up & Delivery Service
- Extended warranty available on both new & used components
- America's largest USED hi-end inventory... we buy & sell by phone

*New York Magazine "Best Bets", pg. 57, Sept. 4, 1989

AMERICA'S LARGEST AUDIO SPECIALITY STORE



Authorized Dealerships:

Apogee, Arcam (#1 U.S. Dealer), Ariston, Audioquest, Boston Acoustics, B&K (#1 N.Y.C. Dealer), B&O, B&W (#1 N.Y.C. Matrix Dealer), California Audio Labs, Carver, Celestion SL, conrad-johnson, Counterpoint (#1 U.S. Dealer), CWD, Duntech, Eminent Technology, Grado, Infinity, JSE, Kimber Kable, Luxman, Magnum Dynalab (#1 E. Coast Dealer), Mod Squad (#1 E. Coast Dealer), MIT, NAD, Nitty-Gritty, ProAc, Revolver, Rogers (#1 U.S. Dealer), Sonus Faber, Sony ES, Sota, Spica (#1 E. Coast Dealer), Stax, Straightwire, Sumiko, Sumo, Target, Threshold & Forte (#1 N.Y.C. Dealer), Tice (#1 U.S. Dealer), Van Den Hul (#1 U.S. Dealer), VPI (#1 U.S. Dealer), Velodyne, Vendetta, VTL, Wadia, Well Tempered, Yamaha, etc.

new location: 627 BROADWAY, GREENWICH VILLAGE, NY 10012

our other location: 687-A BROADWAY, GREENWICH VILLAGE, NY 10012 212 505-2273

212 505-1111 800 833-0071 outside NYC MOST MAJOR CREDIT CARDS

THE DAT STORE

DIGITAL AUDIO TAPE RECORDERS

MONDAY THRU FRIDAY: 9:00-6:00 / WEEKENDS: 1:00-4:00

OVER 25 MAKES & MODELS--IN STOCK NOW!

PANASONIC SONY JVC AKAI
CASIO PIONEER NAKAMICHI
NEC TASCAM SHARP FOSTEX

& Introducing the smallest DAT to date:

THE AIWA HD-X1

DIRECT DIGITAL RECORDING MASH FILTERS
DIGITAL IN & OUT RECHARGEABLE BATTERY
256X OVERSAMPLING SUB-CODE EDITING
A/D CONVERTER W/WIRED REMOTE & CASE INC.

2624 WILSHIRE BOULEVARD
SANTA MONICA, CA 90403
(213) 828-6487 / FAX (213) 470-6176

SERIOUS AUDIOPHILES DESERVE SERIOUS SERVICE.

Acoustat • Advent • AKG • Audible Illusions •
Audio Pro • Audiophile • Audioquest •
Beyer Dynamic • Blaupunkt • Bose • Canon •
Cardas • Celestion • Counterpoint • Crest • CWD •
Dahlquist • dbx • DCM • Dual • Fosgate •
Grado Signature • Hafler • Harman Kardon •
Jamo • JBL • JSE • JVC • Lexicon •
Magnum Dynalab • MFA • Mod Squad • NEC •
Niles Audio • Nitty Gritty • Ohm Acoustics •
Onkyo • Ortofon • Philips • Precise • Proton •
PS Audio • Revox • SAE • SME • Sonance • Sony •
Sumiko • Stax • Straightwire • Superphon •
Talisman • Tannoy • TDK • Teac • Thorens •
Ungo Box • Velodyne • VPI • Wharfedale

AUDIO/VIDEO Reference

Call Us ... (213) 517-1700
18214 Dalton Ave., Dept. A6, Gardena, CA 90248

VALUEable

Products, Service and Consultation
designed to give you the maximum
performance for your dollar.

Adcom • B&W • Polk • NAD • Celestion
Carver • PS Audio • Counterpoint • M&K
Denon • Terk • Proton • Sota • ADS
Optonica • Canon Video • Tera • Stax
Magnum • Ambria • Mod Squad • Thorens
Lexicon • Grado • Signet • Klipsch
Nitty Gritty • Tara Labs • AudioQuest
Paradigm • Talisman • Sumiko
Sharp Vision • Sonance • SME

Systems
Design
Group

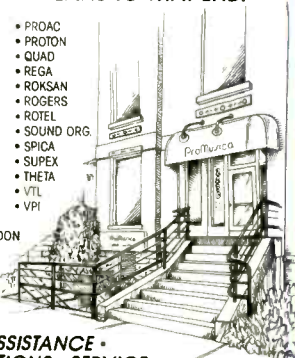
(213) 370-8575
1310 Kingsdale Ave.
Redondo Beach, CA. 90278
Mon-Fri 11am-7pm
Sat 11am-6pm

ProMusica

AUDIO SPECIALTY

WE SELL MUSIC: AUDIO EQUIPMENT
IS SIMPLY A MEANS TO THAT END.

- ACCUSTAT
- ADCOM
- ARAGON
- ARCAM
- ARICI
- AUDIOTECH
- BEYER
- CREEK
- CWD
- DUAL
- ENERGY
- GOLDRING
- GOODMANS
- GRADO
- HARMAN/KARDON
- JANIS
- LINN
- MOD SQUAD
- NAIM
- PARADIGM



EXPERT ASSISTANCE •
INSTALLATIONS • SERVICE

2236 N. CLARK • CHICAGO, IL 60614 • 312-883-9500

Visit our **SPEAKER FACTORY SHOWROOM**
at 3021 Sangamon Ave., Springfield, IL 62702

Authorized Dealer:

- B&K/Sonata
- Thorens
- Sumo
- Soundcraftsmen
- Parasond
- Belles
- Fosgate
- Audio Dynamics
- Audioquest



LEGACY
SIGNATURE II

800-283-4644
call for literature

Reel to Real Designs

W. New England's Best!

Acoustat • Adcom • Apogee • Aragon •
AudioQuest • B&W • Celestion •
CWD • Dahlquist • Denon • Dual •
Hafler • Infinity • JVC Video • Krell •
Krell Digital • Lexicon • Magnum • MIT
• Mod Squad • Monster • NAD • NHT •
Onkyo • Ortofon • Proceed • Proton •
Shure • SME • Snell • Sony ES • Sota
• Stax • Sumiko • Tera • Vandersteen
• Velodyne • VPI

Sound & Music

Sales & Service • 351 Pleasant Street
Northampton, MA 01060 • (413) 584-9547

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

O'Coin's

SERVING CENTRAL NEW ENGLAND WITH
VALUED PRODUCTS FOR OVER 30 YEARS

ACOUSTAT, AKG, APATURE, ARISTON, ASC,
AUDIO CONTROL, AUDIOQUEST,
BEYERDYNAMIC, BOULDER, GAMBER, CARVER,
DUAL, ESOTERIC, FORTE, HAFLER, HARMAN/
KARDON, KEF, LEXICON, MISSION, NAD, NITTY
GRITTY, ONKYO, ONKYO GRAND INTEGRA,
ORTOFON, PARAGON, PARASOUND, POLK
AUDIO, REVOX, SONY, TECHNICS ... AND
MANY MORE AT PRICES THAT SOUND RIGHT.

O'COIN'S

239 Mill Street Worcester, MA 01602
508-791-3411 x 315
M-F 10-9pm, Sat 9-6pm
DISCOVER, MASTERCARD, VISA ...
FINANCING AVAILABLE

Dealers ... Just
as you're reading
this ad, so are
thousands of
buyers.

For complete
information on
placing your
ad, call
Carol Berman at
(212) 767-6292.

1(800)274-0644

LARGEST SELECTION & LOWEST PRICES in the Country! Call! Call! the Needle Doctor HAS IT ALL !!



50% OFF cartridges

The needle doctor sells all major lines of needles and cartridges. Great variety! He stocks old styluses, accessories, and turntables, too.

Free Turntable Clinics
M-Th 10-7 Fri-Sat 10-6
419 14th Avenue SE
Minneapolis, MN 55414

**Jerry Raskin's
Needle Doctor**

(612)378-0543 or 1(800) 274-0644

We've moved

HIGHER FIDELITY

704-889-5440

THREE NEW LISTENING ROOMS

605-F Polk Street
Pineville (Charlotte), NC 28134

Authorized Dealer For: AKG • ARAGON • BEYER • B&W • CAMBRIDGE • CELESTION • CHICAGO • COUNTERPOINT • CRAMOLIN • DAHLQUIST • GRADO • KOSS • MAGNUM DYNALAB • MAY AUDIO • MEITNER • MOD SQUAD • MORDAUNT SHORT • NILES • RATA • ROTEL • SENNHEISER • SHURE • SONRISE • SUMIKO • SUMO • SUMO ARIA • SYSTEMDEK • TERK • TWEAK • VAN DEN HUL • VAMPIRE • VPI • WBT • ZETA AND MORE. ASK ABOUT OUR PROFESSIONAL AUDIO DIVISION. **HUGE SELECTION OF AUDIOPHILE RECORDINGS AND COMPACT DISCS.**

DAT—We have legal DAT with full warranty.

AUDIO ENSEMBLE

For the love of music.

Magnum Dynalab
conrad-johnson
Martin-Logan
Krell Digital
Vondersteen
Quicksilver
Audioquest
Aragon
Spica
Krell
Naim
Rego
NAD
CAL
B&K

Audio Ensemble
2 Pauls Way (Rte 101A)
Amherst, NH 03031
603-886-4742

audio experts

WESTCHESTER'S FOREMOST CUSTOM DESIGN AND INSTALLATION SERVICES

Adcom	Grado	Rotel
Audio Access	Lexicon	Signet
Barig & Olufsen	MB Quart	Sonance
B&W	MKO	Sony Projection
Carver	Niles	Soundstream
Danlquist	Ortofon	Sumo
Denon	Philips	Target
Energy	Proton	Triad
		Wharfedale

Call us . . . or come in, and find out why "The experts choose the experts."

(914) 698-4444
875 Mamaroneck Ave.,
Mamaroneck, NY 10543



Music & Video Systems for the Novice & Connoisseur

**Savant
Audio & Video**

Consultancy - Custom Systems - Acoustic Treatment
Installation - Retail

Apogee • Arcici • Audio Prism • AudioQuest
Basis • Benz • Cards • Chesky
Chicago Speaker Stand • Classé • Clearaudio
Cogan Hall • Creek • Delos • Distech • Dorian
Electron Kinetics • Eminent Technology
First Sound • Garth • Garrott • Harmonia Mundi
Klyne • Lantana • Last • Lectron • Magnan
Merrill • Mod Squad • Mogami • Morch
Nestorovic • Neutrik • Opus3 • Pro Ac • Q E D
Rega • Reference Recordings • Sequerra
Sheffield Lab • Sims • Sumiko • Superphon
Tara Labs • Target • Tice Audio
Vendetta Research • V M P S • Wadia
Water Lily • W B T • and More

(609) 799-9664
Princeton Jct., N.J. 08550

ALPHA STEREO

Quality Components. Professional Installation & Service



"We are known for the companies we keep"

Adcom, NAD, Rotel, Onkyo, Denon, Dual, Mission, Celestion, Cooustic, Soundstream, Audioquest, Paradigm, Monster Cable, Ortofon, AKG, Stax, Polk Audio, Alpine, Sharp Vision

Northern NY's oldest & most renowned dealer.

345 Cornelia St., Plattsburgh, NY 12901

518-561-2822

Fax: 518-561-2961

Monday-Friday 10am-8pm. Saturday 10am-6pm
Mastercard, Visa, Discover, Amex

**Any Recording By
Phone or Mail**

Now you can order any CD, Tape, or LP in print from our 200-page catalog. We carry all major labels plus independents like Chandos, Harmonia Mundi, Sheffield, and many more.



Send \$6.00 (refundable on your first order from the catalog) for our 45,000 title catalog with \$50 in merchandise credits. Subscribers get our Annual Catalog

+ 1 year of **FREE** updates covering new releases & specials. Absolutely no obligation or unrequested shipments.

Call ☎ **1-800-233-6357** or send to
Bose Express Music, A5, 50 W. 17th St. NYC, NY 10011

**WE KNOW ELECTRONICS
FROM THE INSIDE OUT**

harman/kardon

Hafler vector research

A D C EPICUR E JBL

maxell. TDK.

APATURE PHOENIX GOLD

MAIL ORDERS WELCOME

1-518-563-6031

15 Clinton Street • Plattsburgh, NY 12901

**CITY SERVICE
ELECTRONICS**

ARCH ELECTRONICS INC.

2006 Chestnut St., Phila, PA 19103

(215) 563-4660

Complete Audio Video Store for
All Levels of HiFi Enthusiasts

Featuring:

AIWA	GRADO
ADVENT	HAFLER
ARISTON	JBL
AUDIO DYNAMICS	MONSTER CABLE
BOGEN	PASO
CAMBRIDGE	SONY HI/VIDEO
CELESTION	TECHNICS
DISCWASHER	. . . AND MORE!!

No charge for shipping

Aragon
Audible Illusions
Audioquest
B&K
CAL
Celestion
conrad-johnson
Creek
Eminent Technology
Grado
Heybrook
Kimber Kable
Koetsu
Krell
Krell Digital
Magnum Dynalab
MIT
Monster
ProAc
Quad
Quicksilver
Rega Planar
Rotel
SME
Sonographe
Spendor
Spica
STAX
Vandersteen
VPI
VTL
Well-Tempered



Rhode Island's State-Of-The-Art Audio Store.



304 Thayer Street
Providence, RI
(401) 521-1140
Open Mon-Fri 11-8; Sat 11-6

The Houston Authority

AUDIO


- B&W • B&K • Sony ES • NAD
- Carver • Allison • Arcici • Velodyne
- Lexicon • Canton • Shure • Stax
- Sound Connections • Van den Hull • M&K
- Dual • Ortofon • Fineline • Pinnacle
- Proton • Bose • Sonrise/Xylophile • Target
- Monster Cable • Sonance • Terk

VIDEO

- Sony • Proton • JVC • Minolta • Pioneer

We are not a mail order discounter

AUDIO



VIDEO

The Groove Audio Video
2624 Westheimer at Kirby
Houston, Texas 77098 713-523-2900

OMNI SOUND

For the sound mind

Analogic Design Group
ASC Tube Traps
Athena
Audible Illusions
Audioquest
Avalon Acoustics
Chicago Speaker Stand
Clearaudio
Duntech
Eminent Technology
Forte Audio
Grado
Jeff Rowland Design Group
Kimber Kable
MIT
Monster Cable
Nitty Gritty
Onkyo
Precise Acoustics
Proton
PS Audio
Sony ES
SOTA
Souther
Spectrum
Spica
Thiel
Threshold

DALLAS, TEXAS . . . 214/964-6664
19020 Preston Road (75248)

PREFERRED SOUND



Authorized dealers for:

- Aragon
- B&W
- conrad-johnson
- Canton
- Dahlquist
- Luxman
- Rotel
- Sharp-Optonica
- Theta Digital

We accept American Express, Visa, and MasterCard.


309 East Water Street
Charlottesville, Virginia 22901
804-296-5696

Vermont's Audio Leader!

DUAL
ARISTON
TARA LABS

PARADIGM • A&R CAMBRIDGE
DENON • SUPERPHON • KLIPSCH
B&K • KEF • ADVENT • ADS • ROTEL
MARANTZ • REGA • AUDIOQUEST
PROTON • AUDIO CONTROL • AKG
SENNHEISER • CREEK • GRADO
TARGET • GOLDRING • AUDIOLAB
BRETTFORD • SPICA • KIMBER
AIWA • PRO-AC • VPI • MAGNUM

"INTELLIGENT AUDIO AT REASONABLE PRICES"
802-863-4372



207 College St • Burlington, VT 05401

LISTEN UP!

We have developed a modification that dramatically improves the sound of all compact disc players at a price that is a true bargain . . . only

\$145.00 U.S.

Money Back Guarantee

For information and review about this procedure, please write to the address below or feel free to call us.

Executive Stereo

896 Queen Street West
Toronto, Ontario M6J 1G6 Canada
(416) 538-4000

Be as selective in where you buy as you are in what you buy.

We know they're hard to resist. Guaranteed lowest prices in the universe. Every day's a sale day. Big, bigger, biggest.

But, buying a serious audio or video component isn't the same as buying a dishwasher or microwave. And that's why AUDIO recommends you visit an independent A/V specialty retailer when shopping for equipment.

A/V product is the heart of his business, not a "profitable or trendy" sideline. That means the independent dealer will always be more concerned in helping you select the proper equipment than he will be helping himself to a commission.

So, be as selective in where you buy as you are in what you buy. Support your independent specialty dealer.

Audio The Equipment Authority

ANNOUNCEMENTS

Aaaannouncinggggg!! Aaaannouncinggggg!!

MOSCODE HYBRID HAFLER

POWER AMPS—Enjoy the Benefits of Moscode Tube Technology with a Moscode Conversion for Haflers. Call Write: CLASSIC AUDIO, 238 Liberty Ave., New Rochelle, NY 10805. (914) 633-3039.

A TRANSDUCER FOR THE PERFECTIONIST AUDIOPHILE ONLY. This state of the art speaker (Pat Pend.); Utilizes no Woofers, Midranges, Tweeters, Ribbons, Electrostatics or conventional Planar Drives. About the only thing ours has in common with other High-End Transducers, is that it recreates a near perfect sound stage. For free information on our product line, write to: A.W.H., P.O. Box 591, Bellport N.Y. 11713.

Attention Michigan Audiophiles! AUDIO ILLUSIONS of East Detroit, Michigan presents these fine products: 3A Loudspeakers, Audible Illusions, Aragon, Audioquest, British Built, Cogan-Hall, Chicago Stands, Creek, Edison-Price, Hafler, Heybrook, Onix, Pioneer Video, Primare, Precise, Ryan, Revolver, Simply Physics, Straightwire, Sumo, Synthesis, Yankee & much more!!! Call (313) 772-8822 for more information.

CLASSIFIED ADVERTISING LINE ADVERTISING

CLASSIFIED LINE ADS ARE PAYABLE IN ADVANCE BY CHECK OR MONEY ORDER ONLY. (Sorry, we cannot accept credit cards or bill for line advertising.) **ALL LINE ORDERS** should be mailed to:

AUDIO MAGAZINE, P.O. Box 9125
Dept. 346-01, Stamford, CT 06925

ORDERS WILL NOT BE PROCESSED WITHOUT ACCOMPANYING PAYMENT FOR FULL AMOUNT. Agency discounts do not apply to line advertising.

CLOSING DATE—First of month two months preceding the cover date. If the first of the month falls on a weekend or holiday, the closing date is the last business day preceding the first. **ADS RECEIVED AFTER THE CLOSING DATE WILL BE HELD FOR THE NEXT ISSUE UNLESS OTHERWISE STATED.**

GENERAL INFORMATION—Ad copy must be typewritten or printed legibly. The publisher in his sole discretion reserves the right to reject any ad copy he deems inappropriate. **ALL ADVERTISERS MUST SUPPLY:** Complete name, Company Name, Full street address (P.O. Box numbers are insufficient) and telephone number. Classified ads do not carry Reader Service Card Numbers. Frequency Discounts not fulfilled will be short rated accordingly.

DISPLAY ADVERTISING

DISPLAY ADVERTISERS should make space reservation on or before the closing date. Ad material (film or velox) may follow by the tenth. **DISPLAY ADVERTISERS MUST SUPPLY CAMERA READY ART.** PRODUCTION CHARGES WILL BE ASSESSED ON ANY AD REQUIRING ADDITIONAL PREPARATION.

ALL DISPLAY CORRESPONDENCE should be sent to:

Carol A. Berman, AUDIO MAGAZINE
1633 Broadway, New York, NY 10019

FOR RATES & ADDITIONAL INFORMATION:
DISPLAY ADS: Carol Berman (212) 767-6292
CLASSIFIED LINE ADS: 800-445-6066

ANNOUNCEMENTS

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. United States Post Office Building, POB 176AAR, Walton, NY 13856 607-865-7200.

—Audio Advertiser for over a Decade—

AUDIO RESOURCE HAS MOVED to its new 4400 sq. ft. store at 3133 EDENBORN AVENUE, METAIRIE, LOUISIANA 70002. We now have five private listening rooms where you can audition one of the LARGEST SELECTIONS of HIGH END AUDIO EQUIPMENT in the country. **AUDIO RESOURCE** continues to offer precision-matched tubes, plus sales, service, and restoration of vintage components. Call or write for information on our products and services **AUDIO RESOURCE**, 3133 EDENBORN AVE, METAIRIE, LA 70002. (504) 885-6988.

... CIZEK'S BACK ...

LOOKING FOR REPRESENTATION. Shipping brand new designer series speaker systems. Features new innovations including patented crossover network. Repair, modify & upgrade classic Cizek speaker systems. HTA INC., 1611 Crenshaw, Torrance, CA 90501, Suite 142, Dept. AM589 Phone (213) 539-2469 Voice Box 300.

High-end and hard-to-find audio components. New and used. Foreign and domestic. Low, low prices! **AUDIO AMERICA** (Virginia). Call 1-703-745-2223.

MOSCODES, FUTTERMANS, AUDIO RESEARCH SP3, 6 & 8'S MODIFIED & SERVICED BY GEORGE KAYE. Moscode Designer—Tremendous improvement. Protect your investment. **CLASSIC AUDIO**, 238 Liberty Avenue, New Rochelle, NY 10805. (914) 633-3039.

HARVEY ELECTRONICS

outlet Center

Save on extraordinary audio/video components at Harvey Electronics' new outlet center Wednesdays - Sundays.

Manufacturer's overruns, ones-of-a-kind, demo models special purchases & B* stock.

600 Secaucus Road
Secaucus, NJ 201 865-7349

Adcom • Bang & Olufsen • Boston
Acoustics • Carver • Denon
Infinity • JSE • KEF • Klipsch
McIntosh • Mitsubishi • Nakamichi
Polk • Proton • Sony • Yamaha

ANNOUNCEMENTS

Old Colony Sound Lab offers a free catalog for the asking. Twenty-four pages of amplifiers, preamps, crossovers, audio accessories, parts, boards, resistors, capacitors, etc. Everything you need for that do-it-yourself project to improve the sound of your audio system. Write Old Colony Sound, PO Box 243A, Peterborough, NH 03458, or call (603) 924-6371.

... from Euphonic Technology

AccuPower™

... an affordable answer to the degrading effects of power line pollution! **AccuPower** can recover losses in transparency, detail, imaging and dynamics caused by RFI, EMI and equipment interactions
... our audio-optimized and patented* **AccuPower** Isolating Line Filter will restore all your audio and video components to their optimum level of performance!

Call or write for details.

EUPHONIC
technology 

19 Danbury Road, Ridgefield, CT 06877
(203) 431-6434 • FAX (203) 431-3660
Model AP-4, \$549
* US Pat. No. 4,259,705

Albany

ALCORS

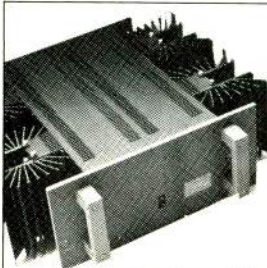
CD & LP

- ◆ *1ST RATE RECORDINGS & PERFORMANCES*
- ◆ *MUSIC OF OUR CENTURY & THE PAST*
- ◆ *SOMETHING DIFFERENT AND WORTH LISTENING TO*
- ◆ *RECORDED MAGIC*

distributed by

UNIVOCAL
CORPORATION

2016 FLINTBURY CT. • SAN JOSE, CA 95148
(408) 270-6033 • FAX (408) 270-6039
IN CANADA INTERLINEAR
105 RIVIERA DR., #3 • MARKHAM, ONTARIO, L3R5J7
(416) 479-1893



BRANDS AND MODELS ON DISPLAY

- QUAD CD PLAYER & REMOTE PREAMP
- MIT BALANCED PROLINE
- KRELL KPA PHONO PREAMP
- DAY-SEQUERRA FM URBAN ANTENNA
- VELODYNE
- WADIA DIGITAL
- DUNTECH SOVEREIGN

1917 S. WEBSTER
GREEN BAY, WI 54301
(414) 437-8727

HI-FI HEAVEN

ANNOUNCEMENTS

AUDIO CLASSICS

Precision Stereo Components Bought-Sold-Traded-Repaired-Modified. **AMPLIFIERS:** Acoustat TNT200 \$750; Carver 1.5 \$400; Conrad-Johnson Premier 1B \$3650; Counterpoint SA220 (\$2795) \$2499; Denon POA6600 \$900; Electrocompaniet Amp II \$500; Hafler SE120 Demo \$299, XL280 Demo \$575, XL600 Demo \$995; Krell KSA200B \$4500; Marantz 15 \$250; McIntosh MC225 \$6-800, MC240 \$1200, MC250, \$450, MC502 \$675, MC752 \$675, MC754 \$750, MC2100 \$500, MC2105 \$599, MC2120 \$600, MC2150 \$900, MC2200 \$800, MC2250 \$1560, MC2300 \$1400, MC2500 \$2700, MC7200 \$2075, MC7270 \$1750, Nakamichi PA5 \$700; Nikko Alpha 230 \$250. **CD PLAYERS:** Denon DCD3300 \$700; Hafler Iris \$549; Mod Squad CDB650 \$600; Philips, Call; Sonograph SD1 \$300. **CROSS-OVERS:** Levinson LNC2 \$1975. **EQUALIZERS:** Audio Control C101 \$399, Richter Scale \$349, Ten Plus \$295; McIntosh MQ101 \$175, MQ104 \$99-285, MQ107 \$400; SAE XVII \$75. **HEAD AMPS:** Conrad-Johnson HV1A \$350; Step-up Transformers, Call. **INTEGRATED AMPLIFIERS:** McIntosh MA230 \$399; MA5100 \$400, MA6100 \$500-600, MA6200 \$1200; Rotel RA820BX \$150. **PREAMPLIFIERS:** Counterpoint SA3000 (\$1895) \$1699; Crown IC150 \$300; Hafler Iris Demo \$679; HK Citation 11 \$150; Krell KSP7B (\$2700) \$2000; Marantz 7C \$1400, 7T \$250; McIntosh C11 \$700, C20 \$600, C22 \$1400, C24 \$300, C26 \$400, C27 \$700, C31V \$1200, C32 \$850, C34V \$1700; Mod Squad Line Drive \$250; SAE XXX \$75; Threshold FET 10/hl (\$3000) \$1750. **PROCESSORS:** Quad & Surround Sound Processors, Call. Audio Control Phase Coupled Activator \$239; dbx 124 \$150; Lexicon CP1 \$1050, CP2 \$799; SCI 100 \$99, Sansui DS77 \$199; Shure HTS5200 \$449; Sony SDP505ES \$350. **RECEIVERS:** McIntosh MAC1700 \$450, MAC1900 \$500, MAC4100 \$1100, MAC4300V \$2200. **SPEAKERS:** Acoustat Spectra 11 \$899, 33 \$1799; B&W Active 1 \$2500, 808 \$4000, DM100 \$180, Matrix 3 \$800; Duntech Marquis \$3300; JSE Infinite Slope Used 2 \$1400; McIntosh ML1C \$500, XL1W \$375, XR1051 \$1000; Velodyne 1200 \$795, ULD12 \$1095, ULD15II \$1669. **TAPE DECKS:** Astrocom 407 \$250; Crown SS824 \$750, Nakamichi BX150 \$225. **TEST EQUIPMENT:** Audio Control SA3050A \$877; McIntosh MPI4 \$1400; Sound Technology 1000A \$1200. **TONE ARMS:** Dennesson ABLT1 \$1000; Eminent Technology \$300; many more. **TUBES:** Many major brands. **TUNERS:** Hafler Iris \$450; Magnum Dynalab FT11 Demo \$399, 205 Demo \$199, Etude Demo \$955; Marantz 10B \$1400; McIntosh MR65B \$200-500, MR71 \$600, MR80 \$1600, MR500 \$900, MR510 \$1000, MR7082 (\$1499) \$1200. **TUNER PREAMPS:** McIntosh MX110 \$250-500, MX112 \$500, MX113 \$550, MX117 \$1200. **TURNTABLES:** Dual CS5000 \$359; Luxman PD555 \$1500; Thorens TD124 \$125, TD125 \$200, TD126 \$400. **FREE Catalogue.** Layaway Program. Major Credit Cards accepted. 8AM-5PM EST Mon.-Fri., **AUDIO CLASSICS**, United States Post Office Building, POB 176AAA Walton, NY. 13856. Call Mike.

607-865-7200

—Audio Advertiser for over a Decade—

TIPS FOR MAIL ORDER PURCHASERS

It is impossible for us to verify all of the claims of advertisers, including product availability and existence of warranties. Therefore, the following information is provided for your protection.

1. Confirm price and merchandise information with the seller, including brand, model, color or finish, accessories and rebates included in the price.

2. Understand the seller's return and refund-policy, including the allowable return period and who pays the postage for returned merchandise.

3. Understand the product's warranty. Is there a manufacturer's warranty, and if so, is it from a U.S. or foreign manufacturer? Does the seller itself offer a warranty? In either case, what is covered by warranty, how long is the warranty period, where will the product be serviced, what do you have to do, and will the product be repaired or replaced? You may want to receive a copy of the written warranty before placing your order.

4. Keep a copy of all transactions, including cancelled checks, receipts and correspondence. For phone orders, make a note of the order including merchandise ordered, price, order date, expected delivery date and salesperson's name.

5. If the merchandise is not shipped within the promised time or if no time was promised, 30 days of receipt of the order, you generally have the right to cancel the order and get a refund.

6. Merchandise substitution without your express prior consent is not allowed.

7. If you have a problem with your order or the merchandise, write a letter to the seller with all the pertinent information and keep a copy.

8. If you are unable to obtain satisfaction from the seller, contact the consumer protection agency in the seller's state or your local U.S. Postal Service.

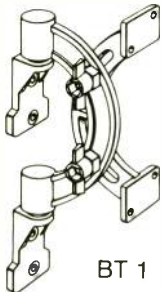
If, after following the above guidelines, you experience a problem with a mail order advertiser that you are unable to resolve, please let us know. Write to Scott Constantine, Advertising Director, at AUDIO Magazine. Be sure to include copies of all correspondence.

TARGET

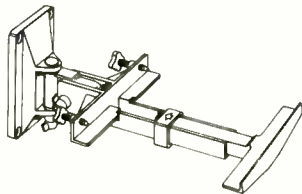


B-TECH

WALL BRACKETS FOR SPEAKERS



BT 1



BT 3



BT 4

For your free copy of our catalogue contact:

MAY AUDIO MARKETING INC.

P.O. Box 1048, Champlain, N.Y. 12919 - Tel.: (518) 298-4434

in Canada: (514) 651-5707

ANNOUNCEMENTS

PHILIPS PREMIUM GRADE D/A CONVERTERS. Upgrade any 16-bit MAGNAVOX CD player with the newer TDA1541A-S1 Crown and SAA7220B selected DAC and Digital Filter chip set. Send \$45 check or m.o./set. or \$35 for DAC only. These are the same chips sold elsewhere for three times this price. DIGITAL UPGRADES, 5931 Reseda, #107, Tarzana, CA 91356. (818) 345-8592.

FOR SALE

AAAAMPSTRAVAGANZA! ADCOM 545, 555 - \$305 up; CROWN PSA2 (\$1700 new) - \$775; CARVER 400, 1.5T, 4.0 - \$250 up; McIntOSH 7005 CD - \$995; NAKAMICHI ST7 - \$329; NAKAMICHI BX 300 - \$395; FOSGATE SURROUND - \$199. WANTED TO BUY: TANDBERG 3014 OR 3014A NONWORKING. MUST MAN BE BORN AGAIN? JOHN 3:1-18. (313) 949-4567.

AAA—AUDIO ELITE IN WISCONSIN!!!

HAFLER, PS AUDIO, B&K, JSE, NAKAMICHI, PROTON, CARVER, ONKYO, ADS, VPI, DCM, SONOGRAPH, FRIED, NITTY GRITTY, SUMIKO, THORENS, SUPERPHON, SNELL, M&K, LUXMAN, BOSE, PHILLIPS, VELODYNE and any others you desire. (414) 725-4431.

CALL US WE CARE!!!

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, Infinity, JBL, Counterpoint, JSE, Spica, M&K, Bose, VPI, Sonograph, Sumiko, Thorens, Velodyne. WHY CALL US NOW? 414-727-0071. WE HAVE THE LOWEST PRICES!!!

AAA—LOW PRICES—HIGH END EQUIPMENT!!!

PS AUDIO, HAFLER, B&K, CARVER, NAKAMICHI, SUPERPHON, LUXMAN, THORENS, M&K, SNELL, INFINITY, ONKYO, PROTON, SONOGRAPH, FRIED, NITTY GRITTY, SUMIKO, BOSE, PHILLIPS, DCM, VELODYNE, ADS, VPI, JSE and any others you desire. AUDIO ELITE, (414) 725-4431, Menasha, Wisconsin.

OUR PRICES CAN'T BE BEAT!!!

AAA! NAKAMICHI, LUXMAN, CARVER, BOSTON ACOUSTICS, DENON, NAD, CELESTION, B&W, AR, AD-COM, PS AUDIO, HAFLER, ADS, COUNTERPOINT, B&K, ONKYO, KEF, PROTON, JBL, SNELL, DCM, INFINITY, HK, VELODYNE, JSE, SPICA, M&K, PHILIPS, VPI, BOSE, SONOGRAPH, (414) 727-0071.

AA/SOUND ADVICE

LOW PRICES/FAST DELIVERY! DENON, NAD, CELESTION, B&W, HARMON 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.

CALL US!!

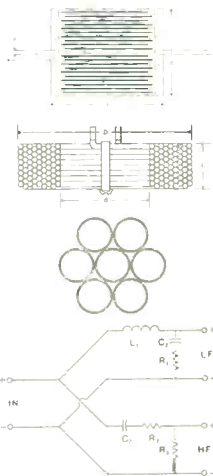
ACCENT ON MUSIC WESTCHESTER NY. LINN, NAIM, REGA, ARCAM, CREEK, EPOS, ROTEL, REVOLVER, NITTY GRITTY, TARGET & SOUND ORG. Interesting LP's & CD's; practical, honest advice; free delivery and installation; & single speaker demo rooms. Hear the difference, 175 Main St., Mount Kisco, NY 10549 (914) 242-0747.

ACOUSTIC ENERGY, AUDIBLE ILLUSIONS, AUDIO-QUEST, ARICI, ASC TUBE TRAPS, B&K SONATA, CELESTION, CLASSE' AUDIO, CARDAS, ENTEC, EPOS, KEF CUSTOM, KIMBER KABLE, LEXICON, MAGNUM DYNALAB, MERLIN, MISSION CYRUS, THE MOD SQUAD, NILES, PHILIPS AUDIO/VIDEO, REGA PLANAR, SONRISE CABINETS, STAX, SONUS FABER, SOUND ANCHOR, TARGET STANDS, TERA LABS, TEMPORAL CONTINUUM, TERA VIDEO, VELODYNE, WBT. 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, DISCOVER, FAX 301-890-3819.

AFFORDABLE HIGH-END, NEW AND DEMO UNITS: B&K, Musical Concepts, Angstrom, Merlin, Kinergetics, Straight Wire, Musical Fidelity, Pro Ac & more. ARIEL, Carmel, IN 46032. Visa/ MC. (317) 846-9766 or (317) 841-7154, 5-10 pm.

SPEAKER COMPONENTS

CROSSOVER COMPONENTS



FAST CAPACITORS

Metallized Polypropylene (Non-Polarized)
Values from 1.0 mfd to 200 mfd.
Voltage Rating: 250 VDC / 150 VAC

SOLENI INDUCTORS

Perfect Lay Hexagonal Winding Air Cored
Values: from 10 mH to 30 mH,
Wire Sizes from #20 AWG to #10 AWG

HEPTA-LITZ INDUCTORS

Seven Strands Litz-Wire Constructions
Values from .10 mH to 30 mH
Wire sizes from #16 AWG to #12 AWG

SOLENI CROSSOVERS

Custom Computer Design
Passive Crossover for Professional, Hi-Fi and Car Hi-Fi, Power up to 1000 Watt.

CROSSOVER, SPEAKER PARTS

Gold Speaker Terminals, Gold Banana Plugs
Gold Binding Posts, Crossover Terminals,
Power Resistors, Mylar Capacitors,
Plastic Grill Fasteners, Nylon Ty-Wraps
Grill Cloth, Car Speaker Grills, Misc. Parts.

SOLENI INC.
4470 Thibault Ave.
St-Hubert, QC J3Y 7T9
Canada
Tel.: (514) 656-2759
Fax: (514) 443-4949

**COMPUTER AIDED DESIGN FOR
ENCLOSURE AND CROSSOVER
AVAILABLE TO CUSTOMER**

Product specifications and prices
available upon request.

THE EVOLUTION 2000

Brings Recorded Music to Life

- 200 Watts/Channel (into 8 ohms)
- Zero Feedback
- Direct Coupled Output
- All-Tube Gain



the conrad-johnson group

2800R Dorr Ave • Fairfax, VA • 22031 • 703 698 8581

Music so real you want to touch it!



"As for the performance of the Sapphire, we would call it highly respectable on all counts and just about state-of-the-art in imaging." Peter Aczel, The Audio Critic, Issue No. 14.

For exceptional sound at affordable prices call 1-800-346-9183 today to receive your free catalog of the finest speakers & kits. Audition in your home at no risk. We look forward to serving you!

AUDIO CONCEPTS, INC.
901 S. 4th St., La Crosse, WI 54601
(608) 784-4570

FOR SALE

ADS, NAKAMICHI, CARVER, BANG OLUFSEN, REVOX, B&W, KEF, HARMON/KARDON, N.A.D., LUXMAN, HAF- LER, TANDBERG, ADCOM, DENON, KLIPSCH, YAMAHA, D.B.X.; INFINITY, J.B.L. AND OTHER QUALITY COM- PONENTS. BEST PRICES—LIVE PROFESSIONAL CONSU- LATION WEEKDAYS—AUTOMATED PRICING AND IN- FORMATION AVAILABLE 24 HOURS. ALL PRODUCTS COVERED BY MANUFACTURER'S U.S.A. WARRANTY. AMERISOUND SALES INC., EAST: (904) 262-4000 WEST: (818) 243-1168.



The mark of a true Denon.

This sticker tells you who is an authorized Denon dealer and who isn't.

Some people who offer Denon products are not authorized dealers. That can lead to problems.

First, *only* authorized dealers offer you the protection of a Denon warranty with your purchase: at other dealers, you may have no warranty at all.

Authorized Denon dealers stock only components designed for the U.S., and have the training to help you select the one right for you.

Authorized dealers know Denon technology inside and out and stock factory parts for your Denon to preserve true Denon sound.

So before you buy your Denon, look for this Denon Authorized Dealer Sticker.

It assures you of the authentic Denon technology and support you expect. And nothing less.

To find your nearest AUTHORIZED Denon Dealer call: 1-201-575-7810 (9:00 am-5:00 pm EST) **DENON**

FOR SALE

ATTENTION AUDIO BUYERS!!!

AUTHORIZED DEALER FOR...ADS, ALPHASONIK, BOSTON ACOUSTICS, CARVER, DENON, DUAL, HAF- LER, INFINITY, KENWOOD, KICKER, MONSTER CABLE, ORTOFON & YAMAHA! THE SOUND APPROACH, 6067, JERICHO TPKE, COMMACK, NY 11725 (516) 499-7680.

AUDIO ARCHIVES IN SAN DIEGO. We sell MERLIN SPEAK- ERS, the new HALES SPEAKERS, (both CARDAS wired), CARDAS cables, CONVERGENT AUDIO preamps, class-A amps, SOUND ANCHOR stands, other High-End items. (619) 455-6326.

FOR SALE

ADCOM • B&K • HAF- LER

High-performance capacitors, Toroidal transformers, Dual-Mono conversions complement our affordable basic *redesigns*. Effortless musicality and you-are-there transparency distinguish these remarkable modifica- tions. Halfer modifications *kits* available!

TEFLON™ PREAMPLIFIER

MC-2TI (TEFLON™) preamplifier board installs into Haf- ler, B&K and Adcom preamps, outperforming the mega- buck competitors! **ACCESSORIES:** SuperConnect III \$60/meter pair, money-back guarantee! SuperConnect III has replaced \$1000 interconnects in some systems!

MUSICAL CONCEPTS

ONE PATTERSON PLAZA • ST. LOUIS, MO 63031 • 314-831-1822. SEND/CALL FOR BROCHURE. DEALER INQUIRIES INVITED

AN INCREDIBLE MOD

IS WHAT YOU'LL SAY WHEN YOU HEAR OUR CLASS "A" F.E.T. CIRCUITRY. EXPECT A MIRACLE TRANSFORMA- TION OR YOUR MONEY-BACK! ADCOM GFA-555, 545, 535-\$269.00 INSTALLED. CLASS "A" DISCRETE F.E.T. ANALOG OUTPUT STAGE FOR MAGNAVOX/PHILIPS CD PLAYERS-\$199.00 INSTALLED. ALSO, OUR COM- PLETE CD-50 WITH CLASS "A" DISCRETE F.E.T. OUT- PUT, SHUNT VOLTAGE REGULATION AND OUR MONEY-BACK GUARANTEE-\$679.00. TRY OUR CD POWER CORD \$89.00.

SUPERMODS

2375 WEST 21ST AVE. EUGENE, OR. 97405
503-344-3696

WAVETRACE TECH.

4215 EAST BAY DR. #1205C CLEARWATER, FL. 34624
813-536-2904

ATTENTION HAF- LER, DYNA, MAGNAVOX OWNERS!

Audio by Van Alstine builds complete new higher performance circuits for you. Not "modifications," but original new engineering designs that eliminate transient distortion, have no on or off thumps, are durable and rugged, and sound closer to live than anything else at a rational price. Our complete do-it-yourself rebuild kits start at \$200, including all new PC cards. Complete wonderfully-musical factory wired amplifiers, preamplifiers, tuners, CD players, and a great \$99 phono cartridge. Write or call for our new illustrated catalog. Audio by Van Alstine, 2202 River Hills Drive, Burnsville, MN 55337. (612) 890-3517.

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. Newsletter.

Peerless CC Loudspeakers From Madisound

Three years ago Peerless of Denmark decided to take a fresh look at what could be improved on existing loudspeaker design. This effort has resulted in CC drive units, featuring:

- CC drive units resist flexing and the transmission of resonance between cabinet and frame.
- The magnetic structure has been designed so that the conductivity of the magnet is actually assisted by the design and composition of the frame.
- A high conductivity shorting ring is used with the magnet structure to redirect stray flux back to the primary field at the gap of voice coil and magnet.
- Most loudspeakers are measured with very low excursion, but when the voice coil is pushed to beyond the plane of the magnet, these measurements no longer apply. Peerless CC drivers have exceptionally long excursion capability, and true power handling is higher than anything with a similar price tag.
- Cones for CC woofers use a special proprietary Polypropylene that is flaked for lower internal damping, and is manufactured at the Peerless factory specifically for this application.
- Tweeters for the CC line have the precision gap tolerances of very expensive drive units. In addition, Peerless CC tweeters offer field replaceable voice coils.
- This year, with the help of Bosch of Germany, Peerless installed a sophisticated automatic assembly process to eliminate hand operations that contribute to production variability.

Please study the following specifications, and then look at the price. You will see why Madisound Speaker Components recommends

Peerless CC drive units for your audio projects at home or on the road.

Model	Imp. Ω	Fs Hz	Qts	Vas Ltrs	Power Watts	Etary db	Xmax mm peak	Box Ltr Sealed Vented	F3 Hz	Price Each
1687:105 DT 26/72 SF (Round KO10DT)	8	980			100	91				\$18.00
1733:146 MR 26/102 PPB/AL (53/4" Midrange)	8	50	.29	10.8	130	87.9	±4	8V	87	30.50
1757:180WR 33/102 PPB (7" Woofer)	4	36	.29	27	120	87	±5.5	20V	44	36.00
1732:180WR 33/102 PPB (7" Woofer)	8	40	.37	24	120	87.3	±5.5	20V	42	36.00
1758:220 WR 33/102 PPX/AL (8 1/2" Woofer)	4	30	.39	60	125	88.7	±5.5	54V	31	40.00
1709: 220 WR 33/102 PPX/AL (8 1/2" Woofer)	8	25	.38	83	125	87.5	±5.5	45V	32	40.00
1759:260 SWR 39/115 PPX/4L AL (10 1/2" Woofer)	4	22	.34	125	150	88	±8.5	71V	28	52.00
1727: 260 SWR 39/115 PPX/4L AL (10 1/2" Woofer)	8	24	.38	105.7	150	87.6	±8.5	35S/87V	40/25	52.00
1760: 315 SWR 39/115 PPX/4L AL (12 1/2" Woofer)	4	24	.48	222	300	89.5	±5.0	60S	43	62.00
1715: 315 SWR 39/115 PPX/4L AL (12 1/2" Woofer)	8	18	.28	372	300	90.5	±5.0	111V	30	62.00

Ordering Information: All speaker orders will be shipped promptly, if possible by UPS. COD requires a 25% prepay- ment, and personal checks must clear before shipment. Adding 10% for shipping charges (inclu- des shipping procedure (Resi- dents of Alaska, Canada, and Hawaii, and those who require Blue Label air service, please add 25%). There is no fee for pack- aging or handling, and we will refund to the exact shipping charge. We accept MasterCard or Visa on mail and phone orders.

Madisound Speaker Components—8608 University Green—Box 4283—Madison WI 53711

Phone: (608) 831-3433
Fax: (608) 831-3771

FOR SALE

AUDIO BEST: LA, ORANGE, SAN BERNADINO, CALIFORNIA. HOT COMPONENTS: CELESTION SL-3000, COUNTERPOINT, TARALAB, PS DIGITLINK, MIT: AUDIBLE ILLUSIONS; MODSQUAD; ACOUSTAT SPECTRA 11+; SPICA ANGELA; KINERGETICS; MAGNUM; FOSGATE; B&K, SUPERPHON, MUSIC REFERENCE, RAUNA, SOUNDLAB, VPI, MAPLENOLL, SYSTEMDEK, GRADO, GARROTT, MONSTER, STRAIGHTWIRE, MUSIC CONCEPTS, (714) 861-5413, APPOINTMENT.

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, N.Y. 11755 (516) 360-1990.

AUDIO NEXUS = QUALITY

Featuring legendary **VANDERSTEEN** loudspeakers & **COUNTERPOINT** electronics.

Apogee • Arston • Audioquest • Bel • B&K • British Fidelity • Counterpoint • Eminent Technology • Forte • Fried • Jamo • JSE • Kimber Kable • Klyne • Magnum Dynalab • Melos • MIT • Monster Cable • Musical Concepts • Nitty Gritty • Premier • PS Audio • Precise • Rotel • Rowland Research • SME • Sonographe • Sony ES • Sota • Stax • Systemdek • Talisman Alchemist • Vandersteen • Vendetta **SUMMIT, NJ. (201) 277-0333.**

AUDIO NOUVEAU

THE NEW WAVE IN VALUE FOR THE DOLLAR EQUIPMENT. FEATURING: SONY ES, YAMAHA, MIRAGE, B&K, COUNTERPOINT, DAHLQUIST, NAD, MONSTER, THORENS, REGA, MICHELL, TARGET, SOUNDSTREAM, BOSTON, AUDIOPHILE AND MORE. 71 SOUTH MAIN ST., CANANDAIGUA, NY 14424 (716) 394-6180 AMEX,VISA,MC.

AUDIOQUEST PRODUCTS! WE CARRY THE ENTIRE LINE OF AUDIOQUEST CABLES, CARTRIDGES, TONEARMS, & ACCESSORIES. CALL FOR PRICES & ORDERING INFORMATION. GOLDEN EAR/HCM AUDIO, 1-800-222-3465, 1-916-345-1341.

Audio test equipment by Bruel & Kjaer, GenRad, Hewlett Packard, Rockland, Sound Technology, Spectral Dynamics, Tektronix, Wavetek, and others. Used, guaranteed, low prices. Call for complete list. (401) 421-7430.

B&K AMPLIFIERS & PREAMPS REPRESENT THE FINEST VALUE IN AMERICAN MADE ELECTRONICS! WE HAVE ON DISPLAY THE ENTIRE LINE OF B&K ELECTRONICS INCLUDING THE SONATA SERIES. FOR MORE INFORMATION OR AUDITIONING CALL GOLDEN EAR/HCM AUDIO 1-800-222-3465. 1-916-345-1341.

THE BEST IN AFFORDABLE HIGH-END! AUDIOQUEST • B&K • BOSE • CELESTION • GRADO SIGNATURE • HARMAN KARDON • JBL • MONSTER • NITTY GRITTY • PREMIER • SONY • SOTA • STAX • STRAIGHTWIRE • SUMIKO • PLUS MANY ACCESSORIES. CALL FOR PRICES & ORDERING INFORMATION. GOLDEN EAR/HCM AUDIO 1-800-222-3465. 1-916-345-1341.

BUY/SELL/TRADE IN THE AUDIO/VIDEO TRADER! Published monthly. FREE ADS! \$15/yr. sample \$1.00-S.A.S.E. 330 SO. MAIN STREET, DEPT. A, WAKE FOREST, NC 27587.

CABLE TV CONVERTERS! ZENITH, TOCOM, JERROLD, OAK, SCIENTIFIC ATLANTA, HAMLIN. VISA-M/C-COD. ORDER YOURS TODAY! (800) 327-8544.

CABLE TV CONVERTERS/DECODERS. WE HAVE ALL MAKES AND MODELS. WILL BEAT ALL PRICES. 1-800-677-3335.

CABLE TV WIRELESS REMOTE CONVERTERS/DESCRAMBLERS. SALE/USE REGULATED BY FEDERAL LAW. T.J. SERVICES. (313) 979-8356.

CASH FOR USED PWR/PREAMPS - ARC, Levinson, Krell, PS Audio, Threshold & Conrad-Johnson. Simply Ship in UPS/COD. Call CA (209) 298-7931 or FAX (209) 297-0359 Sennie.

We're Esoteric because . . .

We prefer to part from the mainstream to bring our customers components that reveal more of the music *naturally!* "Product name value" does not guarantee musical accuracy; therefore, we choose components designed and manufactured by people dedicated to "high fidelity" instead of "high profile". Our premier speakers are the Diapason by Shahinian, the TDL Monitors, the Apogee Diva & the Altec BIAS 550.

ALTEC LANSING • APOGEE • BARCLAY • BEDINI • COUNTERPOINT • LEXICON MARANTZ • PRECISE • ROTEL • JEFF ROWLAND • SHAHINIAN • TDL • WADIA • AND MORE
ESOTERIC SOUND, COVENTRY COMMONS RTE 347, STONY BROOK, N.Y. 11790 516-689-7444

IT'S TIME YOU CLEANED UP YOUR IMAGE

Without Missing Link™, you're audibly missing a newly discovered refinement not available with any electronic manufacturers original power cable. A refinement of sound being reproduced from component to component, clearly audible as increased transparency of wider and deeper soundstage, spatial coherence around instruments and voices, recovery of hidden nuances, increased clarity across the audio band, low frequencies that are cleaner and have more authority, a delicate intimacy of high, seamless tonal balance and holographic musical images. Hearing is believing what Missing-Link can recover and enhance in your audio system.



distributed by

UNIVOCAL CORPORATION

Aural Symphonics

2016 FLINTBURY CT. SAN JOSE, CALIFORNIA 95148
408-270-6033 FAX 408-270-6039
IN CANADA, INTERLINEAR, 416-479-1893

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

Does your system sometimes sound different for no apparent reason?

The reason could be your power. A refrigerator or air conditioner, even in another part of the house, may cause voltage to vary whenever they kick on or off. Or you may be getting line noise—electrical interference that your preamplifier and amplifier amplify and send on to your speakers.

Solution? TrippLite LC-1800. It regulates voltage so it's constant—not too low, not too high. Full voltage—even in brownouts. LEDs show you what TrippLite is doing!

TrippLite's patented ISOBAR circuits provide three "banks" of isolation, two receptacles per bank. You can eliminate interference between critical components. It's like putting your CD player, preamp, and power amp all on separate lines. Sonic benefits may be subtle... but real.

Protection, too

And TrippLite prevents spikes and power from damaging your equipment. This protection is absolutely essential if you leave any of your gear on all of the time.

Take a Power Tripple—No Risk!

Try the TrippLite LC-1800 for 30 days. If not satisfied with the performance (and protection), return it for a full refund of your purchase price. Made in USA by Tripp Manufacturing Co., Est. 1922. Only \$299.00 plus \$9.95 shipping in the US. If you want a clean musical signal, start with clean, consistent power. Order now.

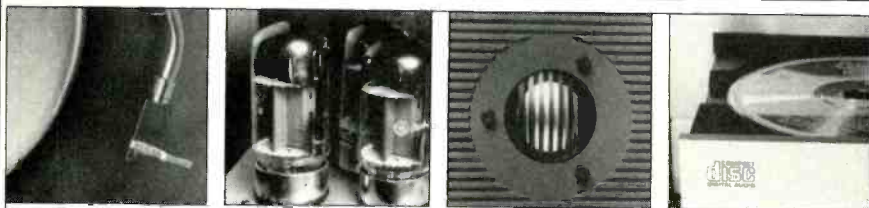


Charge It! Amex / Discover / MC/ Visa

1-800-942-0220

audio advisor, inc.

225 Oakes SW • Grand Rapids, MI 49503
616-451-3868 • FAX 616-451-0709



THERE'S MORE TO HEAR AT LYRIC.

At Lyric, you'll find more great components to choose from. And along with all the brands and models on display, more knowledge and experience. More service, too. Which explains why more people around the world make Lyric their choice for high-quality audio.

Let us help improve your system with state-of-the-art models from more than 50 manufacturers. We supply 220 volt equipment, and most speaker models are available for export.

Accuphase • Ariston • Audio Research • B & W • Bryston • Cal. Labs • Carnegie • Carver • Celestion • Classe conrad-johnson • Dynavector • Entec • Goldmund • Infinity (including IRS) • JVC • JSE Infinite Slope • Koetsu Magnephanar • M & K • Manley • Mark Levinson • Mirage • MIT • Mod Squad • Mondial • Monster Cable • Motif NAD • Nakamichi • Oracle • Pioneer • Proton • Quad • Rega • Revox • Rogers • Shure • SME • Sonance Sonographe • Sony ES • Sota • Spectral • Stax • Vandersteen • Velodyne • VPI • VTL • Well Tempered and other fine brands



1221 Lexington Ave.
New York, NY 10028
212-439-1900
800-848-4981

2005 Broadway
New York, NY 10023
212-769-4600

146 East Post Road
White Plains, NY 10601
914-949-7500

Smarter Audiophiles like yourself are getting inside the best in audio technology with thousands of fellow *Audio Amateur* readers, the first magazine to guide them, step-by-step, through design modifications of preamps, amps, and CD players and the first to discuss wire, gold connectors, and capacitors. Treat yourself, four times a year, to an insider's look at audio's critical issues.

Audio Amateur

PO Box 576 (D.A90) (603) 924-9464
Peterborough, NH 03458 FAX (603) 924-9467
\$20/year \$35/2 years
(US \$ only, Outside US add \$4 per year postage)
(MC/Visa accepted for phone and FAX orders)

FOR SALE

CALL TOLL FREE! 1-800-826-0520 FOR: ACOUSTAT, Audio Control, Lexicon, JBL, Nitty Gritty, M&K, Oracle, Proac, Proton, Stax, Thorens, Dahlquist, Hafler, Monster Cable, Belles, CWD, dbx, Fried, Harman Kardon, Onkyo, Grado, Celestion, DCM, Duntech, Niles, Citation, Kinergetics. Sound Seller, 1706 Main St., Marinette, WI 54143. (715) 735-9002.

EUROPEAN LPs, CDs!

Highest Quality: Classical, Jazz; unavailable in record stores! To receive continuous listing, specials, ordering information: send \$1.00 (postal stamps!) to AUDIO ADVANCEMENTS, POB 100, Lincoln Park, NJ 07035. (201) 633-1151.

FOR SALE

CASH for USED AUDIO EQUIP. BUYING and SELLING by PHONE. CALL for HIGHEST QUOTE. (215) 886-1650. The Stereo Trading Outlet, 320 Old York Road, Jenkintown, PA 19046

ADS., NAKAMICHI, CARVER, BANG OLUFSEN, REVOX, B&W, KEF, HARMON/KARDON, N.A.D., LUXMAN, HAF- LER, TANDBERG, ADCOM, DENON, KLIPSCH, YAMAHA, D.B.X., INFINITY, J.B.L. AND OTHER QUALITY COMPONENTS. BEST PRICES—LIVE PROFESSIONAL CONSULTATION WEEKDAYS—AUTOMATED PRICING AND INFORMATION AVAILABLE 24 HOURS. ALL PRODUCTS COVERED BY MANUFACTURER'S U.S.A. WARRANTY. AMERISOUND SALES INC., EAST: (904) 262-4000 WEST: (818) 243-1168.

DYNACO ST70 UPGRADES. Gold EL34 Sockets. 1215 Microlarad on-board solid state B+, triode output, more. Complete service. DoReTech Audio Services, Box 6054, South Hackensack, NJ 07606-4354. (201) 843-0488.

ELECTRONIC CROSSOVERS, SUBSONIC FILTERS for mono/stereo subwoofers, bi-amp, tri-amp. Free flyer: ACE AUDIO, #532 5th STREET, EAST NORTHPORT, NY 11731-2399.

ENIGMA • ERA • EPOCH cd players by musical concepts

ENIGMA, "Inexpensive, but for Champagne tastes!"
ERA, "Successor to CD-3/TPS-praised by TAS®!"
EPOCH, "Astonishing musicality by ANY standard, a breakthrough! Redefines your expectations!" Musical CD reproduction is affordable!

MUSICAL CONCEPTS

ONE PATTERSON PLAZA • ST. LOUIS, MO 63031 •
314-831-1822 SEND/CALL FOR BROCHURE—
DEALER INQUIRIES INVITED.

FOR SALE McINTOSH, JBL (ALNICO), KRELL, M. LEVINSON AND OTHER HIGH END AUDIO COMPONENTS. LET ME FIND YOUR HARD TO GET ITEMS. JOHN WOLFF, 313-229-5191 24HR MACH. 6-11PM EST BEST.

GAS EQUIPMENT OWNERS: From repairs to complete rebuilds, we are the GAS specialists. Since 1977. Call or write: **GASWORKS** 8675 Northview Street, Boise, Idaho 83704 (208) 323 0861.

JSE INFINITE SLOPE MODEL IV SPEAKERS. MINT. MATCHED WALNUT SPECIAL EDITION. \$2800. CALL JOHN EVENINGS UNTIL 10:30PM EST. (607) 564-9510.

MARANTZ 94 GOLD. PM94 AMP, CD94 CD PLAYER & CDA94 D/A CONVERTER. LIST \$6600, SALE \$3300. NEW WITH WARRANTY. MAY SELL SEPARATELY. (713) 794-0147 OR (713) 870-9928.

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—

MCINTOSH: BUY/SELL

WANTED: MCINTOSH, MARANTZ, AUDIO RESEARCH, DYNACO, LEVINSON, KRELL, ALTEC, JBL, TANOY, CJ, SEQUERRA, WESTERN ELECTRIC, TUBE & SOLID STATE, BUY-SELL-TRADE, MAURY CORB, (713) 728-4343, 12325 Ashcroft, Houston, TX 77035.

MINNESOTA, you'll find Bedini, Kinergetics, Well Tempered, Rega, Precision Audio, van den Hul, Audio Prism, Sumo, Arcici, Royd, Sumiko & more at AUDITION AUDIO, (612) 331-3861. By appointment.

MIT cables, custom terminations, Camacs, XLR balanced, hi-flexibility tonearm sets, Shotgun CVT; MIT hookup for internal rewiring; Athena PolyPhasors; ATMA-SPHERE OTL amplifiers, CLEMENTS speakers, VENDETTA RESEARCH, VAN DEN HUL GRASSHOPPER, ASC Tube Traps; Wonder Caps-solder-wire; Resistas; Edison Price, Odyssey, Tiffany connectors; Simply Physics Tone Cones & Isodrive; many accessories-mod parts, \$1 catalog (\$3 overseas); Michael Percy, Box 526, Inverness, CA 94937; (415) 669-7181.

QED HiFi

MADE IN ENGLAND

"I urge anyone shopping for an amplifier in this price range to audition the A240SA II - it really is something special indeed."

HI-FI HERETIC
Number Eleven (p.50)



THE AUDIBLE DIFFERENCE

For your free copy of our catalogue contact:

MAY AUDIO MARKETING INC.

P.O. Box 1048, Champlain, N.Y. 12919 - Tel.: (518) 298-4434
in Canada: (514) 651-5707

FOR SALE

MINT CONDITION! FOSGATE 3610 SURROUND SOUND PROCESSOR-\$900. FOSGATE 3600-\$200. DR. COVERMAN (512) 345-9411 9-5 CST.

MONSTER CABLE! WE CARRY THE MONSTERS FINEST PRODUCTS. "M" SERIES, POWERLINE, ALPHA GENESIS, MORE! CALL FOR PRICES & ORDERING INFORMATION. GOLDEN EAR/HCM AUDIO, 1-800-222-3465. 1-916-345-1341.

OVER 175 COMPONENTS OF CAREFULLY SELECTED, "EXPERIENCED" EQUIPMENT. ALL SOLD WITH 90 DAY IN-HOUSE PARTS AND LABOR WARRANTY. STOCK INCLUDES: FOUR KLIPSCH K-HORNS-\$1400/PAIR; NAKAMICHI 582-\$400; HAFLEER 220-\$325. DH 101-\$135; H/K CITATION 12-\$175; PHASE LINEAR 700B-\$425; CARVER MXR 130-\$420, TX11-\$300; QUAD FM4-\$325, FM3/303/33-\$400, ESL SPEAKERS (NEW PANELS 1-YEAR WARRANTY)-\$1500; PERREAUX TS2-\$300, TU2-\$425, SM2-\$625, TC2-\$400; ADS 1090-\$700; YAMAHA R9-\$450; THRESHOLD STASIS 3-\$1300; MERIDIAN 207-\$1500. CALL TO SEE IF WE HAVE WHAT YOU NEED. HIGH TECH SERVICES (703) 534-1733.

NITTY GRITTY RECORD CLEANING MACHINES & SUPPLIES. IF YOU STILL BELIEVE IN VINYL THE NITTY GRITTY IS A MUST! CALL FOR PRICES & ORDERING INFORMATION. GOLDEN EAR/HCM AUDIO, 1-800-222-3465. 1-916-345-1341

PAUL HEATH AUDIO

Audible Illusions, B&K, Classe Audio, Cardas, Theta, Iverson Eagle 400, Gryphon, Dynalab, Epos, PS Audio, Philips Audio-video, Melos, MFA, MIT, Mod Squad, Merlin, TDL, Quicksilver, VPI, Well-tempered, Linaeum, Precise, Deltac, Kuzma, Mentmore, Townsend Rock Reference. 217 Alexander, Rochester, NY 14607. (716) 262-4310.

PS AUDIO—SUPERB!

Fast, **FREE** shipping! Knowledgeable, friendly service! Audioquest, Audire, Chesky, CWD, Fried, Grado, Kinergetics, Lexicon, Mirage, Monster Cable, Quad, Sota, Spica, Stax, Straightwire, Thorens, more. **READ BROTHERS-STEREO**, 593 King Street, Charleston, South Carolina 29403. (803) 723-7276.

RANE, SENNHEISER, AKG, A-T, dbx, Fostex, SONY TAPE, LOFTECH, TRIPP-LITE, ELMO TeleCines, LOWEL, Chinon, BOGEN, Hi8 CARPENTER/GHP, BOX 1321, MEADVILLE, PA 16335-0821.

SAVE 40% ON HIGH-END home speakers, subwoofers, amplifiers. FREE CATALOG! CATALOG, 3021 Sangamon Ave., Springfield, IL. 62702. 1-800-283-4644.

60 YEARS IN BUSINESS...WE MUST BE DOING SOMETHING RIGHT! If it's a much-in-demand audiophile product, we're likely to have it for immediate shipment. Consult with one of our quiet experts or just order U.S.—warranted components directly. VISA/MC. Ask for Steve K. or Dan W. **SQUARE DEAL**, 456 Waverly Ave., Patchogue, N.Y. 11772. (516) 475-1857; (800) 332-5369.

"SOUND YOU CAN TOUCH"

FEATURING: AUDIOQUEST • BARCLAY • CARDAS • CLASSE AUDIO • GRADO SIGNATURE • KOETSU • MAGNUM DYNALAB • MUSIC METRE • PROAC • RYAN ACOUSTICS • SANSUI/VINTAGE • SUMIKO • SUPERPHON • TARGET • WAVETRACE • WELL TEMPERED CUSTOM CABLE TERMINATIONS. **AUDIO EXCELLENCE**. LIVERPOOL, NY (315) 451-2707. VISA/MC/AMEX.

USED AND DEMO EQUIPMENT: Audio Research SP-15, SP-9 Mark II and CL30, Counterpart SA-11 and SA-20, Infinity IRS Gama, Celestion SL 700, Theta DS PRO, Kimber Cable silver speaker cable and interconnects. Call **AUDITION AUDIO** for pricing and details at (801) 467-5918. Visa, MC, Amex accepted.

For Purists Only.

"This preamp has no equal. It excels in every important area and does many things no other preamp I have heard can do. This is a breakthrough component in its realistic musicality, eye-opening sound-staging, and intimate dynamic communication."

M. Gndt, Sounds Like... NO. 4, 1989

Listen.



Convergent Audio Technology

28 Falcon Drive • West Henrietta, NY 14586

716-359-2700

Gifted Listener Audio



Ariston • Audioquest • Celestion • ET • Euphonic Technology • Forte • Mirage • Nitzy Gritty • Onkyo • Phantom Acoustics • Magnum • Sonrise • SOTA • Sumiko • SME • Talisman • Threshold • Fried • Wadia Digital • Livesire • Books Recordings Accessories

5866 Old Centreville Road
Centreville, Virginia 22020

703-818-8000

FOR SALE

STAX HEADPHONES ARE THE FINEST AVAILABLE! WE ARE AN AUTHORIZED U.S. DEALER. CALL FOR PRICES & ORDERING INFORMATION. GOLDEN EAR/HCM AUDIO 1-800-222-3465. 1-916-345-1341.

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

Your Records will sound better and last longer.

Audio Advisor's New "Record Doctor" vacuum cleans records... spotless! Only \$169.95

You don't have to spend \$300 or more to clean your records right—liquid application and vacuum suck-up. New "Record Doctor" exclusively from Audio Advisor cleans records right for only \$169.95.

Get serious

Serious audiophiles ALWAYS vacuum-clean their records—for less surface noise and fewer ticks and pops. Sound is clearer, cleaner... the music more natural. Your amplifier doesn't have to amplify noise!

Longer record life

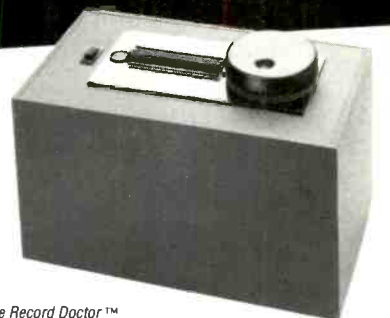
Records LAST LONGER because your stylus no longer pushes particles of dust into soft vinyl grooves. You protect irreplaceable, priceless LPs for years to come. The "Record Doctor" pays for itself!

Sucks up debris

Record Doctor's powerful vacuum sucks up fluid, safely removing dirt, dust, grease and fingerprints. Debris is sucked up, NOT picked up from one part of the record and left on another.

"I can't believe how good my records sound. Record Doctor gets rid of the grunge that was getting between me and the music," says D.P.G., Brooklyn, NY.

"You are right. Record Doctor does the job just as well as an expensive machine," writes D.K. from LA. "And I'd rather rotate the records myself anyway!" (Expensive machines have an extra motor to rotate records. Rotate them yourself and save!)



The Record Doctor™

You get the complete package: vacuum machine, professional applicator brush, and cleaning fluid—all for only \$169.95 (220v version \$189.95) plus \$8.95 shipping & handling in US. Satisfaction guaranteed—no other machine near this price cleans records better.

Charge It! Amex / Discover / MC / Visa

1-800-669-4434

audio advisor, inc.

225 Oakes SW • Grand Rapids, MI 49503
616-451-3868 • FAX 616-451-0709



We buy and sell

LP vinyl records

Over 100,000 titles in stock

139 West 72nd Street
New York, NY 10023

Rare Records Ltd. 212 877-5020

TFS - the cable with Natural Advantages... **99.9999% PURE SILVER**



Hand crafted & individually tested.



LEKTRAFIL SYSTEMS INC

593 PHELPS AVE., VICTORIA, B.C. CANADA V9B 3J2
(604) 474-5667 • DEALER INQUIRIES WELCOME

MASTERCARD • VISA • AMEX • DINERS • DISCOVER

DAT

AUDIO GALLERY

AMERICA'S BEST PLACE TO BUY
DIGITAL AUDIO TAPE RECORDERS

*Don't be deceived by imitators. We are
the original DAT stereo store in the USA!
We're the 1st and we're still the best.*

AUDIO GALLERY

"the friendly store"

213 • 829 3429

2716 Wilshire Blvd, Santa Monica,
CA 90403. FAX: 213 • 829 0304

Hours: Mon-Fri 10am-6pm
Saturday 12pm-5pm

Ask about the DATMAX 600,
an all-in-one solid
state DAT tape
unit!

FOR SALE

STRAIGHTWIRE CABLES! WE STOCK MAESTRO & RHAPSODY. CALL FOR PRICES & ORDERING INFORMATION. GOLDEN EAR/HCM AUDIO, 1-800-222-3465, 1-916-345-1341

SUBWOOFER. BUILD IT YOURSELF. Add clean low base to your system. Easy to follow plans. Send \$5, R.T. AUDIO, Box 3588, Merrifield, VA 22116 "KITS AVAILABLE."

TRANSCENDENCE THREE—Finally musical reality! Announcing the stunning original new hybrid Fet-Valve designs from Audio by Van Alstine. The Fet-Valve Amplifiers, the Fet-Valve Preampifiers, and the Fet-Valve CD Players. A perfect combination of tubes for voltage gain and power fets for current gain, each used ideally! The result is musical reality—the closest approach to live music in your home short of bringing in the musicians. One listen and you will be satisfied with nothing less. Now ultimate musical enjoyment is much less expensive. Write or call for our illustrated catalog. Audio by Van Alstine, 2202 River Hills Drive, Burnsville, MN 55337. (612) 890-3517.

UNIVERSAL REMOTE LABELS CUSTOMIZED PROGRAMMABLE REMOTES. OVER 650 SELF STICK WORDS & SYMBOLS ONLY \$18.50. SEND CHECK TO: REMOTE AUDIO & LABELS P.O. BOX 68 UNIONDALE N.Y. 11553

USED Electron Kinetics Eagle 2A Amplifier \$595; Klipsch, K-Horns (Walnut) \$2000; Linn, Sara (Teak) \$895; LP-12 \$800, DMS with stands \$2400; Meridian 207 CD \$1,100, 201 Preampifier \$600; PS Audio 4.5 Preampifier \$399; Sonograph SD-1 Beta CD Player \$649; Tandberg 3012 Integrated Amplifier, Call Terry at 402-391-3842

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. Call (212) 767-6292 for display ads or (800) 445-6066 for word ads.

LOUDSPEAKERS

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.

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.

ADS., NAKAMICHI, CARVER, BANG OLUFSEN, REVOX, B&W, KEF, HARMON/KARDON, N.A.D., LUXMAN, HAF-LER, TANDBERG, ADCOM, DENON, KLIPSCH, YAMAHA, D.B.X., INFINITY, J.B.L. AND OTHER QUALITY COMPONENTS. BEST PRICES—LIVE PROFESSIONAL CONSULTATION WEEKDAYS—AUTOMATED PRICING AND INFORMATION AVAILABLE 24 HOURS. ALL PRODUCTS COVERED BY MANUFACTURER'S U.S.A. WARRANTY. AMERISOUND SALES INC., EAST: (904) 262-4000 WEST: (818) 243-1168.

BEST SELECTION—50 HOME, SUBWOOFER, CAR & PRO SPEAKERKITS. JBL, AUDAX, MOREL, SEAS, VIFA, ELECTRONIC CROSS-OVER, 64p CATALOG, \$2. GOLD SOUND, BOX 141A, ENGLEWOOD, CO 80151.

Kits, cabinets and assembled speaker systems. 14" x 20" catalog of handcrafted speakers, \$5.00. Advanced Sound, Dept A, 711 E. Magnolia Ave., Knoxville, TN 37917.

AUDIOFILE QUIZ:

Q: How many manufacturers have products currently listed in every major category (sources, preamps, amps, speakers) of Stereophile Magazine's Recommended Components List?

A: Only One.

Q: What manufacturer consistently produces musically accurate components to suit a wide range of applications and budgets?

A: Conrad-Johnson Design, Inc., engineering and producing conrad-johnson electronics, motif solid-state electronics, Sonographe audio systems, and Synthesis dynamic loudspeakers.

the conrad-johnson group

2800R Dorr Ave • Fairfax, VA • 22031 • 703 698 8581

LOUDSPEAKERS

CABINETS AND STANDS. Large selection of high quality Speaker Cabinets and Stands. Available in Oak and Walnut. Sanded smooth, ready to finish and reasonably priced. Call or write: Grenier Cabinets, 5901 Jennings Road, Horseheads, NY 14845. (607) 594-3838.

...CIZEK'S BACK!...

LOOKING FOR REPRESENTATION (213) 539-2469. SEE AD UNDER ANNOUNCEMENTS!

CSL LOUDSPEAKERS: Great sound at reasonable prices! FREE 10-day in home trial. FREE INFORMATION. (703) 953-1840 or write CSL LOUDSPEAKERS, P.O. Box 10155, Blacksburg, VA 24062-0155.

ELECTROSTATIC SPEAKERS OUR SPECIALTY! Factory direct pricing! Full warranty and money back guarantee. Factory sealed. Enjoy the finest at the lowest possible price! David Lucas, Inc., Dept. A, 924 Hulton Rd., Oakmont, Pa., 15139, (412)828-9049.

FRIED SPEAKERS & KITS

State-of-the-art! Amazing performance/price! FREE shipping. Knowledgeable, friendly service! Audire, CWD, Grado, Kinergetics, Lexicon, Monster, PS, Quad, Spica, Stax, Thorens, more. **READ BROTHERS STEREO**, 593 King Street, Charleston, South Carolina 29403. (803) 723-7276.

LEGACY-1 LOUDSPEAKERS BY REEL TO REAL

DESIGNS: Probably the most accurate speaker system you'll ever own. Samarium Cobalt leaf tweeter hands off to a 30mm European dome. Vocals are recreated by the most remarkable cone driver anywhere. A multi-chambered, slot-loaded dual woofer configuration extends bass response to 16 Hz. Biampable through Tiffany gold binding posts and high definition cable. Elegant 43" tower design. Ten year warranty. \$1648/pr shipped prepaid. Ten day home trial. RTRD, 3021 Sangamon Ave., 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. Meniscus, 2442 28th St. S.W., Wyoming, Michigan 49509. (616) 534-9121.

1990 DYNAUDIO SpeakerKits

We believe SUPERIOR SOUND QUALITY promotes itself, and invite you to DISCOVER for yourself. ADVANCED AKUSTIC, 4555 PERSHING, SUITE 33•184, STOCKTON, CALIFORNIA 95207. Catalog \$1.50 • 1-209-477-5045.

OUTDOOR SPEAKERS

Waterproof speakers designed for deck, patio, garden, pool, spa, sauna. Full range sound capability. Guaranteed. Free brochure. Poly-Planar, Inc. 1-800-544-1842.

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.

Speaker Box Builders Program for the IBM PC XT/AT and Commodore 64 computers. Very easy to use, even for beginners. Calculates ported boxes, closed boxes, port sizes & speaker tests. Includes manual and book. ONLY \$25.00 Jordan Century P.O. Box 1347 Odessa Texas 79761.

SPEAKER KITS Call or write for free catalog of the finest kits available. **NORTHWOODS AUDIO**, 4078 Church Rd., Conover, Wisc. 54519. Ph. (715) 479-7532.

audio-technica *THEEK*

YOUR SEARCH IS OVER!



We specialize in hard to find phono cartridges and original replacement styli only!

(800) 221-0906

CALL TOLL-FREE FOR FREE PRICE QUOTES AND V-SAMC ORDERS N.Y. STATE (516) 598-1112

SEND SELF ADDRESSED STAMPED ENVELOPE FOR OUR FREE CATALOG.

LYLE CARTRIDGES
Dept. A, Box 158
Valley Stream, N.Y. 11582

Phones Open Mon-Sat 9 am-8 pm

ortofon SHURE STANTON

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.

PHILIPS



COMPACT DISC PLAYERS

CD40X \$229.88	CD840 In Stock
CD50X \$279.88	CD80X Sale
CD60X \$369.88	CD680X* .. \$199.88

MAGNAVOX



CDB630 \$289.88 Deluxe
CDB510 \$189.88 w/Remote
CDB582* Closeout/Factory Renewed

*Call for special prices of closeouts and factory renewed models.

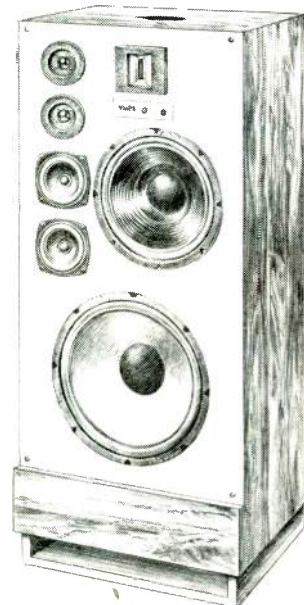
When in Boston, please visit the world's smallest Hi-Fi shop for new:

SONY ES	LUXMAN	PS AUDIO
Q AUDIO	STAX	HAFLER
	PARADIGM	CAMBER
	APATURE	GRADO
	SOTA	CARVER

95 Vassar Street
Cambridge MA 02139

617-547-2727

LOWER LOUDSPEAKER DISTORTION



The VMPS Super Tower/R, 49x21x17", 166 lbs. \$749ea kit, \$998 ea assem in light or dark oak

The **VMPS SUPER TOWER/R** is a six way, very low distortion, high efficiency floorstanding speaker system with a linearity of response, first octave bass extension, and enormous dynamic range to please the most demanding audiophile.

Along with the **VMPS TOWER II** (\$479 ea kit, \$649 ea assem), this system was selected by **AUDIO** magazine critic Anthony Cordesman for his "Personal Honor Roll" of top 20 speakers from around the world (see also **AUDIO's** full review, Jun 89). Luxury options available for the ST/R include **SOUNDCOAT** damping treatment (\$75/cab), the 200W Superdome soft-dome tweeters (\$120/set), crossovers of 100% Wondercaps (\$152), and Powerline II internal wiring (\$50).

Write for reprints of **AUDIO** and **STEREOPHILE** rave reviews of these systems plus the **SUPERTOWER III** (\$3896/pr kit, \$4796/pr assem), our three highly acclaimed **SUBWOOFERS** (Smaller, \$259ea kit, \$329ea assem; Original, \$359ea kit, \$429ea assem; Larger, \$479ea kit, \$599ea assem), the new **TOWER II SPECIAL EDITION** (\$1376/pr kit, \$1776/pr assem), and John Curl's SCP2B phono preamp (\$2495), hailed by numerous international audio publications as the finest available.

VMPS AUDIO PRODUCTS

div. Itone Audio

3412 Eric Ct. El Sobrante Ca 94803
(415) 222-4276

Hear VMPS at: The Listening Studio, Boston; Par Troy Sound, Parsippany NJ; Dynamic Sound, Washington DC; Stereoland, Natrona Hts PA; Hifi Farm, Beckley WV; Arthur Morgan, Lake Mary FL; Audio by Caruso, Miami FL; Stereoworks, Houston TX; Parker Enterprises, Garland TX; Encore Audio, Lees Summit MO; Essential Audio, Winchester VA; American Audio, Greenville SC; Shadow Creek Ltd., Andover MN; Audio Specialists, South Bend IN, Mike Romo, Scottsdale AZ, Lookout Electronics, Longview WA; The Sound Room, Vancouver Can; Audio Haven, Upland CA; Exclusively Entertainment, San Diego CA, Sounds Unique, San Jose CA; Ultimate Sound, San Francisco CA; Private Line Home Entertainment, Stockton CA; Itone Audio, El Sobrante CA.

ABSORB YOURSELF



Sorbothane® has an incredible ability to absorb energy. This allows AudioQuest Sorbothane products to effectively damp and isolate all vibration sensitive equipment — CD/laser players and audio and video electronics.

P.O. Box 3060
San Clemente, CA 92672 USA
Tel: 714-498-2770 Fax: 714-498-5112



COMPACT DISCS

CLASSICAL CD'S AND LP'S. SELECTED FOR MUSICAL QUALITY AND SONIC FIDELITY. FREE CATALOG. ALTERNATIVE AUDIO, 801 WEST EL CAMINO #183, MOUNTAIN VIEW, CA 94040. (800) 873-4434 AND (415) 822-5015.

Classical discs at discount prices. Knowledgeable, courteous personnel. Starting prices: \$5.99. Schwann publications. S&B Classical Compact Discs, 141 Memory Lane, Orange, MA. 01364-9693, (508) 575-0317.

ON-LINE CD NETWORK, Buy/Sell Used Cds, Great Deals, Great Selection, Multi-line System, 8-N-1, Modern Access (415) 824-7603.

TEST YOUR SYSTEM WITH CD'S from Denon, Prosonus, HiFi News, etc. Details: DB SYSTEMS. P.O. BOX 460, RINDGE, NH 03461. (603) 899-5121.

CD PLAYERS

COMPACT DISC PLAYERS

Knowledgeable, friendly service! Finest brands. FREE shipping. READ BROTHERS STEREO, 593 King Street, Charleston, South Carolina 29403. (803) 723-7276.

PHILIPS REFERENCE CD PLAYERS NEW CD-80 W/S1 CROWN CHIP SET, NEW BITSTREAM CD-840, LHH-1000 STEREOPHILE RECOMMENDED COMPONENTS CLASS A [VOL. 12 NO. 6], CD-60, CD-50, NEW CD-40, CDV VIDEO PLAYERS CDV-488, CDV-487, FOR FREE LITERATURE CALL 301-890-3232, JS AUDIO, ONE CHILDRESS COURT BURTONSVILLE, MARYLAND 20866, WE HONOR VISA, MASTERCARD, AMERICAN EXPRESS, DISCOVER.

AUDIOPHILE RECORDS

AUDIOPHILE RECORD WAREHOUSE! Out-Of-Print Direct-To-Disc, Halfspeed, Quix 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.

NEW IMPORT LP'S! English EMI, Decca, Lyrita. Japanese King Superanalog, London, Blue Note, Verve. Pacific Vinyl, 8306 Wilshire #856, Beverly Hills, CA 90211 (213) 280-3584.



Ambiance™ by Henry Kloss

Ambiance is an ultra-compact speaker that proves high performance, small size and low cost need not be mutually exclusive. Factory direct from Cambridge SoundWorks for \$109-\$129 each (plus freight), depending on finish. 1-800-AKA-HIFI. In Canada 1-800-525-4434. 154 California Street, Newton, Massachusetts 02158

CALL US
FOR QUALITY AUDIO
AT THE LOWEST PRICES
WITH FAST SERVICE,
EVEN ON ESOTERIC ITEMS

SOUND ADVICE . . . without the price



(914) 666-0550
P.O. Box 673
Bedford Hills, New York 10507-0673

COMPACT DISCS

FREE CATALOG/NEWSLETTER. CD's, DAT, Cassettes, Reel. Write to DIRECT-TO-TAPE RECORDINGS, 14-R Station Ave., Haddon Heights, NJ 08035.

ONE OF THE TEN BEST BUYS IN AUDIO.



Revelation II Preamp—\$749.95

"With the Superphonic equipment, the sound is smooth and detailed, and seemingly effortless. Music has a sense of clarity and openness that is utterly believable, never sounding strident or harsh... the Superphonic dazzles... with an unrelenting music rightness..." — *Hi Fi Heretic*, Issue #10, "The Best Buys In Audio."



Call or write: Superphonic Products Inc.
1035 Conger #3, Eugene, OR 97402
503-345-4226 FAX 503-345-0704
Dealer Inquiries Invited

SUPER
PHON

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.

Audio

For details call
Carol Berman at
(212) 767-6292

AUDIOPHILE RECORDS

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, Waterlily, North Star, Odin, BIS, Hungaroton, Chandos, CMP, Hyperion, Japanese and British Imports (Ips), Many TAS recommended LP's!

OUT OF PRINTS

Nautilus, Super Disks, Nimbus, UHQ, 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

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

For latest, most descriptive catalog send \$3.00 for U.S. or \$5.00 for Canada/overseas. Includes \$4.00 U.S. or \$6.00 Canadian/overseas DISCOUNT CERTIFICATE on next purchase.

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). [See Nov. & Dec. AUDIO.] Classical/jazz/drama/sound environment albums; in all three formats, from U.S. & Germany. Free catalog: Box 1727A, Ross, CA 94957. (415) 457-9052

WANTED TO BUY

AAAWAYS PAYING TOP \$\$ FOR TUBE OR S.S. MCINTOSH, TUBE MARANTZ AND FISHER, SEQUERRA, M. LEVINSON, KRELL, C.J., ARC, ALL JBL PRE-1975 PARTS AND SYSTEMS, EV PATRICIANS, GEORGIANS, EARLY ALTEC AND??? MFSL, NAUTALUS AND OTHER 1/2 SPD. MASTERS, 24HR ANS. MACH. 1-800-628-0266, 6-11PM EST BEST.

Always Paying Best For: Studer, CAL, CJ, Levinson, McIntosh, Marantz, Audio Research, Quad, Leak, Sequerra. Vintage speakers, units, from Western Electric, Tannoy, JBL, Altec, Jensen, EV. Tel: 818/701-5633 David Yo, P.O. Box 802, Northridge, Ca. 91328-0802.

AUDIO TECHNICA AT770 PORTABLE PHONO SYSTEM IN GOOD WORKING CONDITION. CONTACT MR. BAILEY, P.O. BOX 692, DUNKIRK, MD 20754 (301) 855-4961 BEFORE 9 PM EST EVENINGS OR WEEKENDS.

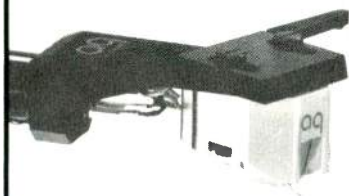
GET OFFERS FIRST, THEN CALL! MARANTZ, MCINTOSH, ALL TUBE COMPONENTS, VINTAGE SPEAKERS, HI-END. OUTBIDDING EVERYONE ON CERTAIN ITEMS. N.Y.S.I. (718) 377-7282 WEEKDAY AFTERNOONS.

HI-FI SUPPLIES—PAYS CASH FOR LEVINSON, ARC, C.J., KRELL, SPECTRAL, ROWLAND & THRESHOLD. (212) 219-3352, 7 DAYS 10AM-6PM (NY).

I WILL PAY RETAIL for all tube **MARANTZ** or used **McINTOSH** tube or solid state. Need not work. (504) 885-6988 days.

IT'S WORTH IT CALLING ME! MCINTOSH, MARANTZ TUBE AMP, MCINTOSH SOLID STATE, WESTERN, JBL HARTSFIELD, EV PATRICIAN, JENSEN, TANNOY, ALTEC, TRUSONIC, SPEAKER & HORN, OLD EQUIPMENT. WILL PAY TOP CASH. HENRY CHANG, 115 S. NICHOLSON AVENUE, MONTEREY PARK, CA 91754. (818) 307-7372. FAX: (818) 288-1471 L.A.

TRADE IN AND TRADE UP



Convert your old AudioQuest cartridge to one of our current state-of-the-art models. Our very liberal trade in policy allows you from 35% to 125% of the value of your cartridge towards a new AQ cartridge. Any AudioQuest MC cartridge ever made qualifies!

P.O. Box 3060
San Clemente, CA 92672 USA
Tel: 714-498-2770 Fax: 714-498-5112

aq
audioquest

tad mini-monitor
and Laug bass
system in one
sleek package.
You deserve Mink!

Lantana

P.O. Box 1958 • Garden Grove, CA 92642
(800) 234 - TADS (8237)

WANTED TO BUY

WANTED: APOGEE DIVAS (with DAX and KRELL amps/pre-amp if possible). Call Jeff G. (215) 628-2000 Day-time M-F (215) 646-2700 Evenings & Weekends.



MY COST, PLUS ONE DOLLAR!

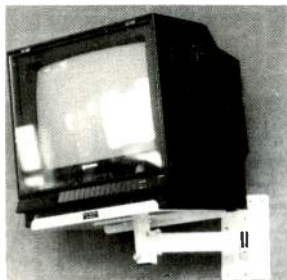
MUST SELL MY EXCESS INVENTORY OF:

ACOUSTAT	CELESTION D.L.
ADCOM	CONRAD-JOHNSON
AR	DAHLQUIST M-900
ARISTON	E.S.B.
B&W	ROTEL
B&W STANDS	SONOGRAPHE

CALL NOW! / TOLL-FREE - 800-438-6040

HAROPA PRODUCTS

Why not wall mount your speakers and T.V. set?



MULTIVISION 2 T.V. BRACKET

Accepts T.V. sets up to 20" deep.

Full double swivel and tilt facility.

Control knob adjustment.

Will even swivel round corners!

Beautifully finished in white.

In Great Britain, HAROPA PRODUCTS are leading manufacturers of T.V. & speaker wall mounting systems.

These products are now available in the U.S. — distributed only by:

MAY AUDIO INC.
P.O. BOX 1048
CHAMPLAIN
NY 12919.

Tel: (518) 298 4434.

or Canada

Tel: (514) 651 5707.



HAROPA SPEAKER WALL BRACKETS

Swivels & tilts speakers to optimum listening position.

Speakers clamped securely, totally non damaging.

Excellent, unobtrusive design.

Holds speakers between 5"—11½" deep.

FINALLY, A SUBWOOFER THAT ISN'T SUBSTANDARD.

Until now, a car audio enthusiast had to settle for a big subwoofer that, despite its size, couldn't keep up with the rest of the system.

No matter how crisp the sound of that system, it invariably was marred by muddy, sluggish thumping from the sub.

Morel's design engineers did something about it. Revolutionized the automobile subwoofer with the introduction of their Push-Pull Technology.

The new and remarkably compact 10" PP10 utilizes two identical drivers with identical double magnets and identical 3" Morel Hexatech voice coils in a single shallow basket for your stereo amp.

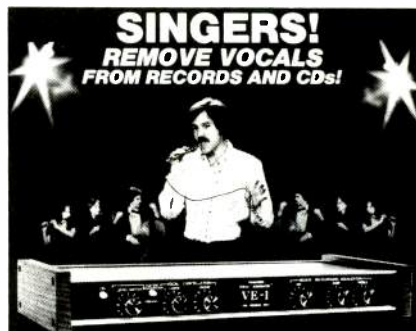
As a result, the PP10 provides adroit high-power handling, exceptional clarity and transparency, drum-tight bass, and speed of sound that integrates beautifully with mid- and high-range frequencies.

Morel's PP10 SubWoofer. The new standard in subwoofer technology.

Call or write us for the PP10's full specs, and for information about Morel's complete line of coaxials and Integra systems, tweeters, midranges, woofers and crossovers for your car.

Morel Acoustics USA
414 Harvard Street, Brookline, MA 02146
tel. (617) 277-6663 FAX (617) 277-2415

Morel (U.K.) Ltd.
11 Foxtail Road, Ransomes Indus. Estate
Ipswich IP3 9RT, England
tel. (0473) 719212 FAX (0473) 716205



SING WITH THE WORLD'S BEST BANDS!

An Unlimited supply of Backgrounds from standard stereo records! Record with your voice or perform live with the backgrounds. Used in Professional Performance yet connects easily to a home component stereo. This unique product is manufactured and sold Exclusively by LT Sound - Not sold through dealers. Call or write for a Free Brochure and Demo Record.

LT Sound, Dept. AU-3, 7980 LT Parkway
Lithonia, GA 30058 (404) 482-4724
Manufactured and Sold Exclusively by **LT Sound**
24 HOUR PHONE DEMO LINE: (404) 482-2485

WANTED TO BUY

TOP PAYING FOR MCINTOSH, MARANTZ TUBE AMP
McIntosh Solid State, Western, JBL, Altec, Tannoy, EV, Jensen, Speakers & Horn, EMT Turntable, Ortofon Arm, Temma—(516) 935-2605, (516) 496-2973.

WANTED NAKAMICHI TX1000 TURNTABLE, GOOD WORKING CONDITION. Call Dave (if not in please leave a message) at: (808) 544-3240.

WANTED: WESTERN ELECTRIC, JBL, MARANTZ OLD EQUIPMENT. SUNLIGHT ENGINEERING COMPANY: 213-320-7020, 22130 SOUTH VERMONT AVENUE, #A, TORRANCE, CA 90502.

INVENTIONS WANTED

A NEW IDEA? Call NATIONAL IDEA CENTER of Washington D.C. FREE INFORMATION--(800) 247-6600 EXT.155. Come see THE INVENTION STORE!!

INVENTIONS/NEW PRODUCTS/IDEAS WANTED: Call TLCl for free information 1-800-468-7200, 24 hours/day—USA/CANADA.

RETAIL MART

HIGH-END AUDIO IN SALT LAKE CITY: Audition Audio features speaker systems by Magneplanar, Vandersteen, Martin Logan, Celestion, Spica, Infinity IRS, Electronics by Audio Research (new Classic 30 & 60 in stock), Mark Levinson, Aragon, Counterpoint, NAD, Adcom, Luxman. Front ends by Versa Dynamics, VPI, Well-Tempered, SME AR, Accuphase CD players. Also Sumiko, MIT, Audioquest, etc. Three hard-wired sound rooms including a new room built for the Infinity IRS. **2144 Highland Dr., Suite 125, SLC, UT 84109. (801) 467-5918.** Visa, MC, Amex accepted.

WE HAVE THE FINEST SHOWROOM in our area with the best selection of audio/video components available. We represent Adcom, Infinity, Thorens, NAD, Polk, Yamaha, Canton, Luxman, Klipsch, SONY ES, and more. **CONTINENTAL SOUND, 98-77 Queens Blvd., Forest Hills, NY 11375. (718) 459-7507.**

DECALS/EMBLEMS

CUSTOM EMBROIDERED EMBLEMS, PINS, DECALS. Free catalog/quotes. Rush sketch. STADRI, 61AU JANE STREET, NEW YORK, NY 10014. (212) 929-2293.

CAR STEREO

"STEREO WORLD" is your discount sound source with super deals on the following car and home stereo lines: Technics, Panasonic, JVC, Sony, Pyle, Pioneer, Sherwood, Hi-Fonics, Blaupunkt, Kenwood, Harmon Kardon, and many others. Also full line of installation kits. Please call or write for free catalog. Free UPS in 48 states. 10AM-6PM Mon-Fri. Visa/MC; COD accepted. "Our 4th year." P.O. Box 596, Monroe, NY 10950 (914) 782-6044.



ATTENTION RECORD COLLECTORS



What do the Library of Congress, the Smithsonian Institute, hundreds of radio stations, record stores and libraries have in common?

They all use VPI Record Cleaners to clean their valued records.

"VPI—THE PROS CHOICE!"

VPI Industries Inc., 77 Cliffwood Avenue, #3B, Aberdeen, NJ 07721
Tel: 201-946-8606 Fax: 201-946-8578

CAR STEREO

FREE CATALOG! CAR STEREO, RADAR DETECTORS, ALARMS AND ACCESSORIES. PIONEER, KENWOOD, SONY, ALPINE, PYLE & OTHERS. CALL CARTUNES (513) 424-0400.

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.

BLANK TAPE

4.95 SHIPPING ANY SIZE ORDER. UPS 1-800-245-6000

TDK	DENON	OCTAVE	FUJI/SONY	MAXELL
SAF-100 2.50	HD-100 2.99	RE-115 99	FUJI-PRO 90 1.99	MAXELL MET-100 2.49
MA-90 2.49	HD-90 2.39	RE-110 99	FUJI-PRIV-90 1.99	MAXELL 230 2.99
MA-90 2.28	HD-100 2.99	RE-115 1.09	FUJI-DH-90 99	XL-100 2.79
SA-100 2.28	HD-100 2.99	RE-110 1.19	SONY METAL-90 3.99	XL-100 2.39
SA-90 2.28	HD-100 2.99	RE-110 1.29	SONY METAL-SP-100 2.49	XL-100 1.99
SA-90 1.99	DX-90 1.29	RE-110 1.55	SONY UX-PRO 90 2.49	LD-35-90 6.99
SA-80 1.79				
MA-110 3.49				
AL-100 1.59				
AR-90 1.99				
D-90 99				
C-90 99				
MAX G PRO-90 13.99				
SKC GX-90 79				

DAI-20-10-48 SONY METAL MASTER-48 MAXELL URIC-90

FREE XEII-100 WITH EVERY AUDIO ORDER
We will Beat Any Price of the Total Order including All Shipping & Handling Charges by 1% 4.95 Shipping Any Size Order C.O.D. Add \$3.20
All Tapes have U.S. Warranties Parcel Post B/N Call
TAPE WORLD 220 SPRING ST. BUTLER PA 16001
DEALER PROGRAMS ON DENON, THATS AND OCTAVE

VISA MC NO EXTRA CHARGE

ALL VIDEO: T100 2.19, HC 4.19, HIFI 5.18, PRO 8.99, S-VIDEO 8.41, SMI-100 5.79

1800' OR 2400' AMPEX REELS USED ONCE-SAMPLE: \$3.00. NEW MAXELL REELS/CASSETTES. SPECIAL: TDK SA90: \$1.79, AR100: \$1.55. FREE FLYER. AUDIO TAPES. BOX 9584-A, ALEXANDRIA, VA. 22304. (703) 370-5555. VISA/MC.

HELP WANTED

DIRECTOR OF MARKETING

PEAVEY ELECTRONICS CORPORATION, a leader in the manufacture of sound equipment, has an exceptional opportunity for a Marketing executive with the vision, experience, and leadership to be a part of the senior management team.

The successful candidate will be responsible for the development and implementation of a national marketing strategy for our products, as well as managing the advertising department and its activities.

This individual must be capable of determining market profitability segments, and focusing the activities of marketing efforts in the direction best suited for bottom line profitability. You must have a proven track record of success in leading market development as well as advertising campaigns and sales management.

We offer compensation and a benefits package which reflect the magnitude of this challenging position, as well as a location in the Deep South with small town appeal near beaches, symphony, year 'round outdoor activities and more.

Send resume with salary history/requirements in confidence to the Human Resources Administrator,

PEAVEY ELECTRONICS CORPORATION
P.O. Box 2898
Meridian, MS 39302-2898
Equal Opportunity Employer

Say "G'day" to Greencorp's family of Australian tapes.

THE GOOD STUFF - our great XDS tape that the big recording companies (Philips, EMI, & overseas divisions of RCA) buy from Greencorp for their music cassettes.

THE BETTER STUFF - Music-PLUS, the best-sounding tape you ever heard, short of genuine chrome. Its custom formulation produces a higher frequency response and lower noise level than the heavily advertised brands.

THE BEST STUFF - genuine chrome tape coated with Dupont's chromium dioxide powder. CD-grade, delivering much quieter output than so-called "chrome-bias" ferric oxide products.

Greencorp tape is the right stuff at the right price... order your blanks today!

	QUANTITY	25	100	500
XDS Music Grade	C12	.39	.28	.26
The	C32	.46	.35	.32
Good	C47	.51	.39	.35
Stuff!	C62	.58	.45	.42
	C92	.68	.55	.52
Music-PLUS	C12	.44	.32	.30
The	C32	.54	.42	.39
Better	C47	.58	.45	.41
Stuff!	C62	.66	.52	.47
	C92	.77	.64	.57
Genuine Chrome	C12	.53	.41	.39
The	C32	.63	.51	.48
Best	C47	.68	.55	.51
Stuff!	C62	.75	.61	.57
	C92	.98	.85	.80
	C100	1.04	.88	.82

Norelco-type clear plastic boxes, sturdy commercial grade .18 .16 .15
Self-adhesive, white cassette labels and blank inserts \$3.00 per 100

VHS Video Cassettes: prices each in quantity

QUANTITY	20	60	120
Premium T-015	1.70	1.55	1.45
Grade by T-030	1.80	1.65	1.55
length T-060	2.10	2.00	1.90
T-120	2.80	2.70	2.60

TELEPHONE ORDERS:
TOLL FREE: 1(800) 972-0707
Local: (305) 429-9225
FAX ORDERS: (305) 429-9214

* F.O.B. Deerfield Beach, FL. Taxes (if any) plus shipping extra. CALL FOR SHIPPING CHARGES & LARGER QUANTITY PRICES.
* Minimum quantities are 25 per size (audio), and may be mixed to get larger quantity discounts.
* Orders of 6,000+ shipped road freight at cost.
* We accept company or personal checks, or charges to VISA, MASTERCARD, and AMERICAN EXPRESS. (possible surcharge)
* Prices subject to change without notice.
SATISFACTION GUARANTEED! If not satisfied for any reason, return the cassettes within 30 days for a full refund of the unused portion.

GREENCORP USA inc.



The Right Stuff from Down Under

Suite 105, 1015 W. Newport Center Drive, Deerfield Beach, Florida 33442

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


"The Quick Connection"
B.J. AUDIO
 991 Beechmeadow
 Cincinnati, OH 45238
 (513) 451-0112

HOME
 NAKAMICHI · H/K · ONKYO · CHICAGO SPEAKER STAND
 · CARVER · AIWA · DESIGN ACOUSTICS · DENON · POLK
 · CELESTION · ADCOM · YAMAHA · NAD · PARADIGM

CAR

· ALPINE	· ADS
· BOSTON ACOUSTICS	· COUSTIC
· AUDIO CONTROL	· BAZOOKA
· POLK AUDIO	· INFINITY
· ROCKFORD FOSGATE	· PRECISION POWER
· KENWOOD	· MB QUART
· CARVER	· DENON
· SOUNDSTREAM	· SONY
· NAKAMICHI	· YAMAHA
· PYRAMID	· PYLE

M/C, Visa or COD



Your search for refinement will end here.

Brown Electronic Labs
 2530 Berryessa Rd., Suite 126, San Jose, CA 95132

AD INDEX

SERVICES

Audio Repairs and Restorations by Cliff 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. United States Post Office Building, POB 176SAR, Walton, NY 13856 607-865-7200.

—Audio Advertiser for over a Decade—

BUSINESS OPPORTUNITIES

NEED MONEY — JOIN US. How to make thousands every month. Write for free information. JW Publishing, 4700 Cranberry NW, Canton, OH 44709.

DAT

Custom DAT tapes. "Three Centuries of French Organ Music" & "Fenstermaker Plays Bach". Both from live concerts at Grace Cathedral, from digital masters. \$30.00 each. T-V Recording, Box 70021, Sunnyvale, CA 94086.

MISCELLANEOUS

TERMPAPER assistance. 15,278 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).

MAIL ORDER

A BARGAIN: STAX SIGN/LAMBDA \$1,395. PRO/LAMBDA (#3) \$799, PRO/LAMBDA (#1) \$499, SIGN/SRM1MK2 \$998, SIGN/SRD7 \$675, 220V AVAILABLE; GRACE 747, F9E (Super) #109, F9ERUBY \$175, DENON 103D \$149; FR1MK3F \$235; ZEISS BINOCULARS; ALL UNUSED. (212) 966-1355.

ADS., NAKAMICHI, CARVER, BANG OLUFSEN, REVOX, B&W, KEF, HARMON/KARDON, N.A.D., LUXMAN, HAF-LER, TANDBERG, ADCOM, DENON, KLIPSCH, YAMAHA, D.B.X., INFINITY, J.B.L. AND OTHER QUALITY COMPONENTS. BEST PRICES—LIVE PROFESSIONAL CONSULTATION WEEKDAYS—AUTOMATED PRICING AND INFORMATION AVAILABLE 24 HOURS. ALL PRODUCTS COVERED BY MANUFACTURER'S U.S.A. WARRANTY. AMERISOUND SALES INC., EAST: (904) 262-4000 WEST: (818) 243-1168.


THE BEST RECORD RACK IN AMERICA. Stackable, portable, oak units hold LPs, 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. New and used. Foreign and domestic. Low, low prices! **AUDIO AMERICA** (Virginia). Call 1-703-745-2223.

Firm (Reader Service No.)	Page
Acoustic Research (1)	Cover II
Adcom (2, 3)	21-24, Cover IV
AKG Acoustics	6
Allsop (4)	115
Altec Lansing (5)	12 & 13
Apogee Acoustics (6)	45
Audio Advisor (7)	133
Audio Influx (8)	10
Audio Research (9)	95
Audiostream (10)	47
B & K (11)	134
BBE Sound, Inc. (12)	125
Bose (19)	29
Brystonvermont (13)	9
California Audio Labs	18 & 19
Cambridge Soundworks (14)	32 & 33
Chivas Regal	93
Columbia House	16 a & b
Counterpoint (15)	Cover III
Dahlquist (16)	16
Esoteric Audio (17)	27
Finyl (18)	118
Fosgate (20)	132
GRP (21)	129
Hafler (22)	102
Hafler	41 & 42
Harman Kardon (23)	15
Hifonics (24)	121
Infinity Systems Inc.	39
J & R Music World (25)	17
JBL (52)	83
KEF (26)	5
Kinergetics Research	35
Krell Digital	101
Krell Industries	73
Levinson	97
Luxman (28)	85
M & K Sound (29)	113
Madrigal	116
Martin-Logan	87
McIntosh (31)	105
Mission Electronics (32)	31
Mobile Fidelity (33)	117
Monitor Audio (34)	75
MTX (35)	109
Music Interface Technology (36)	40
Naim Audio	99
Onkyo	7
Ortofon (37)	6
Parasound (38)	114
Pioneer (40, 41)	81, 111
Pioneer (39)	1
Polk (42)	68 & 69
Proceed	3
Reel to Real (43)	107
Sonance (44)	77
Sony	48 & 49
Soundcraftsmen (30)	36 & 37
Soundwave Fidelity (45)	119
SSI Products Inc. (46)	20
Stereo Exchange (47)	135
That's America (48)	11
The Absolute Sound (49)	124
Velodyne (50)	103
Wadia Digital (51)	91
Wisconsin Discount Stereo	127
Yamaha	89

Touch Tone Participant

DIMENSIONAL PURITY

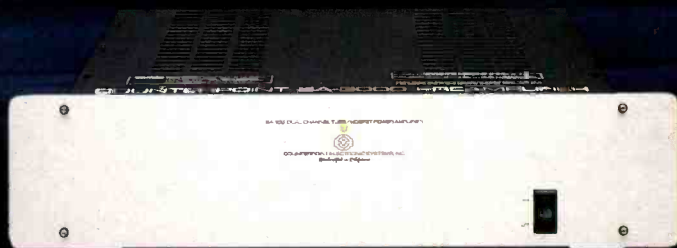


VANDERSTEEN AUDIO

Vandersteen Audio was founded in 1977 with the commitment to offer always the finest in music reproduction for the dollar. Toward this goal there will always be a high degree of pride, love, and personal satisfaction involved in each piece before it leaves our facilities. Your Vandersteen dealer shares in this commitment, and has been carefully selected for his ability to deal with the complex task of assembling a musically satisfying system. Although sometimes hard to find, he is well worth seeking out.

Write or call for a brochure and the name of your nearest dealer.

VANDERSTEEN AUDIO
 116 WEST FOURTH STREET
 HANFORD, CALIFORNIA 93230 USA
 (209) 582-0324



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 its power range, you cannot buy better sound.** We warmly invite you to audition the Counterpoint SA-100

Power Amplifier, and its 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

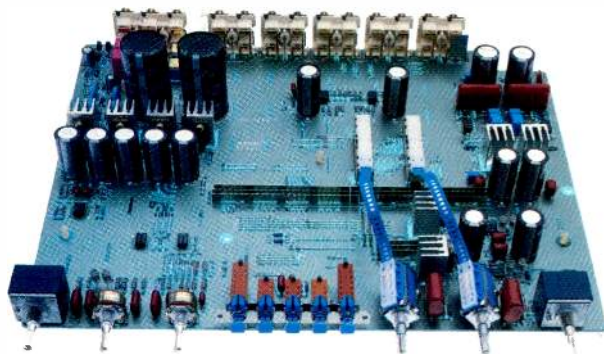
Adcom's GFP-565 Preamp: Pure and Simple.



In Search of Sonic Perfection, Adcom Took the Path of Least Resistance

The fewer circuits a musical signal encounters on its way to your loudspeaker system, the greater its musical purity will be. Now, through obsessive attention to detail and design ingenuity, Adcom has created the GFP-565 — the world's first affordable preamplifier with direct, linear gain path circuitry. By combining the GFP-565 with any of Adcom's power amplifiers, you can experience the exceptionally lifelike sound which has astonished even the most demanding critics.

From Input to Output,
the Signal Path is
as Direct, Pure and
Simple as Possible



By gold plating all input and output jacks, and then directly mounting all jacks, switches, potentiometers and other laboratory grade components on a double copper-plated, glass epoxy printed circuit board, signal losses and noise are dramatically reduced.

Three Sets of Outputs for the Perfect Balance of Performance and Flexibility

You can use one or more sets of outputs: 1) BYPASS - direct-coupled before tone controls, filters, etc. for the most direct path to your power amplifier while retaining control of volume and balance. 2) LAB - direct-coupled with no output-coupling capacitors yet with tone, filter and loudness controls. 3) NORMAL - same as LAB but with highest quality output capacitors for use with amplifiers needing the extra protection of ultra-low-frequency roll-off.

Bi-amped and tri-amped systems are easily accommodated by this flexible arrangement.

Pure Convenience

The minimalist aesthetics of the GFP-565 are deceptive in their simplicity. Without being overly complicated to use, this preamplifier is able to integrate and control all of the components in the most sophisticated of music systems. There are five high-level inputs as well as a phono input. A separate front-panel switch allows the use of an external processor, only when needed, leaving both tape circuits free. And, of course, you may listen to one input while recording from another.

More Sound, Less Money

Adcom stereo components have a reputation for sounding superior to others costing two and three times more. Keeping faith with this tradition, Adcom took the path of least resistance. Why not do the same? Ask your authorized Adcom dealer for a demonstration of this remarkable stereo preamplifier. Please write or call for a fully detailed brochure. You'll discover the best value in high performance preamplifiers. Pure and simple.

ADCOM[®]
details you can hear

©1990 ADCOM